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New and Reconsidered Mexican Acanthaceae XIII. *Justicia*

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Five new species of Mexican *Justicia* are described, illustrated, and mapped: *J. alanae*, *J. matudae*, *J. mexiae*, *J. olmeca*, and *J. totonaca*. Descriptions, phenological data, habitats, and provisional conservation assessments are provided for each of them. A new name in *Justicia*, *J. amplifolia*, is proposed for the species previously known as *Sericographis macrophylla* Oerst. and *Jacobinia macrophylla* (Oerst.) Benth. & Hook.f. ex Hemsl. A lectotypification, detailed taxonomic account, and illustrations are provided for this species. New state distribution records are documented for *J. phlebodes* Leonard & Gentry (Nayarit), *J. pilosella* (Nees) Hilsenb. (Veracruz), and *J. spicigera* Schltdl. (Tabasco).

KEYWORDS: New species, new name, distribution records, pollen, endemism, conservation

Se describen, ilustran y mapean cinco especies nuevas de *Justicia* mexicanas: *J. alanae*, *J. matudae*, *J. mexiae*, *J. olmeca* y *J. totonaca*. Se proporcionan descripciones, datos fenológicos, hábitats y evaluaciones provisionales de conservación para cada una de ellas. Se propone un nombre nuevo en *Justicia*, *J. amplifolia*, para la especie conocida anteriormente como *Sericographis macrophylla* Oerst. y *Jacobinia macrophylla* (Oerst.) Benth. & Hook.f. ex Hemsl. También se proporciona una lectotipificación, cuenta taxonómica detallada e ilustraciones para esta especie. Se documentan nuevos registros de distribución por estado para *J. phlebodes* Leonard & Gentry (Nayarit), *J. pilosella* (Nees) Hilsenb. (Veracruz), y *J. spicigera* Schltdl. (Tabasco).

As currently circumscribed, *Justicia* L. is the largest genus of Acanthaceae and occurs throughout the worldwide distributional range of the family. Of the more than 700 species, about 105 of them are known to occur in Mexico (Daniel, unpublished). Additional undescribed species continue to be discovered there, especially in the seasonally moist to wet forests in southern portions of the country. Many are local or regional endemics. Five new species of *Justicia* from southern Mexico are described below; a new name in *Justicia* for the species originally described as *Sericographis macrophylla* Oerst. is proposed; and the distributions of *J. phlebodes* Leonard & Gentry, *J. pilosella* (Nees) Hilsenb., and *J. spicigera* Schltdl. are documented from states from which they have not been reported previously.

No attempt is made here to provide sectional affiliations for the taxa treated because recent phylogenetic studies on the infrageneric classification of *Justicia* and its relatives in the Justiceae (e.g., Kiel et al. 2017, 2018) reveal that most of the currently recognized sections and subsections of *Justicia* in the New World are not monophyletic, and that the phylogenetic affinities of many species remain unresolved. However, similarities, distinctions, and identification keys are noted/provided for previously described species that appear to be morphologically similar.

Materials and Methods

Selected herbarium specimens were studied from the following herbaria: ARIZ, C, CAS/DS,

F, GH, K, LL, MEXU, MO, NY, P, US, W, and XAL. Specimens indicated as "image only" were only studied via digital images, primarily from herbarium websites/portals or JSTOR Global Plants (2019). Pollen was studied as described by Daniel (1998) and imaged in the Scanning Electron Microscopy Laboratory at the California Academy of Sciences. Provisional conservation assessments are offered based on IUCN (2017) guidelines using herbarium specimen data and historical imagery in Google Earth Pro (2019); extent of occurrence (EOO) and area of occupancy (AOO) were calculated using GeoCat (2019).

New Species

Justicia alanae T.F. Daniel, sp. nov.

Type.— MEXICO. **Puebla**: Mpio. Xicotepec de Juárez, 5 km NE de Xicotepec, carr. a La Ceiba, 20°19′N, 097°48′W, 1200 m, bosque mesófilo perturbado, 24-II-1987 (flr, frt), *G. Toriz A., A. Campos V., O. Vega T., & P. Tenorio L. 298* (holotype: MEXU-image only; isotype: CAS!). Figures 1–3.

Perennial herbs to 1.5 m tall. Young stems subquadrate-sulcate, becoming subquadrate to quadrate proximally, distally densely 2-fariously pubescent with retrorse to retrorsely appressed eglandular trichomes 0.2–0.4 mm long and often also with sparse and flexuose eglandular trichomes to 0.4 mm long between the 2 lines of denser trichomes, trichomes usually with conspicuous maroon septae, stems soon becoming more sparsely pubescent or glabrate. Leaves petiolate, petioles 20–95 mm long, at least medial ones nearly as long as or longer than blade, blades ovate, 45–140 mm long, 16–65 mm wide, 2.0–2.8 times longer than wide, acuminate to falcate at apex, subcordate to rounded to truncate at base, adaxial surface glabrous, abaxial surface pubescent along main veins with antrorse to antrorsely appressed eglandular trichomes 0.1–0.2 mm long, margin entire to subsinuate, sparsely ciliate. Inflorescence of axillary and/or terminal pedunculate dichasiate spikes or more commonly panicles of dichasiate spikes to 90 mm long (including peduncles but excluding flowers), 6–10 mm wide near midspike (measured flat), (alternate or) opposite at nodes, sometimes clustered in leaf axils, peduncles of spikes to 40 mm long, pubescent like young stems or becoming ± evenly pubescent distally with variously oriented eglandular trichomes 0.05–0.2 mm long, rachis pubescent like peduncle; dichasia opposite or alternate at spike nodes, 1 per axil, 1-flowered, sessile. Bracts at a node homomorphic (when each subtending a dichasium, i.e., dichasia opposite and both bracts fertile) or heteromorphic when only 1 dichasium present at a node (i.e., dichasia alternate and 1 bract sterile); fertile bracts oblanceolate to elliptic to obovate to broadly spatulate, 3.2–8 mm long, 1–4.5 mm wide, rounded to acute at apex, abaxially and marginally pubescent with flexuose eglandular trichomes to 1 mm long and also with mostly erect glandular trichomes 0.05–0.2 mm long, glandular trichomes often sparse and rarely absent on some bracts; sterile bracts conspicuously reduced, narrowly linear to oblanceolate, 0.7–4 mm long, 0.2–0.8 mm wide. Bracteoles (linear to) oblanceolate to narrowly obovate-spatulate, 2.5–7.5 mm long. 0.5–1.6 mm wide, pubescent like bracts. Flowers sessile. Calyx 5-lobed, 3–4 (–4.5 in fruit) mm long, lobes homomorphic, lance-linear to lance-subulate, 2.6–3.5 (–4 in fruit) mm long, 0.3-0.5 mm wide, abaxially nearly glabrous to sparsely pubescent with flexuose to antrorse eglandular trichomes and sometimes also with very sparse and inconspicuous glandular trichomes < 0.05 mm long. Corolla white with maroon markings on lower lip, 7.5–13 mm long, externally pubescent with erect to flexuose eglandular trichomes 0.05–0.3 mm long, tube 5–8 mm long, narrow proximal portion of tube 2.5–4 mm long, longer than or equal to throat in length, throat 2–4 mm long, 1.8–3 mm in diameter at mouth (measured flat), upper lip 3–5 mm long, 2-fid, lower lip 3–5.5 mm long with three lobes 1–2 mm long and 1.5–2.5 mm wide, central lobe largest. Stamens 5–5.5 mm long, filaments glabrous, thecae of a pair superposed (contiguous, overlapping by

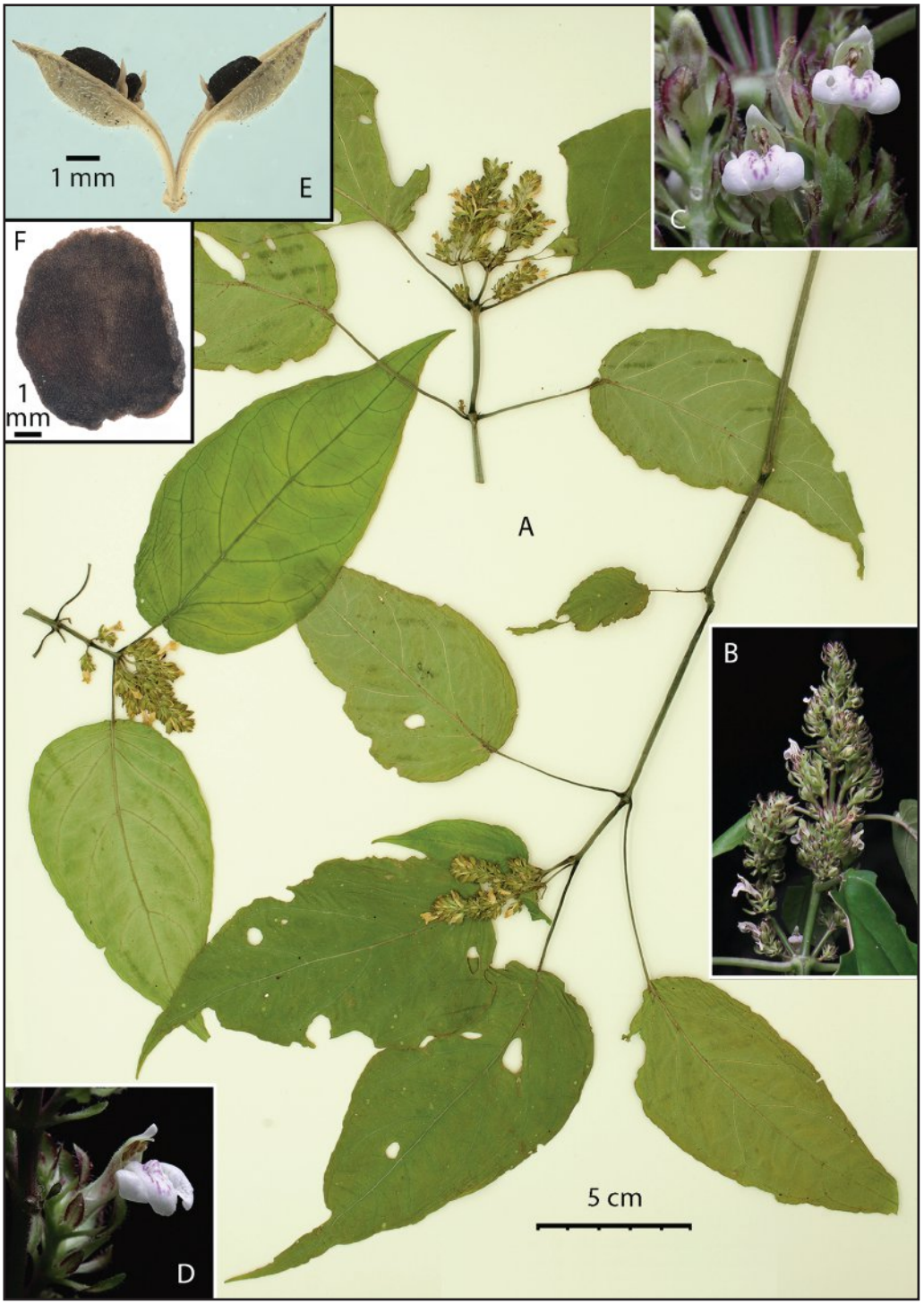

FIGURE 1. *Justicia alanae* (*Jiménez C. & Gorostiza S. 31242*). –A. Habit. B. Inflorescence. C. Flowers, front view. D. Flower, profile view. E. Capsule. F. Seed. Field photos B–D by J. Amith, used with permission.

