

## JUSTICIA SALASIAE, A NEW SPECIES OF ACANTHACEAE FROM OAXACA, MEXICO

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**Abstract:** *Justicia salasiae*, a new species from tropical deciduous forests in the Sierra Madre del Sur of southern Oaxaca, Mexico is described and illustrated. The species is distinctive by its panicles of spikes bearing elongate bracts and its tuberculate seeds that bear minute trichomes on the tubercles.

**Resumen:** Se describe e ilustra *Justicia salasiae* como especie nueva de selva baja caducifolia de la Sierra Madre del Sur, en el sur de Oaxaca, México. Se distingue la especie por sus panículas de espigas con las brácteas alargadas y sus semillas tuberculadas con tricomas minúsculas en los tubérculos.

**Keywords:** *Justicia*, Acanthaceae, taxonomy, Sierra Madre del Sur, Oaxaca, Mexico.

Recent studies of the dry and mesic forests in the Sierra Madre del Sur of southern Oaxaca have resulted in the discovery of several new species of Acanthaceae (e.g., Acosta C., 2007; Acosta C. and Daniel, 1993) and range extensions for others (e.g., Acosta C. and Saynes V., 2006). Recent collections from throughout the state, especially those emanating from inventories by the the Sociedad para el Estudio de los Recursos Bióticos de Oaxaca (SERBO) in the Sierra Madre del Sur, bring the number of native species of Acanthaceae known from the state to 129 (Daniel, unpublished). Oaxaca is thus the richest state for Acanthaceae in Mexico, surpassing the 127 native species documented from Chiapas (Daniel, 2007). Additional new Oaxacan Acanthaceae await description. Here we describe one of the most distinctive among these.

***Justicia salasiae*** T.F. Daniel and E.J. Lott, sp. nov. (Figs. 1–3, cover).

TYPE: MEXICO. OAXACA: Mpio. San Miguel del Puerto, ca. 5.5 km (by road) N of Mex. 200 (coastal hwy.) on road to Xadani, 15°52.486'N, 96°0.965'W, 200 m, canyons in tropical deciduous forest, 23 February 2012, T.F. Daniel, E.J. Lott, and N. Salas M.

11890 (HOLOTYPE: MEXU!; ISOTYPES: CAS!, K!, MO!, SERO!, TEX!, US!).

Perennial HERBS to SHRUBS to 2 m tall; older (woody) stems irregularly fissured-striate, with distinct ridges (lenticels often converging into ridges), puberulent with erect eglandular trichomes < 0.05 mm long, young stems subquadrate with prominent lenticels on 4 angles, becoming multi-striate, inconspicuously puberulent with erect eglandular trichomes and sessile punctate glands < 0.05 mm long, longer eglandular trichomes (up to 0.5 mm long) sometimes present at and near nodes. LEAVES petiolate, petioles to 20 mm long, blades ovate to elliptic, 36–175 mm long, 8–66 mm wide, 2.7–4.5 × longer than wide, acuminate at apex, subattenuate to attenuate at base, surfaces puberulent like stems and also pubescent (at least abaxially) with erect to flexuose eglandular trichomes to 0.6 mm long, margin entire. INFLORESCENCE of axillary and terminal ± pedunculate panicles of dichasiate spikes to 120 mm long (including peduncles and excluding corollas), peduncles to 10 mm long, pubescent with erect glandular, subglandular, and sometimes eglandular trichomes, bracts subtending panicle branches sometimes dark, subfoliose, linear to narrowly elliptic (to

