

CALLIANDRA RICOANA (LEGUMINOSAE, MIMOSOIDEAE, INGEAE): A NEW AND CRITICALLY ENDANGERED SPECIES FROM CHIAPAS, MEXICO

HÉCTOR M. HERNÁNDEZ^{1,4}, RODRIGO DUNO DE STEFANO², CELSO GUTIÉRREZ³,
GERMÁN CARNEVALI-FERNÁNDEZ-CONCHA², LILIA L. CAN² AND ELISEO POOL²

¹Departamento de Botánica, Instituto de Biología, Universidad Nacional Autónoma de México, México, D.F., Mexico

²Herbario CICY, Centro de Investigación Científica de Yucatán, A.C., Mérida, Yucatán, Mexico

³Herbario UCAM, Centro de Investigaciones Históricas y Sociales, Universidad Autónoma de Campeche, San Francisco de Campeche, Campeche, Mexico

⁴Corresponding author: hmhm@ib.unam.mx

Abstract: *Calliandra ricoana*, a new species of Leguminosae (Mimosoideae, Ingeae), from the state of Chiapas, Mexico, is described and illustrated. Critical examination of *C. ricoana* in comparison with members of *Calliandra* section *Androcallis*, series *Macrophyllae* shows that it is morphologically similar and presumably closely related to *C. macqueenii* and *C. trinervia* var. *arborea*, but it can be distinguished from these and the other members of the series by a combination of characters, namely the arborescent habit, relatively larger leaflets, short peduncles, homomorphic flowers, longer corollas and longer, exerted staminal tubes.

Key words: Fabaceae, sect. *Androcallis*, ser. *Macrophyllae*, tropical trees.

Resumen: Se describe e ilustra a *Calliandra ricoana*, una nueva especie de Leguminosae (Mimosoideae, Ingeae), del estado de Chiapas, México. El examen crítico de *C. ricoana* en comparación con los miembros de *Calliandra* sección *Androcallis*, serie *Macrophyllae* muestra que la nueva especie es morfológicamente similar y, presumiblemente, estrechamente relacionada con *C. macqueenii* y *C. trinervia* var. *arborea*, pero puede ser distinguida de éstos y los demás miembros de la serie por una combinación de caracteres; a saber, el hábito arborescente, los folíolos relativamente más grandes, los pedúnculos cortos, las flores homomórficas, la corola más larga y los tubos estaminales más largos y exertos.

Palabras clave: Fabaceae, secc. *Androcallis*, ser. *Macrophyllae*, árboles tropicales.

The tribe Ingeae Benth. comprises 36 genera and about one thousand species (Lewis and Rico Arce, 2005). Ingeae differs from other tribes of the subfamily because the stamens are basally united in a tube of variable length. *Calliandra* Benth. is readily distinguished from other genera of Ingeae by its elastically dehiscent fruits, also found in *Zapoteca* H. Hern. (Hernández, 1986) and *Calliandropsis* H. Hern. et Guinet (Hernández and Guinet, 1990), its 8-grained, bisymmetric, calymmate polyads, with columellar/granular exine structure, and a mucilaginous structure on the “basal” cell (Guinet and Hernández, 1989), and by its atypical chromosome numbers ($n = 8$ and 11), which contrast with the consistent basic chromosome number ($X = 13$) found in the remaining members of the tribe (Hernández,

1986, 1989). In addition, Prenner (2004), and Prenner and Teppner (2005) found several floral ontogenetic characters in *C. angustifolia* Spruce ex Benth. (e.g., unidirectional sepal initiation, cochlear descending sepal aestivation, helical androecium initiation and a particular mode of pollen presentation), providing further evidence for the isolated character of the genus.

The latest comprehensive account of *Calliandra* was produced by Barneby (1998), who recognized approximately 130 species ranging from southwestern United States of America to northern Uruguay, Argentina and Chile, including most of Mexico, Central America, South America and the Antilles. More recently, Souza *et al.* (2013) constructed a phylogeny of the genus using morphological and molecu-

