

## NEW TAXA OF JUSTICIA (ACANTHACEAE) FROM SOUTHERN MEXICO AND GUATEMALA

Thomas F. Daniel  
Department of Botany  
California Academy of Sciences  
875 Howard Street  
San Francisco, California 94103

**ABSTRACT.** Four new taxa of *Justicia* (Acanthaceae) are described from southern Mexico and adjacent Guatemala: *J. cymulifera* from the Uxpanapa region of Veracruz with an unusual inflorescence, *J. karsticola* from the Uxpanapa region with heteromorphic floral bracts, *J. maya* from Chiapas consisting of plants that were previously included in *J. herpetacanthoides*, and *J. campechiana* subsp. *vestita* from Chiapas and Guatemala that differs from the nominate subspecies primarily by pubescence characters. Images and maps accompany the descriptions and discussions of these taxa.

*Justicia* L. is the largest genus of Acanthaceae with more than 700 species currently recognized worldwide. These include some 100 species from Mexico (Daniel, unpubl.). Recent studies of Acanthaceae, especially from southern Mexico, continue to reveal undescribed taxa in this remarkably species-rich genus (e.g., Daniel 1999, 2002, 2003; Daniel et al. 2005). In fact, 22 species of *Justicia* were described from Mexico between 1995 and 2006 (IPNI 2006), and at least 10 others await publication. Four additional taxa of *Justicia* are herewith proposed from southern Mexico and Guatemala.

***Justicia cymulifera*** T. F. Daniel, sp. nov.—TYPE: MEXICO. Veracruz: Mpio. Minatitlán, 2 km N de Uxpanapa (Pob. 12) sobre camino al Pob. 13, 17°14'N, 94°13'W, 130 m, arroyo seco en selva alta perennifolia perturbada, 17 May 1983, T. Wendt et al. 4103 (holotype: CAS!; isotype: CHAPA). Fig. 1.

Herbae perennes vel frutices. Folia petiolata; laminae anguste ellipticae vel oblanceolatae, 100–265 mm longae, 23–71 mm latae, 3–5.5-plo longiores quam latiores. Thyrsi vel thyrsorum paniculae cymuliferae; cymulae 1–3 in axillis bractearum, pedunculatae; cymulae bracteolae externae deltatae vel cordatae, 10–20 mm longae, 7–14 mm latae. Calyx 5–5.2 mm longus. Corolla aurantiaca-rubra, 33–35 mm longa, extus pubescens trichomatibus eglandulosis. Stamina thecis 1.9–2.2 mm longis, impariter insertis, theca supera dorsaliter pubescenti, theca inferna basi calcarata; pollinis grana 3-aperturata. Capsula ignota.

Perennial herbs to shrubs to 3 m. Young stems subterete to quadrate-sulcate, ± scurfy (or the epidermis becoming ± scaly), apparently devoid of trichomes. Leaves petiolate, petioles to 20 mm long, blades narrowly elliptic to oblanceolate, 100–265 mm long, 23–71 mm wide, 3–5.5 times longer than wide, acuminate at apex, attenuate at base, surfaces lacking trichomes but ± scurfy, margin entire to subsinuate. Inflorescence of axillary (or terminal) pedunculate thyrses or panicles of thyrses to 220 mm long (excluding flowers) bearing cymules (with 2 inner and 2 outer bracteoles forming an involucre at base of flower), peduncles to 95 mm long, bifariously pubescent with erect to flexuose to retrorse eglandular trichomes 0.1–0.3 mm long, rachis pubescent like peduncles; bracts caducous, subfoliose, lance-ovate, 13–16 mm long,



