New Species, New Combinations and New Synonymies Towards a Treatment of Acanthaceae for the Manual de Plantas de Costa Rica

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NEW SPECIES, NEW COMBINATIONS AND NEW SYNONYMIES TOWARDS A TREATMENT OF ACANTHACEAE
FOR THE MANUAL DE PLANTAS DE COSTA RICA

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ABSTRACT

In preparation for the publication of the Manual de Plantas de Costa Rica, new species, names, combinations, and synonymsies are provided in six genera of Acanthaceae: Anisacanthus, Chamaeranthemum, Dicliptera, Justicia, Ruellia and Stenostephanus. The new species are Anisacanthus grace-woodiae, A. altior, J. altior, J. lithophila and S. chavesii. A new name at the species level, R. leonardiana, is provided for R. tubiflora var. hirsuta. With Hubracanthus, Hansteinia, Kalbreyeriella and Razisea being subsumed within Stenostephanus, the new combinations S. blepharorhachis, S. citrusus, S. leiorhachis (= Razisea spicata non S. spicatus), S. strictus, S. ventricosus, S. villosus and S. wilburii are formalized. Seven new synonymies are presented for species of Chamaeranthemum, Dicliptera, Justicia and Stenostephanus, as well as lectotypifications in the first and latter two genera.

RESUMEN


Key words: Acanthaceae, Anisacanthus, Chamaeranthemum, Costa Rica, Dicliptera, Justicia, Ruellia, Stenostephanus.

INTRODUCTION

Fieldwork that has supported the monumental effort to completely document the flora of Costa Rica in the form of the Manual de Plantas de Costa Rica (Hammel et al. 2003+) continues to reveal new species and new country records of Acanthaceae. This is true, despite the fact that the country’s flora has been studied by botanists for more than 150 years, and its Acanthaceae have been treated in three major previous works (i.e., Lindau 1898; Leonard 1938; Durkee 1986). A number of new species have been discovered and described since the last countrywide treatment (e.g., Daniel 1993; Gómez-Laurito and Hammel 1994; Durkee and McDade 1996; McDade and Tripp 2007). Recently, focused effort to complete the Acanthaceae treatment for Volume IV of the Manual de Plantas de Costa Rica has resulted in a number of additional novelties and the need for several new combinations and synonymsies.

Anisacanthus

A new species of Anisacanthus Nees—the first recorded for Costa Rica—has been collected from Diria National Park on the Nicoya Peninsula, Guanacaste. This area has been the source of a number of novelies in various families (see Hammel 2012), including Chileranthemum pyramidatum (Lindau) T.F. Daniel (Acanthaceae), a species previously known only from Mexico and Guatemala (Daniel 1995). As discussed below, the new species of Anisacanthus is closely related to the two other Central American species of the genus but is quite distinct from them.

Anisacanthus grace-woodiae Hammel & McDade, sp. nov. (Fig. 1–2, 8–9).—TYPE: COSTA RICA. Guanacaste: Canton Santa Cruz. Peninsula de Nicoya. Parque Nacional Diria: Cerro Brujo, por el camino, cerca a las torres, 700–800 m, 19 Mar 2008, B. Hammel & I. Pérez 24533 (holotype: CR; isotypes: MO, RSA).

Similar to the other two Central American species of Anisacanthus, A. nicaraguensis Durkee and A. tetracaulis Leonard, plants of the new species have bright red, apparently 4-merous corollas with the stamens and style held adjacent to the middle lobe of the lower lip of the corolla at anthesis. However, they differ from both by the shorter calyx, also from A. nicaraguensis by the slightly shorter...
corolla and from *A. tetracaulis* by the lobes of the lower lip being longer and strap shaped (vs. ovate).