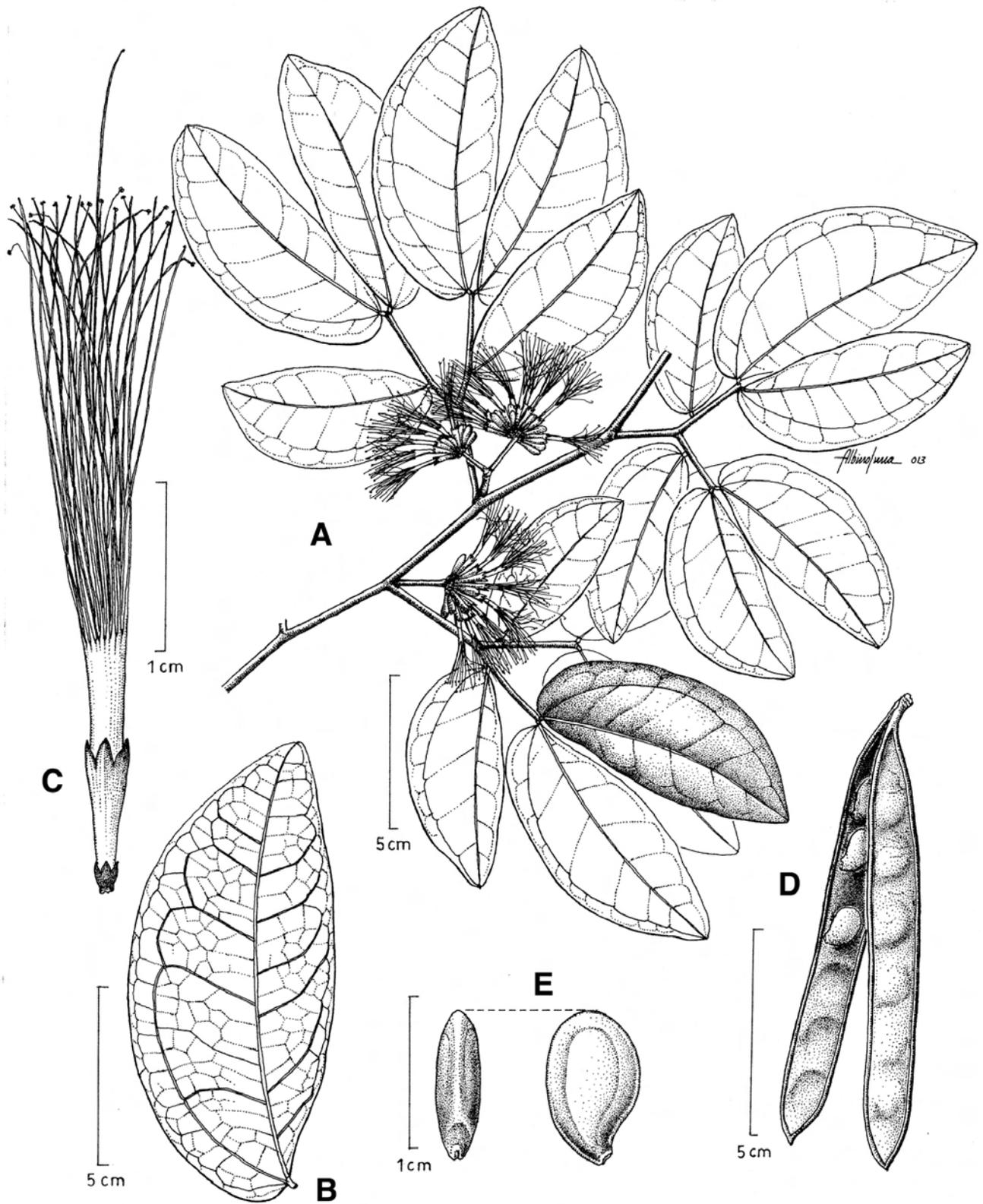


Figure 1. *Calliandra ricoana* H. Hern. et R. Duno. A) Branchlet with inflorescence at anthesis. B) Leaflet. C) Flower showing the exserted staminal tube. D) Pod. E) Seeds. Drawn by Albino Luna: A-C from *Breedlove and Davidse 55360* (MEXU), D-E from *Wendt et al. 2327* (holotype, MEXU).

lar data [nrDNA sequences (ITS) and cpDNA (trnL-F)]. She concluded that the New World *Calliandra* species, together with genus *Guinetia* L. Rico *et* M. Sousa (Rico Arce *et al.*, 1999), but excluding the two African species, conform a monophyletic group. Here, we propose *C. ricoana*, a new species belonging to section *Androcallis* Barneby, series *Macrophyllae* Benth.

Calliandra ricoana H. Hern. *et* R. Duno, sp. nov. (Figure 1).