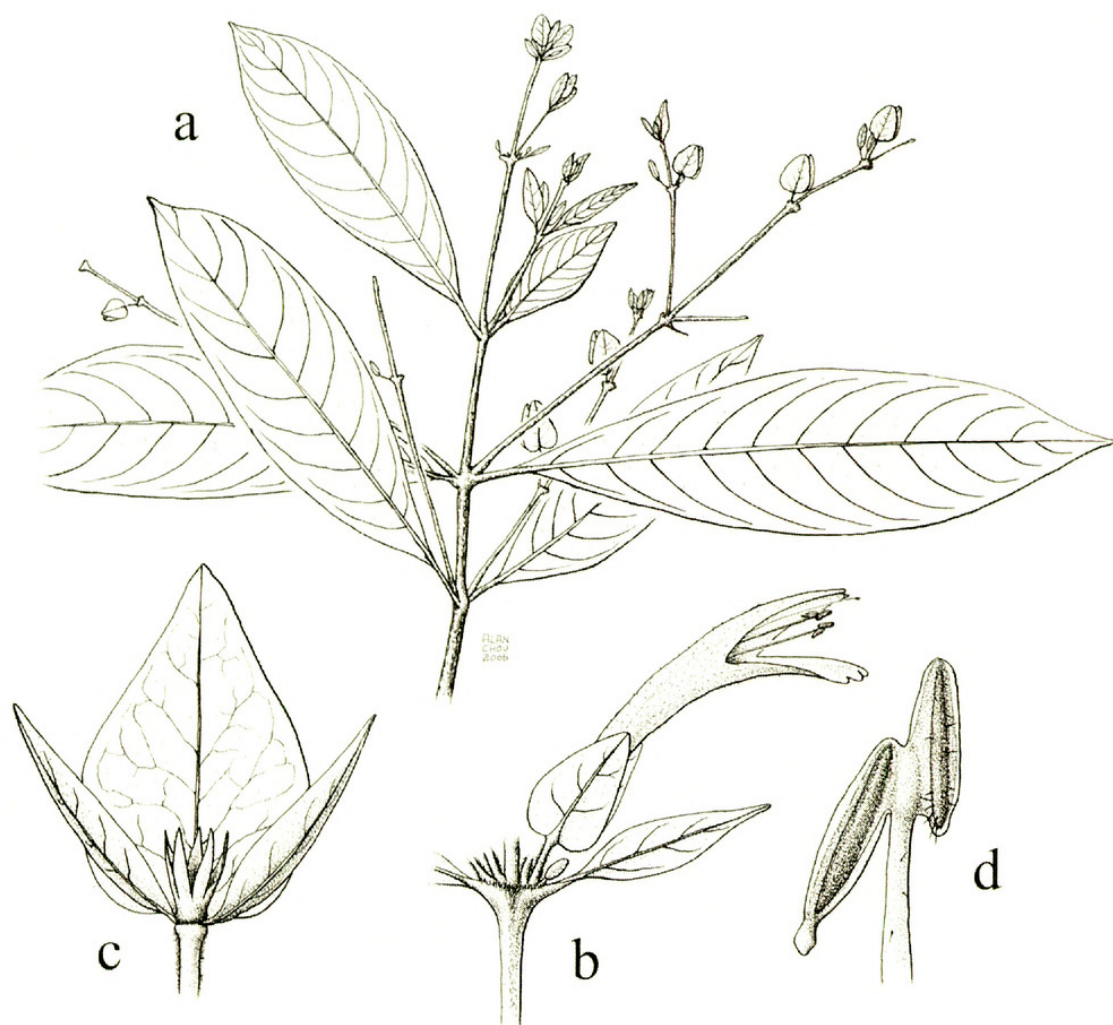


FIG. 1. *Justicia cymulifera*. a. Habit (Wendt et al. 4170),  $\times 0.4$ . b. Inflorescence node with flower (Wendt et al. 4103),  $\times 1.2$ . c. Cymule with one outer bracteole removed, showing adaxial surface of the other outer bracteole, inner cymule bracteoles, and calyx (Wendt et al. 4103),  $\times 1.9$ . d. Distal portion of stamen with anther (Wendt et al. 4103),  $\times 10.7$ .

3–5 mm wide, abaxial surface  $\pm$  scurfy, lacking trichomes; cymules opposite at bracteal nodes, 1–3 per axil, pedunculate, peduncles 3–13 mm long, pubescent like rachis; outer cymule bracteoles deltate to cordate, 10–20 mm long, 7–14 mm wide, subcordate to cordate at base, abaxial surface glabrous; inner cymule bracteoles lance-ovate, 6.5–14 mm long, 2–4.5 mm wide, abaxial surface glabrous. Flowers 1 per cymule, sessile. Calyx 5-lobed, 5–5.2 mm long, tube 0.6–1 mm long, lobes lanceolate, 4–4.6 mm long, 1–1.1 mm wide, abaxially glabrous. Corolla orange-red, 33–35 mm long, externally pubescent with erect to flexuose eglandular trichomes 0.1–0.2 mm long, tube 20 mm long,  $\pm$  gradually expanded from base, upper lip 14–15 mm long, 2-lobed at apex, lobes to 0.3 mm long, lower lip 12 mm long, lobes 1.3–1.5 mm long, 1 mm wide. Stamens 13–15 mm long, filaments pubescent with eglandular trichomes, thecae 1.9–2.2 mm long, subequal (lower theca slightly longer than upper theca), subperpendicular to parallel, unequally inserted (overlapping by 1 mm), upper theca dorsally pubescent with eglandular trichomes, lower theca with a blunt basal appendage 0.2–0.3 mm long; pollen (Fig. 2a–d) 3-aperturate, apertures flanked on each side by 1 row of insulae (in various stages of distinctness), exine reticulate. Style 35 mm long, glabrous distally, stigma 0.2 mm long. Capsules not seen.