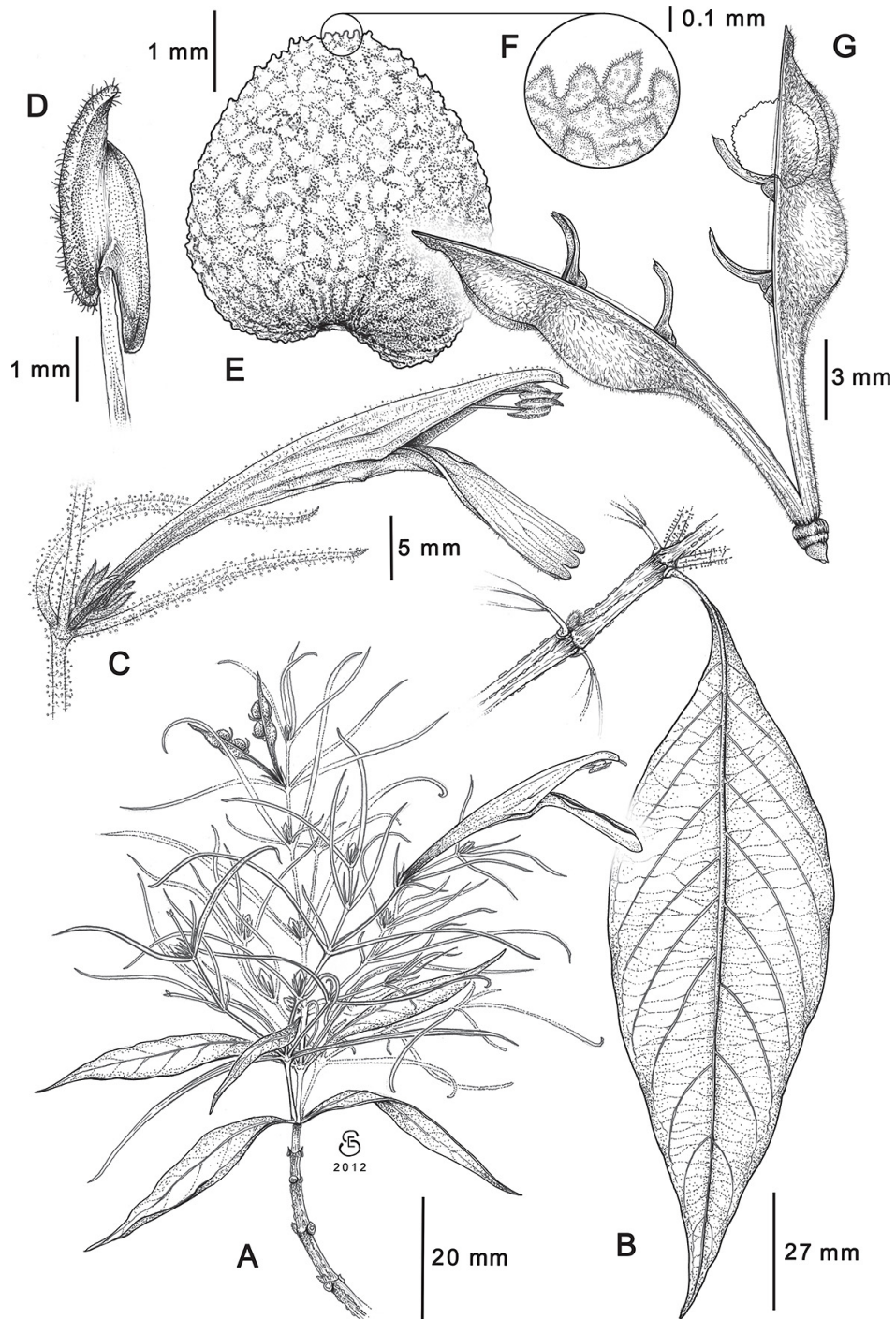


FIG. 1. *Justicia salasiae* (Daniel et al. 11890). A. Distal nodes and inflorescence. B. Proximal nodes and leaf. C. Inflorescence node with flower. D. Anther. E. Seed. F. Enlargement of tubercles of seed with minute trichomes. G. Capsule. Drawn by S. Edgerton.