0.1–0.2 mm, or separated by a gap to 0.05 mm long), ± parallel or somewhat offset, subequal in size, upper theca 0.8–1.1 mm long, lacking a basal appendage, lower theca 1–1.4 mm long, with a prominent basal appendage 0.5–0.6 mm long, appendage oriented 90° to fertile portion of theca, thecae dorsally pubescent with flexuose eglandular trichomes to 0.7 mm long (lower theca often with shorter and less prominent trichomes); 2 densely pubescent staminode-like invaginations of the corolla present near midpoint of corolla tube. Pollen 3-colporate, 6-pseudocolpate, exine between colpi and pseudocolpi sometimes partially separating into insulae. Style 6–11 mm long, proximally pubescent with eglandular trichomes, stigma subcapitate, 0.05–0.1 mm long. Capsule 5–7 mm long, pubescent with erect to flexuose eglandular trichomes 0.1–0.3 mm long, stipe 1–2.5 mm long, head 4–4.5 mm long. Seeds flattened, ± ovate to broadly oblong, 1.6–2.2 mm long, 1.3–1.7 mm wide, surface minutely papillose, margin entire.

Phenology.— Flowering: February–April; fruiting: February–April.

Distribution and habitats.— Mexico (Puebla; Fig. 2), endemic to the Sierra Nororiental in northern Puebla; plants occur in tropical subperennial forest and mesophytic montane forest (these sometimes secondary forests or plants occurring at disturbed sites therein) at elevations of 276–1200 meters.

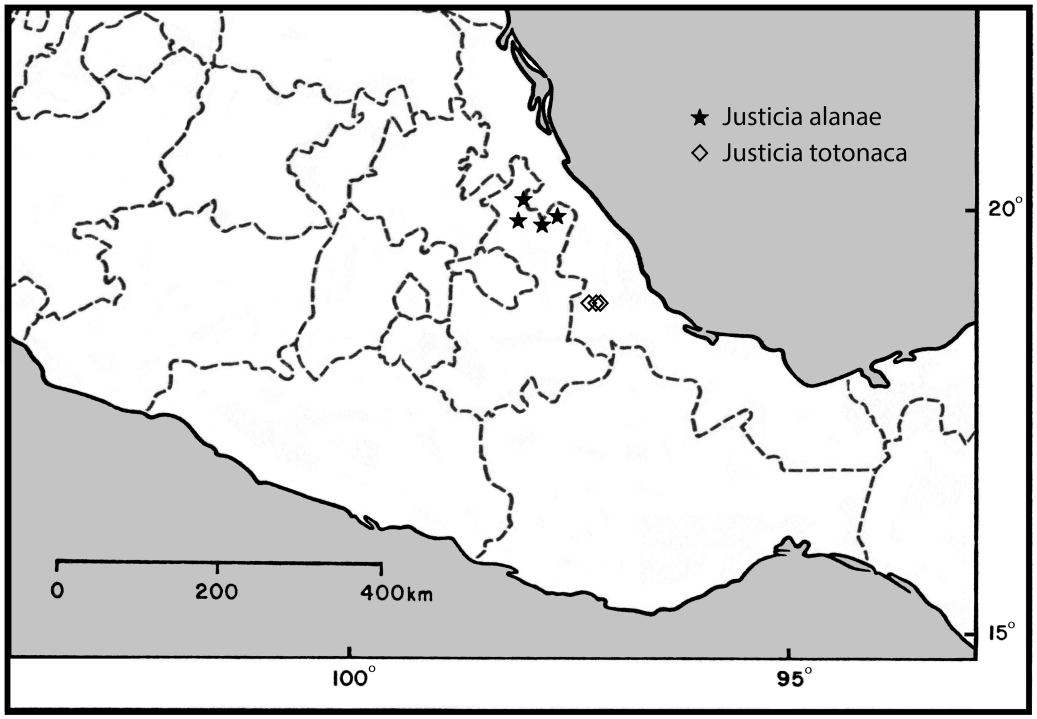

Figure 2. Map of part of southern Mexico showing distributions of *Justicia alanae* and *J. totonaca*.

Conservation.— Based on the four known collection sites for this species, the EOO = 804 km^2 , the AOO = 16 km^2 , and the greatest linear extent of its distributional range (NW–SE) = 51 km. No collections are known to occur in protected areas. In addition to the type, at least three other collections have been made at different times at the type locality. No threats have been identified for this species, and thus it is provisionally assessed as Least Concern (LC).

Etymology.— The epithet honors Jonathan Amith, a proponent of this species who also took useful photographs of it in Puebla, and his sometime young field assistant and daughter Alana.

Paratypes.— MEXICO. **Puebla**: Mpio. Xicotepec de Juárez, 5 km NE de Xicotepec, carr. a La Ceiba, 20°19′N, 097°48′W, *A. Campos V. & G. Toriz A. 206* (CAS, MEXU-image only), *P. Tenorio L., G. Toriz A., A. Campos V. & O. Vega T. 12613* (CAS, MEXU-image only), *G. Toriz A. & A. Campos V. 374* (CAS, MEXU-image only); Mpio. Ayotoxco de Guerrero, Cuauhtémoc, en la loma de Santa Cecilia, cerca del Río Atekakalach, 20.03894°, -97.40643°, *M. Jiménez C. & M. Gorostiza S. 31242* (CAS); Mpio. Atlequizayán, Atlequizayán, camino a Lhimakgatlhakgna', en localidad de Tatitsapsni', 20.00266°, -97.62263°, *C. Ledesma C., O. López F. & M. Gorostiza S. 22328* (CAS); Mpio. Ahuacatlan, Agua Dulce, 4 km SE de Ahuacatlan, brecha a Zapotitlan, 20°01′N, 097°50′W, *P. Tenorio L., G. Toriz A., A. Campos V. & O. Vega T. 12722* (CAS; MEXU-image only), *G. Toriz A., A. Campos V., P. Tenorio L. & O. Vega T. 320* (CAS, MEXU-image only).

Discussion.— In spite of slight variation in type and disposition of cauline pubescence and variation in degree of glandularity among individuals, plants of *J. alanae* are morphologically homogeneous. Distinctive features of this species include the variation in bracts with either two fertile and homomorphic bracts at a node or one sterile and one fertile bract at a node with those bracts differing in size and usually also in shape. Heteromorphic bracts appear to be more frequent on spikes from leaf axils and/or on those forming the lateral branches of a panicle. Homomorphically bracteate spikes tend to be the ones terminating shoots. Bracts and bracteoles of *J. alanae* are green and are often tinged with maroon at the margins and apex (Fig. 1). Relatively long and naked petioles are prominent in this species, as are the pouch-like invaginations of the corolla near the midpoint of the corolla tube (cf. Daniel 2002). These staminode-like structures appear to be associated with the basal portion of the rugula and veins in the corolla tube leading thereto.

Justicia alanae undoubtedly pertains to a group of species known from various regions of the Neotropics that were discussed by Wasshausen and Daniel (1995) and Daniel (2002, 2007). A suite of morphological characters shared among four of these species (*J. chol* T.F. Daniel, *J. karsticola* T.F. Daniel, *J. alanae*, and *J. wendtii* T.F. Daniel) include: maroon septa of the cauline trichomes; some or all of the bracts hetermorphic (by size, shape, and whether fertile or sterile) and with their abaxial surface nearly always including glandular trichomes; relatively small corollas with maroon markings and with a pair of invaginations forming pouch-like and pubescent appendages internally in the corolla tube; anther thecae of a pair parallel to subparallel, unequally inserted to superposed, both dorsally pubescent with the lower one usually less densely so, and with the lower theca bearing a conspicuous basal appendage (commonly oriented at a 90° angle to the fertile portion of the theca); and 3-colporate, 6-pseudocolpate pollen (Fig. 3). These four similar species can be distinguished by the key below. Other similar Mexican species with either heteromorphic bracts and/or staminode-like invaginations of the corolla, but which differ conspicuously by their pollen, include *J. nevlingii* Wassh. & T.F. Daniel (pollen 4-colporate, 8-pseudocolpate) and *J. chimalapensis* T.F. Daniel (pollen 2-colporate with apertures flanked on each side by 1 row of insulae).

1a. Bracts inconspicuously ciliate with trichomes (0.05–0.2 mm long) and sometimes also with scattered flexuose eglandular trichomes to 0.3 mm long; corolla externally pubescent with eglandular and glandular trichomes; seeds sparsely pubescent with branched eglandular trichomes; southern Veracruz . *J. wendtii*

1b. Bracts conspicuously ciliate with trichomes up to 2 mm long (some, usually most, longer than 0.3 mm); corolla externally pubescent with eglandular trichomes only; seeds lacking branched trichomes 2

2a. Cauline trichomes mostly retrorse to retrorsely appressed; petioles elongate, at least medial ones nearly as long as or longer than blade, blades rounded to truncate to subcordate at base; floral bracts opposite or alternate; corolla white and with maroon markings; stamens 5–5.5 mm long; Puebla. . . . . *J. alanae*

2b. Cauline trichomes flexuose to antrorse; petioles not elongate as described above, blades acute to attenuate at base; floral bracts opposite; corolla pale yellow to yellow-green and with maroon markings; stamens 3.5–4.5 mm long 3

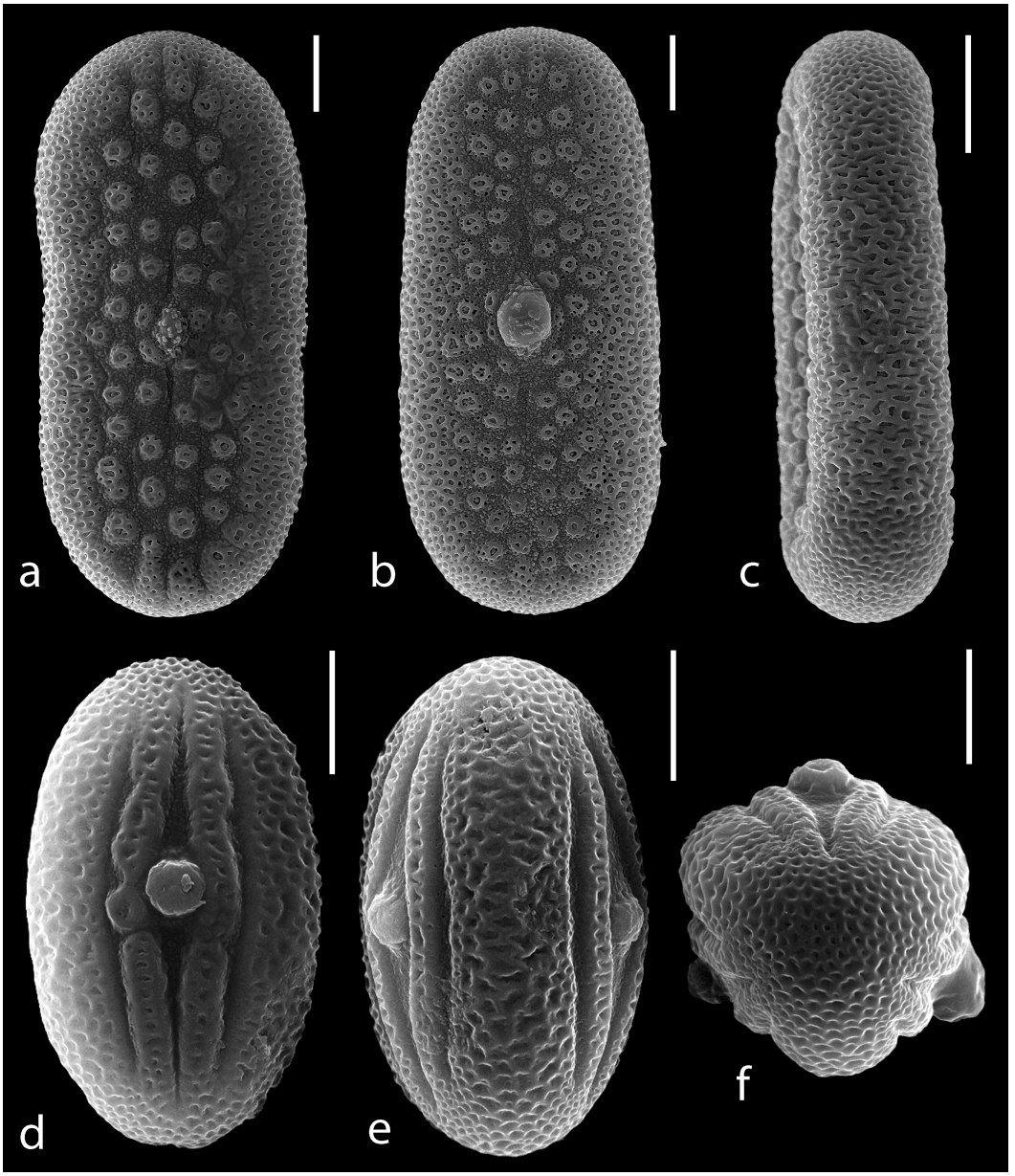

FIGURE 3. Scanning electron micrographs of *Justicia* pollen I. A–C. *Justicia amplifolia*. A. Apertural view (*Amith & Mendoza 1419*). B. Apertural view (*Luther s.n.*). C. Interapertural view (*Luther s.n.*). D–F. *Justicia alanae* (*Toriz A. et al. 320*). D. Apertural view. E. Interapertural view. F. Polar view. Scales = 10 µm.