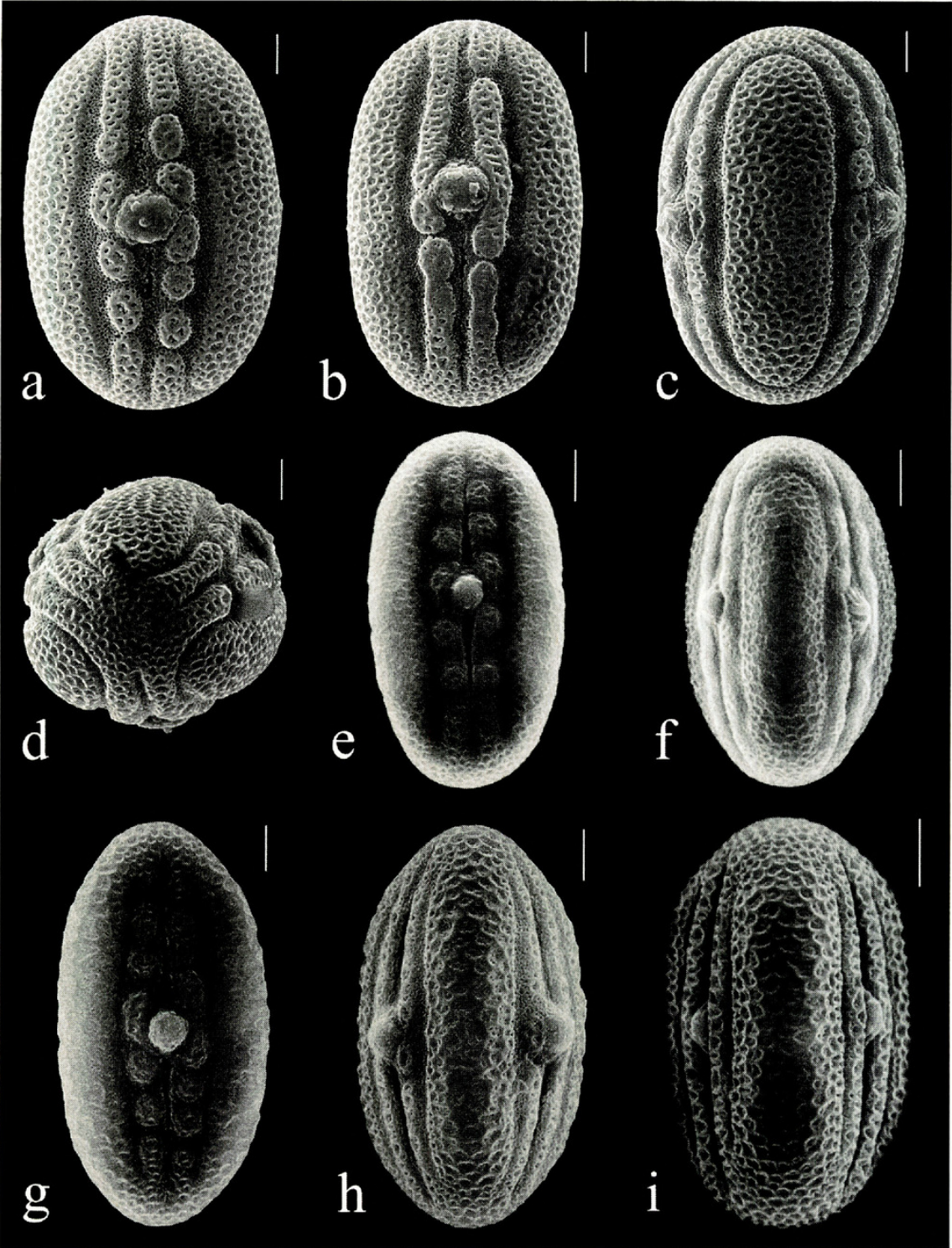


Fig. 2. Scanning electron micrographs of pollen. a–d. *Justicia cymulifera* (Wendt et al. 4103). a. Apertural view with  $\pm$  discrete insulae. b. Apertural view with “coalesced insulae.” c. Interapertural view. d. Polar view. e–f. *Justicia campechiana* subsp. *vestita* (Miranda 5860). e. Apertural view. f. Interapertural view. g–h. *Justicia maya* (Breedlove & Daniel 71004). g. Apertural view. h. Interapertural view. i. *Justicia karsticola* (Wendt et al. 2994), interapertural view. Scales = 5  $\mu$ m.

Phenology. Flowering: May; fruiting: unknown.

Distribution (Fig. 3). Known only from southern Veracruz where plants occur in lowland rain forests of the Uxpanapa region at elevations of 130 to 450 m.



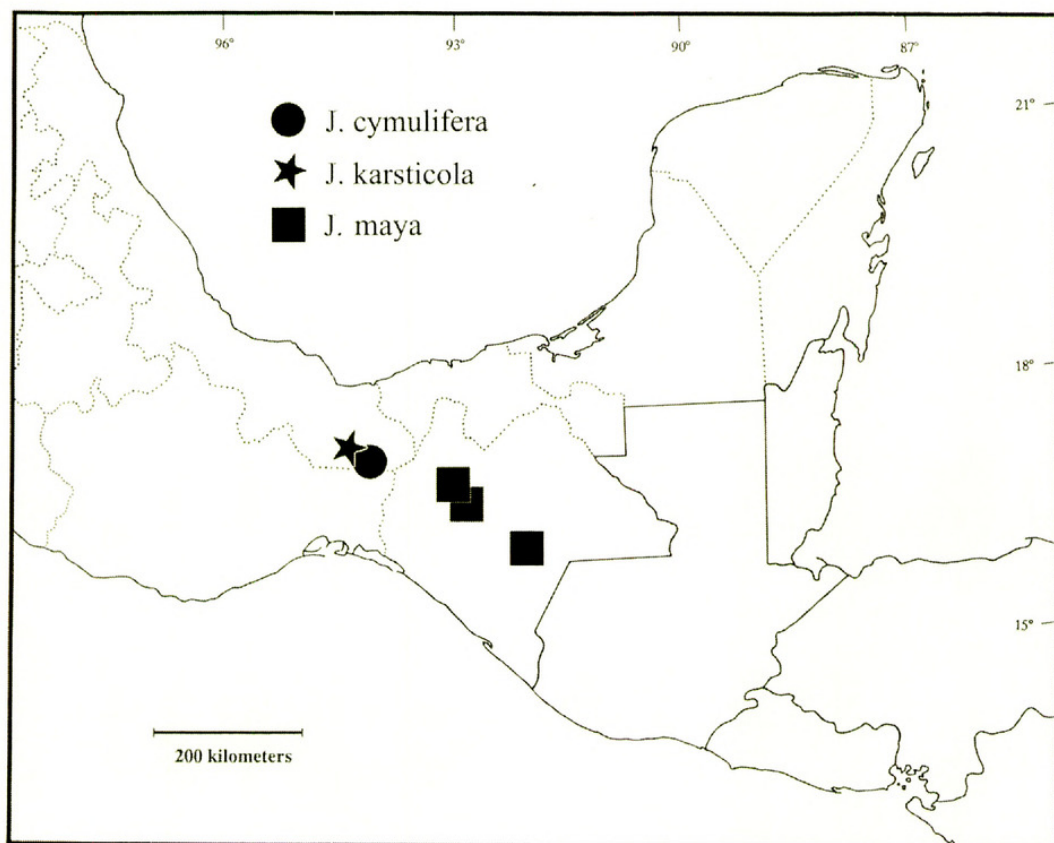


FIG. 3. Distribution of *Justicia cymulifera*, *J. karsticola*, and *J. maya*.

PARATYPE. **Mexico.** VERACRUZ: Mpio. Minatitlán, Cerro Blanco, ca. 7 km NE de Uxpanapa en el camino a Pob. 15, 17°14'N, 94°09'W, T. Wendt et al. 4170 (CAS).

*Justicia cymulifera* can be distinguished from other species of *Justicia* in Mexico by its pedunculate cymules (with the outer cymule bracteoles deltate to cordate) bearing relatively long, orange-red corollas. Superficially it resembles several species of *Dicliptera* due to the presence of similar cymules. It can be distinguished from species of that genus by its young stems, which are subterete to quadrate-sulcate (vs. generally hexagonal in *Dicliptera*), lower theca with a conspicuous basal appendage (vs. basal appendages absent in *Dicliptera*), and pollen with insulae present (vs. insulae absent in *Dicliptera*). Although capsules remain unknown for *J. cymulifera*, in capsules of *Justicia* the placentas do not separate from the inner capsule wall as they do in *Dicliptera*. A morphologically similar species that occurs at higher elevations (ca. 1200 m) in Guatemala, *J. pedicellata* D. N. Gibson, also has similar cymules, 3-aperturate pollen (with apertures flanked by a single row of insulae on each side), and relatively long, red corollas. Capsules are known for that species, and they resemble those found in other species of *Justicia* rather than those of *Dicliptera*. These two cymule-bearing species of *Justicia* from northern Latin America can be distinguished by the following couplet.