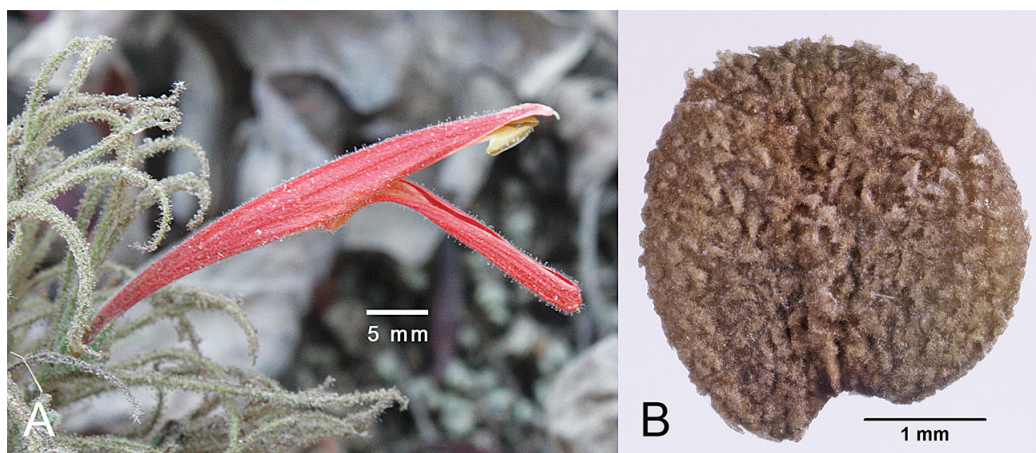


FIG. 2. Photographs of *Justicia salasiae* (Daniel et al. 11890). A. Inflorescence with elongate and glandular bracts and flower. B. Seed with subconic tubercles.

oblanceolate), 27–53 mm long, 1–9 mm wide, pubescent with glandular and eglandular trichomes to 0.5 mm long; spikes alternate or opposite, usually pedunculate, to 115 mm long (including peduncle and excluding corollas), peduncles to 15 mm long, rachis clearly visible, pubescent with erect glandular and subglandular trichomes 0.05–0.5 mm long and sometimes with sparse erect to flexuose eglandular trichomes to 1 mm long as well; dichasia alternate, sessile, 1-flowered. BRACTS sometimes dark, subacicular to linear to linear-elliptic, 13–51 mm long, 0.4–1.5 (–3) mm wide, abaxial surface pubescent like rachis. BRACTEOLES sometimes dark, subulate to lance-subulate, 2–9 mm long, 0.5–1 mm wide, abaxial surface pubescent like rachis. Flowers sessile to subsessile (i.e., pedicels to 1 mm long). CALYX 5-lobed, 3.5–6 (–7) mm long, lobes subulate to lance-subulate, 2.5–5 mm long, 0.5–1 mm wide, widest at base, lobes usually equal to subequal in size, sometimes 6 heteromorphic with posterior lobe ca. L as long as longest lobe, all lobes abaxially pubescent like rachis. COROLLA orange-red with throat yellow internally, 25–43 mm long, externally pubescent with erect to flexuose eglandular and glandular trichomes 0.1–0.4 mm long, tube 15–27 mm long, gradually expanded distally, 2–2.7 mm in

diameter near midpoint, upper lip 9–15 mm long, 2-fid at apex, lower lip 10–16 mm long, lobes 1–2.7 mm long, 1–2 mm wide. STAMENS 12–16 mm long, thecae unequally inserted (overlapping by 2–2.5 mm), parallel to subparallel to subperpendicular, 2.9–3.5 mm long, equal to subequal in length, lacking basal appendages, distal theca dorsally pubescent with eglandular trichomes to 0.1 mm long, proximal theca glabrous; pollen 2-aperturate, apertures flanked on each side by 2 rows of insulae and 1 row of peninsulae. STYLE 28–34 mm long, proximally pubescent with eglandular trichomes, distally glabrous, stigma inconspicuous, 0.05–0.1 mm long, lobes (if present) not evident. CAPSULE 15–19 mm long, pubescent with erect to retrorse eglandular trichomes 0.1–0.5 mm long, head 8–10 mm long, with slight medial constriction. SEEDS green (immature) to golden brown (mature), subcircular to subcordate, compressed, 2.7–4 mm long, 2.5–3.6 mm wide, surface covered with subconic tubercles bearing inconspicuous erect trichomes ca. 0.01–0.02 mm long.

PHENOLOGY. Flowering: December–March; fruiting: February–March.

DISTRIBUTION AND HABITAT. Mexico (Oaxaca); plants occur in the southeastern Sierra Madre del Sur (Sierra Sur of Oaxaca)