3a. Fertile bracts rounded- to truncate-apiculate at apex; inflorescence of axillary pedunculate dichasiate spikes to 6.5 cm long (including peduncles but excluding flowers), dichasia alternate, 1-flowered; Chiapas and Tabasco . . . . . *J. chol*

3b. Fertile bracts rounded-subacute to acute at apex (lacking a conspicuous apiculum); inflorescence of (axillary and) terminal pedunculate panicles (7–15 cm long) of spicate axes, spicate axes (= modified dichasia?) opposite, mostly 3–5-flowered; southern Veracruz . . . . . *J. karsticola*

Justicia matudae T.F. Daniel, sp. nov.

Type.— MEXICO. **México**: Distr. V. de Bravo, Otzoloapan, [ca. 19°07′08″N, 100°17′18″W], ladera húmeda, matorral bajo, 1300 m, 5-IX-1954 (flr), *E. Matuda et al. 31440* (holotype: MEXU!; isotypes: ARIZ!, CAS!, CODAGEM-images only). Figures 4–6.

Shrubs to 1.5 m tall. Young stems ± evenly and ± densely pubescent with mostly antrorse or retrorse (also including erect to flexuose) eglandular trichomes 0.1–1.3 mm long, or with 2 ± conspicuous bands of denser trichomes and with additional trichomes between the bands. Leaves subsessile to short-petiolate, petioles 2–7 mm long, blades broadly ovate to ovate (to elliptic), 26–95 mm long, 11–58 mm wide, 1.4–3.2 × longer than wide, sometimes reduced in size distally, acute to acuminate at apex, subcordate to rounded to acute at base, adaxial surface pubescent throughout (denser on younger growth) with antrorse to antrorsely appressed eglandular trichomes 0.05–0.8 mm long, abaxial surface densely pubescent throughout with antrorse (to flexuose) eglandular trichomes to 1 mm long, dense clusters of trichomes at junctions of midvein and secondary lateral veins not evident (if possibly present, then inconspicuous), margin ± entire, ciliate from base to apex. Inflorescence of axillary and terminal dense headlike dichasiate clusters (± appearing like verticels, especially at apex of shoot; see discussion); clusters opposite at nodes, 1 (–2) per axil, multi-flowered, sessile. Bracts, green (sometimes dark colored when dry), ovate to elliptic to oblong to obovate (proximally) and becoming oblanceolate distally, 7–16 mm long, 2–9.5 mm wide, acute at apex, abaxially and marginally pubescent with mostly antrorse eglandular trichomes to 0.4 mm long, distal portion of bracts often recurved. Bracteoles obovate to oblanceolate to narrowly elliptic, 4–14 mm long, 0.6–3.2 mm wide, becoming progressively narrower from primary to tertiary pairs, abaxially and marginally pubescent like bracts, distal portion of bracteoles often recurved. Flowers sessile. Calyx 5-lobed, 6–8 mm long, lobes homomorphic, ovate to lance-ovate, 2–4 mm long, 1.1–1.7 mm wide, apically attenuate, abaxially sparsely pubescent with antrorse eglandular trichomes to 0.2 mm long, marginally ciliate with erect to flexuose eglandular trichomes to 0.8 mm long. Corolla red, 25–37 mm long, externally pubescent with flexuose to retrorse eglandular trichomes 0.1–0.6 mm long, tube gradually expanded distally, 16–20 mm long, 2.5–5 mm in diam. (measured flat) at mouth, upper lip 9–17 mm long, entire to 2-fid at apex, lower lip 9–19 mm long, 3-lobed, lobes 2–7 mm long, 1.8–4 mm wide. Stamens 8.5–15 mm long, filaments distally glabrous, proximally pubescent with eglandular trichomes, thecae of a pair subparallel to subsagittate, subequally to unequally inserted (overlapping by 1.5–2 mm), 1.9–2.5 mm long, equal to subequal in length, glabrous, lacking basal appendages. Pollen 2-aperturate, apertures consisting of a narrow colpus and a prominent central os, flanked on each side by 3–4 rows of insulae (farthest rows from aperture sometimes entirely or partially consisting of peninsulae). Style 22–27 mm long, glabrous throughout; stigma subellipsoid, 0.2 mm long. Capsules and seeds not seen.

Phenology.— Flowering: August–September; fruiting: unknown.

Distribution and habitats.— Mexico (central Michoacán and western México; Fig. 5); plants occur in thornscrub and tropical deciduous forest at elevations of 650–1300 m.

Conservation.— Based on the five known collections of this species, the EOO = 7,530 km^2, the AOO = 20 km^2 , and the greatest linear extent of its distributional range (W–E) = 250 km. *Stein-*

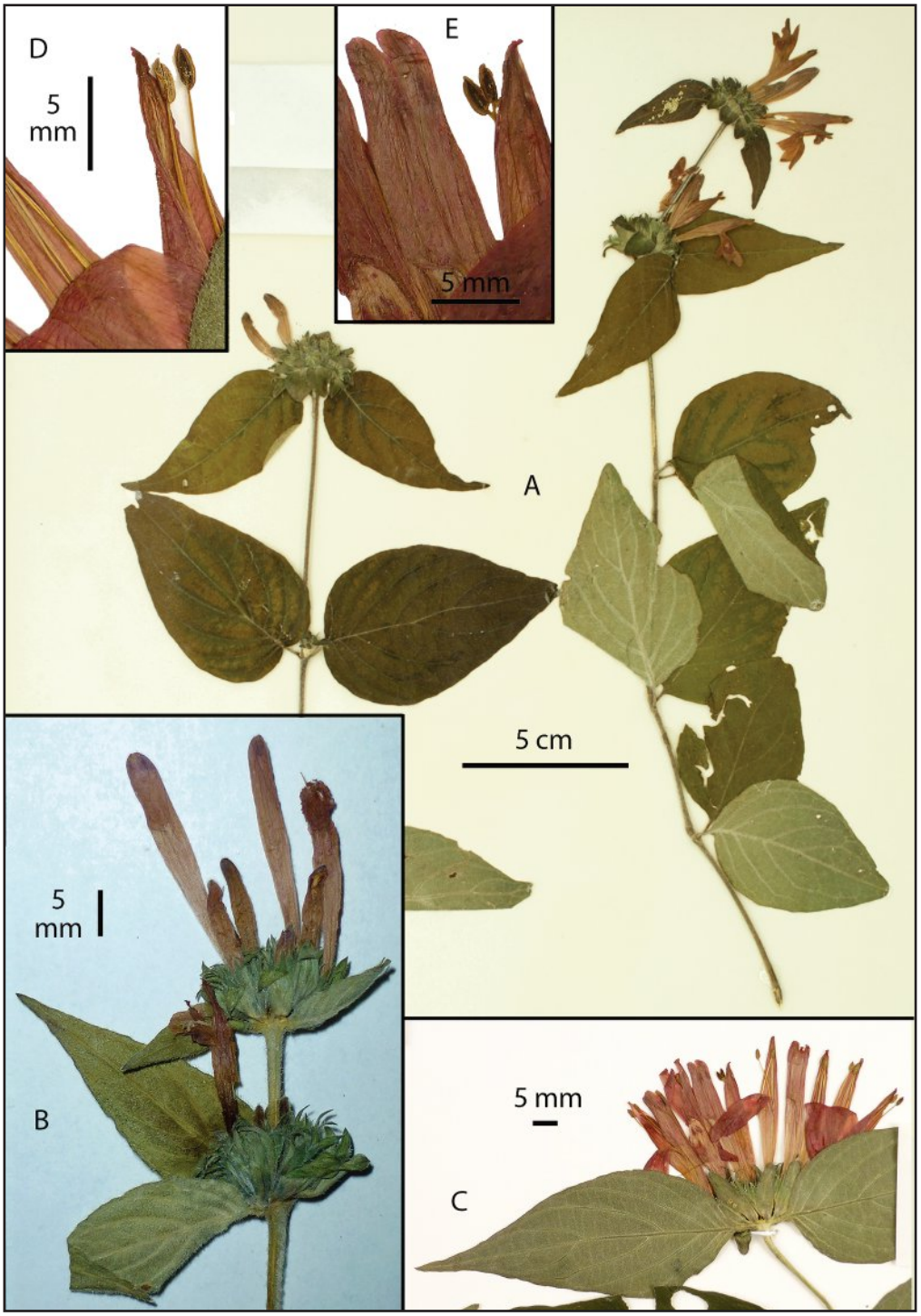

FIGURE 4. *Justicia matudae*. A. Habit (*Hinton et al. 15189*, NY). B. Branch with inflorescences (*Hinton et al. 15189*, US). C. Inflorescence (*Ibarra M. 6764*). D. Views inside upper lip of corolla with stamens and rugula (*Ibarra M. 6764*). E. View of upper lip (from side) and lower lip of corolla (*Ibarra M. 6764*).

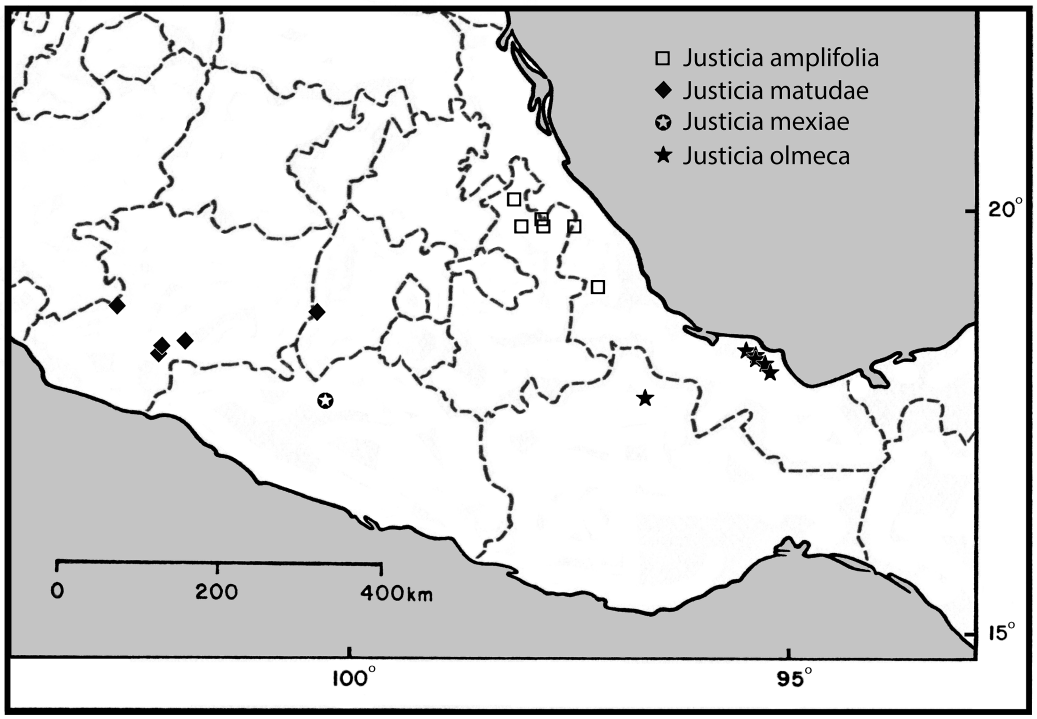

FIGURE 5. Map of part of southern Mexico showing distributions of *Justicia amplifolia*, *J. matudae*, *J. mexiae*, and *J. olmeca*.

mann 4528 indicates that plants were uncommon at that collection site. Plants are not known from any protected areas, but at least one small protected area occurs within the EOO. At least one of the three subpopulations (the westernmost occurrence in Michoacán) is within an area threatened by active volcanoes, but threats remain unknown for the majority of the population. Based on IUCN (2017) criteria and current knowledge of the species and its threats, *J. matudae* is probably best assessed as Least Concern (LC).

