Peperomia hobbitoides (Piperaceae), a New Species of Karstophile from the Rain Forests of the Isthmus of Tehuantepec, Mexico

Author: Wendt, Tom

Source: Lundellia, 2003(6) : 37-43

Published By: The Plant Resources Center, The University of Texas at Austin

URL: https://doi.org/10.25224/1097-993X-6.1.9

PEPEROMIA HOBBITOIDES (PIPERACEAE), A NEW SPECIES OF KARSTOPHILE FROM THE RAIN FORESTS OF THE ISTHMUS OF TEHUANTEPEC, MEXICO

Tom Wendt

Plant Resources Center, The University of Texas at Austin, 1 University Station F0404, Austin, Texas 78712-0471

Abstract: **Peperomia hobbitoides** is described as a new species from karst rain forests of extreme southeastern Veracruz, Mexico. The new species grows directly on outcrops of karstic limestone, sprouting from corms lying in tiny soil pockets of ledges, depressions, and holes in the rock. It may be distinguished from all previously described species of *Peperomia* of Mexico and Central America by the combination of the small perennial corm, the broadly ovate acuminate-tipped leaves with cordate bases and campylodromous venation, and the ellipsoid fruit 1.5–2.0 times as long as thick with a distinct narrow apical appendage ca. 0.15–0.3 mm long. The herbage of the new species has a strong fragrance and flavor of fresh coriander (cilantro) and is eaten by inhabitants of the area. *Peperomia hobbitoides* is most similar morphologically to *P. asarifolia* Schltdl. & Cham. and *P. bernoullii* C. DC. but is easily distinguished from both.

Resumen: Se describe **Peperomia hobbitoides** como una especie nueva de las selvas cársticas del extremo sureste de Veracruz, México. La especie nueva prospera sobre afloramientos de roca caliza cárstica, naciendo de tubérculos que se encuentran en el suelo de pequeños huecos y depresiones de la roca. La nueva especie se distingue, de otras descritas para México y Centroamérica, por la siguiente combinación de caracteres: el tubérculo pequeño y perenne; las hojas anchamente ovadas y con el ápice acuminado, la base cordada, y la venación campilódroma; y el fruto elipsoide (el cuerpo del fruto 1.5–2 veces más largo que ancho) y con un apéndice apical ca. 0.15–0.3 mm de largo. El follaje de *Peperomia hobbitoides* al estrujarse expele una fragancia sugestiva del cilantro, y por el sabor del mismo se ocupa en la comida casera en el área. *Peperomia hobbitoides* es morfologicamente semejante a *P. asarifolia* Schltdl. & Cham. y *P. bernoullii* C. DC., pero se distingue facilmente de ambas.

Keywords: Flora of Mexico, flora of Veracruz, karst rain forest, *Peperomia,* Piperaceae.

Botanical material collected by personnel of the herbarium (CHAPA) of the Colegio de Postgraduados, Chapingo [now Montecillos], Mexico, during the 1980's in the rain forests of the Isthmus of Tehuantepec continues to yield species new to science, including the following:

Peperomia hobbitoides T. Wendt, sp. nov. (Fig. 1).

TYPE: **MEXICO.** VERACRUZ: Municipio Minantitlán [now Mpio. Uxpanapa]: Cerro Blanco, ca. 7 km al NE de Uxpanapa en el camino al Poblado 15, pendientes fuertes con peñascos grandes de caliza, selva alta perennifolia de *Dialium, Pouteria sapota, Brosimum, Spondias radlkoferi,* y sobre la roca *Pseudobombax* y *Bursera,* 17°14′N, 94°09′W, 370 m., 19 Oct 1983, *T. Wendt, A. Montero H. & I. Almaráz G. 4223* (HOLOTYPE: MEXU; ISOTYPES: BM, CHAPA, MO, NY, TEX, XAL).

Inter species subgeneris *Tildeniis* ad *P. asarifolium* Schltdl. et Cham. et *P. bernoullii* C. DC. accedens sed apice folii acuminato, corpore fructus ellipsoidali 1.5–2-plo longiore quam latiore, appendice apicali fructus 0.15–0.3 mm longa ab utroque recedens.