Inflorescence of pedunculate cymules in axils of leaves or clustered at distalmost node; leaves sessile or with petioles to 5 mm long, blades 30–62 mm long, 12–21 mm wide; peduncles of cymules glabrous; calyx 7–8 mm long; outer surface of corolla pubescent with mostly retrorse eglandular trichomes and sometimes with erect glandular trichomes as well; filaments distally glabrous; plants of Guatemala (Alta Verapaz).

*J. pedicellata*



Inflorescence of axillary or terminal pedunculate thyrses or panicles of thyrses bearing pedunculate cymules; leaves with petioles to 20 mm long, blades 100–265 mm long, 23–71 mm wide; peduncles of cymules bifariously pubescent; calyx 5–5.2 mm long; outer surface of corolla pubescent with erect to flexuose eglandular trichomes; filaments distally pubescent; plants of Mexico (Veracruz).

*J. cymulifera*

The presence of cymules in *Justicia* similar to those of *Dicliptera* and its relatives (e.g., *Hypoestes*) is not surprising considering the close phylogenetic relationship among these genera as shown by McDade et al. (2000). Indeed, that study revealed *Dicliptera* and its relatives (subtribe Diclipterinae) to be nested between Old World and New World species of *Justicia*. The presence of cymules among Old World species of *Justicia* was noted by Champluvier (2002) in *J. scutifera* Champ.

***Justicia karsticola*** T. F. Daniel, sp. nov.—TYPE: MEXICO. Veracruz: Mpio. Minatitlán, 13.7 km E de La Laguna, sobre terracería a Uxpanapa, luego 7.2 km N a Belisario Domínguez, 17°20.5'N, 94°23'W, 120 m, área kárstica en selva perennifolia, 5 Mar 1981, T. Wendt et al. 2994 (holotype: CAS!; isotype: CHAPA). Fig. 4.

Herbae perennes usque ad 6 dm altae. Folia petiolata, laminae ovatae vel ovato-ellipticae, 67–77 mm longae, 25–38 mm latae, 1.9–3.1-plo longiores quam latiores. Inflorescentia floribus in paniculis spicatis. Bracteae florales heteromorphae, oppositae; bracteae fertiles late ellipticae vel subcirculares, 4–5 mm longae, 2.3–3.6 mm latae; bracteae steriles lineares vel oblanceolatae, 2–3.5 mm longae, 0.2–0.5 mm latae. Calyx 5-lobus, 3–3.3 mm longus, lobis homomorphis. Corolla flavovirens labiis purpureo-notatis, 8.5–9.3 mm longa, extus pubescens trichomatibus eglandulosis. Stamina thecis 1.1–1.3 mm longis, impariter insertis, pubescentibus, theca inferna basi calcarata. Capsula ignota.

Perennial herbs to 6 dm tall; young stems subterete to subquadrate, 2-fariously pubescent with (flexuose to) antrorse eglandular trichomes 0.3–0.5 mm long, septae of trichomes conspicuous and purplish. Leaves petiolate, petioles to 32 mm long, blades ovate to ovate-elliptic, 68–77 mm long, 25–38 mm wide, 1.9–3.1 times longer than wide, acute to subacuminate at apex, acute to subattenuate at base, adaxial surface glabrous, abaxial surface pubescent along midvein with antrorse eglandular trichomes, margin entire to coarsely angulate. Inflorescence of terminal pedunculate panicles to 15 cm long (including peduncle and excluding corollas) and 15 mm in diameter, peduncles to 20 mm long, pubescent with cauline type trichomes ± concentrated in 2 lines, rachis ± evenly pubescent (or trichomes concentrated in 2 lines) with cauline type trichomes, lateral branches of panicles consisting of short spikelike axes (= modified dichasia?) to 13 mm long, sessile to subsessile (peduncles to 1 mm long), mostly 3–5-flowered; inflorescence bracts (i.e., bracts along main panicle rachis subtending lateral spikelike branches) petiolate, ovate to lanceolate to elliptic, 5–8 mm long, 1–2.5 mm wide (or proximalmost pair often larger, to 15 × 4 mm). Bracts of lateral spikelike axes (= floral bracts) opposite, those of a pair heteromorphic with fertile bracts much larger than sterile bracts; fertile bracts petiolate, broadly elliptic to subcircular, 4–5 mm long, 2.3–3.6 mm wide, abaxial surface pubescent with erect eglandular and glandular (sometimes ± inconspicuous) trichomes 0.05–0.2 mm long and often with longer antrorse eglandular trichomes along midvein, margin conspicuously ciliate with erect to flexuose eglandular trichomes 0.3–1.2 mm long; sterile bracts sessile, linear to oblanceolate, 2–3.5 mm long, 0.2–0.5 mm wide, abaxial surface and margin pubescent with flexuose eglandular trichomes to 0.7 mm long. Bracteoles