PARATYPES.— MEXICO. **Michoacán**: Distr. Apatzingan, Rancho Viejo, [Mpio. Buenavista, ca. 19°12′N, 102°40′W], *G. Hinton et al. 15189* (GH, NY, US); Mpio. Churumuco, El Limón, Ejido Llano de Ojo de Agua, 18°43′52″N, 101°40′28″W, *G. Ibarra M. 6764* (MEXU); Mpio. La Huacana, ca. 2 km (air) ENE of Los Ranchos, along ridge top of Cerro El Barril, 18°42′35″N, 102°00′00″W, *V. Steinmann 3455* (CAS); Mpio. La Huacana, Sierra Las Cruces, 6.5 km (air) SW of Los Ranchos, Cañada Las Cruces, 18°39′59″N, 102°03′46″W, *V. Steinmann 4528* (CAS).

DISCUSSION.— Leaves of *Hinton et al. 15189* are beset with either prominent punctate gland-like protrusions or a parasitic infestation; because these structures are not evident on other collections of the species, they are assumed to represent the latter. The dichasiate clusters appear to be reduced dichasiate spikes (i.e., lacking an elongate rachis; thus bearing both bracts and bracteoles), but it is possible that they are compound dichasia, in which case all of the bracteal units represent bracteoles.

Justicia matudae (Fig. 4) appears closely allied morphologically to *J. mexiae* (see below) with which it shares numerous morphological traits, including: densely clustered axillary inflorescences that appear as verticels at vegetative nodes; red corollas of similar size, shape, and pubescence; anther thecae of similar orientation and size that are glabrous and that lack basal appendages; and

2-aperturate (colporate with apertures flanked by 2 or more rows of insulae) pollen (Fig. 6). Distinctions between them are noted under *J. mexiae* below. *Justicia candicans* (Nees) L.D. Benson, a widespread and variable species of the southwestern United States and western Mexico, shares some of these characteristics (e.g., corollas, anther thecae, and pollen). It differs by its less dense and rarely verticillate axillary inflorescences that sometimes form multi-flowered, short dichasiate spikes (terminating shoots or in leaf axils) or consist of solitary 1-flowered dichasia in leaf axils; narrower bracts; and corollas that usually have white markings on the lower lip.

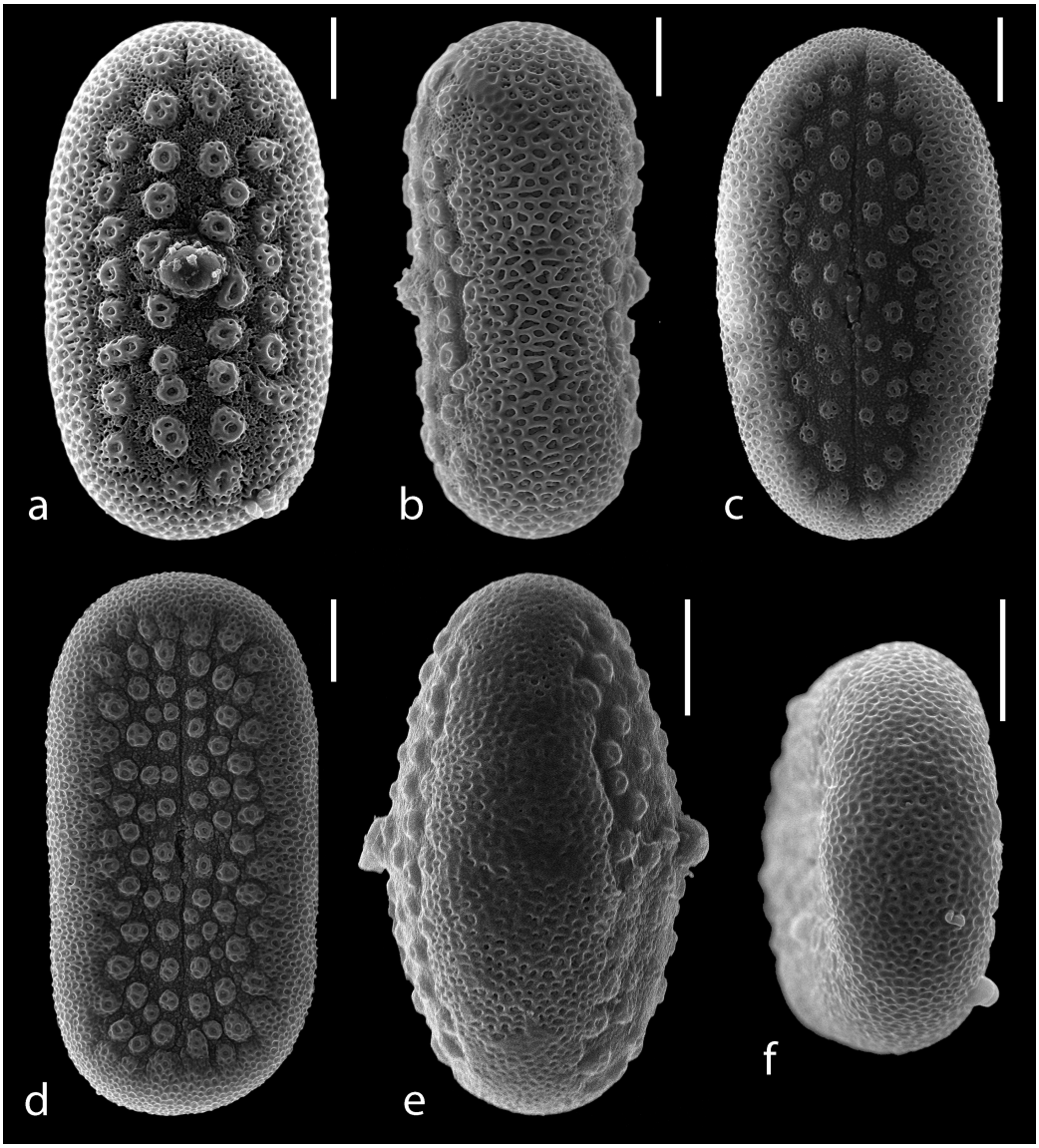

FIGURE 6. Scanning electron micrographs of *Justicia* pollen II. A–B. *Justicia totonaca* (*Ventura 15945*). A. Apertural view. B. Interapertural view. C. *Justicia mexiae*, apertural view (*Mexia 8732*). D–F. *Justicia matudae*. D. Apertural view (*Steinmann 4528*). E. Interapertural view (*Matuda et al. 31440*). F. Polar view (*Matuda et al. 31440*). Scales = 10 µm.

***Justicia mexiae* T.F. Daniel, sp. nov.**

Type.— MEXICO. **Guerrero**: Distr. Aldama, Sierra Madre del Sur, N of Río Balsas, Temisco, Barranca El Salto, [ca. 18° 8′17.20″N, 100°13′34.94″W], 350 m, 3-XI-1937 (flr), *Y. Mexia 8732* (holotype: MO!; isotypes: CAS!, F!, GH!, LL!, NY!, US!). Figures 5-7.

Shrubs of unknown height. Young stems 2-fariously pubescent with mostly antrorse to antrorsely appressed eglandular trichomes 0.2–0.7 mm long, trichomes mostly restricted to the 2 bands but soon becoming sparse and/or intermixed with retrorse to retrorsely appressed eglandular trichomes. Leaves petiolate, petioles 5–18 mm long, blades ovate-elliptic to elliptic, 60–121 mm long, 20–52 mm wide, (1.8–) 2.2–3.3 × longer than wide, not or only slightly reduced in size distally, acuminate at apex, (acute to) subattenuate to attenuate at base, adaxial surface sparsely pubescent with flexuose to antrorse eglandular trichomes to 1 mm long, abaxial surface sparsely pubescent along veins with similar trichomes, junctions of midvein with second-order lateral veins ± densely pubescent with a cluster of trichomes (i.e., with domatia), margin ± entire, sparsely ciliate only proximally or ± throughout. Inflorescence of axillary and terminal (i.e., in axils of distalmost pair of leaves) dense headlike dichasiate clusters (± appearing as verticels, especially at apex of shoot); clusters opposite at nodes, apparently 1 per axil, multi-flowered, sessile. Bracts dark colored (when dry), obovate to subcircular to oblate, 7–11 mm long, 3.9–9 mm wide, rounded to acute at apex, abaxially and marginally pubescent with mostly antrorse to antrorsely appressed eglandular trichomes 0.05–0.4 mm long, distal portion of bracts erect. Bracteoles oblong to obovate to obovate-spatulate to narrowly oblanceolate, 7–10 mm long, 0.6–8 mm wide, becoming progressively narrower from primary to tertiary pairs, abaxially and marginally pubescent like bracts, distal portion of bracteoles erect. Flowers sessile. Calyx 5-lobed, 5.5–6.5 mm long, lobes homomorphic, ovate to lance-linear to linear, 4.5–5.5 mm long, 1–2 mm wide, apically attenuate to aristate (arista to 0.5 mm long), abaxially pubescent like bracts, margin distally ciliate with flexuose to crinkly eglandular trichomes to 0.4 mm long. Corolla red, 26–30 mm long, externally pubescent with erect to flexuose eglandular trichomes to 0.7 mm long, tube gradually expanded distally, 16–20 mm long, 3.8–4 mm in diameter (measured flat) at mouth, upper lip 9–13 mm long, entire at apex, lower lip 9–12 mm long, 3-lobed, lobes 0.5–3 mm long, 1–2.5 mm wide, central lobe largest. Stamens 11–15 mm long, filaments distally glabrous, proximally pubescent with eglandular trichomes, thecae of a pair subparallel to subsagittate, unequally inserted (overlapping by 1.5–1.7 mm), 1.8–2.3 mm long, subequal in length, glabrous, lacking basal appendages. Pollen 2-aperturate, apertures consisting of a narrow colpus with a prominent central os, flanked on each side by 2–3 rows of insulae (farthest rows from aperture sometimes partially or entirely consisting of peninsulae). Style 25–28 mm long, distally glabrous, proximally pubescent with eglandular trichomes; stigma asymmetrically subcapitate, 0.2 mm long. Capsule and seeds not seen.

Phenology.— Flowering: November; fruiting: unknown.

Distribution and habitat.— Mexico (north-central Guerrero; Fig. 5); plants were noted to be common in undergrowth on a wooded slope at an elevation of 350 m.

Local name.— "Chililllo" (*Mexia 8732*).

Conservation.—This species is known only from the type collection made in 1937. Without additional information or known threats, following IUCN (2017) guidelines, it is provisionally assessed as data deficient (DD).

