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Revision of the Neotropical Genus *Callaeum* (Malpighiaceae)

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ABSTRACT. The monotypic genus *Callaeum* (Malpighiaceae) was proposed by J. K. Small in 1910 to accommodate an aberrant mascagnioid plant, *Jubelina nicaraguensis* Griseb. On the basis of flower, fruit, and leaf characters this genus is again recognized as distinct from *Mascagnia*, in which it was submerged by Niedenzu, and is augmented by the addition of most of the remaining members of Niedenzu's *Mascagnia* subg. *Plagiogynixa*, to which Niedenzu assigned *C. nicaraguense*. This makes necessary the new combinations **Callaeum antifebrile**, **C. macropterum**, **C. malpighioides**, **C. psilophyllum**, and **C. septentrionale**. In addition, **C. chiapense** is added by transfer from *Stigmaphyllon*, and three new species, **Callaeum clavipetalum**, **C. coactum**, and **C. reticulatum**, are described. Keys, descriptions, and citations of representative specimens are provided for the ten recognized species, and the segregation of this genus from *Mascagnia* is discussed.

In the last revision of *Mascagnia*, Niedenzu (1928) divided it into the subgenera *Mesogynixa* (=subgenus *Mascagnia*) and *Plagiogynixa*, the latter set apart on the basis of its transversely dilated stigmas, few-flowered inflorescences, spherical buds, and three reduced posterior anthers. Earlier, Small (1910) had placed one of the members of *Mascagnia* subg. *Plagiogynixa*, *M. nicaraguensis* (Griseb.) Niedenzu, in the monotypic genus *Callaeum*, based upon *Jubelina nicaraguensis* Griseb., a Central American plant with accessory fruit-wing appendages much like those found in *Jubelina*. Small did not explain his reasons for placing *J. nicaraguensis* in a separate genus, but did provide a key in which *Callaeum* was distinguished from other North American Malpighiaceae.

Mascagnia, as circumscribed by Niedenzu, is a diverse collection of vines and shrubs with three-winged (rarely two-winged) mericarps. Palynological data, coupled with macromorphological information, indicate that the genus is a paraphyletic grouping, occupying the middle portion of a phylogenetic tree whose ultimate branches may include such genera as *Hiraea*, *Triopterys*, and even *Malpighia* (Lowrie 1982). *Mascagnia* subg. *Plagiogynixa* forms the nucleus of a natural group of species consistently different from other species of *Mascagnia*, and not necessarily most closely related to *Mascagnia*. The species of this subgenus, with one exception (see Excluded Taxon), are here segregated into Small's genus *Callaeum*, which is further augmented by the description of three new species.

CALLAEUM Small, N. Amer. Flora 25(2):128. 1910.—TYPE: *Callaeum nicaraguense* (Griseb.) Small.

Mascagnia subgenus *Plagiogynixa* Niedenzu, Arbeiten Bot. Inst. Königl. Lyceums Hosianum Braunsberg 3:27. 1908.—LECTOTYPE (here designated): *Mascagnia macroptera* (DC.) Niedenzu.

Cabi Ducke, Arq. Serv. Florest. 2:13–14. 1943.—TYPE: *Cabi paraensis* Ducke.

Woody vines, or shrubs with scandent or trailing branches. Leaves opposite, petiolate; leaf blades chartaceous, occasionally subcoriaceous, with secondary veins weakly to strongly arcuate, occasionally brochidodromous, connected by conspicuous scalariform tertiary veins in larger-leaved species, densely pubescent to glabrate, with marginal glands on either side in the proximal half, a pair of glands often terminating laminar flanges along the apical ⅓ of the petiole, with the petiole then appearing glanduliferous; stipules either minute and epipetiolar or absent. Inflorescences axillary or terminal, simple or compound, the floriferous peduncles attached in umbels or short racemes. Pedicels circinate in bud in some species, straight in others; buds globose, with petals exposed. Sepals pubescent abaxially, the lateral 4 biglandular, with round or ovate glands; anterior sepal eglandular. Petals lemon-yellow, abaxially sericeous or glabrous, clawed, the limb denticulate-margined, cuneate or rounded at base, occasionally with marginal glands; posterior petal with a thicker and proportionally

longer claw and usually smaller. Stamens 10, glabrous, dimorphic (fig. 1a), the 3 most posterior with smaller anthers and greater fusion (up to ⅞ of length) of filaments; filaments otherwise ⅓–⅔ connate; anthers ovoid, with smooth or faceted, flat or inflated connectives. Ovary pubescent, trilocular, obscurely three-ridged; styles 3, free, glabrous or pubescent, slightly S-curved, widening toward apex, the tips broadly conical or rounded; stigmas internal, transversely expanded (fig. 1a). Sepals and styles usually persistent in fruit, the fruit itself a 3-parted schizocarp, with the mericarps attached to a pyramidal torus and each bearing 2 flabellate, papery, parallel-veined lateral wings and a sail-like papery dorsal wing, occasionally with ruffles or smaller winglets interposed between these (in *C. antifebrile*, however, all wings are vestigial); at least some of the wings of mature fruits with corky tissue at base, forming a nut-like covering around the seed (fig. 2g); ventral areole linear to ovate, 4–16 mm high. Seed ovoid or globose, with a thin reddish brown testa; cotyledons once-folded, equal or unequal, flat to semi-terete.

A genus of ten species, distributed primarily at low and middle elevations from Baja California, Arizona (?), and northeastern Mexico to southwestern Nicaragua, and from Ecuador and northern Venezuela east to northeastern Brazil and south to northeastern Argentina and Uruguay; *Callaeum* is conspicuously absent from the Guayana Highland region, where the Malpighiaceae are otherwise quite diverse (Anderson 1981).

The relationship of *Callaeum* to other Neotropical Malpighiaceae is not clear. The winged-fruited Malpighiaceae have been recognized as an unnatural group, and parallelism in fruit morphology probably has occurred frequently; Anderson (1980a), referring to the samara-bearing Malpighiaceae, suggested that "too great a reliance upon characters of the fruit has probably obscured relationships in some cases," and he urged caution in postulating relationships solely on the basis of fruit characters. Pollen characters place *Callaeum* securely among approximately 15 other "mascagnioid" genera (Lowrie 1982), but do not resolve its position further; Lowrie (1982) found that the cuboidal to spherical, irregularly polyporate to polyrugate pollen of the three species of *Callaeum* he examined was also found in *Jubelina* and *Lophopterys*, and in some species of *Tetrapterys* and *Mascagnia*, but concluded that the type was likely to have evolved several times among these genera.

Floral and vegetative features, although potentially useful systematically, are, at present, limited in their value because detailed study of mascagnioid genera is incomplete. Expanded transverse stigmas similar to those of *Callaeum* occur in *Lophopterys* and some species of *Heteropterys*, but there are no other characters that suggest relationship to those genera. *Mascagnia sinemariensis* (Aubl.) Griseb. and close relatives have umbellate inflorescences, hairy petals, and fruits with large papery lateral wings, but they lack reduced posterior anthers, expanded stigmas, corky bases of mericarp wings, and well-developed dorsal wings on the mericarps, and have ovoid buds and oblong sepal glands. Some of the anthers in *Mascagnia hippocrateoides* (Triana & Planchon) Niedenzu are reduced in size, but they are not the posterior ones.

Callaeum is most closely related to other Malpighiaceae with internal stigmas, ten stamens, and prominent lateral wings on the mericarps. In addition to *Callaeum*, the group of genera so defined includes *Hiraea, Jubelina, Lophopterys, Mascagnia, Mezia, Tetrapterys,* and *Triopterys*. *Callaeum* may be distinguished from *Hiraea, Jubelina, Lophopterys,* and *Mezia* by the combination of conspicuous peduncles and pedicels, eight sepal glands, and absence of hollow inflated areas in the mericarp nut. *Triopterys* has Y-shaped mericarps, and those of most species of *Tetrapterys* are X-shaped. From species of *Tetrapterys* with fruits without bilobed lateral wings, and species of *Mascagnia* with yellow flowers and papery fruit wings, *Callaeum* may be distinguished by its reduced posterior anthers, transversely dilated stigmas, and corky tissue surrounding the locule of the fruit.

The following explanation is offered as an aid to users of the following key. Conventions of terminology for the Malpighiaceae follow those of Anderson (1981), in turn following Niedenzu (1928). Each flower is considered to represent a reduced cyme, and as such is subtended by, in descending order from the flower, a pedicel, two bracteoles, a peduncle, and a bract (fig. 1h). Petal measurements are based on soaked flowers and will be significantly longer than the same measurements on dried material. Fruit characters refer to individual mericarps, of which there are three per flower, each with

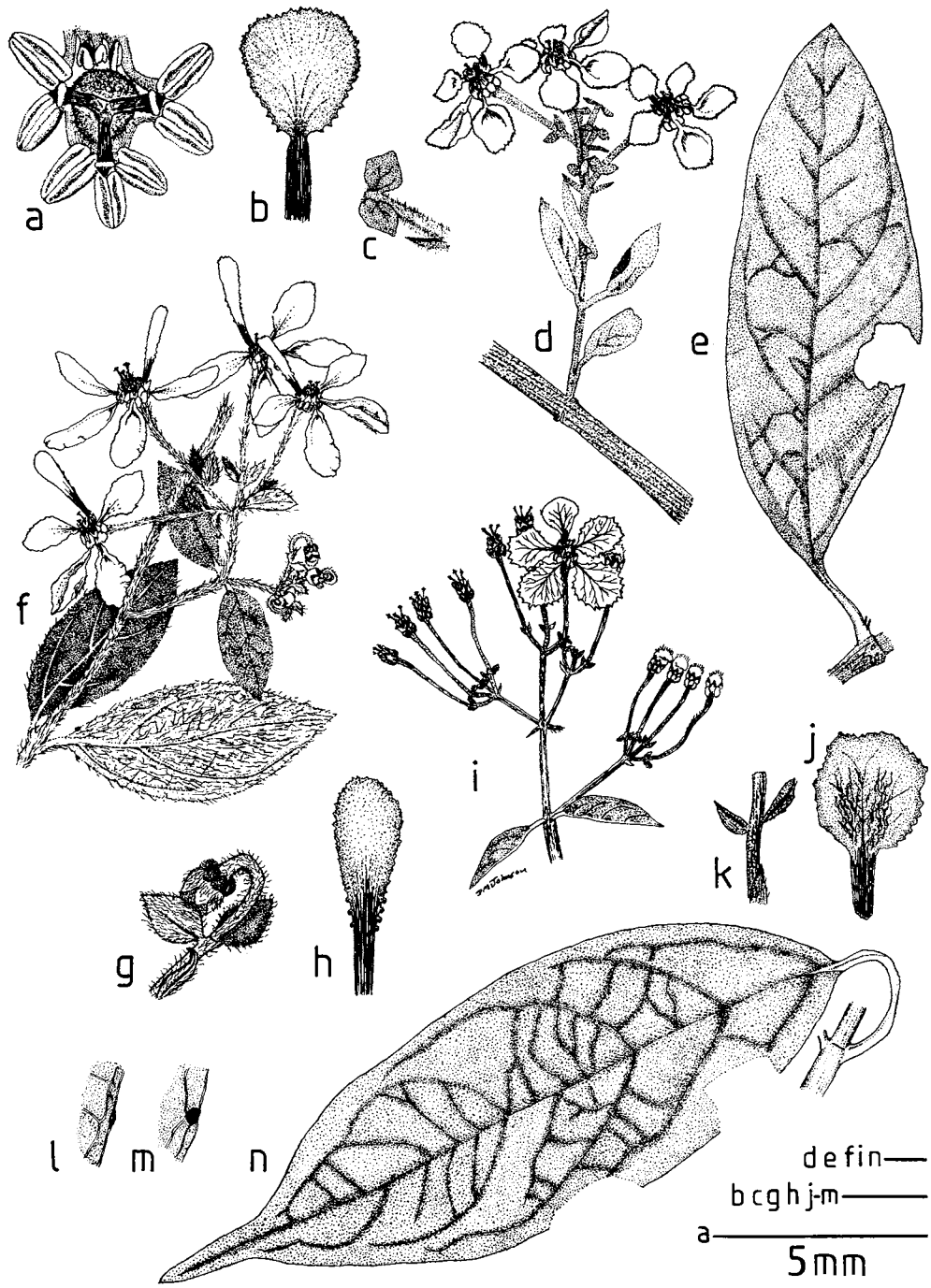

FIG. 1. a. Androecium and gynoecium of *Callaeum septentrionale*, viewed from above, showing the reduced posterior anthers (top), and styles with transversely dilated stigmas (two styles horizontal, one vertical). b–e. *C. coactum*. b. Posterior petal. c. Bract, peduncle, and bracteoles. d. Inflorescence. e. Leaf. f–h. *C. clavipetalum*. f. Habit. g. Bract, peduncle, bracteoles, and circinate pedicel of young bud. h. Posterior petal. i–l, n. *C. reticulatum*. i. Inflorescence. j. Posterior petal. k. Bract, peduncle, and bracteoles. l. Abaxial view of leaf, showing position of marginal gland. m. Abaxial view of leaf of *C. antifebrile*, showing abaxial position of marginal gland. n. Leaf.