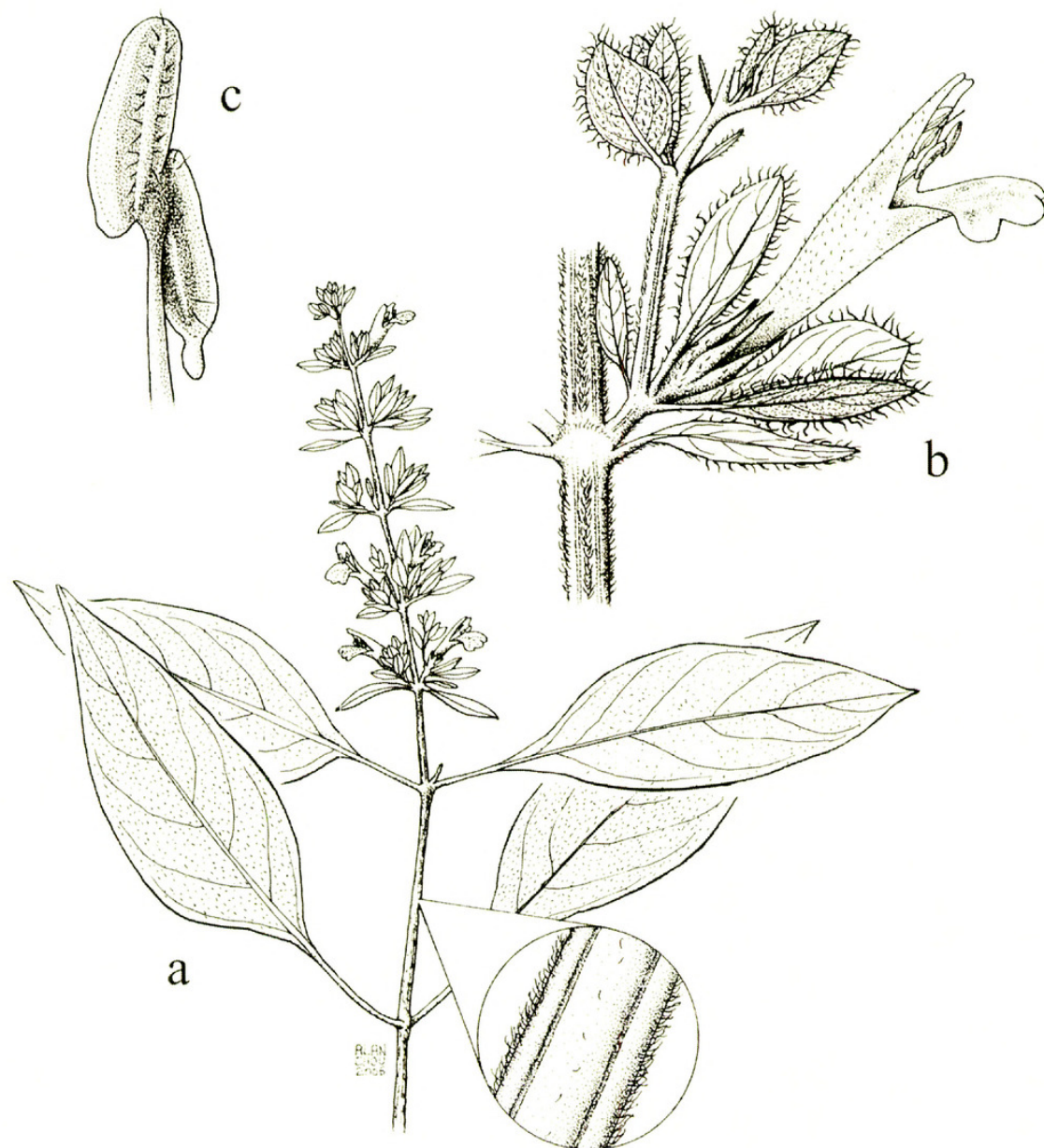


FIG. 4. *Justicia karsticola* (Wendt et al. 2004). a. Habit ( $\times 0.8$ ) with enlargement of vegetative internode ( $\times 7$ ). b. Inflorescence node with spikelike branch (= modified dichasium?) bearing a flower,  $\times 5$ . c. Distal portion of stamen with anther,  $\times 19$ .

obovate, often asymmetric, 4–5.2 mm long, 1–1.8 mm wide, abaxial surface and margin pubescent like fertile bracts. Flowers alternate (i.e., one per node), sessile to subsessile (pedicels to 0.5 mm long). Calyx 5-lobed, 3–3.3 mm long, lobes  $\pm$  equal, lanceolate, 2.3–2.6 mm long, 0.4–0.6 mm wide, abaxially pubescent with antrorse to flexuose eglandular trichomes 0.1–0.2 mm long. Corolla yellowish green with maroon markings on lips, 8.5–9.3 mm long, externally pubescent with erect to flexuose to retrorse eglandular trichomes 0.05–0.2 mm long, tube 5–5.5 mm long, slightly gradually expanded distally but lacking a distinct throat, 1.6–1.8 mm in diameter near midpoint, upper lip 3–4.2 mm long, emarginate at apex with lobes 0.2–0.3 mm long, lower lip 3.5–4 mm long, lobes 1.2–1.7 mm long, 1.2–2 mm wide. Stamens 4–4.2 mm long, inserted near apex of corolla tube, exerted from mouth of corolla but not extending beyond upper lip, filaments glabrous, thecae maroon, 1.1–1.3 mm long, subequal



in length (lower longer), parallel to subparallel, unequally inserted (overlapping by 0.3 mm), dorsally pubescent with eglandular trichomes, lower theca with a spurlike basal appendage 0.2–0.3 mm long; pollen (Fig. 2i) 3-colporate, 6-pseudocolpate, exine reticulate. Style 6.5–7 mm long, exerted from mouth of corolla but not extending beyond upper lip, proximally pubescent with eglandular trichomes; stigma asymmetrically funnellform, 0.2 mm long, lobes not evident. Capsule and seeds not seen.

Phenology. Flowering: March.

Distribution (Fig. 3). Known only from southern Veracruz where plants occur on karst (limestone) in lowland rain forests of the Uxpanapa region at elevations of 120 m.

*Justicia karsticola* is known only from the moist Uxpanapa lowlands of Veracruz. This region of high precipitation and diverse rain forests in southeastern Veracruz and adjacent Oaxaca is a center for endemic and disjunct taxa (Wendt 1987, 1997). With the recognition of both *J. cymulifera* and *J. karsticola* from the Uxpanapa region, at least 13 species of the genus are known there [also: *J. ardens* T. F. Daniel, *J. borraerae* (Hemsl.) T. F. Daniel, *J. fimbriata* (Nees) V. A. W. Graham, *J. kanal* T. F. Daniel, *J. lindeniana* (Nees) J. F. Macbr., *J. nevlingii* Wassh. & T. F. Daniel, *J. pectoralis* Jacq., *J. spicigera* Schltdl., *J. uxpanapensis* T. F. Daniel, *J. valvata* T. F. Daniel, and *J. wendtii* T. F. Daniel]. Four of these, *J. cymulifera*, *J. karsticola*, *J. uxpanapensis*, and *J. wendtii*, appear to be endemic to the region. *Justicia ardens* is known only from the Uxpanapa lowlands and the adjacent (and generally somewhat higher in elevation) Chimalapa region in Oaxaca. Several of these species of *Justicia* occur on, or are restricted to, the weathered limestone (karst) that characterizes large portions of this region.