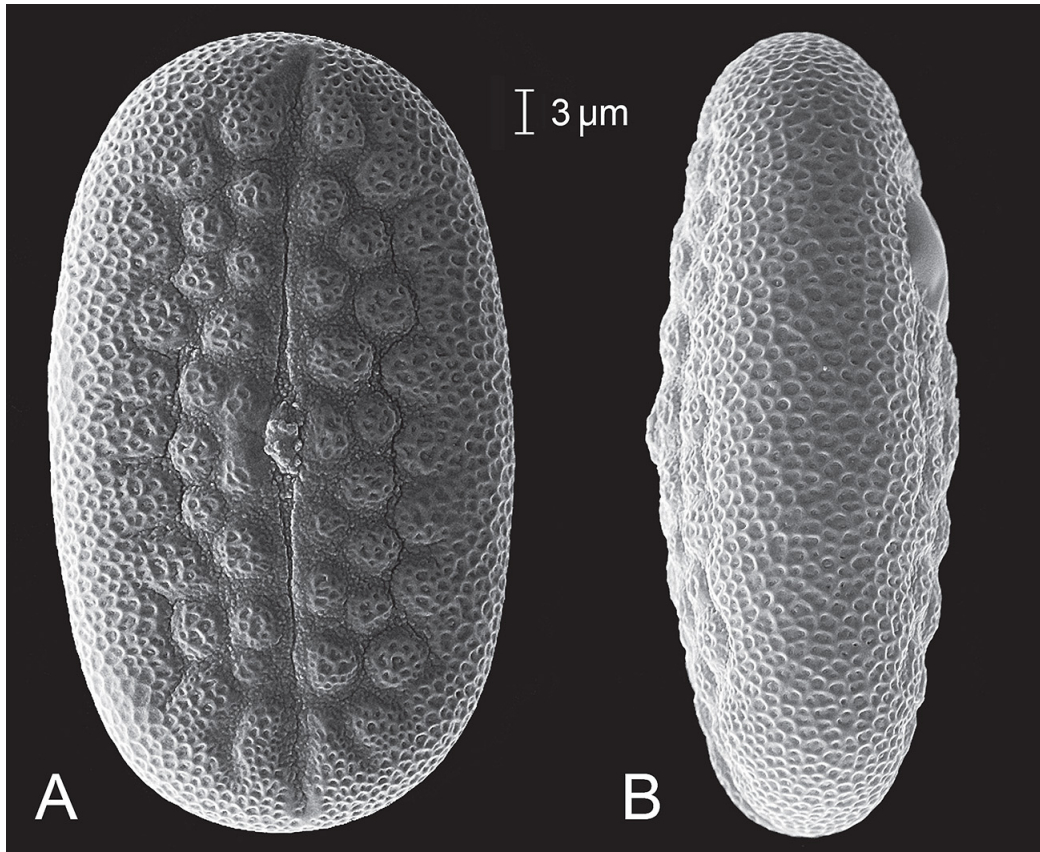


FIG. 3. Pollen of *Justicia salasiae* (Daniel et al. 11890). A. Apertural view showing colporate aperture flanked by 2 rows of insulae and 1 row of peninsulae on each side. B. Interapertural view showing reticulate exine.

in tropical deciduous forest (with *Bursera* sp., *Jacaratia mexicana*, *Pseudobombax ellipticum*, *Thouinidium decandrum*, *Comocladium engleriana*) at elevations of 20–160 m.

**ETYMOLOGY.** Named for Silvia H. Salas-Morales, coordinator of projects for the Sociedad para el Estudio de los Recursos Bióticos de Oaxaca (SERBO), curator of SERO, and dedicated student of the vegetation and flora of Oaxaca, who has greatly facilitated our studies in Mexico.

**Paratypes:** MEXICO. OAXACA: Distr. Tehuantepec, Mpio. Santiago Astata, 4 km N de Barra de la Cruz, sobre el cerro, 15u519010N, 95u57907.70W, 13 Dec 2001, M. Elorsa C. 5514 (CAS, SERO); Mpio. San Pedro Huamelula, La Toma del Papayo, 16u02911.30N, 95u42942.40W, E. Lott et al. 5789 (MEXU);

Distr. Pochutla, Mpio. San Miguel del Puerto, 6.1 km de la desviación a Xadani, sobre la terracería, 15u52924.50N, 96u00954.50W, 21 Mar 2003, A. Saynes V. et al. 3828b (CAS).