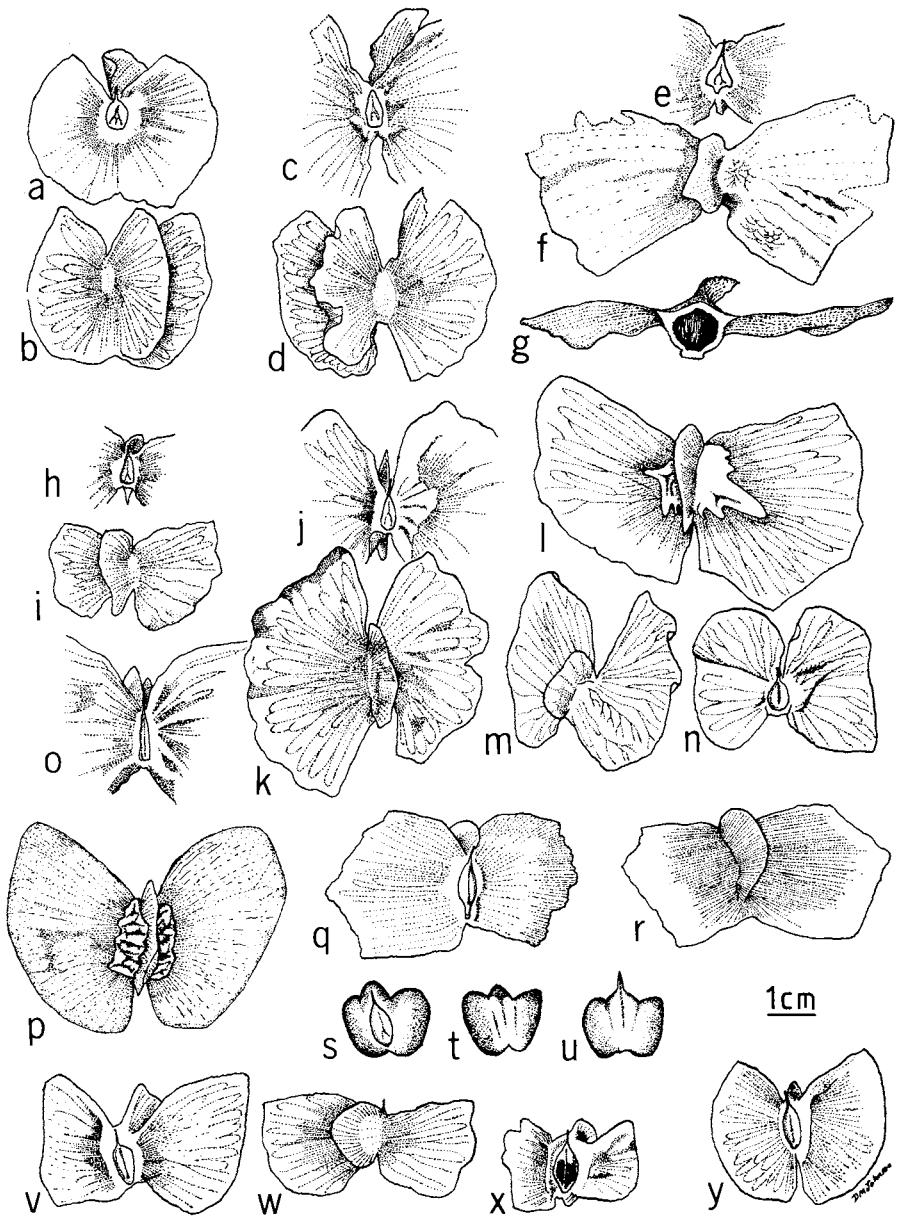

FIG. 2. Mericarps of species of *Callaeum*. a–d. *C. macropterum*. a. Ventral view of mericarp from plant from Baja California. b. Dorsal view of same mericarp. c. Ventral view of mericarp from plant from Michoacán. d. Dorsal view of same mericarp, showing distinct lateral (2) and dorsal (1) wings. e–g. *C. coactum*. e. Ventral view, showing deltoid areole. f. Dorsal view. g. Cross-section of mericarp showing corky tissue (unshaded) surrounding ovary locule. h–i. *C. septentrionale*. h. Ventral view. i. Dorsal view. j–l. *C. malpighioides*. j. Ventral view of mericarp from plant from Veracruz. k. Dorsal view of same mericarp. l. Dorsal view of mericarp from Guatemalan plant, showing intermediate winglets. m–n. *C. chiapense*. m. Dorsal view. n. Ventral view. o–p. *C. nicaraguense*. o. Ventral view. p. Dorsal view, showing corrugated intermediate winglets. q–r. *C. reticulatum*. q. Ventral view. r. Dorsal view. s–u. *C. antifebrile*. s. Ventral view. t. Dorsal view. u. Dorsal view of specimen with a short dorsal wing. v–y. *C. psilophyllum*. v. Ventral view of mericarp from plant from Distrito Federal, Brazil. w. Dorsal view of same mericarp. x. Ventral view of mericarp from type of *Mascagnia pachyptera* (Bolivia). y. Ventral view of mericarp from plant from Misiones, Argentina.

two lateral wings and one dorsal wing (fig. 2d). The scar representing the point of attachment of the mericarp to the torus is termed the ventral areole (fig. 2c). Mericarp wing height is the distance across the wing parallel to the long axis of the ventral areole; width is the maximum distance across the wing perpendicular to the height.

KEY TO THE SPECIES OF *CALLAEUM*

1. Larger leaves 7 cm or less in length.
   2. Flowering specimens; lateral petals abaxially glabrous or sparsely pilose.
      3. Young shoots sericeous or glabrate; small leaves subtending the inflorescences acute or acuminate ..... 1. *C. macropterum*
      3. Young shoots finely and densely tomentose, appearing felted; small leaves subtending the inflorescence emarginate, obtuse, or mucronate ..... 2. *C. coactum*
   2. Flowering or fruiting specimens; if flowering, lateral petals abaxially sericeous, often densely so.
      4. Posterior petal clavate or spatulate, glabrous (fig. 1h); bracteoles rhombic to ovate (fig. 1g), 2.5–3.0 mm long ..... 6. *C. clavipetalum*
      4. Posterior petal with an obovate, orbicular or quadrate limb, abaxially sericeous; bracteoles ovate or oblong (fig. 1k), 0.7–2.2 mm long.
         5. Fruiting specimens; dorsal wing of mericarp ⅚ as high to same height as lateral wings, sometimes fused to the lateral wings at the base (fig. 2a–d) ..... 1. *C. macropterum*
         5. Fruiting or flowering specimens; if fruiting, dorsal wing of mericarp ½ to ⅗ as high as lateral wings, the wings never fused at the base.
            6. Fruiting specimens; mature fruits covered by overlapping spreading hairs.
               7. Mericarp bearing a corky, convoluted, and corrugated intermediate winglet 14–17 mm high on either side of dorsal wing (fig. 2p); ventral areole of mericarp linear to lanceolate, 2 times as high as wide or higher (fig. 2o) ..... 7. *C. nicaraguense*
               7. Mericarp lacking intermediate winglets; ventral areole of mericarp deltoid, less than 2 times as high as wide (fig. 2e) ..... 2. *C. coactum*
            6. Flowering or fruiting specimens; if fruiting, mature fruits covered by non-overlapping appressed hairs or scattered patches of pubescence, or glabrate, or fruits lacking on specimen.
               8. Pedicels of young buds not circinate; anther connectives distinctly faceted; ventral areole of mericarp 5–6 mm long ..... 3. *C. septentrionale*
               8. Pedicels of young buds circinate; anther connectives indistinctly faceted or smooth; ventral areole of most mericarps on a specimen 7–13 mm long (rarely only 4 mm long).
                  9. Pedicels more than 14 mm long; ventral areole of mericarp 1.5–2.5 mm wide; plant of Guatemala to Nicaragua ..... 7. *C. nicaraguense*
                  9. Pedicels 4–14 mm long; ventral areole of mericarp 3–5.5 mm wide; plant of South America ..... 10. *C. psilophyllum*

1. Larger leaves more than 7 cm in length.
   10. Mericarp 3-lobed, each lobe somewhat longitudinally ridged, the ridges occasionally raised into wings 10 mm high and 2–4 mm wide (fig. 2s–u); marginal glands of leaf abaxial to the margin (fig. 1m) ..... 9. *C. antifebrile*
   10. Mericarp distinctly 3-winged, with at least the lateral wings over 15 mm wide (fig. 2k); marginal glands of leaf actually on the margin (fig. 1l).
      11. Petals abaxially glabrous or sparsely pilose; dorsal wing of mericarp ⅚ to same height as lateral wings (fig. 2b, d) ..... 1. *C. macropterum*
      11. Petals abaxially sericeous; dorsal wing of mericarp ⅔–¾ height of lateral wings (fig. 2i, k).
         12. Leaf widest at or above middle; tips of hairs on petals spreading; mericarp with elaborately corrugated intermediate winglets (fig. 2p) and a linear ventral areole (fig. 2o) ..... 7. *C. nicaraguense*
         12. Leaf widest below the middle; tips of hairs on petals appressed; mericarp lacking intermediate winglets, or with intermediate winglets flattened, not corrugated (fig. 2l), and ventral areole ovate or panduriform (fig. 2q, v, x).
            13. Pedicels of young buds not circinate; posterior petal 12.3–16 mm long; plants of Mexico and Central America.
               14. Floriferous peduncles attached in 8–12-flowered racemes, with the lowest peduncles or opposite pairs of peduncles separated by internodes of 3–4 mm; leaves subcoriaceous, acute ..... 5. *C. chiapense*

14. Floriferous peduncles attached in 4–6-flowered umbels or racemes, with the lowest peduncles or opposite pairs of peduncles separated by less than 3 mm; leaves chartaceous, acuminate ..... 4. *C. malpighioides*

13. Pedicels of young buds circinate; posterior petal 5.5–12.5 mm long; plants of South America.

15. Pedicels of mature buds and flowers in the same umbel parallel to one another; secondary and higher-order veins of leaf prominently raised above the intercostal tissue on the abaxial surface; species of rainforest at 900–2000 meters in northern Peru and adjacent Ecuador ..... 8. *C. reticulatum*

15. Pedicels of mature buds and flowers in the same umbel divergent; only secondary veins of leaf raised above the intercostal tissue on the abaxial surface; species of various habitats at 50–500 meters, south of the Amazon River ..... 10. *C. psilophyllum*

1. **Callaeum macropterum** (DC.) D. M. Johnson, comb. nov.—*Hiraea macroptera* DC., Prodr. 1:586. 1824.—*Mascagnia macroptera* (DC.) Niedenzu, Gen. Masc. 27. 1908.—LECTOTYPE (here designated): Mexico, [Michoacán], Apatzingán, Sessé and Mociño, Ic. Fl. Mex. 284, in Torner collection at the Hunt Institute for Botanical Documentation. The copy of this plate (De Candolle plate no. 130) in the De Candolle herbarium has for many years been accepted as the type of *H. macroptera*. With the rediscovery of the original Sessé and Mociño paintings (McVaugh 1982), however, has come the possibility that the originals might be more legitimately considered the types than the copies. While the short protologue for this name does not give any information that excludes the copy as the type, the original does bear the name *Hiraea macroptera* in what is certainly De Candolle's handwriting (compared with samples in Burdet (1973)), showing that he had had opportunity to study and name the plate, and suggesting that he did consider it in composing his protologue. It is thus chosen over the copy as lectotype. The locality for the collection is given in *Plantae Novae Hispaniae* (Sessé and Mociño 1893), the plant there mistakenly identified as *Banisteria laurifolia*.