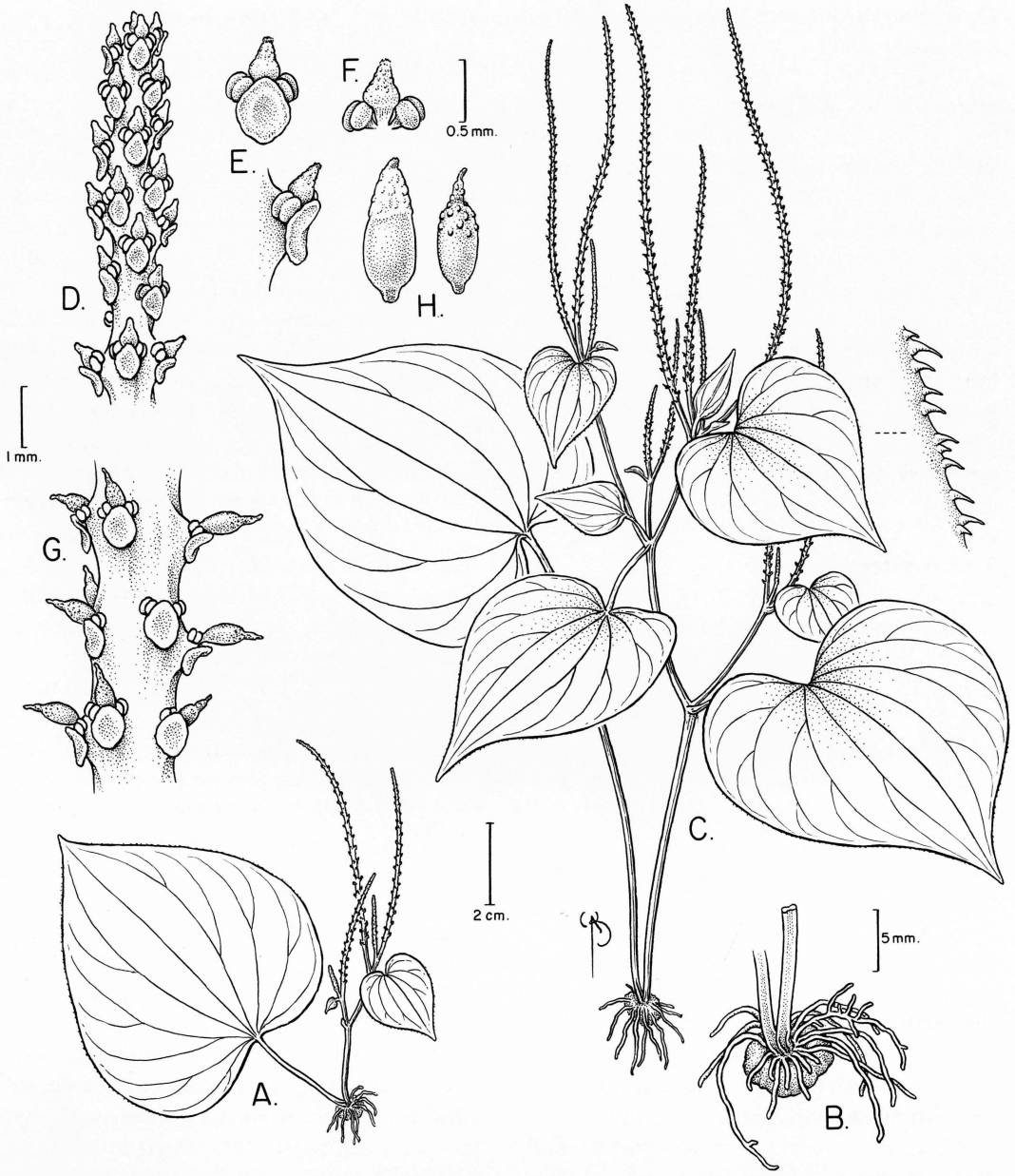

FIG. 1. *Peperomia hobbitoides.* A. Smaller plant (same scale as C). B. Detail of corm. C. Larger plant, with detail (right) of leave blade margin. D. Part of flowering portion of inflorescence/infructescence (rehydrated). E. Flower from abaxial (above) and lateral views. F. Flower with peltate floral bract removed, abaxial view. G. Part of fruiting portion of inflorescence/infructescence (drawn from dry material). H. Fruits, rehydrated (left) and dry (right). All drawn from the type collection by Bobbi Angell.