Shrubs or small trees to 6(-10) m tall. Leaves bipinnate, without extrafloral nectaries; pinnae 1 pair; leaflets 3 per pinna, the distal ones larger, (7.6-)10-13 × (2.8-)3.5-5.6 cm. Inflorescence a hemispherical head; peduncles 3-17 mm long; receptacle not elongate, 2 mm long. Flowers homomorphic; calyx (1-)2-4 mm long, campanulate; corolla 9-18 mm long, tubular or tubular-infundibuliform; filaments white in the basal half, reddish in the distal half; staminal tube conspicuously exerted in all flowers, 14-38 mm long. TYPE: Mexico, Chiapas, municipio de Palenque, 11.4 km al S de Palenque, sobre carretera a Ocosingo (carr. 199), 2 km al S del entronque con carretera a Chancalá (carr. 192), 17° 27' lat. N, 91° 59' long. W, alt. 300-330 m, selva alta perennifolia, lomas empinadas, suelo margoso con lutitas, arbusto o arbolito de hasta 4 m, frecuente en lugares abiertos, 2 Diciembre 1979 (flower, fruit), **T. Wendt, E. Lott and J. García 2327** (holotype: MEXU; isotypes: CAS, CHAPA, ENCB).

Shrubs or **small trees** to 6(-10) m tall; stems to 12 cm diam. at the base; young branches glabrous; **stipules** 1.8-3 mm long, triangular to ovate, membranous, glabrous, deciduous. **Leaves** bipinnate, glabrous throughout, without extrafloral nectaries; pinnae 1 pair; petioles 1.5-6.2 cm long, with a conspicuous ventral channel; rachis lacking; rachilla 2-3.5 cm long, with a conspicuous ventral channel; **leaflets** 3 per pinna, the distal ones larger, (7.6-)10-13 × (2.8-)3.5-5.6 cm, inequilaterally elliptic or elliptic-lanceolate, base oblique, the narrow size cuneate, the wide size lobate, acute to short-acuminate, coriaceous, blade light green in the abaxial face, dark green and lustrous in the adaxial face; venation brochidodromous, with 2(-3) prominent veins arising from the base, the thicker vein excentric and slightly incurved, the higher order veins and reticular veinlets weakly raised on both faces. **Inflorescence** a hemispherical head, 12-30 flowered; peduncles axillary, solitary or fasciculate, 3-17 mm long; receptacle not elongate, 2 mm long; bracts spatulate, concave, ± 1.5-2.3 mm long, persistent. **Flowers** homomorphic, apparently diurnal, sessile; **calyx** (1-)2-4 mm long, campanulate, teeth deltate, membranous, glabrous to sparsely puberulent, light green to reddish; **corolla** 9-18 mm long, tubular or tubular-infundibuliform, membranous, glabrous to sparsely puberulent, light green to reddish; **filaments** (40-)50-62 mm long, 24-26-merous, white in the basal half, reddish in the distal half; **staminal tube** conspicuously exerted in

all flowers, 14-38 mm long; **anthers** dorsifixed, transversally oblong to elliptic; **polyads** 8-grained, ± ellipsoid, with two central grains and six heteromorphic peripheral grains, peripheral grains variously angled, each central pollen grain with 4 perimetral pori, ectexine verrucose; **ovary** glabrous. **Pods** pendulous, solitary or rarely 2 per capitulum, elastically dehiscent, usually 7-11.3 × 1-1.2 cm, linear, flattened, with thick marginal suture ribs, base attenuate, apex obtuse to rounded with a short mucron, rigidly membranous, glabrous. **Seeds** 3-6 per pod, on short dilated funiculus, compressed-ovoid, pleurogram inconspicuous.

Distribution and ecology. *Calliandra ricoana* appears to be restricted to two small areas in northeastern Chiapas, Mexico: one south of Palenque (municipality of Palenque) and the other in the vicinity of Agua Azul waterfalls (municipality of Tumbalá), at 300-450 m elevation (Figure 2). Unfortunately, the area, originally covered by dense tropical evergreen forest, has been almost completely deforested, although small forest fragments still remain. However, the plant seems to be abundant in the area as indicated in the herbarium specimen label (Wendt *et al.* 2327).

Phenology. Flowering occurs between August and January, and fruiting between September and January.



Figure 2. Geographical distribution of *Calliandra ricoana* (red dots).

Table 1. Morphological comparison of *Calliandra ricoana* and related taxa. Most character states of *C. macqueenii* and *C. trinervia* var. *arborea* were taken from Barneby (1998).