Hiraea mexicana Rose, Contr. U.S. Natl. Herb. 1: 312. 1895.—TYPE: Mexico, Colima, Armeria, 12 Feb 1891, *Palmer 1275* (holotype: US, photos at NY!; isotypes: NY!, US!).

Mascagnia macroptera var. *α flabellariicarpa* Niedenzu, Arbeiten Bot. Inst. Königl. Lyceums Hosianum Braunsberg 3:27. 1908.—TYPE: Mexico, Sinaloa, Villa Unión, Jan 1895, *Lamb 397* (isotypes: A!, CAS!, DS!, GH!, MO!, NY!, US!).

Shrub or small tree with scandent twining branches; young shoots sericeous to glabrate; stems 0.6–4.0 mm wide, gray or brown, with 0.5 mm high sinuous ridges with age; interpetiolar ridges at nodes absent. Larger leaf blades 2.5–11.0 cm long, 0.7–4.0 cm wide, linear to ovate, cuneate to rounded at base, acute (rarely acuminate) at apex, sericeous or glabrate above and below, with a marginal gland on either side at base; petiole 2–10 mm long, bearing minute epipetiolar stipules at base. Inflorescence a 4-flowered umbel or 4–10-flowered short raceme subtended by lanceolate leaves 1.0–2.5 cm long and acute or acuminate at the apex; bracts 1.3–2.5 mm long, ovate, sericeous abaxially; peduncles 4–7 mm long, sericeous; bracteoles 1.2–2.3 mm long, ovate to orbicular, sericeous abaxially. Pedicels 5.5–9.0 mm long, sericeous, not circinate in bud. Sepals sericeous abaxially, the lateral 4 exceeding the glands by 1.1–1.7 mm, the glands ovate, 1.3–1.7 mm long. Petals glabrous, the 4 lateral ones 8.3–14.5 mm long, 6.4–11.3 mm wide; posterior petal 8.3–13.0 mm long, 4.8–10.4 mm wide, with a claw 0.5–0.6 mm wide forming ¼ to ½ the length of the petal; posterior petal limb obovate to orbicular, occasionally with several marginal glands at base. Filaments ⅖–½ connate, 2.0–3.0 mm long; posterior anthers three, 0.5–0.9 mm long, anterior anthers seven, 1.0–2.0 mm long; connectives flat, smooth. Ovary 1.2 mm long, sericeous; styles 1.7–2.1 mm long, slightly expanded at apex, sericeous at base. Mericarp 3-winged, sparsely sericeous or glabrate; lateral wings semicircular, 3.4–6.5 cm high, 1.2–4.7 cm wide; dorsal wing ⅝ height or same height as

laterals, 1.9–3.3 cm wide, fused with laterals at base (fig. 2a, b), or free (fig. 2d); intermediate winglets absent; ventral areole 4.5–13 mm high, 3–5 mm wide, ovate (fig. 2a, c). $n = 10$ (counted by M. A. Baker in *Daniel 1941*).

Representative specimens examined. MEXICO. **Aguascalientes:** Mpio Calvillo, Malpasa, *Paredes 41* (MEXU). **Baja California Sur:** 39 mi W Santa Rosalia, *Chambers 753* (DS, MEXU); 11.9–14.5 mi W Hwy 1 in Rosarito, *Daniel 1941* (MICH); Carmen Island, Puerto Ballendra, *Johnston 3804* (A, CAS, GH, NY, US); Puerto Escondido, *Johnston 3850* (A, CAS, DS, F, GH, MO, US); Loreto, *Jones 27092* (DS, F, MO, NY); Maleje [Mulege], *E. Palmer 19* in 1887 (DS, GH, MICH, NY, US); Santa Agueda, *E. Palmer 251* in 1890 (GH, US); between head of Bahía de Concepción and Comondú, *Wiggins 5462* (CAS, DS, F, GH, MICH, NY, US); near Canipole, *Wiggins 5717* (CAS, DS, GH, MICH, NY, US); N end of Isla Danzante, Gulf of California, *Wiggins 19043* (DS); inland from Punta San Ignacio, *Wiggins and Wiggins 18030* (MEXU, US). **Chihuahua:** Mpio Batopilas, La Bufa–Quirare road, *Bye 7758* (GH, MICH); Batopilas, *Hartman 1011* (GH, US); Morís, *Pennington 13, 53* (TEX). **Colima:** 17–18 km SSW Colima on Manzanillo road, *McVaugh 22949* (ENCB, MICH); Coquimatlán, *Reko 4682* (MEXU, US). **Guerrero:** Pungarabato, Distr Coyuca, *Hinton 5545* (A, MEXU, NY); Pungarabato, Distr Mina, *Hinton 9967* (GH, MICH, NY, US); 27 mi W Arcelia toward Cd. Altamirano, *Porter 1368* (GH, DS, MEXU). **Jalisco:** Santa María de Los Angeles, Mpio Colotlán, *Díaz 2385* (ENCB); Huacasco, *McVaugh 11992* (MICH, US); 4 km SE Puerto Vallarta, *Rzedowski 16585* (ENCB, MICH, US). **Michoacán:** 40 km by road SW Apatzingán, *Anderson and Anderson 5882* (ENCB, MICH, MO); road to Aguililla, 15–25 km S Río Tepalcatepec bridge, *McVaugh 22857* (ENCB, MICH); 3 km N Tepalcatepec, *McVaugh 24648* (MICH); Apatzingán, *Rzedowski 16608* (ENCB, MEXU, MICH); 7 km S San Lucas, *Soto Nuñez 41* (MEXU); El Ranchito, Mpio Coahuayana, *Soto Nuñez 2839* (MEXU). **Nayarit:** Punta Mita, Mpio Compostela, *Estrada Faudon 19* (ENCB); Bucerias, Mpio Valle de Banderas, *Villareal de Puga 9* (ENCB). **Sinaloa:** road to Potrero, 5.8 mi from Hwy 15, *Bates and Vivaldi 3364* (NY); cerca de Angostura, *Díaz Luna s.n.* (ENCB); Calmoa, Río Fuerte, *Gentry 932M* (MICH); 1.4 mi NE Choix, *Nash et al. L19582* (NY); Ymala, *E. Palmer 1736* (NY, US); near Bacubirito, *W. Palmer 1240* (NY, US); Agua Caliente de Zevada, Mpio Sinaloa de Leyva, *Pérez 3* (CAS, MEXU, MO); Rosario, *Rose 14504* (NY, US); vicinity of Guadalupe, *Rose 14683* (NY); Culiacán, *Rose 14942* (GH, NY, US); bank of Mazatlán River at Presidio ford, *W. Wright 1277* (MO, US). **Sonora:** 0.7 mi S Alamos, E of Navajoa, *Anderson and Laskowski 4556* (ENCB, MICH); Hwy 15, 2 mi N Querobabi turnoff, *Bell 17692* (GH, MICH, NY); SW Villa de Seris, *Drouet et al. 3468* (DS, F); Hwy 2, Imuris, *Dwyer 14145* (MICH); Cocorít, Yaqui Valley, *Gentry 889M* (MICH); San Bernardo, Río Mayo, *Gentry 1347* (A, MO, NY); Granado, *Hartman 219* (GH, US); 10 mi NE Cienega, Distr Altar, *Hester s.n.* (MICH); Guaymas, *Johnston 3096* (CAS, GH); Picu, *MacDougal and Shreve 18* (US); Hwy 15, 2 mi S Benjamin Hill, *Norris 20003* (CAS, MICH); 6 mi N Obregon, *Parker 8208* (NY, US); Yaqui River, *Palmer s.n.* in 1869 (NY); Alamos, *Rose 12749* (A, F, GH, MO, NY, US); Magdalena, *Rose 15125* (GH, NY, US); near Carbo, *Wiggins 7270* (A, DS, MICH, US); between Tepapa and Batuc, *Wiggins 7500* (A, DS, MICH, US); 19 mi S Llano, between Nogales and Hermosillo, *Wiggins and Rollins 478* (A, DS, MICH, MO, NY, US).

U.S.A. **Arizona:** without definite locality, *Palmer s.n.* in 1869 (NY).

Occurs in dry forests and fencerows, and on rocky slopes and edges of arroyos at 50–1950 m elevation from Arizona and Baja California Sur south to Guerrero (fig. 3), flowering and fruiting all year.

Plants of this species form a cline from those with small (less than 2 cm long) leaves and fused fruit-wing bases in the Sonoran Desert to those with large (6–10 cm long) leaves and free fruit-wing bases in Guerrero. The cline is gradual, with a fairly steady increase in leaf size and fruit-wing discreteness from north to south. *Hiraea mexicana* Rose is one of the large-leaved, free-winged forms from the southern portion of the range.

In its area of range overlap with *C. coactum* in the Río Balsas drainage, *C. macropterum* may be distinguished by the characters given in the key, and also tends to occur at lower elevations. In Guerrero it also overlaps with *C. malpighioides*, but is readily distinguished by its glabrous petals.

This plant is known by a wide variety of vernacular names, among them *gallinita, matanene, bataneni, guirote, jumete,* and *aparigua.* Various collectors of the plant have reported that it is used to treat fevers and that it is used as food by goats and sheep, while others have claimed that it is toxic to the touch (causing diarrhea).