PERENNIAL HERB with delicate annual stem from a small perennial corm, this to ca. 1 cm diam., ± irregularly shaped but often roughly globose, the stem and basal leaf arising from a ± depression in upper surface and roots rising from around stem base on upper corm surface (the corm thus "campylotropous" in the sense of Hill (1906, 1907)); largest plants to 30 cm tall with up to 6 aerial internodes along principal axis, the axillary shorter branches common, the lowest internode to 8 cm long, the upper ones sequentially reduced in length, largest late-season plants generally weak, often reclining or straggling with desultory adventitious roots at lowest node and occasional above; many fertile plants even in late season much smaller, with only 2 or 3 internodes, the height less than 15 cm, and limited branching; entire plant with strong fragrance (and flavor) of fresh *Coriandrum sativum* L. (coriander or cilantro) when crushed. STEMS glabrous, liquid-engorged when fresh, when dry this reflected by irregularly strongly flattened and/or ribbed aspect; dried flattened stems to 4 mm wide near base on largest plants. LEAVES alternate, a basal leaf arising from corm at extreme stem base, this generally the largest leaf and apparently sprouting from corm before aerial stem; petioles of basal leaves to 13 cm long, at first relatively short but soon ca. as long as or generally distinctly longer than the subtended blade, petioles reduced in actual and relative length upward, in upper leaves much shorter than blade, the petioles of texture like stem, sulcate at least near base and partially clasping stem; leaf blade cordiform, that of basal leaf generally the largest, in this mostly 5–10(–15.5) cm long, 4–8.5(–10) cm wide, 1.1–1.6 times as long as wide, the apex acuminate to abruptly acuminate, when the latter the acumen 1–2.5 cm long, the base broadly to narrowly cordate, upwards on plant the blades gradually reduced in size but similar in shape, all leaf blades quite thin-textured and ± translucent when dry, the venation campylodromous with mostly 7–9 veins from base, their arrangement typically of 5 stronger more central veins, 2 slightly weaker veins outside these, and 2 much finer ones diverging from the extreme bases of the previous 2 and running near margin, the central 3 veins occasionally united for up to 6 mm, all basal veins except the central one and the marginal two with at least one major lateral to the outside, all these basal and lateral veins arching apexward and ± joining near margin, plane on both surfaces, finer venation coarsely reticulate, not strongly marked; margin ciliate with thick-based obscurely septate conical pointed hairs mostly 0.1–0.3 mm long, these also often scattered along veins of abaxial surface especially in younger leaves, the adaxial surface with quite scattered larger very stout bulbous-based conical pointed obscurely septate trichomes mostly 0.2–0.7 mm long, these generally more common near the margin, sometimes very sparse. INFLORESCENCES unbranched terminal (becoming leaf-opposed) and axillary spikes, these often appearing to form compound basally-branched inflorescences of 2–4 spikes due to crowding of spikes in axils (due to basal or near-basal branching of the axillary spike-bearing shoot), each axillary spike then subtended by a much-reduced foliage leaf or bract, the spikes generally delicate, glabrous, typically 4–12 cm long but eventually sometimes as long as 20 cm; peduncles few (–7) mm long, 0.4–1.5 mm thick; rachis relatively loosely flowered, the flowers roughly arranged in whorls with distinct space between whorls in fruiting portion, at length the arrangement sometimes appearing random, the individual flowers mostly borne on irregular broadly conical projections. FLORAL BRACT peltate, ± round, 0.4–0.6 mm diam., the upper surface abundantly beset with superficial globular clear glands. STAMENS 2; filaments 0.2–0.4 mm long; anthers 0.2–0.3 mm long and nearly as broad, barely exserted from floral bract, cream-colored at anthesis. PISTIL ovoid, 0.4–0.6 mm long, narrowed apically to a terminal finely fimbriate stigma,

densely beset with glands like those of floral bract. FRUIT (when dry) medium golden-brown to medium reddish-brown, short-stipitate (to 0.1 mm) or essentially sessile, the body ellipsoid, 0.4–0.65 mm long, 0.2–0.35 mm thick, 1.5–2.0 times as long as thick, apically abruptly narrowed (dry) to an irregularly cylindrical appendage 0.15–0.3 mm long, when rehydrated the appendage seen to be a fleshy ± bluntly conical structure covering the apex of the fruit body; fruit surface (dry) finely verruculose below, distal portion of body and appendage appearing strongly white-pustulose with glands like those of floral bract (these much less obvious and immersed in rehydrated material.)