Discussion.— It is not without hesitation that *Justicia mexiae* (Fig. 7) is described as distinct from *J. matudae* (see above); additional collections may reveal them to be a geographic variants of a single species or entirely conspecific. However, at this time, the distinctions noted in the key below appear to warrant their recognition at specific rank. Although the pollen of both species is very similar, among grains studied to date, those of *J. mexiae* (Fig. 6) often have fewer rows of

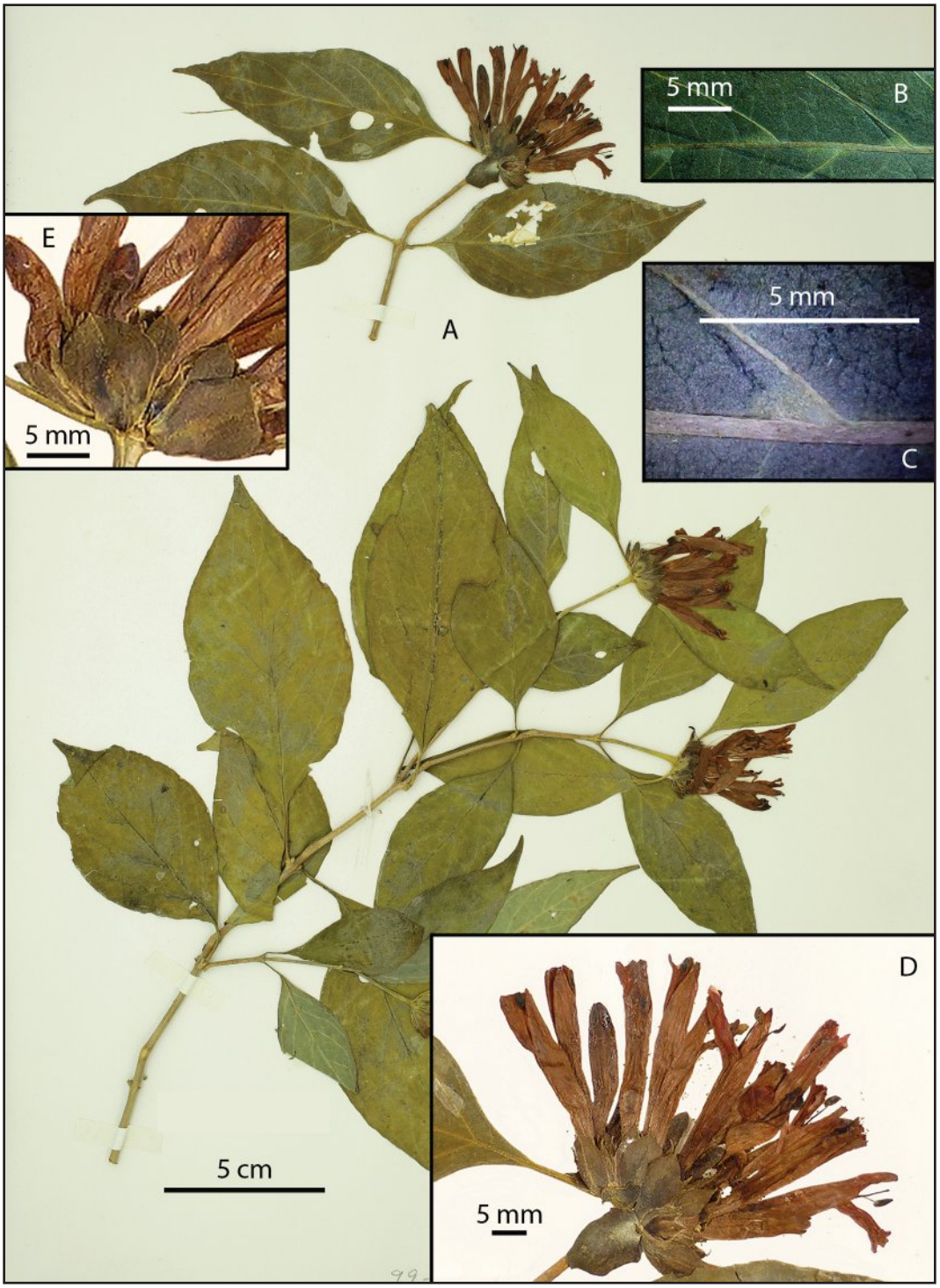

FIGURE 7. *Justicia mexiae* (*Mexia 8732*). A. Habit (MO). B. Domatia on abaxial surface of leaf (US). C. Close-up of domatia in axil of midvein and secondary vein (US). D. Inflorescence (MO). E. Close-up of bracts, bracteoles, and base of flowers (CAS)

insulae flanking the aperture than those of *J. matudae*. As in *J. matudae* it is not entirely clear whether the dense axillary clusters are expanded dichasia lacking peduncles/pedicels (therefore with only bracteoles of several orders present) or, as treated here, a reduced dichasiate spike (lacking a rachis) with bracts and bracteoles present. The bracts and bracteoles of *J. mexiae* are apparently tinged reddish, and are usually darker than the leaves on drying.

1a. Leaves subsessile or with petioles 2–7 mm long, blades subcordate to rounded to acute at base, abaxial surface pubescent throughout and lacking dense clusters of trichomes (domatia) at junctions of midvein and secondary lateral veins (if possibly present, then inconspicuous); bracts and bracteoles often distally recurved; calyx 6–8 mm long with lobes 2–4 mm long; style glabrous throughout; México and Michoacán . . . . . *J. matudae*

1b. Leaves petiolate with petioles 5–18 mm long, blades (acute to) subattenuate to attenuate at base, abaxial surface sparsely pubescent with trichomes restricted to veins, and with dense clusters of trichomes at junctions of midvein with second-order lateral veins (domatia); bracts and bracteoles erect; calyx 5.5–6.5 mm long with lobes 4.5–5.5 mm long; style distally glabrous and proximally pubescent; Guerrero . . . . . *J. mexiae*

Justicia olmeca T.F. Daniel, sp. nov.

Type.— MEXICO. **Oaxaca**: Mpio. San Felipe Usila, Cerro Verde, camino al "Vainilla" de J. Roldán, 5 km NNE de Usila, 17°56′N, 096°30′W, selva alta perennifolia sobre suelos kársticos, 550 m, 1-X-1992 (flr), *G. Ibarra M., J. Meave del Castillo & M. Vargas 3742* (holotype: MEXU!; isotype: MO!). Figures 5, 8, 9.

Perennial herbs to 1 m tall. Young stems densely and ± evenly to ± 2-fariously pubescent with flexuose and conspicuously multi-septate eglandular trichomes 0.5–2.5 mm long. Leaves long-petiolate, petioles 17–58 mm long, (those near midstem ca. 0.5–1 × as long as blades), pubescent like young stems, blades (ovate-elliptic to) ovate to broadly ovate to deltate, 70–113 mm long, 45–72 mm wide, 1.2–1.9 × longer than wide, truncate to rounded to subacute at base, shortly acuminate at apex, adaxial surface sparsely pubescent with cauline type trichomes, abaxial surface similarly pubescent but with trichomes denser (especially along major veins), margin entire, ciliate throughout with cauline type trichomes. Inflorescence of terminal (and also sometimes in axils of distalmost pair of leaves) subsessile to pedunculate dense dichasiate spikes to 57 mm long (including peduncle and excluding flowers), 13–20 mm wide (measured flat) near midspike, peduncles of spikes 3–33 mm long, pubescent like young stems, rachis not visible, pubescent like young stems; dichasia opposite, 1 per axil, 1-flowered, sessile. Bracts sessile to short-petiolate, ovate to elliptic to broadly obovate, 10–16 mm long, 5–8.5 mm wide, apically rounded to acute, abaxially and marginally pubescent with cauline type trichomes. Bracteoles lanceolate to linear-elliptic to linear-oblanceolate to oblanceolate, 7–11.5 mm long, 0.8–1.5 mm wide, pubescent like bracts. Flowers sessile. Calyx 5-lobed, 5–9 mm long, lobes equal to subequal in length, linear-lanceolate to lanceolate, 4.5–6.6 mm long, 0.7–1.3 mm wide, abaxially and marginally glabrous or with very few cauline type trichomes, margin ± hyaline. Corolla red, 29–35 mm long, externally pubescent with cauline type trichomes and flexuose glandular trichomes 0.1–0.9 mm long, internally with stipitate glands on the lower lip, tube 20–26 mm long, gradually expanded distally, 3–5 mm in diameter (measured flat) at mouth, upper lip 7–9.5 mm long, 2-fid at apex, lower lip 7–11 mm long, 3-lobed, lobes 1.2–3 mm long, 1.5–2.5 mm wide, central lobe usually largest. Stamens 8–10 mm long, thecae of a pair subparallel to subsagittate, unequally inserted (overlapping by 1.6 mm), 2–2.5 mm long, ± equal in size (or distal theca slightly longer), glabrous, not or inconspicuously appendaged at base (i.e., upper theca sometimes with a basal appendage up to 0.05 mm long and lower theca sometimes with a basal appendage to 0.15 mm long). Pollen 5-colporate, 10-pseudocolpate, pseudocolpi variously fused (see discussion). Style 30–35 mm long, distally

glabrous, stigma ± capitate, 0.2 mm long, 0.3–0.5 mm wide. Capsule 9 mm long, pubescent with cauline type trichomes, stipe 3 mm long, head 6 mm long. Seeds not seen.

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

Distribution and habitats.— Mexico (northern Oaxaca and southern Veracruz; Fig. 5); plants occur (sometimes on karstic substrates) in moist to wet forests (e.g., selva alta perennifolia, selva mediana subperennifolia, and bosque mesófilo de montaña), scrub, forests in canyons, and cafetales at elevations of 200–1350 m.

Local name.— "Monchyvay" (Popoluca; *Leonti et al. 488*).

Use.— Boiled leaves used to wash snake-bites (*Leonti et al. 488*).

Conservation.— Based on the nine known collections, the EOO = 3,410 km^2, the AOO = 32 km^2, and the greatest linear extent of its distributional range (SW–NE) = 176 km. Six of the nine collections (i.e., all of those from Veracruz) were made in the Reserva de la Biosfera Los Tuxtlas. Both collections of Ventura from Veracruz indicate that plants were scarce at those locales, whereas Calzada's collection from the same general region noted that plants were abundant at that collection site. Plants in Veracruz would all appear to be threatened by the continuing deforestation documented by aerial imagery in the reserve between 1967 and 2000, a threat that has since diminished only to some extent (Los Tuxtlas Biosphere Reserve 2019). Threats are not known for the plants occurring in Oaxaca. Thus, at least two possible locations exist for the species. Based on IUCN (2017) criteria, this species is provisionally assessed as Endangered (EN: B1ab(iii) + 2ab(iii)).

Etymology.— The specific epithet refers to the indigenous Olmec people whose culture and influence once dominated much of the region in which this species occurs.

Paratypes.— MEXICO**. Oaxaca**: Mpio. San Felipe Usila, Cerro Verde, *A. Hanan & R. de Santiago s.n.* (CAS); Mpio. San Felipe Usila, Cerro Verde, camino al "Vainilla" de J. Roldán, 5 km NNE de Usila, 17°56′N, 096°30′W, *G. Ibarra M., J. Meave del Castillo & M. Vargas 3741* (MEXU, MO). **Veracruz**: Mpio. Soteapan, Sierra de Santa Marta, 5 km W de Santa Marta, 18°26′N, 094°57′W, *J. Calzada 5187* (F); Mpio. Soteapan, 2.5 km N de Santa Marta, ladera E del Volcán Santa Marta, 18°21′06.51″N, 094°53′49.56″W, *A. Campos V. & C. Granados M. 6609* (MEXU); Mpio. Soteapan, Sierra Santa Marta, 3 km NW de San Fernando, [18°17′4.49″N, 094°54′24.14″W], *M. Leonti et al. 488* (MEXU); Mpio. Catemaco, Cerro Buenavista, 3 km N de Catemaco, carr. a Sontecomapan, 18°29′N, 095°06′W, *A. Torres R. 427* (MEXU); Mpio. San Pedro Soteapan, Ejido Santa Martha, 18°25′N, 094°56′W, *F. Vázquez B. & D. Hernández L. 44* (F, XAL); Mpio. Catemaco, Pipiapan, [ca. 18°26′14.7″N, 095°03′8.9″W], *F. Ventura 12178* (CAS); Mpio. Santiago Tuxtla, Loma Quemada, [ca. 18°32′5.40″N, 095°16′51.42″W], *F. Ventura 14895* (CAS).

Discussion.— Plants of *J. olmeca* (Fig. 8) are morphologically homogenous; however, the leaves are rarely (i.e., one leaf of *Hanan & de Santiago s.n*. at a distal node) elliptic and abruptly acute at the base. Morphological allies of this species remain undetermined. It is distinctive by combination of the following characteristics: elongate petioles (especially those near midstem), stipitate glands on the internal surface of the lower lip of the corolla, subcapitate stigmas that appear to consist of a disk-like platform subtending two rounded mounds, and the 5-aperturate pollen.