The Palmer collection from Arizona represents the first record of *C. macropterum* from the United States; it has not been re-collected in Arizona (T. Daniel, C. Mason, and D. Pinkava, pers. comm.), suggesting that perhaps there was an error in labeling the collection and that it was in fact collected in Mexico. Palmer did col-

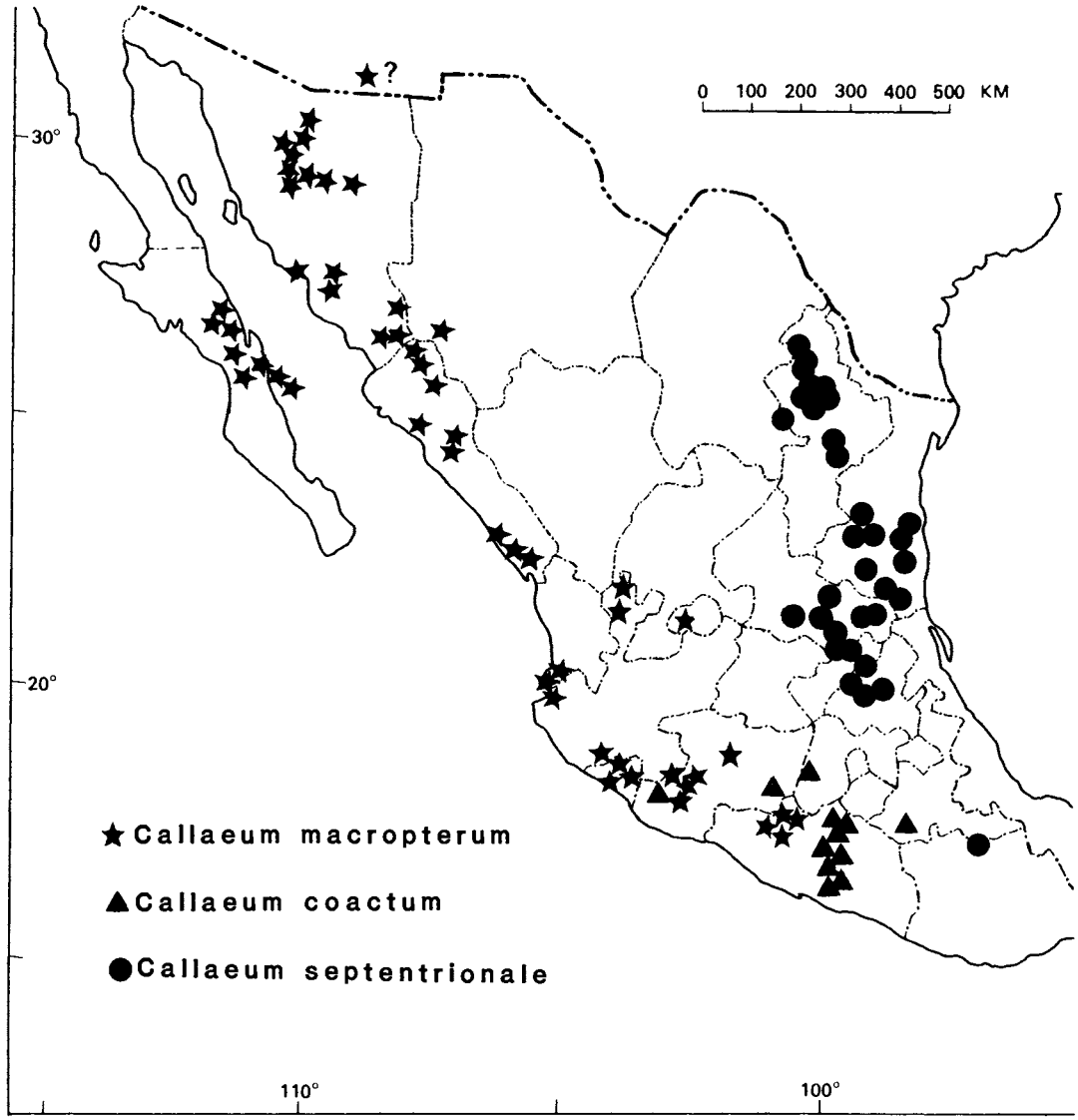

FIG. 3. Ranges of *Callaeum macropterum*, *C. coactum*, and *C. septentrionale*.

lect in southern Arizona in 1869, however (McVaugh 1956), and the plant has been collected in Sonora within 50 miles of the Arizona border, so the label may indeed be correct.

2. **Callaeum coactum** D. M. Johnson, sp. nov.—TYPE: Mexico, Guerrero, about 35 km NNW Chilpancingo, 2 Feb 1965, *McVaugh 22177* (holotype: MICH!; isotype: ENCB!).

Mascagnia septentrionalis var. *β subvelutina* Niedenzu, Pflanzenreich IV, 141:120. 1928.—TYPE: Mexico, Guerrero, sonnige, steinige Hänge am Río Balsas, *Seler and Seler 4280* [*218*]. Niedenzu's variety of *M. septentrionalis* is placed in synonymy here rather than elevated to species rank because I cannot be certain of its identity, as it was based on a specimen that was at Berlin and thus destroyed. No isotypes have been found.

Liana lignosa vel fruticulus, ramis scanden-

tibus volubilibus usque ad 2–3 m altis, ramis junioribus coactis, 1.0–1.3 mm latis, demum glabratis; jugis interpetiolaribus deficientibus. Foliorum majorum lamina 3.8–5.8 cm longa, 1.7–2.7 cm lata, elliptica vel obovata, basi cuneata vel rotundata, apice obtusa vel acuta, abaxialiter coacta, demum glabrata, adaxialiter pilosa vel glabrata, nervis lateralibus 6–10 arcuatis, margine utroque 1–2-glandulifero prope basem; petiolus 5–9 mm longus, stipulis minutis basalibus epipetiolaribus. Inflorescentia racemosa, 4–6-floris, foliis parvis (0.5–2.0 cm longis) apicaliter obtusis, mucronatis, vel emarginatis abaxialiter coactis subtenta (fig. 1d); bractea 1.3–2.5 mm longa, abaxialiter coacta, lanceolata; pedunculus 3–6.5 mm longus, coactus; bracteolae 1.9–2.2 mm longae, abaxialiter coactae, ovatae vel orbiculares (fig. 1c). Pedicellus 8–15 mm longus, coactus, ± circinatus in alabastro. Sepala 4 lateralia 8 glandulas ovatas 1.2–2.0 mm longas 1.5–2.1 mm superantia, omnia abaxialiter sericea. Petala abaxialiter glabra vel leviter pilosa, 4 lateralia 8.6–14.1 mm longa, 5.6–10.1 lata, margine limbi erosa; petalum posticum 7.4–8.1 mm longum, 6.2–8.8 mm latum, ungue 0.8–1.7 mm latis, apicaliter indentato, limbo aequalibo vel duplo longiora quam ungue, basaliter rotundato vel truncato, margine limbi utrinque 2–3-glandulifero prope basem (fig. 1b). Filamenta 2–3 mm longa, ⅖–½ connata; antherae posticae 3, 0.5 mm longae, antherae anticae 7, 1.1–1.3 mm longae; connectivum splendens, convexum. Ovarium 2 mm longum, lanatum; styli 1.5 mm longi, lanatis ad basem. Mericarpium trialatum, dense tomentosum vel strigosum (fig. 2f); alae laterales 4.0–6.0 cm altae, 3.0–3.5 cm latae, trapezoideae vel flabellatae, basi et apice discretis; ala dorsalis 1.8 cm alta, 0.8–1.5 cm lata, crescentiformis vel triangularis; alulae intermediae deficientes; areola ventralis 7–9 mm alta, 4–6 mm lata, deltoidea (fig. 2e).

Specimens examined. MEXICO. **Guerrero:** 40 km N Zumpango del Río on road to Iguala, near km 216, *Anderson and Anderson 5660* (ENCB, MICH); Temisco, *Bruff 1306* (MEXU); Hwy 95, 19 mi S La Cabaña Motel in Iguala, *Freeland and Spetzman 63* (MEXU); Tierra Colorada a Mezcala, *Halbinger s.n.* (MEXU); Ruta 95 Acapulco a México, ca. 187 km por camino N Acapulco, *Lorence 3835* (MICH); along Mex Hwy 55 between Iguala and Chilpancingo, 10 km S Tonolapa and N of Río Mescala, *Miller and Tenorio L. 648* (MICH); Cañón de la Mano, Iguala, *Miranda 3912* (MEXU); Chilpancingo, 8 Jan 1977, *Schwabe s.n.* (MEXU). **México:** barranca de Tonatico, *Matuda 32161* (MEXU). **Michoacán:** Distr Coalcomán, Coalcomán, *Hinton 12962* (MICH, NY); *Hinton 13635* (DS, GH, MICH, NY); 20 km N Huétamo, carr. a Zitácuaro, *Soto Nuñez 1295* (MEXU). **Puebla:** Hwy 190, 27 mi NW Acatlán, *Anderson and Laskowski 4299* (MICH).

Grows in deciduous forests, dry valleys, and on rocky hills of southern Mexico (fig. 3), primarily in the Balsas Depression, at elevations of 600–1200 m, often growing with *Pseudosmodingium, Cordia, Acacia, Bursera, Haematoxylum,* and cacti; flowering November–April, fruiting February–April.

Besides other species of *Callaeum,* this species also might be confused, in flower, with *Tetrapterys cotoneaster* Adr. Juss., which inhabits the same region of Mexico; however, *T. cotoneaster* has linear rather than ovate-orbicular bracteoles and longitudinally decurrent rather than transversely dilated stigmas.

3. **Callaeum septentrionale** (Adr. Juss.) D. M. Johnson, comb. nov.—*Hiraea septentrionalis* Adr. Juss., Ann. Sci. Nat. Bot., 2° sér. 13: 259. 1840.—*Mascagnia septentrionalis* (Adr. Juss.) Niedenzu, Arbeiten Bot. Inst. Königl. Lyceums Hosianum Braunsberg 3:28. 1908.—LECTOTYPE (here designated): Mexico, Nuevo León, Monterrey, Jan 1828, *Berlandier 135* (=*1395*) (K, photo at MICH!; isolectotypes: G!, GH!, NY!). [Details of dates and numbers for Berlandier's collections are given in Berlandier 1980.]

Hiraea greggii S. Watson, Proc. Amer. Acad., New Ser. 9:333. 1882.—LECTOTYPE (here designated): Nuevo León, Monterrey, 17–26 Feb 1880, *Palmer 123* (GH; isolectotypes: GH!, NY!).

Mascagnia macroptera var. *β jussieuana* Niedenzu, Arbeiten Bot. Inst. Königl. Lyceums Hosianum Braunsberg 3:29. 1908.—LECTOTYPE (here designated): [Nuevo León], Monterrey, in arenosis secundas ripas fluminum, June and July 1888, *Pringle 1929* (NY!; isolectotypes: A!, F!, GH!, MICH!, MO!, US!).

Shrub with trailing or twining branches; young shoots sericeous to glabrate; young stems 0.5–1.5 mm wide, without interpetiolar ridges, smooth, terete and greenish olive, the older stems dark brown or gray, wrinkled, with white punctiform lenticels. Larger leaf blades 2.0–

7.0(-9.5) cm long, 0.6–4.0 cm wide, lanceolate to elliptic-ovate, cuneate to rounded at base, acute or acuminate at apex, with 5–8 secondary veins, glabrous above, sparsely sericeous to glabrate below, with 0–3 marginal glands on each side in the proximal half; petioles 2–11 mm long with minute epipetiolar stipules at base. Inflorescence simple or sometimes compound, 4–6-flowered umbels in groups of 1–5, usually subtended by leaves 0.5–2.5 cm long that are similar in shape and vesture to the foliage leaves; bracts 0.6–1.5 mm long, triangular, sericeous; peduncles 1.5–11 mm long, thinly sericeous; bracteoles 0.7–2.2 mm long, lanceolate to ovate, sericeous. Pedicels 6–24 mm long, thinly sericeous, usually even less so than the peduncles. Sepals sericeous abaxially, the lateral 4 exceeding the glands by 1–1.4 mm, the glands ovate, 1.2–1.4 mm long. Petals abaxially sericeous, the 4 lateral ones 9.4–17.0 mm long, 8.0–14.1 mm wide, the limb with a denticulate or short-fimbriate margin; posterior petal 11.3–15.3 mm long, 5.7–10.5 mm wide with a claw 1.2–2.0 mm wide forming ⅕–⅖ the length of the petal, the limb obovate or orbicular, cuneate at base, the margin denticulate or short-fimbriate, bearing 3–5 glandular teeth on each side in proximal half. Filaments ⅓ connate, 2 mm long; posterior anthers 3, 0.4–0.7 mm long, anterior anthers 7, 1.0–1.3 mm long; connectives slightly inflated and faceted. Ovary 2 mm long, sericeous; styles 1.8–2.2 mm long, slightly expanded at apex, sericeous at base. Mericarps 3-winged, sericeous when young, glabrate or thinly sericeous with age (fig. 2i); lateral wings 2.0–4.2(-5.5) cm high, 1.6–2.1 cm wide, flabellate or trapezoidal; dorsal wing ½–⅗ the height of laterals, 1.0–1.7 cm high, 0.6 cm wide, semicircular or auriculiform; intermediate winglets absent; ventral areole 5–6 mm high, 2–3 mm wide, ovate (fig. 2h). $n = 10$ (counted by W. R. Anderson from *Anderson and Laskowski 4046*).