	<i>C. ricoana</i>	<i>C. macqueenii</i>	<i>C. trinervia</i> var. <i>arborea</i>
Habit	shrubs, small trees	shrubs	shrubs, small trees
Maximum height (m)	6(-10)	1.5	9
Leaflets per pinna	3	4	3-4
Leaflet length (cm)	(7.6-)10-13	2.2-5	(4.5-)6.5-11
Leaflet width (cm)	(2.8-)3.5-5.6	0.9-2.2	1.4-5
Peduncle length (mm)	3-17	2.5-5	14-36
Receptacle	not elongate (2 mm long)	elongate (5-7 mm long)	not elongate (1-3 mm long)
Flowers	homomorphic	homomorphic	heteromorphic
Calyx length (mm)	(1-)2-4	1.9-2.3	1.2-3.4
Corolla length (mm)	9-18	9-10	6.4-7.5(-13)
Staminal tube	exserted in all flowers	exserted in all flowers	included or shortly exserted in peripheral flowers, exserted in central flowers
Staminal tube length (mm)	14-38	15-16	4.5-7.5
Stamen length (mm)	(40-)50-62	40	19-33
Stamen color	white/reddish	creamy-white	pink, red, exceptionally white
Pod size (cm)	7-11.3 × 1-1.2	(6-)8-14 × 0.65-0.8	8.5-18 × 1.1-1.7

Etymology. We take pleasure in naming this new species to honor our friend and colleague, Dr. María de Lourdes Rico Arce, recognizing her numerous contributions to our knowledge of the Leguminosae.

Conservation status. Accurate information regarding the distribution area and population dynamics of *C. ricoana* is lacking. However, according to the IUCN Red List criteria (IUCN, 2001), the category of Critical Endangered (CR) may be provisionally assigned in view of its apparently narrow distribution range (only two known populations) and considering that the suitable habitat necessary for its survival is almost totally destroyed.

Morphological comparison. *Calliandra ricoana* is a remarkable member of *Calliandra* series *Macrophyllae* Benth., which, according to Barneby (1998), includes 12 species of macrophyllous trees and shrubs, with leaves consistently bearing a single pair of pinnae, each with one to four, large (mostly 4-19 cm long) leaflets. The new species appears to be closely related to *C. macqueenii* Barneby, also a member of ser. *Macrophyllae*, known only from a restricted locality of Guerrero. *Calliandra ricoana* and *C. macqueenii* have in common the short peduncles, the relatively long corollas, as well as the long exserted staminal tubes. However, *C. ricoana* may be easily distinguished by being larger shrubs or small trees, by the pinnae with 3 larger leaflets, by the not elongate receptacle, and by the larger flower parts (corolla, staminal tube, and filament) and different filament color (Table 1). Another presumably close relative of *C. ricoana* is *C. trinervia* Ben-

th. var. *arborea* (Standley) Barneby, which is also present in Chiapas and elsewhere in Central America (Barneby, 1998; Hernández, 2001; Zamora, 2010). These two taxa share the arborescent habit, the significantly large leaflets and the inflorescences with essentially spherical, not elongated receptacles. However, *C. ricoana* may be easily distinguished from that species by having shorter (3-17 mm) peduncles, homomorphic flowers, usually longer corollas, and longer and exserted staminal tubes in all flowers of the inflorescence. *Calliandra trinervia* var. *arborea* usually has longer (14-36 mm) peduncles, inflorescences with heteromorphic -central and peripheral- flowers, shorter corollas (except in the central flowers), and shorter, inserted staminal tubes in the peripheral flowers (Table 1).

Additional specimens examined. Mexico. **Chiapas, municipality of Palenque:** 6-12 km S of Palenque on road to Ocosingo, 300m, *D.E. Breedlove* 26540 (MEXU), *D.E. Breedlove* 28816 (DS, MEXU); 9-12 km S of Palenque on road to Ocosingo, 300 m, *D.E. Breedlove* and *G. Davidse* 55360 (MEXU); 10 km S of Palenque towards Ocosingo, 17° 24' 15" lat. N, 91° 59' 30" long. W, 330 m, *C. Gutiérrez Báez* 6016 (MEXU); 15 km S of Palenque on road to Ocosingo, 17° 25' lat. N, 91° 59' long. W, 300 m, *D. Macqueen* 327 (EAP, FHO, K, MEXU, NY), 11 km SE of Palenque, *O. Téllez* and *E. Martínez* 820 (MEXU). **Municipality of Tumbalá:** Agua Azul, 17° 16' 00" lat. N, 92° 07' 00" long. W, 450 m, *C. Gutiérrez Báez* 8292 (UCAM); Cascadas de Agua Azul, 17° 14' 52" lat. N, 92° 06' 54" long. W, 296 m, *C. Gutiérrez Báez* 10840 (CICY, MEXU, MO, UCAM).

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