Five-aperturate pollen apparently is not otherwise known among Mexican species of *Justicia* (e.g., Daniel 1998). It is common among Mexican species of *Poikilacanthus* Lindau, a genus that is not monophyletic, and whose relationship to *Justicia* is currently being investigated (Kiel et al. 2017, 2018). However pollen of *Poikilacanthus* (e.g., Daniel 1991, 1998, 2017) consists of two related types bearing circular apertures (simple or compound?) with the interapertural surface covered with subcircular to rectangular to polygonal insulae (gemmate regions enclosed by thick

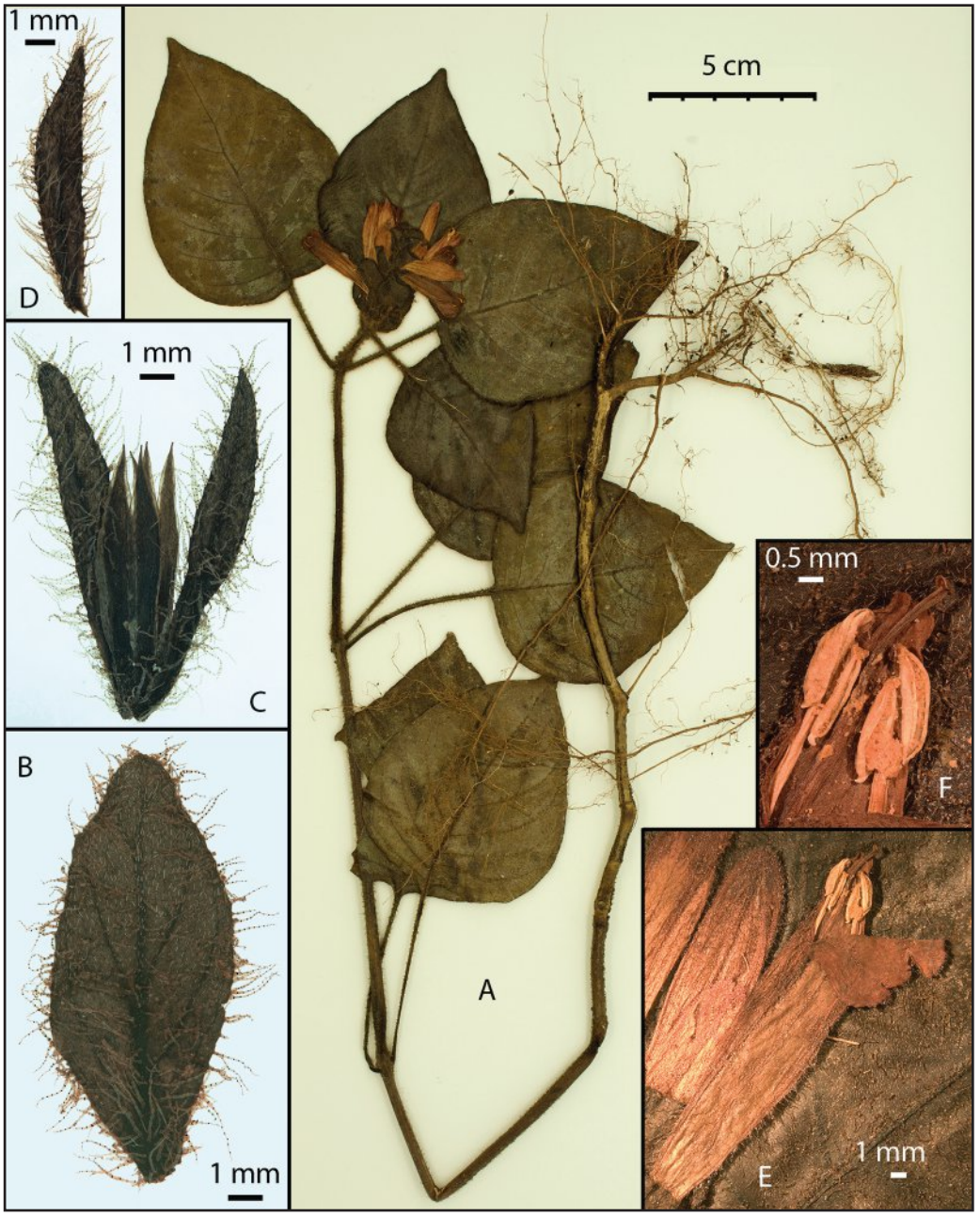

FIGURE 8. *Justicia olmeca*. A. Habit (*Ventura 14895*). B. Bract (*Hanan & de Santiago s.n.*). C. Bracteoles and calyx (*Hanan & de Santiago s.n.*). D. Bracteole (*Hanan & de Santiago s.n.*). E. Flower and buds (*Ventura 12178*). F. Upper lip of corolla with anthers and upper portion of style with stigma (*Ventura 12178*).

muri) that are either 1) discrete and more or less evenly distributed over the surface or 2) share common endwalls and are arranged in loops and bands (loops enclosing a band). Pollen of *J. olmeca* shows some slight similarities to *Poikilacanthus* pollen of this second type. Pollen of both *Hanan & de Santiago s.n.* and *Ventura 14895* (Fig. 9) show sculptural variation in curving and fusion of pseudocolpi with 1) the pair in each mesocolpium distinct (Fig. 9b), 2) the pair in each mesocolpium fused toward one pole (i.e., forming pseudocolpal arches in the mesocolpia; Fig. 9a), 3) the pair in each mesocolpium fused toward both poles (i.e., forming pseudocolpal ellipses in the mesocolpia; Fig. 9d), or 4) the pair of pseudocolpi flanking a colporus (i.e., those in adjacent mesocolpia) fused (or nearly fused) toward poles and forming a pseudocolpal ellipse surrounding the colporus + a ring of interapertural exine (Fig. 9c). Molecular phylogenetic analyses that include this species could be potentially informative regarding relationships among clades of *Justicia* and its relatives among Justicieae in the New World.

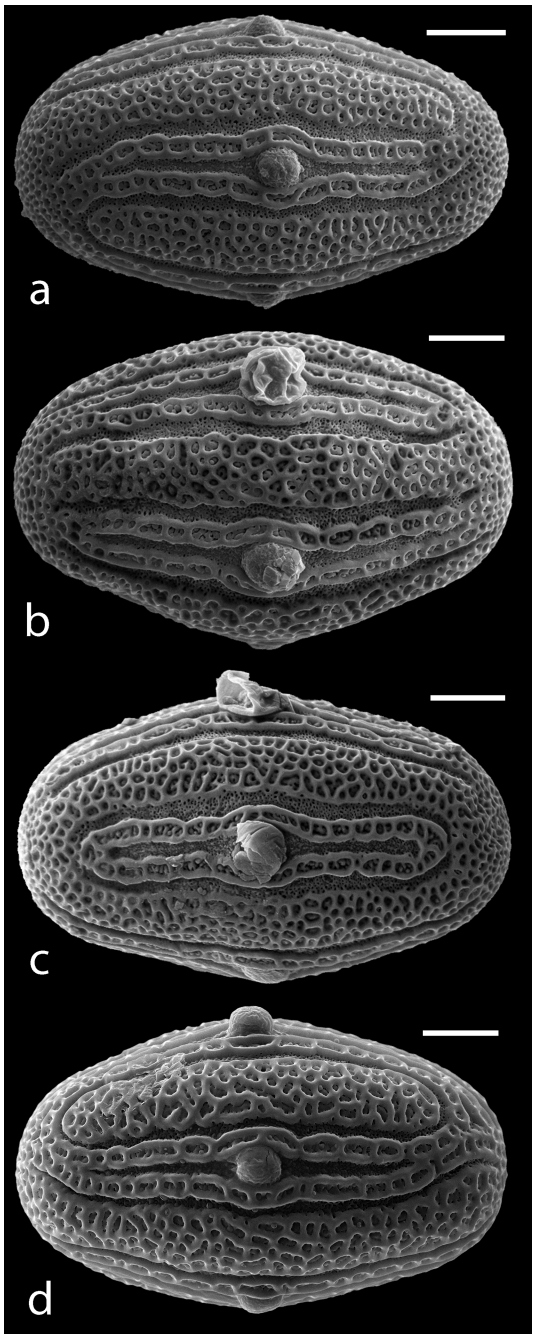

FIGURE 9. Scanning electron micrographs of *Justicia* pollen III. A–C. *Justicia olmeca* (*Hanan & de Santiago s.n.*). A. Apertural view with pseudocolpal arches in mesocolpia. B. Interapertural view with free pseudocolpi. C. Apertural view with pseudocolpi ± encircling apertural region. D. *Justicia olmeca* (*Ventura 14895*), apertural view with pseudocolpal ellipses in mesocolpia. Scales = 10 μm.

***Justicia totonaca* T.F. Daniel, sp. nov.**

Type.— MEXICO. **Veracruz**: Mpio. Atoyac, Cerro La Perla, 3 km SE de Miraflores, 18°57′N, 096°48′W, selva mediana subperennifolia, suelo kárstico, 900 m, 17-V-1985 (frt), *R. Acevedo R. & R. Acosta P. 109* (holotype: MEXU!; isotypes: IEB-not seen, XAL-not seen). Figures 2, 6, 10.

Shrubs to 2 m tall. Young stems subquadrate, evenly and densely pubescent (i.e., stem surface not clearly visible) with erect to flexuose to retrorse to antrorse eglandular trichomes 0.2–0.8 mm long. Leaves petiolate, petioles 7–41 mm long, blades (ovate-elliptic to) elliptic, 151–265 mm long, 57–130 mm wide, 1.6–2.9 × longer than wide, acuminate at apex, subattenuate to attenuate at base, adaxial surface pubescent with mostly erect to antrorse eglandular trichomes 0.2–1 mm long, abaxial surface and margin similarly pubescent, margin entire, ciliate throughout. Inflorescence of axillary (in axils of distalmost 1–2 pairs of sometimes smaller leaves) and terminal pedunculate dichasiate spikes, these forming a terminal panicle of spikes to 60 mm long (including peduncle but excluding flowers), peduncles of spikes to 20 mm long, pubescent like young stems, rachis pubescent with trichomes like those of young stems but these conspicuously sparser; dichasia opposite (or with some alternate) at nodes, 1 per axil, 1-flowered, sessile. Bracts triangular to ovate to oblong, 1.5–5 mm long, 1–1.3 mm wide (often subfoliose and larger at base of spike, i.e., petiolate, obovate to subcircular, and up to 21 × 12 mm in size), apically acute to subacute, abaxially pubescent like rachis. Bracteoles triangular to subulate, 1.5–2.2 mm long, 0.5–1 mm wide, abaxially pubescent like rachis. Flowers sessile. Calyx 5-lobed, 5–7.5 mm long, lobes homomorphic, lanceolate, 3.5–5.5 mm long, 1–1.5 mm wide, abaxially and marginally pubescent like rachis. Corolla orange, 40–49 mm long, externally pubescent with erect to flexuose eglandular trichomes 0.1–0.4 mm long, tube gradually expanded distally, 31 mm long, 6 mm in diameter (measured flat) at mouth, upper lip 15–17 mm long, 2-fid at apex, lower lip 13 mm long, recoiled, 3-lobed, lobes 1.5–2 mm long, 1–1.6 mm wide, central lobe widest. Stamens ca. 20 mm long, filaments pubescent with eglandular trichomes except glabrous in distal ca. one-fifth), thecae of a pair parallel to subsagittate, subequally inserted, 3.3–3.8 mm long, subequal in length, glabrous, each with a rounded basal appendage 0.1–0.2 mm long. Pollen 2-aperturate with a central pore-like aperture flanked on each side by 2 rows of insulae (and sometimes with peninsulae as well). Style 44 mm long, glabrous throughout; stigma globose to subellipsoid, 0.2–0.3 mm long, Capsule 33–43 mm long, glabrous, stipe 17–21 mm long, head 15–22 mm long. Seeds 7 mm long, 3.5–5 mm wide, surfaces pustulate-roughened, lacking elongate trichomes.

Phenology.— Flowering: March; fruiting: May–June.