Representative specimens examined. MEXICO. **Hidalgo:** Jacala, *Chase 7255* (F, GH, LL, MO, NY); 10 km NW Zimapan, *González Quintero 2383* (DS, ENCB, MICH); Sierra de la Mesa, *Rose 9109* (GH), *Rose 10260* (US); S. Ag. Mezquititlán, Nov 1913, *Salazar s.n.* (MEXU). **Nuevo León:** Cañón de Huasteca near Santa Catarina, *Alanís et al. 16168M* (F, GH, TEX); 16.6 mi SW Linares, *Anderson and Anderson 4605* (ENCB, MICH, MO, NY); La Silla, Monterrey, *Arsène 6225* (A, G, MO, US); Monterrey, *Berlandier 138* (=*1398*) (G, GH); Ojo de Agua, Sabinas Hidalgo, *Chase 7001* (F, GH, LL, MICH, MO, NY); Rancho Resendez, Lampazos, *Edwards 297* (DS, F, MEXU, MO, TEX); near Monterrey, *Gregg 228* (MO); Sabinas Hidalgo, *Leavenworth 50* (F, GH, MICH, MO, NY); Diente Canyon, *Muller and Muller 313* (A, F, MEXU, TEX); *Pequeño et al. 16M635* (F, GH, MO, NY, TEX); Hacienda El Carrizo, *Pringle 13969* (GH, MICH, MO, US); Rinconada near Saltillo, *Wislizenus 317* (MO). **Oaxaca:** Tomellin Canyon, *Rose 4674* (GH, NY). **Querétaro:** Landa, *Paray 247* (ENCB); Hwy 69 between Río Verde and Jalpan, 3.1 mi N La Purísima, *Daniel 359* (MICH); "Los Panales," 4 km S El Trapiche, Mpio Arroyo Seco, *Tenorio L. 292* (MICH). **San Luis Potosí:** 16 km W Cd. Valles, *Anderson and Laskowski 4046* (ENCB, GH, MICH); 39 mi E San Luis Potosí, *Anderson and Laskowski 4078* (ENCB, MICH); Valles, *Fisher 37028* (GH, MO, NY, US); Tamasopo, *Fisher 37187* (F, MO, NY); 10–20 mi E Ciudad del Maíz, *Manning and Manning 53465* (GH); 10 km S Cárdenas, *Rzedowski 4580* (ENCB). **Tamaulipas:** vicinity of San Miguel, *Bartlett 10577* (F, LL, MEXU, MICH, US); Sierra de Tamaulipas, region of Rancho Las Yucas, ca. 40 mi NNW Aldama, Mpio Aldama, *Dressler 2335* (GH, MICH, MO); Mpio Soto de Marina, road to Tepeguaje, 11 km E of main highway, *Fryxell 3675* (MICH); 14 mi E Casas, *Graham and Johnston 4103* (MEXU, MICH, TEX); Ocampo Road, *Kenoyer and Crum 3552* (GH); road to Jaumave, 6 mi SW Ciudad Victoria, *McVaugh 10538* (ENCB, MICH, NY, TEX, US); vicinity of Victoria, *Palmer 14* in 1907 (MO, NY, US); *Palmer 217* in 1907 (F, GH, NY, US); from top of pass to Hoja Verde, *Stanford et al. 2023* (CAS, DS, G, MICH, NY).

Occurs on rocky forested slopes and talus, rocky roadbanks, gravelly arroyos, ledges, and riverbanks, often on limestone soils, from Nuevo León and Tamaulipas to Querétaro and Hidalgo (disjunct in Oaxaca) at 85–1800 m in elevation (fig. 3); flowering February–November, fruiting all year.

Plants from the Sierra de la Mesa in Hidalgo often have small (3–5 cm long) narrowly lanceolate leaves but in other respects are identical to plants from other localities. This plant is occasionally sold in the United States as an ornamental. In parts of Nuevo León it is called *naranjillo*.

This species and the following are often mistaken in flower for *Stigmaphyllon ellipticum* (H.B.K.) Adr. Juss., but differ from it in the sericeous petals, the absence of stylar appendages, and in the peduncle always being shorter than the pedicel.

4. **Callaeum malpighioides** (Turcz.) D. M. Johnson, comb. nov.—*Stigmaphyllon malpigh-*

ioides Turcz., Bull. Soc. Imp. Naturalistes Moscou 36:582–583. 1863.—*Mascagnia malpighioides* (Turcz.) C. Morton, Publ. Carnegie Inst. Wash. 461:130. 1936.—LECTOTYPE (here designated): Mexico, Veracruz, Orizaba, July 1855, *Botteri 1073* (G!).

Mascagnia mexicana Niedenzu, Arbeiten Bot. Inst. Königl. Lyceums Hosianum Braunsberg 3:29. 1908.—*Mascagnia nicaraguensis* var. *α mexicana* (Niedenzu) Niedenzu, Pflanzenreich IV, 141:122. 1928.—TYPE: Mexico, Veracruz, Borrego, région d'Orizaba, 11 May 1865 or 66, *Bourgeau 2486* (isotypes: F!, G!, GH!, LE!, P!).

Woody vine; stems grayish- or blackish-brown, sparsely sericeous to glabrate, smooth with few lenticels. Larger leaf blades 7.5–15.5 cm long, 3.9–8.3 cm wide, lanceolate to ovate, rounded or cuneate at the base, acuminate at the apex, with 6–9 arcuate secondary veins connected by scalariform tertiary veins, sparsely sericeous to glabrate on both sides, with 3–5 marginal glands on each side in proximal half; petiole 9–19 mm long, bearing minute epipetiolar stipules at base. Inflorescence usually compound, composed of 4-flowered umbels in groups of 3; smaller leaves subtending inflorescences 1.0–3.0 cm long, elliptic or lanceolate, acuminate at apex; bracts 0.8–1.3 mm long, lanceolate, glabrate; peduncles 1.8–4.0 mm long, glabrate; bracteoles 1.0–1.2 mm long, broadly lanceolate. Pedicel 12–16.5 mm long, not circinate in bud. Sepals sericeous abaxially, the lateral 4 exceeding the glands by 1.4 mm, the glands ovate, 1.0–1.5 mm long. Petals abaxially sericeous, the 4 lateral ones 11.1–17.9 mm long, 9.9–14.6 mm wide, their limbs with denticulate margins; posterior petal 12.6–16.0 mm long, 6.6–12.9 mm wide, with a claw 0.7–1.6 mm wide forming ⅓–⅓ the length of the petal. Filaments 2.0–2.5 mm long, ⅔–½ connate; posterior anthers three, 0.6 mm long, sometimes sterile, anterior anthers seven, 1.0–1.3 mm long; connectives faceted, raised but not conspicuously convex. Ovary 1.5 mm long, sericeous, strongly ridged; styles 2.2–2.3 mm long, sericeous at base or (rarely) almost to the apex. Mericarp 3-winged, thinly sericeous or glabrate (fig. 2k), the lateral wings semicircular or trapezoidal, 4.7–6.5 cm high, 2.9–5.3 cm wide, free at base and apex, with undulate or erose margins; dorsal wing 1.6–3.1 cm high, 0.6–0.9 cm wide; quadrate or bilobed intermediate winglets 0.8–1.2 cm high or corrugated lobes on lateral wing bases occasionally present (fig. 2l); ventral areole 7–9 mm high, 4–5 mm wide, ovate (fig. 2j).

Representative specimens examined. MEXICO. **Chiapas:** El Sumidero, 22 km N Tuxtla Gutiérrez, Mpio Tuxtla Gutiérrez, *Breedlove and Bartholomew 55469* (CAS); road from Chiapilla to San Lucas, Mpio Chiapilla, *Laughlin 2856* (DS); Palenque archeological site 3 mi S Palenque, *Thorne and Lathrop 40555* (DS); near Palenque ruins, *Murray and Johnson 1386* (MICH). **Guerrero:** Camp Morado, Distr Mina, *Hinton 11151* (DS, F, GH, MICH, NY, US); Petlacala–Las Rosas, Distr Mina, *Hinton 14871* (MICH, NY, US). **Veracruz:** Orizaba, San Cristóbal Mts., *Botteri 168* (NY); El Salto de Eyipantla, 8 km del Pueblo de Sihuapan, Mpio San Andrés Tuxtla, *Calzada 1687* (MICH); Cerro Gordo, Mpio Dos Ríos, *Dorantes L. 363* (ENCB); Remudadero, *Purpus 8861* (F, GH, MO, NY, US); Orizaba, *Seaton 103* (GH, US); Trapiche, Mpio Actopan, *Ventura A. 4368* (ENCB); Esquilon, Mpio Jilotepec, *Ventura A. 8460* (ENCB); Conejos, Mpio Puente Nacional, *Ventura A. 14711* (CAS, ENCB, MICH).

GUATEMALA. **Escuintla:** below Las Lajas, *Standley 64803* (F, NY, US); **Petén:** Guayacan, on El Ceibo road about 6 km, *Contreras 7338* (CAS); Yaxha–Remate Road, *Lundell 2078* (F, GH, MICH, US); camino para el Remate km 58, Tikal, Parque Nacional, *Ortíz 463* (F, MICH, US). **Sacatepequez:** between hills Agua and Fuego volcanoes, road to Alotenango, *Molina R. 16669* (NY, US).

BELIZE. El Cayo, *Bartlett 11962, 12924* (MICH); El Cayo and vicinity, *Chanek 133* (F, MICH); Balsam Hill, Edwards Road beyond Columbia, *Gentle 6361* (CAS).

This is a species of forests below 1400 meters, primarily on the Gulf side of the Sierra Madre from north-central Veracruz to Guatemala; it also occurs in Guerrero (fig. 4); flowering June–February, fruiting October–May.

Callaeum malpighioides is, in many respects, a large version of *C. septentrionale*, but is always a vine and occasionally has intermediate winglets on the fruits. It has been treated as a variety of *C. nicaraguense*, which also has intermediate winglets on the mericarps, but is consistently different in absence of interpetiolar ridges, ventral areole shape, shape of the intermediate winglets, leaf shape, non-circinate buds, and indument of the mericarps.

The spelling of the species epithet is often rendered "*malpighiodes*," following Morton (1936). In the original description of this species by Turczaninow, however, it is *malpighioides*, which should be retained.