The short lateral branches in the inflorescence of *J. karsticola* appear as spikes. Whether they are true spikes (with indeterminate growth) or modified dichasia that exhibit sympodial growth resulting in spikelike elongations is not known. Like several other species from the New World, *J. karsticola* has floral bracts heteromorphic at a node. Dimorphic bracts were noted by Graham (1988) in a Brazilian species, *J. scansilis* (Rizzini) V. A. W. Graham, of her sect. *Orthotactus* (Nees) V. A. W. Graham. In that species, however, the sterile bracts are broadly ovate to cordate and the fertile ones are narrowly ovate to lanceolate. *Justicia karsticola* differs from Graham's (1988) circumscription of sect. *Orthotactus* by its compound inflorescence, bracts not ovate, and pollen with three apertures. Wasshausen and Daniel (1995) and Daniel (2002) discussed several heteromorphically bracteate species from Mesoamerica. Mexican species of *Justicia* with heteromorphic bracts include: *J. caudata* A. Gray, *J. chol* T. F. Daniel, *J. karsticola*, *J. nevlingii* Wassh. & T. F. Daniel, *J. tuxtensis* T. F. Daniel, *J. uxpanapensis* T. F. Daniel, and *J. wendtii* T. F. Daniel. *Justicia karsticola* appears florally and palynologically similar to *J. wendtii*; indeed, both species were collected by Wendt from the same locality. They can be distinguished by the characters in the following couplet.

Young stems pubescent with retrorsely appressed trichomes; lateral branches of panicles consisting of pedunculate (peduncles 2–40 mm long) and unilateral spikes; bracts subopposite to alternate, sometimes  $\pm$  heteromorphic, obovate to oblanceolate, 1–2.5 mm wide, margin ciliate with trichomes up to 0.3 mm long; corolla 7–8.5 mm long, externally pubescent with glandular and eglandular trichomes; style 4.5–5 mm long.

*J. wendtii*

Young stems pubescent with (flexuose to) antrorse trichomes; lateral branches of panicles consisting of sessile to subsessile (i.e., peduncles to 1 mm long) and multilateral spikelike axes (= modified dichasia?); bracts opposite, conspicuously heteromorphic, fertile bracts broadly elliptic to subcircular, sterile bracts linear to oblanceolate, 2.3–3.6 mm wide, margin ciliate with trichomes 0.3–1.2 mm long; corolla 8.5–9.3 mm long, externally pubescent with eglandular trichomes; style 6.5–7 mm long.

*J. karsticola*



**Justicia maya** T. F. Daniel, sp. nov.—TYPE: MEXICO. Chiapas: 3 km S of Tuxtla Gutiérrez on road to Suchiapa, 700 m, slope with tropical deciduous forest, 3 Nov 1988, *D. Breedlove & T. Daniel 71004* (holotype: CAS!; isotypes: ENCB! MICH! MO! US!).

Herbae perennes vel frutices. Folia petiolata, laminae ovatae, 23–88 mm longae, 10–51 mm latae, 1.4–2.3-plo longiores quam latiores. Spicae dichasiatae dense bracteatae. Bracteae quadrifariae, late ovatae, 8–12 mm longae, 5–9 mm latae. Bracteolae lineari-ellipticae vel oblanceolatae, 5.5–9 mm longae, 1.2–2.2 mm latae. Calyx 5-lobus, 3–5.5 mm longus, lobis aequalibus. Corolla alba labio supero viridulo et labio infero purpureo-notato, 10.5–15 mm longa, extus pubescens trichomatibus eglandulosis. Stamina thecis 1.2–2 mm longis, impariter insertis, dorsaliter pubescentibus, theca inferna basi calcarata; pollinis grana 3-aperturata. Capsula 7–8.5 mm longa, pubescens trichomatibus eglandulosis. Semina 2.3–2.5 mm longa, minute papillosa.

Phenology. Flowering: October–January; fruiting: October–January.

Distribution (Fig. 3). Endemic to Chiapas; plants occur on rocky slopes in regions of evergreen seasonal forest and tropical deciduous forest at elevations of 700 to 850 m.

PARATYPES. **Mexico.** CHIAPAS: Mpio. Soconusco, 30 km ESE of Puguiltepec on rd. to Comitán, *D. Breedlove 53666* (CAS), *D. Breedlove & F. Almeda 56879* (CAS); Mpio. Tuxtla Gutiérrez, 2 mi S of Tuxtla Gutiérrez, *D. Breedlove & P. Raven 13364* (DS, F, MICH, US); between S. Fernando and Chacona, W of Tuxtla Gutiérrez, *I. Langman 3836* (PH, US); Mpio. Tuxtla Gutiérrez, El Zapotal, SE of Tuxtla Gutiérrez, 16°43'N, 93°06'W, *E. Palacios E. 2011* (CAS).

A detailed description in English and an illustration of this species were provided by Daniel (1995: 66–67, Fig. 17) under *Justicia herpetacanthoides*. At that time I enumerated several differences between Chiapan collections and those resembling the type of *J. herpetacanthoides* from Yucatán. Further, I indicated that the Chiapan plants might represent a species other than *J. herpetacanthoides*, but that further studies of that taxon and several others, including *Beloperone blechioides* Leonard, would be necessary prior to making such a determination. Recent studies of Acanthaceae in Honduras (Daniel 2005) and the Yucatan Peninsula (Daniel, unpubl.) reveal that *B. blechioides* corresponds to a Guatemalan and Honduran species that is now known as *J. ciriloi* T. F. Daniel, and that *J. herpetacanthoides* is not distinct from *J. lundellii* Leonard. Plants from Chiapas are here treated as a distinct species endemic to that state and differ from the Yucatan Peninsular endemic *J. lundellii* by the characters in the following couplet.

Young stems evenly pubescent; bracts sessile, 5–9 mm, wide; calyx 3–5.5 mm long; corolla 10.5–15 mm long; stamens 6.3–6.5 mm long, filaments glabrous; pollen apertures flanked on each side by 1 row of insulae (Fig. 2g, h); capsule 7–8.5 mm long; seeds 2.3–2.5 mm long, surfaces minutely papillose.