*Justicia salasiae* is distinctive among Mexican and Central American *Justicia* L. by the following combination of characters: leaves petiolate, inflorescences of glandular pubescent panicles of spikes, bracts acicular to linear and longer than calyces, corolla orange-red and externally glandular pubescent, thecae lacking basal appendages and the distal one pubescent, pollen 2-aperturate, and seeds with subconic tubercles bearing minute trichomes. Like many species of Mexican *Justicia*, *J. salasiae* does not readily correspond to any of the infrageneric taxa treated by Graham (1988). Using her

key and descriptions, it appears most similar to sections *Drejerella* (Lindau) V.A.W. Graham (which differs by 3-aperturate pollen and simple spikes with eglandular rachises), *Sarotheca* (Nees) Benth. (which differs by corollas not red and bracts shorter than the calyx), and *Simonisia* (Nees) V.A.W. Graham (which differs by eglandular

inflorescence rachises and subspheric, smooth seeds). Seeds with tubercles bearing unbranched and minute trichomes are rare among Mexican *Justicia*-having been reported only for *J. lucindae* T.F. Daniel & V. Steinmann, *J. veracruzana* T.F. Daniel, and *J. zamudioi* T.F. Daniel. These species can be distinguished by the following key:

1. Corolla white to cream with maroon markings, 10–14.5 mm long, externally pubescent with eglandular trichomes only; bracts ovate-elliptic to broadly ovate to subcircular, 3.7–7.5 mm wide; capsule 4.5–7.5 mm long; pollen 3-aperturate . . . . . *J. zamudioi*
1. Corolla reddish or yellow; 25–43 mm long, externally pubescent with glandular and eglandular trichomes; bracts triangular to subulate to acicular to linear to elliptic to oblanceolate, 0.4–3 mm wide; capsule 8–19 mm long; pollen 2-aperturate (2)
  2. Leaves sessile to subsessile (i.e., with petioles to 0.5 mm long); corolla pink-red; inflorescence rachis glabrous; thecae 1.3–1.6 mm long; capsule 8–9.5 mm long . . . . . *J. lucindae*
  2. Leaves petiolate (i.e., with petioles to 40 mm long); corolla yellow or orange-red with yellow in throat; inflorescence rachis pubescent; thecae 2.5–3.5 mm long; capsule 14–19 mm long (3)
  3. Corolla yellow; calyx 9.5–18 mm long, abaxial surface pubescent with eglandular trichomes only; inflorescence rachis pubescent with eglandular trichomes only; floral bracts triangular to subulate, 1–1.5 mm long, abaxially pubescent with eglandular trichomes only; both thecae glabrous, lower theca with a proximal appendage; capsule glabrous . . . . . *J. veracruzana*
  3. Corolla orange-red with yellow in throat; calyx 3.5–7 mm long, abaxial surface pubescent with glandular, subglandular, and often eglandular trichomes; inflorescence rachis pubescent with glandular, subglandular, and often eglandular trichomes; floral bracts acicular to linear-elliptic, 13–51 mm long, abaxially pubescent with glandular, subglandular, and often eglandular trichomes; distal theca pubescent, both thecae lacking basal appendages; capsule pubescent . . . . . *J. salasiae*

Floral visitors were not observed for this species, but the reddish, unscented, and long-tubular corollas (Fig. 2) suggest hummingbirds as potential pollinators.

Pollen of Mexican *Justicia* is diverse, with apertures varying from two to four, “trema” regions associated with the apertures that contain one or more rows of insulae (and/or peninsulae) either present or absent, and pseudocolpi present or absent (Daniel, 1998). Pollen of *Daniel et al. 11890* (Fig. 3) reveals this species to have the most common type among Mexican *Justicia*: flattened, 2-aperturate grains with trema regions consisting of two rows of insulae and one row of peninsulae on each side of the colporate aperture.

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#### LITERATURE CITED

- Acosta, C., S. 2007. Especie nueva de *Justicia* (Acanthaceae) del bosque tropical caducifolio de la costa de Oaxaca, Mexico. *Rev. Mex. Biodiversidad* 78: 11–14.
- , and T. F. Daniel. 1993. A new species of *Justicia* (Acanthaceae) from southern Mexico. *Kew Bull.* 48: 119–123.
- , and A. Saynes, V. 2006. Una nueva variedad de *Lophostachys guatemalensis* (Acanthaceae) de

- interesante distribución geográfica. *Novon* 16: 449–451.
- Daniel, T. F.** 1998. Pollen morphology of Mexican Acanthaceae: diversity and systematic significance. *Proc. Calif. Acad. Sci.* 50: 217–256.
- . 2007. Notes on the distributions of some Mexican Acanthaceae. *Ibugana* 15: 13–22.
- Graham, V. A. W.** 1988. Delimitation and infrageneric classification of *Justicia* (Acanthaceae). *Kew Bull.* 43: 551–624.