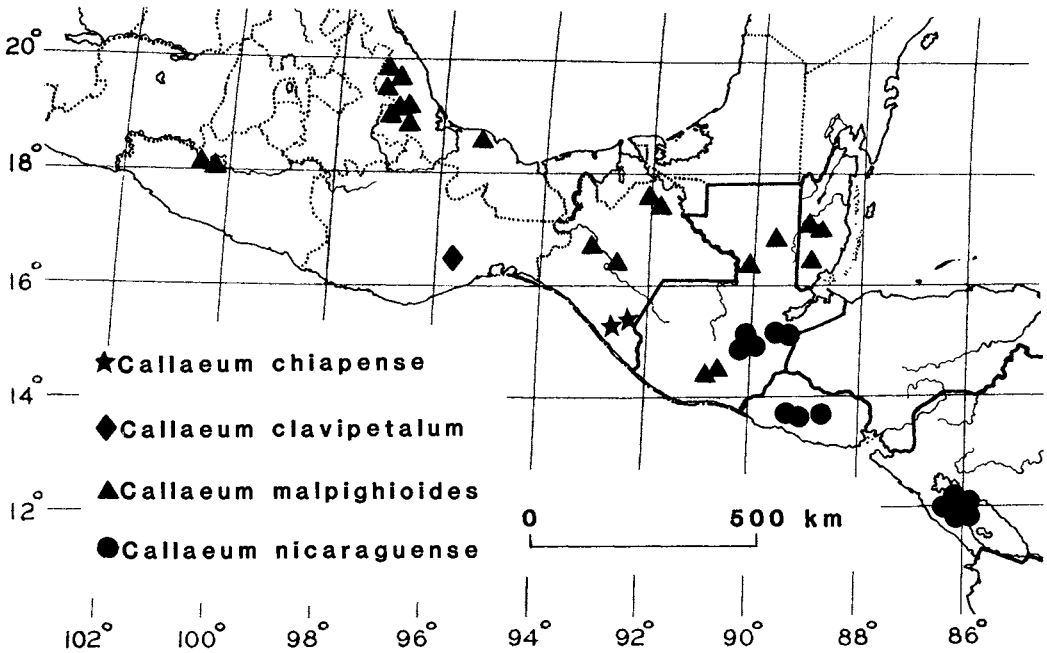

FIG. 4. Ranges of *Callaeum chiapense, C. clavipetalum, C. nicaraguense,* and *C. malpighioides.*

5. **Callaeum chiapense** (Lundell) D. M. Johnson, comb. nov.—*Stigmaphyllon chiapense* Lundell, Wrightia 6(2):32. 1978.—TYPE: Mexico, Chiapas, Carelas near Motozintla, Apr 1945, *Matuda 5510* (holotype: UTD!; isotypes: F!, MICH!).

Woody vine to 25 m; branches golden- to white-sericeous, soon glabrate and with gray longitudinally wrinkled bark. Larger leaf blades 7.4–11.3 cm long, 3.4–5.3 cm wide, lanceolate or elliptical, cuneate at the base, acute at the apex, subcoriaceous, sericeous to glabrate on both sides, with 1–2 marginal glands on each side near base; petiole 7–17 mm long, bearing minute stipules at base. Inflorescence simple or compound; racemes 8–12-flowered, with the lower flowers 3–4 mm apart and the terminal ones clustered; smaller leaves subtending the inflorescence 1.0–3.0 cm long, elliptical, acute or acuminate at the apex, sericeous to glabrate; bracts 1 mm long, lanceolate; peduncles 3 mm long; bracteoles 1.5–2.0 mm long, lanceolate. Pedicels 16 mm long, not circinate in bud. Sepals golden-sericeous abaxially, the lateral 4 exceeding the glands by 1.5–2.0 mm, the glands 1.5–1.6 mm long, ovate. Petals sericeous abaxially, the 4 lateral ones 11.3–15.9 mm long, 5.6–10.1 mm wide; posterior petal 12.3–13.8 mm long, 7.2–9.2 mm wide, with a claw 1.0 mm wide forming $\frac{3}{10}$–$\frac{4}{10}$ the length of the petal. Filaments 1.3–1.6 mm long, ½ connate; posterior anthers three, 0.5–0.6 mm long, anterior anthers seven, 1.0–1.4 mm long. Ovary 1.5 mm long, sericeous; styles 2 mm long, sericeous nearly to the expanded apex. Mericarp 3-winged, glabrate, the lateral wings 2.9–4.0 cm high, 1.8–2.5 cm wide, rounded at the corners, entire (fig. 2m, n); dorsal wing 1.6–2.0 mm high, 0.7–0.9 mm wide; intermediate winglets absent; ventral areole 5.5–6 mm high, 3–4 mm wide, ovate (fig. 2n).

Specimens examined. MEXICO. **Chiapas:** Mt. Ovando, *Matuda 478* (MICH, US); *Matuda 2643* (A, DS, F, MICH, NY); Saxchanal, Sierra Madre, *Matuda 4305* (A, DS, F, MO, NY, US).

A highland species very closely related to *C. malpighioides,* occurring at elevations above 2100 meters in extreme southeastern Chiapas (fig. 4), flowering December–April and in fruit April–July. It may be distinguished from *C. malpighioides* by the acute subcoriaceous leaves, racemose inflorescences with internodes between the lower flowers, range, and habitat. Both of

these species were described originally in *Stigmaphyllon;* this may perhaps be attributed to the expanded style apices with the transverse stigmas suggesting the leaflike stylar flaps of that genus.

In his description of *Stigmaphyllon chiapense,* Lundell observed that the small sterile stamens in the flower were variable in position from flower to flower. In my examination of the type and of other material, however, I found that the seven most anterior anthers of a flower, although occasionally variable in size, never appeared sterile and were always significantly larger than the three most posterior anthers in the same flower, which often did appear sterile.

6. **Callaeum clavipetalum** D. M. Johnson, sp. nov.—TYPE: Mexico, Oaxaca, Barranco Hondo, S. Bartolo Yautepec, Yautepec, 30 Nov 1972, *MacDougall H534* (holotype: NY!).

Liana, ramis 1.5 mm latis, pilosis vel demum glabratis, infuscatis, lenticellis albis verruciformibus. Foliorum majorum lamina 3.0–5.0 cm longa, 1.6–1.8 cm lata, lanceolata vel elliptica, basi cuneata, apice acuta vel acuminata, supra sparsim pubens, infra dense tomentosa, demum glabrata, nervis lateralibus 5–7 arcuatis, margine 1–2-glandulifero prope basem; petiolus 4–6 mm longus, stipulis minutis epipetiolaribus prope basem. Inflorescentia axillaris, cymosa, floribus in 1–3 umbellis 4-floris, bractea 4 mm longa, lanceolata, pilosa; pedunculus 3–6 mm longus, sericeus; *bracteolae 2.5–3.0 mm longae, rhombeae vel ovatae, tomentosae,* infra hirsutiorae (fig. 1g). Pedicellus 11–13 mm longus, pilosus, circinatus in alabastro. Sepala 4 lateralia 8 glandulas 1.2–1.3 mm longas 1.3 mm superantia, omnia triangularia, abaxialiter pilosa. Petala 4 lateralia abaxialiter sericea, 12.2–13.3 mm longa, 7.2–8.9 mm lata; *petalum posticum glabrum, spathulatum vel clavatum,* ungue 4.1–4.8 mm longo, limbo 6.5–9.8 mm longo, 4.8–6.0 lato, denticulato, dentis basalibus plerumque glandulosis (fig. 1h). Filamenta 2–2.2 mm longa, glabra, ½ connata; antherae posticae 3, 0.5–0.6 mm longae, antherae anticae 7, 1.0 mm longae; connectivum splendens, convexum. Styli 2.0 mm longi, tomentosi ad basem. Frutus ignotus.

Known only from the type, and unknown in fruit, but may be easily distinguished from other Mexican callaeums by the combination of relatively large rhombic or ovate bracteoles, densely tomentose leaves, and glabrous club-shaped posterior petal (fig. 1i), the latter reflected in the specific epithet. The type locality is shown in figure 4.

7. CALLAEUM NICARAGUENSE (Griseb.) Small, N. Amer. Flora 25(2):128. 1910.—*Jubelina nicaraguensis* Griseb., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1853:48–49. 1854.—*Mascagnia psilophylla* var. *β brachypoda* Niedenzu, Arbeiten Bot. Inst. Königl. Lyceums Hosianum Braunsberg 4:6. 1912.—*Mascagnia nicaraguensis* (Griseb.) Niedenzu, Pflanzenreich IV, 141:121. 1928.—TYPE: Nicaragua, Segovia, Jan 1848, *Oersted 5397* (holotype: C!; isotype: C!).

Woody vine or shrub; stems greenish, 1.0–2.0 mm wide, thinly sericeous, at length glabrate, reddish brown, and with white lenticels; interpetiolar ridges present. Larger leaf blades 4.8–11.5 cm long, 3.6–8.0 cm wide, elliptic-ovate, obovate or orbicular, cuneate, rounded, or rarely attenuate at base, acuminate at apex, glabrate on both surfaces, with 8–10 arcuate secondary veins connected by scalariform tertiary veins, the margins bearing 1–3 glands on each side in proximal half; petiole 6–18 mm long, bearing minute stipules at base or stipules absent. Inflorescence axillary or terminal, simple or compound, composed of 4-flowered umbels; smaller leaves subtending inflorescence 2.0–4.0 cm long, elliptical or ovate, sericeous to glabrate; bracts 1.1–1.3 mm long, lanceolate; peduncles 2–2.5 mm long; bracteoles 1.1–1.6 mm long, ovate. Pedicels 14.5–21 mm long, circinate in young buds. Sepals abaxially pubescent, the lateral 4 exceeding the glands by 1.2–1.7 mm, the glands ovate or round, 1.5–2.0 mm long. Petals abaxially sericeous, the 4 lateral ones 11.8–18.4 mm long, 9.9–13.8 mm wide, the limbs with denticulate margins; posterior petal 10.4–11.8 mm long, 6.2–7.3 mm wide, with a claw 0.7–1.2 mm thick forming $\frac{3}{10}$–$\frac{4}{10}$ the length of the petal; limb of posterior petal obovate to orbicular. Filaments 2 mm long, ½ connate; posterior anthers three, 0.5 mm long, anterior anthers seven, 0.9–1.3 mm long; connectives slightly raised, weakly faceted. Ovary 1.7–1.8 mm long, sericeous; styles 2.2–2.3 mm long, slightly expanded at apex, sericeous at base.

Mericarp 3-winged (or essentially 5-winged), finely tomentose, the lateral wings 3.8–5.0 cm high, 1.9–3.7 cm wide, trapezoidal to almost semicircular, free at base and apex; dorsal wing ½ height of laterals, 1.7–2.6 cm high, 0.5–0.8 cm wide, auriculiform or semicircular; intermediate winglets to either side of dorsal wing 1.4–2.0 mm high, 0.4–0.6 mm wide, corky, convoluted, and corrugated (fig. 2p); ventral areole 10 mm high, 1.5–2.5 mm wide, linear (fig. 2o).

Specimens examined. EL SALVADOR. **San Salvador:** San Salvador, *Calderón 1475* (US), *1561* (GH, NY, US); vicinity of San Salvador, *Standley 19296* (GH, NY, US). **San Vicente:** vicinity of Ixtepeque, *Standley 21425* (GH, US).

GUATEMALA. **Guatemala:** Sanarate, *Kellerman 5901* (F, US); *5906* (MEXU). **Jalapa:** Guastatoya, *Kellerman 8058* (F, NY, US). **Zacapa:** Zacapa, *Deam 167* (GH, MICH); vicinity of Zacapa, *Pittier 1753* (US).

NICARAGUA. **Managua:** Managua, *Chaves 8* (US); Sierra de Managua, *Garnier A1290* (A, F); Reparto Serranias, a la orilla de La Calle Real, *Guzmán and Castro 5* (MO); cartera a la Laguna de Jiloa entre el km 15 y 16, *Moreno 4342b* (MO); Cuatro Esquinas de Ticuantepe, camino entre Santo Domingo y Las Nubes, *Moreno 4382b* (MICH); ca. 1.4 km from Hwy 2 on road along ridge of Sierra de Managua from Hwy 2 to Hwy 12, *Stevens 4748* (MO); ca. 2.3 km from Hwy 12 on road along ridge of Sierra de Managua from Hwy 12 at km 17 to Hwy 2, *Stevens 5315* (MICH). **Matagalpa:** along bank of Rio Grande, Route 1, Sebaco, *Atwood and Mena B. 2512* (MICH).

Restricted to highlands of southeastern Guatemala, El Salvador, and Nicaragua, at elevations of 200–1400 meters (fig. 4); flowering September–January, fruiting December–March.