ADDITIONAL SPECIMENS EXAMINED: **MEXICO: Veracruz:** Mpio. Jesús Carranza, 2 km al N del Poblado 2, Ejido F. J. Mina, 17°16′N, 94°40′W, elev. 120 m, 24 Sept 1982, *M. Vázquez T. et al. V-2547* (CHAPA, MEXU, TEX); Mpio. Minatitlán, 14 km E of Campamento La Laguna, 7.5 km N along small road through rubber plantation, 150 m, 7 Oct 1986, *B. Hammel & M. Merello 15569* (MO); Mpio. Minatitlán, terracería La Laguna–Uxpanapa, 4.4 km al E del camino al Poblado 11, 31.4 km al E del Campamento La Laguna, 17°14′N, 94°16′30″W, 190 m, 24 Sept 1980, *T. Wendt et al. 2685* (CHAPA, F); Mpio. Minatitlán, 13.7 km al E de La Laguna sobre la terracería a Uxpanapa, luego 5.7 km al N sobre el camino nuevo (no completo) a Belisario Domínguez (brecha 93), 17°19′30″N, 94°23′W, 130 m, 26 Nov 1981, *T. Wendt et al. 3470* (CAS, CHAPA, ENCB, MEXU, MO, TEX, U, XAL); Mpio. Uxpanapa, a 13.8 km al E de La Laguna por la terracería a Uxpanapa, luego 6.8 km al N por el camino a Belisario Domínguez, 17°18′48″N, 94°23′56″W, 100 m, 26 Oct 1998, *M. Ishiki et al. 2236* (U). [Note: All localities now pertain to the Municipio of Uxpanapa, created in 1997.]

The new species is known from lowland rain forest on karst substrates in the Uxpanapa region of extreme southeastern Veracruz, Mexico, in the Isthmus of Tehuantepec. Dominant canopy tree species in these rain forests include *Bernoullia flammea* Oliv., *Brosimum alicastrum* Sw., *Bursera simaruba* (L.) Sarg., *Cedrela odorata* L., *Chrysophyllum venezuelanense* (Pierre) T. D. Penn., *Dialium guianense* (Aubl.) Sandwith, *Guarea glabra* M. Vahl *sens. lat.*, *Spondias radlkoferi* Donn. Sm., and locally *Pseudobombax ellipticum* (H.B.K.) Dugand. *Peperomia hobbitoides* grows directly on outcrops of karstic limestone, sprouting from corms lying in tiny soil pockets of ledges, depressions, and holes in the rock. It has been collected in fertile condition from September through November. The basal leaf and aerial shoot appear to sprout from the corms with the summer rainy season and are flowering and fruiting by September. The single November collection shows plants mostly fruiting and with leaves much eaten, presumably by invertebrates; it is unlikely that the aerial portions typically last beyond December. *Peperomia hobbitoides* is known locally as "cilantro de la roca" due to the fragrance and flavor of the leaves and other parts of the plant, which are identical in these respects to fresh coriander (*Coriandrum sativum,* "cilantro" in Mexico). It is often used during its growing season to enliven the late-morning meal (*almuerzo*) of those passing through the karst forests or working in the fields nearby.

The epithet "hobbitoides" refers to the similarities between plants of the new species and the hobbits of the literary works of British author J. R. R. Tolkien. *Peperomia hobbitoides* is a small and humble plant that lives in an almost fairyland-like environment of wet karst outcrops in rain forest, and it is strongly and faithfully tied to this home substrate. Indeed, it spends perhaps the greater part of the year in holes and depressions in the rock as a resting tuber. It is edible, an attribute of high esteem among hobbits. And, like the hobbits, its home is under threat by forces much larger than itself, in this case forest clearing, which

has eliminated some forest types in the region and reduced the karst forests, and fires, which have severely affected parts of these karst forests.