*J. maya*

Young stems bifariously pubescent; bracts narrowed proximally and ± petiolate, blades 3.5–5.5 mm wide; calyx 2.5–3 mm long; corolla 7–9 mm long; stamens 4–4.3 mm long, filaments pubescent; pollen apertures flanked on each side by a pseudocolpus (insulae generally absent); capsule 5.8–6 mm long; seeds 1.5–1.9 mm long, surfaces irregularly bacculate.

*J. lundellii*

Although both of these species occur in similar vegetation types, *J. lundellii* occurs at lower (5–225 m) elevations.

**Justicia campechiana** Standl. ex Lundell subsp. **vestita** T. F. Daniel, subsp. nov.—TYPE: MEXICO. Chiapas: Mpio. Ocosingo, 70 km SW of Palenque toward Ocosingo, along Jol Uk'um, 550 m, lower montane rain forest, 12 Apr 1981, *D. Breedlove 50937* (holotype: CAS!).

Fig. 5.



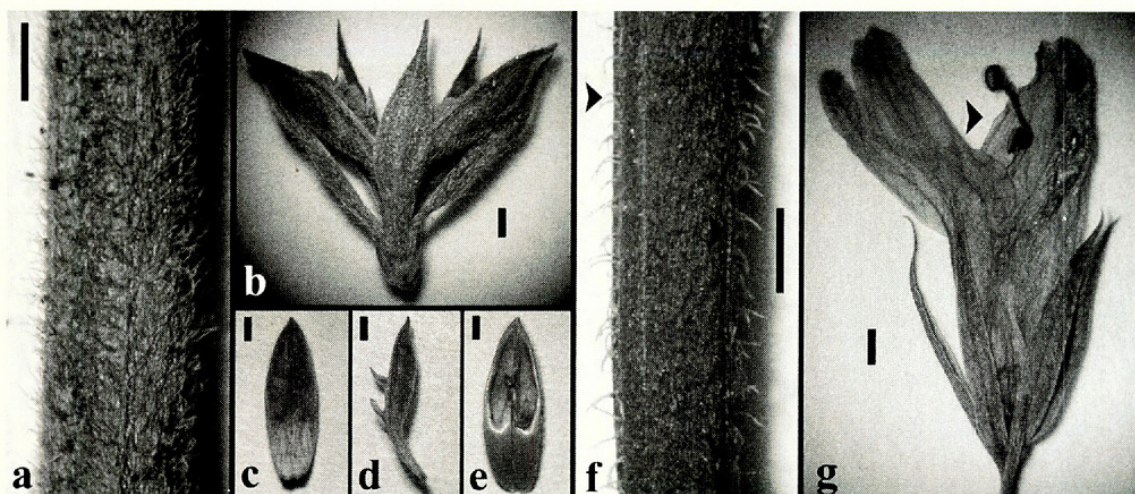


FIG. 5. *Justicia campechiana* subsp. *vestita* (a–e, Breedlove 50937) and subsp. *campechiana* (f–g). a. Young stem with evenly disposed trichomes. b. Calyx and capsule. c. Capsule valve (exterior view). d. Capsule valve (side view showing retinacula). e. Capsule valve (interior view). f. Young stem with arrows indicating two vertical rows of trichomes (Álvarez & Jiménez 3110). g. Flower with arrow indicating widely displaced thecae of one anther (Cabrera C. 9938). All scales = 1 mm.

Differt a subsp. *campechiana* caulibus juvenibus aequaliter pubescentibus, et foliis, bracteis, bracteolis, et calycibus pubescentibus.

Phenology. Flowering: December–January; fruiting: April.

Distribution (Fig. 6). Southern Mexico (Chiapas) and Guatemala (Alta Verapaz); plants occur in lower montane rain forest and montane rain forest at elevations of 550 m and higher.

PARATYPES. **Mexico.** CHIAPAS: Berriozábal–Las Vistas, *Enríquez* 6839 (MEXU), *F. Miranda* 5860 (MEXU).

A detailed description in English of this subspecies was provided by Daniel (1995: 57–58; as *J. campechiana*), who noted the distinctions between Chiapan plants and those from the Yucatan Peninsula that resemble the type. At that time, the species was insufficiently known to me from throughout its range to determine whether the more pubescent plants from Chiapas (and Guatemala) represented a geographically circumscribable population or not. Recent studies of this species from the Yucatan Peninsula reveal that plants from each region indeed comprise morphologically, geographically, and ecologically distinct components of the species, both of which are here accorded subspecific status. Figure 5 illustrates some of the morphological distinctions between the subspecies, and Fig. 6 shows their respective distributions; the following couplet summarizes some of their differences.

Young stems bifariously pubescent with antrorse trichomes; leaf surfaces, abaxial surface of bracts and bracteoles, and calyx glabrous; plants of the Yucatan Peninsula (Mexico: Campeche, Yucatán, Quintana Roo; Belize: Corozal; Guatemala: Petén), occurring in evergreen seasonal forest and tropical subdeciduous forest at elevations from sea level to 240 m.

*J. campechiana* subsp. *campechiana*

Young stems evenly pubescent with flexuose to antrorse trichomes; leaf surfaces, abaxial surface of bracts and bracteoles, and calyx pubescent; plants occurring to the south of the Yucatan Peninsula (Mexico: Chiapas; Guatemala: Alta Verapaz) in lower montane rain forest and montane rain forest at elevations above 500 m.