This species was originally described as a *Jubelina* by Grisebach; however, it lacks the inflated areas on either side of the mericarp nut and the enlarged bracteoles of that primarily South American genus. It has the reduced posterior anthers, transversely expanded stigmas, and corky fruit-wing bases that characterize the mascagnioid plants being treated in this paper, and shares with many of the species the characters of circinate buds and abaxially sericeous petals. On the basis of these characters it is possible to include these other species in *Callaeum*, in spite of the remarkable fruit with well-developed intermediate winglets that makes *C. nicaraguense* (the type species of *Callaeum*) atypical of the group.

8. **Callaeum reticulatum** D. M. Johnson, sp. nov.—TYPE: Peru, Dept Lambayeque, 28 km E of Olmos, 4 Jan 1964, *Hutchison and Wright 3387* (holotype: MICH!; isotypes: MO!, NY!).

Liana lignosa usque ad 12 m alta, ramis teretibus, olivaceis, demum cortice fusco parum rugoso exfoliato, jugis interpetiolaribus praesentibus vel deficientibus. Foliorum majorum lamina 8.4–14.8 cm longa, 3.5–5.5 cm lata, ovato-lanceolata vel elliptica, basi cuneata vel rotundata, apice acuminata utrinque glabrata, *nervacione secundaria, tertiaria, et quaternaria abaxialiter conspicue elevata,* margine 1–2-glandulifero prope basem (fig. 1l); petiolus 5–18 mm longus. Inflorescentia cymosa axillaris vel terminalis (fig. 1i), 3–5 umbellis 4-floris, interdum surculis floriferis duo ex eadem axilla; bractea 1.3–1.9 mm longa; pedunculus 3.7–6.6 mm longus; bracteolae 1.0–2.3 mm longae, ovatae, sericeae (fig. 1k). Pedicellus 7.7–16.7 mm longus, pubescens, circinatus in alabastro; *pedicelli umbellae demum paralleli.* Sepala abaxialiter sericea, 4 lateralia 8 glandulas 1.3–2.0 mm longas orbiculatas 1.0–2.6 mm superantia. Petala abaxialiter sericea, 4 lateralia 10.5–13.5 mm longa, 8.2–12.0 mm lata; petalum posticum 10.8 mm longum, 6.4–6.6 mm latum, ungue 0.8–1.5 mm latis, limbo ⅕–⅖ longitudini formanti (fig. 1j). Filamenta 2.0–3.0 mm longa, ⅓–½ connata; antherae posticae 3, 0.7–1.1 mm longae, antherae anticae 7, 1.4–1.9 mm longae; connectivum splendens, convexum. Ovarium 1.4 mm longum, sericeum; styli 1.8–3.1 mm longi, sericei. Mericarpium trialatum, glabratum, alae laterales chartaceae, 3.3–4.8 cm altae, 2.4–2.8 cm latae, basi parum continuis, apice discretis; ala dorsalis 1.7–2.0 cm alta, 0.4–0.8 cm lata, crescentiformis vel semicircularis (fig. 2q); areola ventralis 7–16 mm alta, 4–4.5 mm lata, fusiformis vel panduriformis (fig. 2q).

Specimens examined. ECUADOR. **Loja:** between Puente Boquerón and Gonzamamá, *Asplund 18086* (S); below Cangonamá towards Pan American Highway W of Catacocha, *Balslev 1340* (NY); road Catacocha–Macará, ca. 16 km N Macará, *Harling et al. 15290* (GB).

PERU. **Cajamarca:** Pucará, *Woytkowski 5664* (MO). **Piura:** Prov Huancabamba, El Chinche (arriba Beatita de Humay km 35), *López M. 8933* (MICH).

Known only from northwestern Peru and adjacent Ecuador (fig. 5), where it occurs in rain-

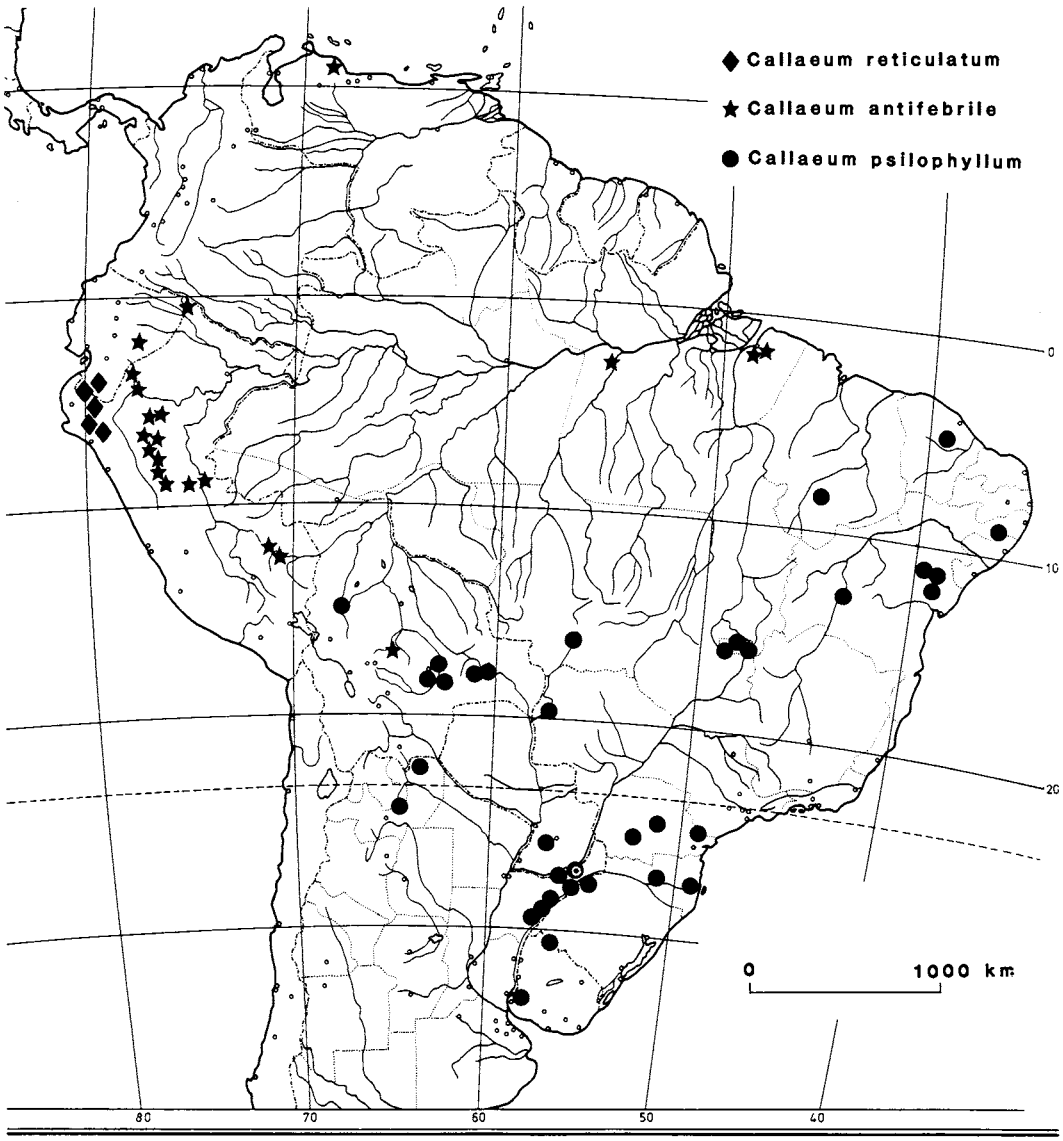

FIG. 5. Ranges of *Callaeum reticulatum*, *C. antifebrile*, and *C. psilophyllum*. Base map copyright 1979 by the University of Utrecht.

forest areas at 900–2000 meters, flowering from October–April and fruiting September–April.

9. **Callaeum antifebrile** (Griseb.) D. M. Johnson, comb. nov.—*Banisteria antifebrilis* Griseb., Linnaea 22:15. 1849.—*Mascagnia psilophylla* var. *β antifebrilis* (Griseb.) Niedenzu, Pflanzenreich IV, 141:121. 1928.—LECTOTYPE (here designated): Peru, [Huánuco], Pueblo Nuevo, *Ruiz s.n.* (MA, photo at MICH; holotype at B, Field Mus. Neg. 12695, presumably destroyed).

Mascagnia psilophylla f. 2 *peruviana* Niedenzu, Arbeiten Bot. Inst. Königl. Lyceums Hosianum Braunsberg 3:28. 1908.—LECTOTYPE (here designated): same as for *Banisteria antifebrilis* Griseb. in preceding.

Cabi paraensis Ducke, Arq. Serv. Florest. 2:13–

14. 1943.—TYPE: Brazil, Pará, Belém, ad urbem culta et subspontanea, Oct-Nov 1940, *Ducke 819* (isotypes: F!, NY!).

Woody vine or climbing shrub 3–15 m high; stems glabrous or slightly sericeous, terete, olive-green to dull brown; pith white and spongy, or absent; interpetiolar ridges present. Lamina of larger leaves 9–16 cm long, 3.5–8.5 cm wide, lanceolate-ovate to ovate, cuneate or rounded at base, short- to long-acuminate at apex, sparsely sericeous below, soon glabrate, glabrous above, 0–8 abaxial glands borne at the margin toward the lamina base on either side; petiole 8–34 mm long, bearing minute stipules at base. Inflorescence compound, of 1–7 four-flowered umbels racemosely arranged, the floriferous shoots usually 2 per leaf axil; bracts 0.6–1.3 mm long; peduncle 3–7 mm long; bracteoles 1.0–1.7 mm long, opposite, glabrate, near peduncle apex. Pedicel 6–11 mm long, circinate in young buds, divergent in umbel. Sepals abaxially sericeous, the lateral 4 exceeding the glands by 0.6–1.1 mm, the glands ovate or oblong, 1.3–3.5 mm long. Petals abaxially sericeous, sometimes sparsely so, the 4 lateral ones 5.9–14.6 mm long, 4.2–9.8 mm wide; posterior petal 5.6–11.6 mm long, 3.3–7.3 mm wide, with a claw 0.4–1.5 mm wide forming ¼ to ½ of the petal length. Filaments 1.6–2.3 mm long, ⅓–½ connate; posterior anthers three, 0.5 mm long, anterior anthers seven, 1.0–1.2 mm long; connectives convex and faceted. Styles 1.7–2.8 mm long, straight or slightly sinuous, sericeous at base, slightly expanded at apex. Mericarp 3-lobed, corky, 1.5–2.0 cm wide (fig. 2s, t), the lobes ridged, occasionally bearing wings 1.0 cm high and 0.3–0.5 cm wide (fig. 2u); intermediate winglets absent; ventral areole 8–10.5 mm high, 5–6 mm wide, ovate (fig. 2s).

Representative specimens examined. BOLIVIA. **Cochabamba:** Prov Chapare (Todos Santos), *Steinbach 416* (F, MICH, NY).

BRAZIL. **Pará:** Belterra, Porto Novo, *Black 48-2342* (INPA); Belém, *Ducke 1641* (F).

ECUADOR. **Pastaza:** Río Conambo near Conambo, *McElroy 371* (QCA).

PERU. **Amazonas:** Huambisa cerca de Caterpiza, *Tunqui 757* (MICH). **Huánuco:** vicinity of Tingo María, *Mathias and Taylor 5308* (F, LA); Chicoplaya, *Rodriguez s.n.* (F); Prov Pachitea, Dtto. Honoraria, *Schunke V. 1744* (F); Cucharas, valley of Río Huallaga, *Woytkowski 1598* (BR, F, GH, MO); Pendencia, *Woytkowski 7507* (F, MO). **Loreto:** Maynas, Río Gueppi, *Gentry et al. 21754* (MICH, MO); above Pongo de Manseriche, *Mexia 6330* (F, GH, MICH, MO, US); San Miguel, Yurimaguas, *Schunke V. 6357* (F, LA); Fortaleza, Yurimaguas, *Williams 4219* (F). **Madre de Dios:** Parque Nacional de Manú, Cocha Cashu station, *Foster 5586* (F, MICH); *Foster 7017* (F). **San Martín:** Chazuta, Río Huallaga, *Klug 4052* (F); N of Uchiza, 18 Jan 1962, *Schunke V. 5740* (F, LA); Prov Mariscal Caceres, E de Puerto Pizana, Tocache Nuevo, *Schunke V. 6473* (MICH); Juan Guerra, near Tarapoto, *Williams 6840* (F); Gramalote ad Saposoa, *Woytkowski 7317* (GH, MO, US). **Ucayali:** sobre el Río Abujao, Prov Coronel Portillo, *Diaz et al. 856* (MICH).