Peperomia hobbitoides may be distinguished from all previously described species of *Peperomia* of Mexico and Central America by the following combination of characters: relatively small terrestrial (rupicolous) caulescent herb springing from a small perennial corm; broadly ovate acuminate-tipped leaves with cordate bases and campylodromous venation; fruit body 0.4–0.65 mm long, ellipsoid, 1.5–2.0 times as long as thick, when dry with distinct narrow apical appendage ca. 0.15–0.3 mm long.

Peperomia is a very large and common pantropical genus especially rich in the neotropics, with estimates of included species worldwide usually hovering around 1000 (e.g., Burger, 1971; Mabberley, 1997). Unfortunately, there is no recent monograph or synopsis of the Mexican species of *Peperomia,* nor any recent treatment for any *Peperomia*-rich area of the country. Indeed, it is hard to imagine a family more in need of taxonomic "friends" (as Standley and Williams [1974] said of the Bignoniaceae, pre-Alwyn Gentry) than the Piperaceae, both in Mexico and worldwide. The most recent general account of *Peperomia* for Mexico is included in Dahlstedt's 1900 study of New World species of the genus. In that work, *P. hobbitoides* would clearly fall within section *Tildenia* ("Eutildenia") of subgenus *Tildenia* Miq., without matching closely any of the species there included. In Standley and Steyermark's (1952) treatment of the family for Guatemala, material of the new species will key to either *P. asarifolia* Schltdl. & Cham. or *P. bernoullii* C. DC., both of which are included in Dahlstedt's synopsis. Review of relevant literature and herbarium material at TEX and US reveals no species apparently closer to *P. hobbitoides* than these two. Both species approach the new species morphologically in their more or less cordate-based, palmately-veined leaves roughly the size of those of *P. hobbitoides,* and in the presence of a corm from which the stem arises. However, each differs from *P. hobbitoides* in their relatively much broader fruits (as do most other species of *Peperomia* section *Tildenia*) and in other particulars discussed below.

Peperomia asarifolia is a somewhat variable species or group of species ranging from northwestern Mexico to southern Central America. Species or synonyms include at least *P. asarifolia, P. heydei* C. DC., *P. jaliscana* S. Watson, and *P. langlassei* C. DC.; type material or type photographs of all these have been examined at US. Plants of this complex vary in pubescence, with some approaching the distinctive ciliation of the leaves of *P. hobbitoides.* However, all differ markedly from the new species in their rounded to acute (never acuminate) leaves; their prominent yellow to orange (never clear) amber-like superficial floral-bract glands; their stout smooth inflorescences in which flowers and fruits are not elevated on peg-like processes when dry; and the quite different fruits, which in the *P. asarifolia* complex are globose to ovoid, about as wide as long (length/width ratio of dry fruit body [excluding apical appendage] 1.1 or less), and very dark-colored, with the apical appendage to only 0.1 mm long and poorly differentiated in dry material.

Standley and Steyermark (1952) consider *Peperomia bernoullii* to include *P. violifolia* C. DC., *P. izcalcoana* Trel., and *P. uphofii* Trel. Type specimens or photographs of types of all but the last have been studied at US, and Standley and Steyermark's decision seems sound. The species does not appear to be common and may be confined to northern Central America; at US and MO, I have seen material only from Guatemala and El Salvador, which is the range indicated by Standley and Steyermark. Its fruits are somewhat more similar in texture and color to those of *P. hobbitoides* than are those of *P. asarifolia,* but they nevertheless differ in being relatively broader (length/width ratio of dry fruit, excluding apical ap-

pendage, 1.3 or less) with an apical appendage (dry) 0.1 mm long or less. Other differences from *P. hobbitoides* include: leaves either glabrous or, often in younger leaves, obscurely ciliate with short conical hairs less than 0.05 mm long (much shorter than the cilia characteristic of the leaves of *P. hobbitoides*); leaf blades (although variable) typically obtuse to broadly acuminate at the apex, and subtruncate or rounded to broadly cuneate at the base; and inflorescences smooth, lacking peg-like processes.