*J. campechiana* subsp. *vestita*



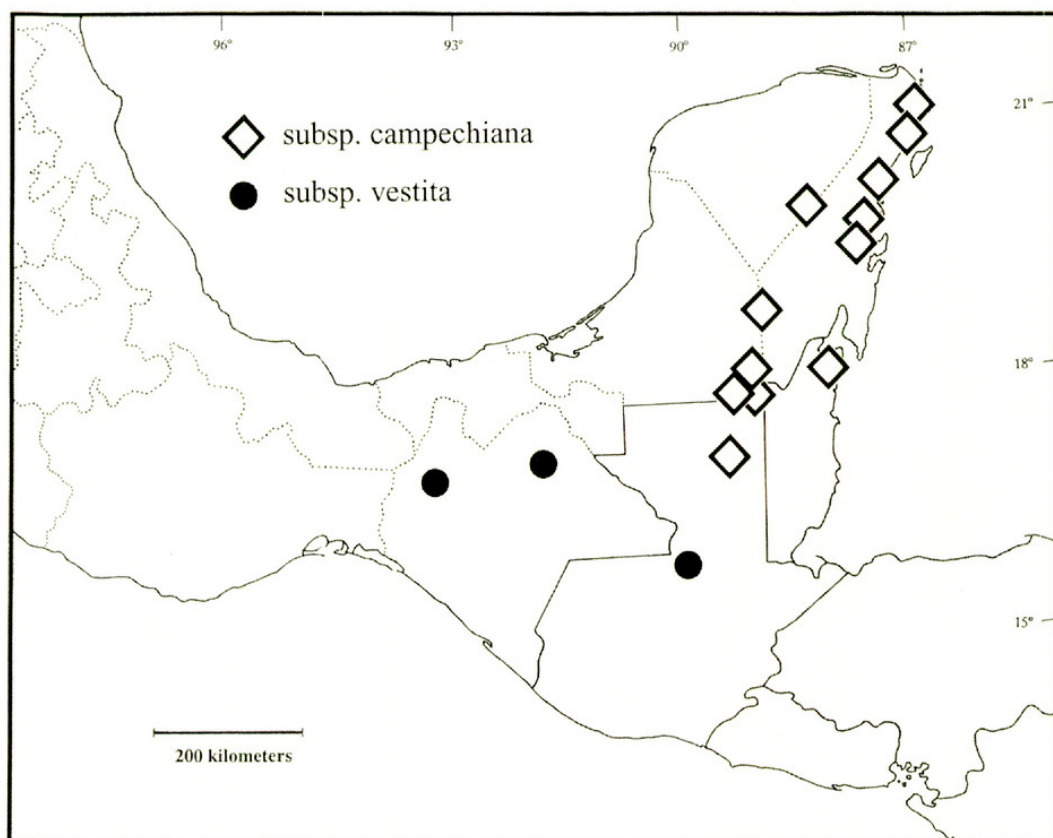


FIG. 6. Distribution of *Justicia campechiana* subsp. *campechiana* and subsp. *vestita*.

Pollen of *J. campechiana* subsp. *vestita* (Fig. 2e–f) is 3-aperturate with one row of insulae on each side of the aperture. In palynological features, it resembles the nominate subspecies.

#### ACKNOWLEDGMENTS

My field studies in the Yucatan Peninsula were funded by a Franklin Grant from the American Philosophical Society in 2003, and they were facilitated by Dr. Germán Carnevali and the Centro de Investigación Científica de Yucatán in Mérida. I thank Scott Serata for assistance with the scanning electron microscope; Tom Wendt for making available his excellent collections from the Uxpanapa region; Alan Chou for the illustrations; and the curators of CAS, DS, F, MEXU, MICH, PH, and US for making specimens available.

#### LITERATURE CITED

- Champluvier, D. 2002. A new and unrecognized species of *Justicia* (Acanthaceae, Justicieae) from Kwango and Katanga (R.D. Congo). *Syst. Geogr. Pl.* 72: 231–235.
- Daniel, T. F. 1995. Acanthaceae. In *Flora of Chiapas*, ed. D. E. Breedlove, 4: 1–158. San Francisco: California Academy of Sciences.
- Daniel, T. F. 1999. Taxonomic and distributional notes on neotropical *Justicia* (Acanthaceae). *Proc. Calif. Acad. Sci.* 51: 483–492.
- Daniel, T. F. 2002. New and reconsidered Mexican Acanthaceae IX. *Justicia*. *Proc. Calif. Acad. Sci.* 53: 37–49.
- Daniel, T. F. 2003. A reconsideration of *Megalostoma* (Acanthaceae), a new species, and recognition of a new section of *Justicia*. *Proc. Calif. Acad. Sci.* 54: 371–380.
- Daniel, T. F. 2005. Catalog of Honduran Acanthaceae with taxonomic and phytogeographic notes. *Contr. Univ. Michigan Herb.* 24: 51–108.



- Daniel, T. F., G. Carnevali, and J. L. Tapia M. 2005. New and reconsidered Mexican Acanthaceae XI: *Justicia* in the Yucatan Peninsula. *Proc. Calif. Acad. Sci.* 56: 607–617.
- Graham, V.A.W. 1988. Delimitation and infra-generic classification of *Justicia* (Acanthaceae). *Kew Bull.* 43: 551–624.
- IPNI (The International Plant Names Index). 2006. Published on the Internet <http://www.ipni.org> [accessed 2 January 2006].
- McDade, L.A., T. F. Daniel, S. E. Masta, and K. M. Riley. 2000. Phylogenetic relationships within the tribe Justicieae (Acanthaceae): evidence from molecular sequences, morphology, and cytology. *Ann. Missouri Bot. Gard.* 87: 435–458.
- Wasshausen, D.C., and T. F. Daniel. 1995. *Justicia nevlingii* (Acanthaceae), a new species from Mexico. *Novon* 5: 114–117.
- Wendt, T. 1987. Las selvas de Uxpanapa, Veracruz-Oaxaca, México: evidencia de refugios florísticos cenozoicos. *Anales Inst. Biol. Univ. Nac. México, Ser. Bot.* 58: 29–54.
- Wendt, T. 1997. Uxpanapa-Chimalapa Region, Mexico. In *Centres of plant diversity, a guide and strategy for their conservation*, ed. S. D. Davis et al., 3: 130–134. Cambridge: World Wide Fund for Nature.





Daniel, Thomas Franklin. 2007. "New taxa of Justicia (Acanthaceae) from southern Mexico and Guatemala." *Contributions from the University of Michigan Herbarium* 25, 179–189.

**View This Item Online:** <https://www.biodiversitylibrary.org/item/45701>

**Permalink:** <https://www.biodiversitylibrary.org/partpdf/186179>

**Holding Institution**

Missouri Botanical Garden, Peter H. Raven Library

**Sponsored by**

Missouri Botanical Garden

**Copyright & Reuse**

Copyright Status: In copyright. Digitized with the permission of the rights holder.

License: <http://creativecommons.org/licenses/by-nc-sa/3.0/>

Rights: <https://biodiversitylibrary.org/permissions>

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.