VENEZUELA. **Falcón:** Dept Silva, ca. 5 km S puente Coro-Moron sobre el Río Tocuyo, *Medina 6* (CORO, MICH).

Occurs in the montaña region of the upper Amazon basin from Ecuador to northern Bolivia; disjunct in northwestern Venezuela and along the Lower Amazon (fig. 5). In the vicinity of Belém the plant is cultivated (Ducke 1943) and it may have been introduced at the localities on the Lower Amazon and perhaps in Venezuela; it is also possible that the compact corky fruits are dispersed long distances by water. The plant flowers all year and has been collected in fruit from November to May.

The fruits of this species, with their rudimentary wings, mark it distinctly from the other species of the genus, but its reduced posterior stamens, sericeous petals, transversely-expanded stigmas, marginal laminar glands, and corky mericarp nut suggest that, like some other mascagnioids (Anderson 1980b, 1981), its closest relatives are species that have winged mericarps, in this case species of *Callaeum*.

Ducke (1943), in describing *Cabi paraensis*, reported that it is used as a hallucinogen in the vicinity of Belém, in much the same way as is *Banisteriopsis caapi* (Spruce ex Griseb.) C. Morton (hence his generic name *Cabi*), and believed his new genus to be closely related to that plant. In Peru, however, the plant seems to be used only for medicinal purposes; the type specimen collected by Ruiz bears the common name *bejuco de las calenturas*, and Grisebach acknowledged this use of the plant as a febrifuge in his specific epithet. Later collectors of the plant in Peru have noted that the leaves and stem of it are used in treatment of internal and external sores. Research on the chemical properties of *Cabi paraensis*, summarized by Schultes (1982), has shown that the plant contains the alkaloid harmine. Other common names for the

plant in Peru include *agahuasca, ayahuasca negro, shillinto, shillinto blanco,* and *shillinto negro.*

10. **Callaeum psilophyllum** (Adr. Juss.) D. M. Johnson, comb. nov.—*Hiraea psilophylla* Adr. Juss. in St.-Hilaire, Flora Bras. Merid. 3:20-21. 1832.—*Mascagnia psilophylla* (Adr. Juss.) Griseb., Flora Bras. 12(1):94. 1858.—LECTOTYPE (here designated): Brazil, Prov. Rio de Janeiro, *St.-Hilaire Cat. C² 2° partie No. 44* (P, photo at MICH!).

Hiraea platyptera Griseb., Linnaea 13:244-245. 1839.—TYPE: Brazil, Paraná, *Sellow IV it. 5676* (isotype: NY!).

Mascagnia pachyptera Rusby, Mem. N.Y. Bot. Gard. 7:271. 1927.—TYPE: Bolivia, Rurrenabaque, 24 Nov. 1921, *Cárdenas 1163* (holotype: NY!; isotype: MICH!).

Climbing or prostrate woody vine 0.8–7 m long; stems terete, sericeous to glabrate; stems with wrinkled tan to gray bark when older; interpetiolar ridges absent from nodes. Blades of larger leaves 5.5–16.0 cm long, 3.0–7.5 cm wide, elliptical or ovate, broadly cuneate or rounded at the base, acuminate at apex, sparsely to densely tomentose, or sericeous to glabrate below, sparsely sericeous or glabrate above, with 0–2 glands on the margin on either side in the proximal half; petiole 6–22 mm long, bearing minute epipetiolar stipules at base or stipules absent. Inflorescence simple or compound, composed of 4–6-flowered umbels or short racemes; smaller leaves subtending inflorescence 1.0–2.0 cm long, lanceolate to ovate, acute at apex, thinly sericeous to densely tomentose; bracts 0.8–3.7 mm long, lanceolate, tomentose or sericeous to glabrate; peduncles 2–9 mm long, sericeous to glabrate; bracteoles 0.7–2.8 mm long, lanceolate to ovate or orbicular, sericeous to glabrate. Pedicels 4.5–14 mm long, sericeous to glabrate, circinate in young buds, and divergent. Sepals abaxially sericeous, the lateral 4 exceeding the glands by 0.5–2.5 mm, the glands 1.0–2.3 mm long, ovate. Petals abaxially sericeous, the 4 lateral ones 6.1–14.8 mm long, 4.3–9.7 mm wide, with erose margins; posterior petal 5.5–12.5 mm long, 2.6–7.3 mm wide, with a claw 0.6–1.1 mm wide forming ⅖–⅗ of the length of the petal; posterior petal limb obovate or rhombic. Filaments 2.0–3.0 mm long, ⅓–⅔ connate; posterior anthers three, 0.5–1.0 mm long, anterior anthers seven, 0.8–1.8 mm long; anther connectives flat and smooth. Ovary sericeous or densely villous, 1.3–1.9 mm long; styles pilose, 1.6–2.4 mm long, expanded at apex. Mericarp 3-winged, glabrate, the lateral wings papery, 1.3–3.9 cm high, 0.9–2.3 cm wide, free at both base and apex (fig. 2v–y); dorsal wing auriculiform or crescentiform, 1.4–2.5 cm high, 0.6–1.0 cm wide (fig. 2w); intermediate winglets occasionally present between dorsal and lateral wings, 0.3–0.5 cm high, 1.0–1.5 cm wide; ventral areole 4–13 mm high, 3–5.5 mm wide, lanceolate to ovate (fig. 2v, x).

Representative specimens examined. ARGENTINA. **Corrientes:** Dept Santo Tomé, Cuay Grande Fonea, *Huidrobo 4223* (CTES); Dept Alvear, Ruta 40 y Río Aguapey, *Schinini et al. 16797* (CTES, MICH); Dept San Martín, 5 km E de Guaviraví, costa del Río Uruguay, *Schinini et al. 17014* (CTES, MICH). **Jujuy:** Dept Santa Bárbara, Santa Bárbara, *Meyer 8652* (NY). **Misiones:** Dept Posadas, Marlises, *Bertoni 5782* (CTES); Dept Candelaria, San Juan, *Bertoni 5851* (CTES); Dept San Javier, San Javier, barranca Río Uruguay, *Schulz 7089* (CTES, MICH). **Salta:** Dept Orán, Tartagal a Vespucio, *Schreiter 1112* (NY).

BOLIVIA. **Santa Cruz:** Puerto Pailas 40 km E Santa Cruz de la Sierra, *Krapovickas and Schinini 32450* (CTES, MICH); Santa Cruz alrededores del Zoológico, *Krapovickas and Schinini 36145A* (MICH); Prov Chiquitos, San José, 17°47'S, 60°47'W, *Krapovickas and Schinini 36521* (MICH); 10 km S San José, 17°47'S, 60°47'W, *Krapovickas and Schinini 36649* (MICH); Santa Cruz, *Kuntze s.n.* in 1892 (NY).

BRAZIL. **Bahia:** Mpio Feira de Santana, Rodovía Feira-Rio de Janeiro, km 8, margem do Rio Jacuípe, *Carvalho 599* (MICH); Mpio Valente, nas imediações da Fazenda Cocho, *Döbereiner and Tokarnia 1460* (MICH); basin of the upper São Francisco River, Bom Jesus de Lapa, *Harley 21388* (MICH); Queimadas, *Rose 19845* (NY). **Ceará:** Humaytá, barranca da beira do Rio Banabuyú, *Ducke 2226a, 2226b* (MG). **Distrito Federal:** "Cimentos Tocantins," km 13 on D.F. 7, *Anderson et al. 35074* (MICH, NY); Corrego Landim, ca. 25 km N Brasília, *Irwin et al. 13972;* Chapada de Contagem, near Corrego Landim, ca. 25 km NE Brasília, *Irwin et al. 19423* (MICH, NY). **Maranhão:** Mpio Loreto, ca. 25 km S of city of Loreto, *Eiten and Eiten 4860* (NY). **Mato Grosso:** Villa Maria, May 1892, *Kuntze s.n.* (NY); July 1892, *Kuntze s.n.* (NY); Estaçao de Bodoquera, Dec 1941, *Santos s.n.* (R). **Paraná:** Fazenda das Almas (Mun. Pirai do Sul), *Hatschbach 18809* (MICH); Rio Pardo, prox. a barra (Mun. Adrianópolis), *Hatschbach 37893* (MICH); Corbelia, arredores, *Hatschbach 46242* (MICH). **Pernambuco:** Mpio Bom Conselho, *Döbereiner and Tokarnia 1675* (MICH). **Rio Grande do Sul:** Porto Xavier, costa del Rio Uruguay, *Krapovickas and Cristóbal 33735* (CTES, MICH). **Santa Catarina:**

Riachuelo, Lontras, Rio do Sul, *Reitz and Klein 8651* (MICH, P); Caxambu, Tupitinga, Campos Novos, *Reitz and Klein 14641* (MICH, P); Lacerdópolis, Capinzal, *Reitz and Klein 14721* (MICH, P).

PARAGUAY. [In dumetis prope Bellavista in regione cursus superioris fluminis Apa, Nov.], *Hassler 8026* (NY).

URUGUAY. Artigas, *Palacios-Cuezzo 2019* (CTES); Fray Bentos, *Fruchard s.n.* (MICH).

A variable and widespread species that occurs on forest edges, riverbanks, and rocky slopes at 50–500 m elevation from northeastern Brazil south to northern Argentina and Uruguay (fig. 5), flowering all year and fruiting November–July.

The plants from the Paraná Basin region have primarily glabrous leaves, while those from the drier, more exposed uplands of Bahia and Distrito Federal have leaves that are appressed-tomentose or sericeous below; *Eiten and Eiten 4860* from Maranhão is atypical in having leaves that are densely sericeous below, and in being a small plant from a woody base. Plants from southeastern Bolivia and Mato Grosso have extremely long peduncles, densely tomentose new growth, and relatively large flowers, but these characters seem to vary independently from collection to collection. The taxonomic significance of these hirsute specimens cannot be assessed at present, but they may prove to represent distinct species rather than aberrant forms of *C. psilophyllum*.

EXCLUDED TAXON

Mascagnia fluminensis (Griseb.) Griseb., Fl. Bras. XII 1: 94. 1858.—*Hiraea fluminensis* Griseb., Linnaea 13: 243–244. 1839.

Grisebach based *Hiraea fluminensis* on collections made by Sellow in Rio de Janeiro. The syntypes at Berlin were destroyed, and no duplicates have been found, but there is a photograph of one of the syntypes, F neg. no. 12688 (MICH!). Niedenzu (1928) included the species in *Mascagnia* subg. *Plagiogynixa*, but recognized it as aberrant in the subgenus by virtue of its ovoid buds, oblong-clavate sepal glands, and non-transversely dilated stigmas, and suggested that it formed an intermediate between subg. *Plagiogynixa* and subg. *Mexogynixa* (=subg. *Mascagnia*) series *Zygandra*, especially *Mascagnia brevifolia*. Neither Grisebach nor Niedenzu saw specimens with fruits.

Recently, W. R. Anderson (pers. comm.) has received two collections from the area of Rio de Janeiro that match the description of *Mascagnia fluminensis* and the photograph of its type. One of those collections bears fruits, which show the plant to be a species of *Heteropterys*. Anderson will describe the fruit and publish the new combination in a forthcoming publication.

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