Distribution and habitats.— Mexico (west-central Veracruz; Fig. 2); plants occur on montane slopes (sometimes noted as karsted) in "selva mediana subperennifolia" and oak forests at elevations of 600–900 m.

Conservation.— Based on the three known collection sites for this species, the calculated EOO = 2.2 km^2 (altered to 12 km^2 because it is less than the AOO), the AOO = 12 km^2, and the greatest linear extent of its distributional range (E–W) = 19 km. The species does not occur in a protected area. *Ventura 15945* indicated that species was rare at the collection site, whereas *Acevedo R. & Castillo C. 216* indicated that plants were abundant at their site. In spite of the small EOO and AOO, no threats have been identified for this species. Its montane habitats do not appear to have been severely impacted based on Google Earth historical imagery between 2001 and 2019 (Google Earth Pro 2019). A provisional assessment of Least Concern (LC) is proposed for this species based on current knowledge.

Etymology.— The specific epithet derives from the name of the indigenous Totonac people of central Veracruz.

Paratypes.— MEXICO**. Veracruz**: Mpio. Atoyac, La Joya, ca. 1.5 km NW del Rancho de

Santa Rosa, 18°57′N, 096°46′W, *R. Acevedo R. & G. Castillo C. 216* (IEB-not seen, MEXU, MO, XAL-not seen); Mpio. Córdoba, Lagunilla, [18.961389, -96.942222], *F. Ventura 15945* (IEB-not seen, MEXU, XAL-not seen).

Discussion.— Prominent characteristics of *J. totonaca* (Fig. 10) include: dense cauline trichomes, large leaf blades, orange corollas externally pubescent with eglandular trichomes only and with the lower lip recoiled, elongate capsules, and large seeds. This species shares several morphological characteristics with a trio of similar species (each of them sometimes cultivated) that also occur in this general region of Mexico: *J. amplifolia* T.F. Daniel, *J. leonardii* Wassh., and *J. spicigera* Schltdl. All have orange corollas of similar shape and size, with the lower lip recoiled. *Justicia spicigera* is the only species in this group that produces a bluish dye when herbage is placed in water. Pollen of *J. totonaca* (Fig. 6), unlike that of other members of this assemblage, lacks distinct colpi. These species can be distinguished using the following key.

1a. Young stems evenly pubescent with trichomes dense (stem surface not clearly visible); calyx 5–7.5 mm long; corolla externally pubescent throughout with eglandular trichomes 0.1–0.4 mm long; anther thecae 3.3–3.8 mm long, both with basal appendages 0.1–0.2 mm long; capsule 33–43 mm long; seeds 7 × 3.5–5 mm; pollen 2-aperturate, but lacking colpi . . . . . *J. totonaca*

1b. Young stems nearly glabrous or evenly to 2-fariously pubescent with trichomes sparse to ± dense (stem surface clearly visible); calyx 2.5–5 mm long; corolla externally glabrous or appearing glabrous but with sparse and inconspicuous glandular (and sometimes eglandular) trichomes up to 0.1 mm long located proximally and/or distally; anther thecae 1.5–3 mm long, lacking basal appendages; capsule 15–21 mm long (unknown in *J. amplifolia*); seeds 2.7–4 ×2.5–3.5 mm (unknown in *J. amplifolia*); pollen 2-colporate . . 2

2a. Leaves sessile or subsessile with petioles up to 2 mm long, blades large (100–340 × 55–146 mm), glabrous (although with inconspicuous punctate glands), broadly attenuate or rounded and ± abruptly constricted at base where sometimes ± auriculate-clasping; external surface of corolla appearing glabrous but sparsely and inconspicuously pubescent with stipitate glands located mostly on the distal portion of the tube and/or limb; pollen 2–brevicolporate . . . . . *J. amplifolia*

2b. Leaves petiolate, petioles 3–24 mm long (if less than 3 mm long as in some *J. leonardii*, then blades shorter than 100 mm and narrower than 55 mm and narrowly attenuate at base), blades usually pubescent with elongate trichomes (at least along major veins), acute to attenuate at base; external surface of corolla glabrous or appearing so but with sparse and inconspicuous stipitate glands usually restricted to proximal portion of tube; pollen 2–colporate (elongate colpi at least evident if not prominent). 3

3a. Stems and leaves yielding a bluish dye when placed in water; leaves glabrous or pubescent with trichomes mostly restricted to major veins; bracteoles abaxially glabrous or glandular–punctate; capsules (rarely present) glabrous . . . . . *J. spicigera*

3b. Stems and leaves not yielding a dye when placed in water; leaves (at least abaxially) ± evenly pubescent or the intercostal regions conspicuously pubescent; bracteoles pubescent with eglandular trichomes 0.05–0.5 mm long; capsules pubescent with inconspicuous sessile to subsessile glands < 0.05 mm long . . . . . *J. leonardii*

New Name

Justicia amplifolia T.F. Daniel, nom nov.

Sericographis macrophylla Oerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1854: 149. 1855, non *Justicia macrophylla* Spreng. (1824, as "1825"). *Jacobinia macrophylla* (Oerst.) Benth. & Hook.f. ex Hemsl., Biol. Cent.-Amer., Bot. 2: 521. 1882. **Type**.—MEXICO. **Veracruz**: Sta. María Tlapacoyo, [Tlapacoyan, ca. 19°57′37.67″N, 097°11′24.84″W], V-1841 (flr), *F. Liebmann (Liebm. Pl. Mex. Nr.) 10666* (lectotype, designated here: C!; isolectotypes: CAS!, K!, K ex hb. Hook.!, P!). Figures 3, 5, 11, 12.

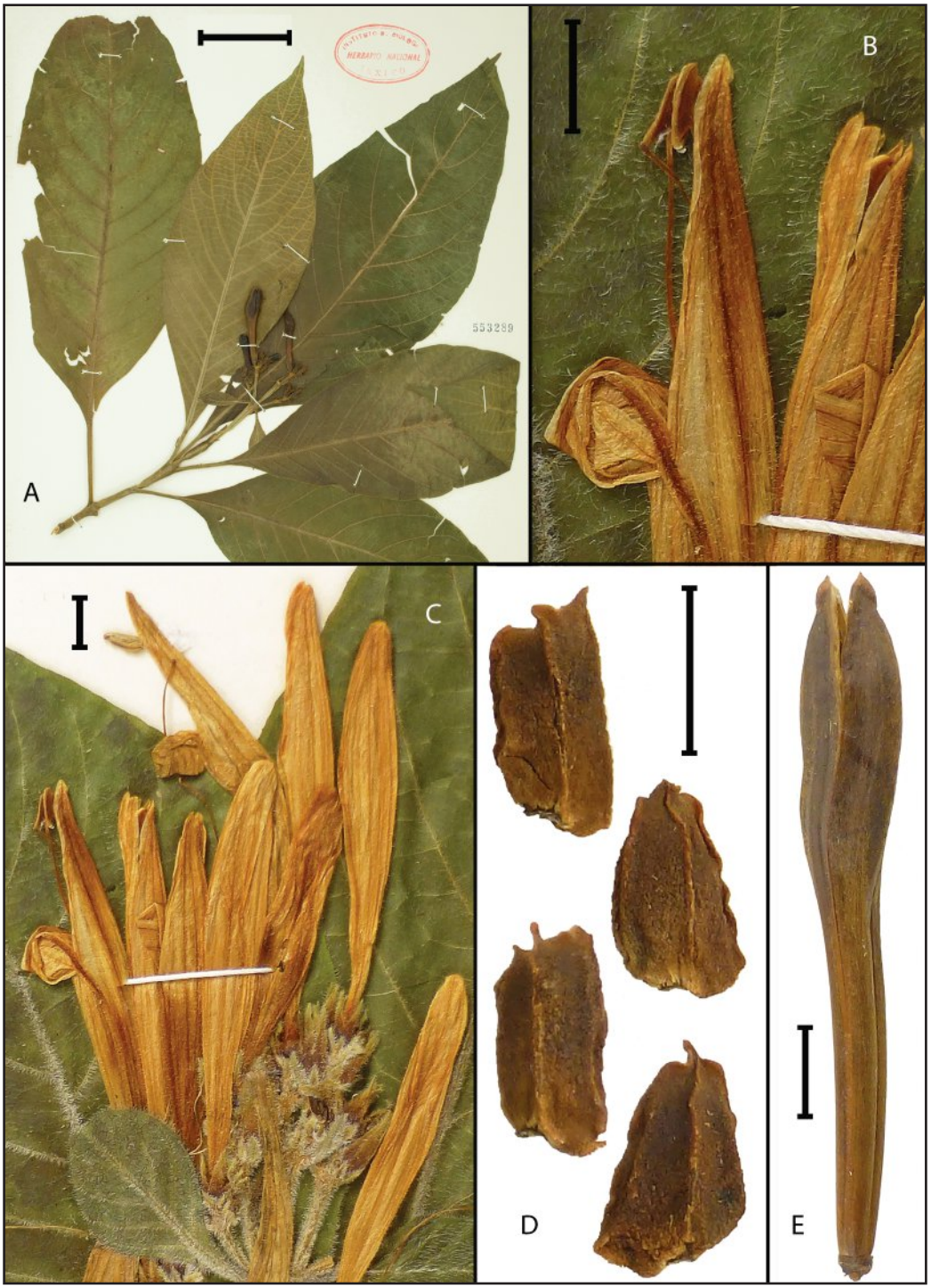

FIGURE 10. *Justicia totonaca*. A. Fruiting branch (holotype). B. Close-up of distal portion of flowers (*Ventura 15945*). C. Inflorescence (*Ventura 15945*). D. Seeds (*Acevedo R. & Castillo C. 216*, MEXU). E. Capsule (*Acevedo R. & Castillo C. 216*, MO). Scale for A = 5 cm, for B–E = 5 mm.

Erect perennial herbs to shrubs to 2 m tall. Young stems distally quadrate and 2-sulcate, nearly glabrous or 2-fariously pubescent (trichomes sometimes only along a portion of internodes) with flexuose to antrorse eglandular trichomes to 1.8 mm long, proximally quadrate and sometimes glabrate. Leaves sessile to subsessile, naked petiole (if present) to 2 mm long, blades ovate-elliptic to elliptic to broadly elliptic to obovate-elliptic, 100–340 mm long, 55–146 mm wide, 1.4–2.8 × longer than wide, rounded and abruptly acute to apiculate at apex, broadly attenuate or rounded and ± abruptly constricted at base and sometimes ± auriculate-clasping there, adaxial surface glabrous, abaxial surface glabrous, both surfaces minutely and inconspicuously punctate glandular, punctations < 0.05 mm diam. and sometimes drying dark reddish or black, margin entire, proximally ciliate with eglandular trichomes to 1.8 mm long. Inflorescence of axillary (in distal 1–2 pairs of leaves or reduced leaves, 1–2 per axil, opposite at nodes) and /or terminal pedunculate panicles of unilateral dichasiate spikes, these sometimes collectively forming a dense and broad cluster of flowers, peduncles of panicles to 50 mm long, ± glabrous or pubescent like young stems, rachis glabrous; dichasia mostly 1 per node (alternate), 1 per axil, 1-flowered, sessile to subsessile (i.e., with peduncles < 1 mm long). Bracts subtending dichasia opposite to subopposite, homomorphic, broadly triangular, 1–2 mm long, 1–1.2 mm wide, abaxially glabrous. Bracteoles narrowly triangular to broadly triangular, 1–2 mm long, 0.4–0.8 mm wide, abaxially glabrous. Flowers sessile to subsessile (i.e., with pedicels to 0.5 mm long). Calyx 5-lobed, 3–5 mm long, lobes homomorphic, lance-subulate, 2–3 mm long, 0.8–1 mm wide, abaxially and marginally glabrous. Corolla orange, 25–42 mm long, externally glabrous except for very sparse and inconspicuous stipitate glandular trichomes < 0.05 mm long, these located mostly or entirely on the distal portion of the corolla tube and/or limb, tube 14–31 mm long, gradually expanded distally (i.e., no clear distinction between narrow proximal portion and throat), 3.5–4.5 mm diam. (measured flat) at mouth, upper lip 9–18 mm long, apically entire to very shallowly 2-fid, lower lip recoiled, 9–20, lobes 1–1.5 mm long, 1.5–2 mm wide. Stamens 9–19 mm long, filaments glabrous, thecae 2.5–3 mm long, those of a pair sagittate, subequally to unequally inserted (overlapping by up to 2.6 mm), equal to subequal in length, glabrous, lacking basal appendages. Pollen 2-aperturate, apertures consisting of a relatively short colpus (brevicolpate) and a prominent os, flanked on each side by 2–3 rows of insulae (farthest rows from aperture sometimes consisting partially or entirely of peninsulae). Style 20–45 mm long, glabrous; stigma oblong, 0.2–0.4 mm long, unequally and inconspicuously 2-lobed. Capsule not seen (ovary glabrous).