Hill (1906, 1907) did a fine study of the fascinating New World "geophilous species of *Peperomia,*" which are referred to section *Tildenia* and appear to be relatively closely related to *P. hobbitoides.* Although Hill claimed to include "all the bulbous species" (1907, p. 139), all species considered are also characterized by acaulescent habit and more or less peltate leaves, thus excluding the corm-forming but caulescent and non-peltate-leaved species similar to *P. hobbitoides.* Nevertheless, at least one point from his study is of direct interest in the present context. Hill placed great emphasis on tuber morphology and development in assessing interspecific relationships. In categorizing the types of tubers and tuberous rhizomes in the group, Hill discussed at length the structure and development of the curious "campylotropous" corm typical of some mostly Mexican and Central American species. In these, the internal curvature of the corm leads to the roots arising next to the basal leaf and stem on the upper side of the corm. This unusual type of corm is also found in *P. hobbitoides* and its closest relatives and may indicate a relationship of these species to one complex of the acaulescent species. Clearly, future studies on the systematics and phylogeny of the geophilous peperomias will have to include species of both caulescent and acaulescent habit.

I find no indication either in herbarium material or in the literature that plants of *Peperomia asarifolia, P. bernoullii,* or any of the other somewhat similar species of *Peperomia* have a fresh coriander fragrance or are used in a way similar to *P. hobbitoides.* This is, of course, not conclusive evidence, as such facts are often overlooked or not noted by collectors. Although it is clear that the vast majority of species of *Peperomia* do not have this attribute, it is equally clear that a few do. For instance, Standley and Steyermark (1952) note some variation of the common name "culantro" (the Guatemalan equivalent of the Mexican "cilantro") for *P. maculosa* (L.) Hook., *P. obtusifolia* (L.) A. Dietr., and *P. peltilimba* Trel. For the Sierra Norte of Puebla, Mexico, Martínez Alfaro et al. (1995) report that *P. donaguiana* C. DC., *P. lenticularis* Dahlst., and *P. peltilimba* Trel., three species quite unrelated to each other, are all used (and in the latter case even sold) as a cilantro substitute. However, none of the mentioned species is closely related to *P. hobbitoides.*

ACKNOWLEDGEMENTS

Field work that led to collections of this species by the author was conducted while at the Centro de Botánica, Colegio de Postgraduados, Chapingo [now Montecillos], Mexico, with the support of that institution and of the federal Comisión del Papaloapan, S.A.R.H. I also thank those who participated in that field work, and especially Agustín Villalobos, Mario Vázquez, and Isidro Navarrete; William Burger for initial comments on the new species; reviewers Michael Nee and Ricardo Callejas for insightful comments and relevant information that led to a better paper; the curators of CHAPA, MO, U and US for loan of material and/or access to their collections; and Bobbi Angell for the fine illustration.

LITERATURE CITED

Burger, W. 1971. Flora Costaricensis. Family #41, Piperaceae. Fieldiana, Bot. 35: 5–218.

Dahlstedt, H. 1900. Studien über Süd- und Central-Amerikanische *Peperomien,* mit besonderer Berücksichtigung der Brasilianischen Sippen. Kongl.

Svenska Vetenskapsakad. Handl. 33(2): 1–218, pl. 1–10.

Hill, A. W. 1906. The morphology and seedling structure of the geophilous species of *Peperomia,* together with some views on the origin of monocotyledons. Ann. Bot. (Oxford) 20: 395–427, pl. 29–30.

———. 1907. A revision of the geophilous species of *Peperomia,* with some additional notes on their morphology and seedling structure. Ann. Bot. (Oxford) 21: 139–160, pl. 15.

Mabberley, D. J. 1997. *The Plant-Book, A Portable Dictionary of the Vascular Plants. Ed. 2.* Cambridge: Cambridge University Press.

Martínez Alfaro, M. A., V. Evangelista Oliva, M. Mendoza Cruz, G. Morales García, G. Toledo Olazcoaga & A. Wong León. 1995. *Catálogo de Plantas Útiles de la Sierra Norte de Puebla, México.* Cuadernos del Instituto de Biología UNAM 27.

Standley, P. C., & J. A. Steyermark. 1952. Flora of Guatemala. Piperaceae. Fieldiana, Bot. 24, part 3: 228–337.

——— **& L. O. Williams.** 1974. Flora of Guatemala. Bignoniaceae. Fieldiana, Bot. 24, part 10: 153–232.