Phenology.— Flowering: March–June; fruiting: unknown.

Distribution and habitats.— Mexico (Puebla and Veracruz; Fig. 5); plants occur in gallery forests and in disturbed areas (e.g., roadsides, cultivated lands) at elevations of 690–977 meters. The species is known in cultivation, and some collections noted below might pertain to remnants or escapes therefrom.

Use.— Planted for living fence (*Amith et al. s.n.*).

Conservation.— Based on the six collections that are potentially from native habitats, the EOO = 3,343 km^2, the AOO = 20 km^2, and the greatest linear extent of the distributional range of the species (NW–SE) is 158 km. The lectotype is likely from an area that is now protected, the Parque Estatal Río Filobobos y su Entorno. Threats have not been identified for this species, although some likely exist. Thus, the number of locations is unclear. Given these data, and the likelihood that some of the collections cited represent cultivated or naturalized plants, this species is provisionally assessed as Data Deficient (DD).

Additional specimens examined.— MEXICO. **Puebla**: Mpio. Cuetzalan, between San Miguel Tzinacapan and Ayotzinapan, en el pueblo de Tecoloapa, 20°02′54.63″N, 097°32′20.72″W, *J. Amith & P. Mendoza 1419* (CAS; MEXU-image only); Mpio. Cuetzalan, San Miguel,

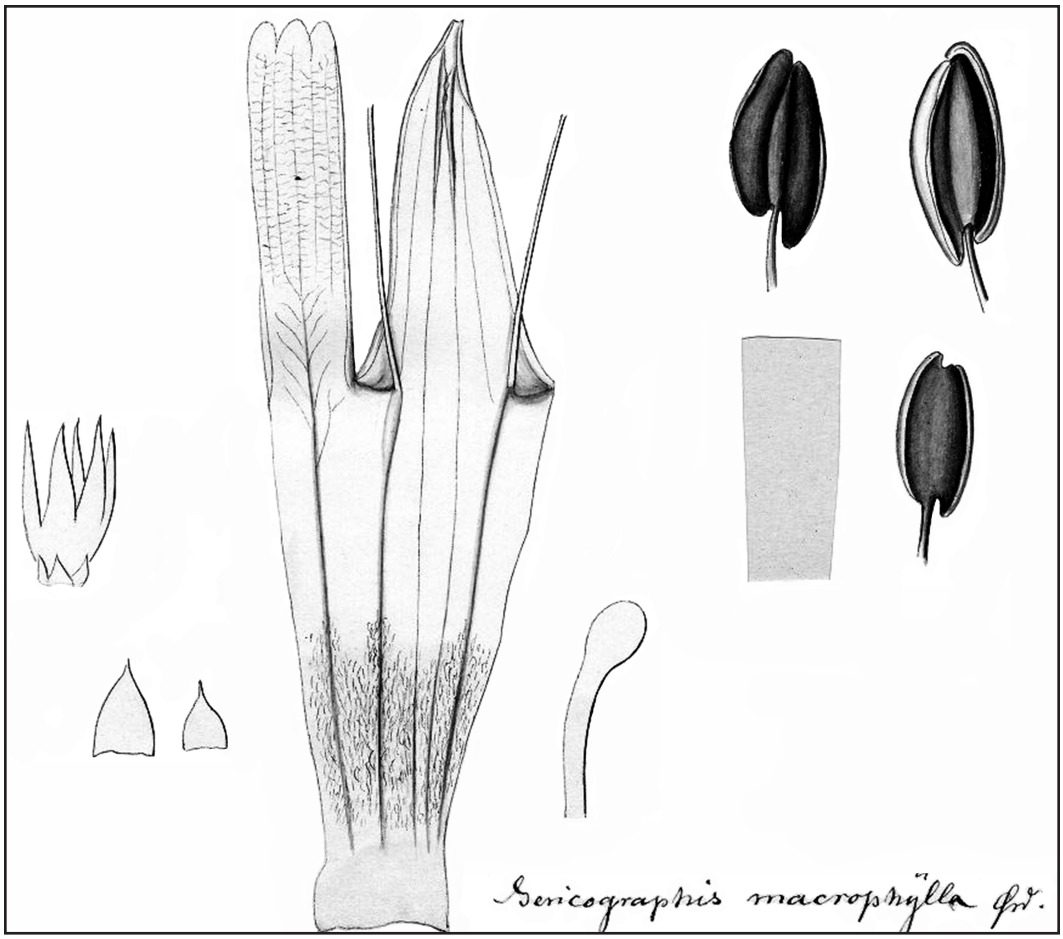

FIGURE 11. *Justicia amplifolia*. Drawing of *Sericographis macrophylla* (presumably by Oersted) at C showing (from left): calyx subtended by a bract and two bracteoles, bract, bracteole, a corolla cut open showing insertion of filaments, apex of style with stigma, and several views of the bithecous anthers. Used with permission of, and copyright reserved to, the herbarium (C) at the Natural History Museum of Denmark.

[ca. 20°01′52.83″N, 097°32′33.91″W], *J. Amith et al. s.n.* in 2015 (CAS); Mpio. Zongozotla, carr. Zongozotla–Cuautempan, en la cascada Tuxpinicin, 19.98164, -97.75716, *C. Ledesma C., O. López F. & A. Sotero H. 21907* (CAS); Mpio. Zihuateutla, Zihuateutla, 40 m de la clínica de Zihuateutla, en la casa de Regina Villegas, 20.25152, -97.88684, *C. Ledesma C. et al. 86044* (CAS). **Veracruz**: Mirador [ca. 19°12′N, 096°52′W], *F. Liebmann (Liebm. Pl. Mex. Nr.) 10667* (syntype: C!). **Cultivation:** Selby Botanical Gardens (ex Gardino Nursery, Delray Beach, Florida), *H. Luther s.n.* in 2006 (CAS), in 2009 (CAS).

DISCUSSION.— A lectotype is designated above from the original material at C, where the first set of Liebmann's collections from Mexico and Central America is deposited, and where Oersted studied them. Oersted (1855) cited two collections of Liebmann from Veracruz, a syntype from Mirador (*Liebmann 10667*) and the lectotype noted above. From the original material, Liebmann's flowering collection with the larger leaves, represented by several duplicate specimens, is chosen as the lectotype. An unpublished illustration at C, bearing Oersted's name for the species in his handwriting, is also likely original material (Fig. 11).

FIGURE 12. *Justicia amplifolia*. Habit (top left), shoot with inflorescence showing large leaves (top right), inflorescence (bottom left), flower from below (bottom right). Photos of cultivated plants taken at Fairchild Tropical Botanical Garden by the author, except photo of flower by J. Amith (used with permission) taken in Puebla.

In 1977 Wasshausen annotated, as *Jacobinia macrophylla*, two Mexican specimens from Veracruz at P that were collected by Hahn in 1866 at Chiquihuite (Cerro del Chiquihuite, ca. 18°56′14″N, 96°46′22″W) and at "Veracruz." Both superficially resemble *J. amplifolia* by their large leaves. However leaves on both collections differ from those of *J. amplifolia* by having petioles much longer than 2 mm and blades pubescent and narrowly attenuate at the base. Additional-

ly, collector's notes on the specimen from Chiquihuite indicate that the corollas were brilliant red. The identity or identities of these two plants will require additional study.

Daniel (1995) included this species in, and annotated specimens of it as, *Justicia spicigera*. Subsequent studies of recent collections and living plants (e.g., at Fairchild Tropical Botanic Garden, Fig. 12) reveal it to be at least as distinct from that species as *J. leonardii*. *Justicia spicigera*, which has human uses (medicine, dye, ornament) and does not often produce fruits, might have been derived from *J. leonardii* by early human cultivation/selection. If so, it is possible that *J. amplifolia*, which has at least ornamental uses, might also be a human-influenced derivative of either *J. spicigera* or *J. leonardii*. All three species are cultivated and share several characteristics, including orangish corollas with the lower lip recoiled. Pollen of *J. amplifolia* is similar to but appears to differ slightly from that of *J. spicigera* and *J. leonardii* by it shorter colpi. Additional distinctions among them are noted in the key above under *J. totonaca*.

New Distribution Records

Justicia phlebodes Leonard & Gentry

MEXICO**. Nayarit**: along route 28 between Tepic and Jalcacatlan [Nay rte. 66 or Mex. rte. 76 and Jalcocotán on recent maps], between KM 14 and KM 15, [ca. 21°31′47.25″N, 105° 02′0.74″W], ca. 1000 m, 7-I-1979 (flr, frt), *T. Croat 45204* (MO); Tepic, 5-I–6-II 1892 (flr), *E. Palmer 2007* (US).

These two collections from west-central Nayarit are the first records of *J. phlebodes* from the state, extend the distribution of the species ca. 225 km south of its nearest known locale in southern Sinaloa, and closely resemble conspecifics from other regions of northwestern Mexico. Indeed, the 2-aperturate pollen with 2–2.5 rows of insulae (to peninsulae) of *Croat 45204* matches pollen previously noted for the species (Daniel 2004). These collections from Nayarit differ from/augment information in Daniel's (2004) description of plants occurring to the north only in the following minor (and mostly continuous) characteristics: bracteoles up to 7 mm long and down to 0.3 mm wide; corolla ± infundibuliform with the tube slightly expanding ca. 4 mm distal to the base and thence slightly expanded toward the mouth, the upper lip up to 11 mm long, and the lower lip up to 11.5 mm long with lobes up to 5 mm long; and the gap between the two anther thecae down to 0.2 mm long, and the lower theca with a basal appendage down to 0.1 mm long. The species has been reported previously from Chihuahua, Durango, Sonora, and Sinaloa (Daniel 2004).

Justicia pilosella (Nees) Hilsenb.

MEXICO**. Veracruz**: Mpio. Tempoal, 5 km del entronque al Higo dirección alrededores del Ejido San Andrés, 21°49′N, 098°24′W, 20 m, selva baja espinosa, 10-VI-1986 (flr), *C. Gutierrez B. & E. Montoya 1834* (MEXU, XAL).

In addition to its occurrences in the United States (New Mexico, Texas), Daniel (2011) recorded this species from the the following Mexican states: Chihuahua, Coahuila, Durango, Guanajuato, Hidalgo, Nuevo León, Puebla, Querétaro, San Luis Potosí, Tamaulipas, and Zacatecas. The collection noted above extends the distribution of *J. pilosella* into northwestern Veracruz, ca. 75 km southwest of its known occurrence near Tampico in southern Tamaulipas, and ca. 135 km east of an occurrence in eastern San Luis Potosí.

Justicia spicigera Schltdl.

MEXICO**. Tabasco**: Edo. Puyacatengo, Centro Régional de Chapingo, orilla del río, 60 m, 27-V-1979 (flr), *K. Hormia 174* (US, W).

Justicia spicigera is otherwise known from cultivated collections from Tabasco, but this collection would appear to possibly represent either a native or naturalized occurrence of the species in that state. It is somewhat unusual among conspecifics by the corollas bearing inconspicuous glands not only proximally on the corolla tube, but also distally on the tube and on the lips. The species is widely cultivated in Mexico, where it is presumed to be native. Daniel (1995, 2003) noted likely native occurrences in Chiapas, Oaxaca, and Veracruz.

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