Erect to spreading, densely branched shrubs 0.6–1.2(–2) m tall; young stems quadrangular; cystoliths present. Leaves with the petiole 0.5–3 cm long, glabrous or with a few scattered trichomes, the blade 3–9(–10.5) × 1.2–5 cm, basally acute to short attenuate, apically acute to acuminate, sparsely puberulent on both sides, trichomes mostly on veins. Inflorescences of terminal and axillary racemes, or panicles of racemes (sometimes with several per node, especially at distal nodes), pedunculate with peduncle 0.5–3 cm long; bracts 1.5–2 mm long, narrowly triangular, pubescent with mixed glandular and eglandular trichomes; bracteoles 1–1.2 mm long, narrowly triangular, pubescent with mixed glandular and eglandular trichomes. Flowers one per node (bract opposite each fertile bract sterile), often secund; pedicel 1–3 mm, pubescent with mixed glandular and eglandular trichomes; calyx 5-lobed, connate basal portion ca. 0.5 mm long, the lobes equal, 3.5–4.5 mm long, pubescent with mixed glandular and eglandular trichomes; corolla lacking a stylar furrow (i.e., rugula), bilabiate, red, pubescent with mixed glandular and eglandular trichomes; tube 13–15 mm long, upper lip minutely bilobed (the lobes ca. 0.5 mm long), 10–12 × 1–2 mm, narrowly strap shaped, positioned vertically (± curved-patent) above throat of tube, lower lip 17–20 mm long (measured from base of upper lip), three-lobed, the lateral lobes about 10 × 1 mm, positioned laterally (± curved-patent) to throat of corolla, the middle lobe 13–15 × 1–2 mm, positioned horizontal to (i.e., continuing distal from) the tube, folded sheath-like to enclose stamens and style, all lobes strap...
Fig. 8. *Anisacanthus grace-woodiae*. Photograph of living plant; insets show fruit and flower; vouchered by *Hammel 26080* (CR).
Fig. 9. *Anisacanthus grace-woodiae*. Scan of the holotype, *Hammel & Pérez* 24533 (CR).
shaped; stamens extending 9–12 mm beyond the middle lobe of the lower corolla lip, the anthers bitemic, the thecae equal, 3–4 mm long, evenly inserted on filament, parallel or sometimes sagitate, staminoid 0; pollen perprolate, tricolporate hexaenu-sudocellate, exine reticulate except granular in colpus; style exerted 0–2 mm beyond anthers, the stigma minutely bilobed. Fruits capsular (with retinaculum present, persistent on capsule wall), 1.3–1.5 cm long, clavate, the stipe 0.7–0.8 cm long, seed-bearing portion discoid, 0.8–0.9 × 0.65–0.75 cm, glabrate; seeds to 4, about 5 mm in diam., flattened, minutely tuberculat.

Known only from Cerro Brujo, Parque Nacional Diriá, Santa Cruz, Guanacaste, plants of this species have been collected in flower and fruit during the dry season, January through March and in December.


Etymology.—We are happy to name this species for Grace Wood, who first discovered this charismatic plant and whose collecting has helped make clear that the Cerro Brujo area of Costa Rica warrants considerable additional fieldwork. Grace and her husband Monty have visited Costa Rica almost annually for many years, Grace collecting plants while Monty collects flies. A gifted amateur botanist, Grace has a very good eye and it has been a joy to have her prowling the herbarium in Santo Domingo, carefully identifying her own collections, during those visits.

Among Costa Rican Acanthaceae, this species may be recognized by its densely racemose inflorescences with one flower per node, bilabi ate (effectively 4-lobed), bright red flowers that are presented with the filaments clasped within the ± horizontal median lobe of the lower lip and the anthers exerted beyond that lobe, and at anthesis mostly with the lateral lobes of the lower lip held at divergent angles to the corolla tube and the minutely bilobed, vertical upper lip also held at a divergent angle to the corolla tube.

Anisacanthus grace-woodiae was included in a phylogenetic study of the Tetramerium lineage (Justicieae) by McDade et al. (2018), as Anisacanthus sp. 26685. Results showed that it is sister to the other two Central American species of Anisacanthus, A. tetracaulis and A. nicaraguensis; these last two are sister taxa. All three species have bright red flowers with an apparently 4-merous corolla with the stamens and style held adjacent to the middle lobe of the lower lip at anthesis. The newly described and only Costa Rican species of this genus is readily distinguished from its closest relatives by the following key:

1. Calyx 9–13 mm long; corolla 33–35 mm long; known only from Nicaragua.  
   1’ Calyx 4–9 mm long; corolla to 30 mm long

2. Calyx 4–5 mm long; corolla with the lower lip extending 17–20 mm beyond tube, the two lateral lobes ca. 10 × 1 mm, the middle lobe 13–15 × 1–2 mm, all lobes strap shaped; known only from Costa Rica. A. grace-woodiae

2’ Calyx 6–9 mm long; corolla with the lower lip extending 11–14 mm beyond tube, all three lobes 3.5–6.5 × 2.5–4 mm, ovate; known from Honduras and El Salvador. A. tetracaulis

Chamaeranthemum

Chamaeranthemum Nees, a New Genus with only four species, is very tenuously—if at all—distinct from pantropical Pseuderanthemum Radlk. ex Lindau. Both genera have corollas with a narrow tube that expands near the mouth and a sub-actinomorphic limb, two bitemic stamens and two staminodia (very rarely in Costa Rican Chamaeranthemum, one or both of the “staminodia” have been found fertile with the anther monothecate). Neither genus has been revised and the results of McDade et al. (2000; in progress) indicate that these genera are part of a clade referred to by these authors as the “Pseuderanthemum lineage,” a group that remains poorly known and requires additional phylogenetic and nomenclatural study. Pseuderanthemum with ca. 120 spp. is the younger, nomenclaturally. Costa Rican material of Chamaeranthemum may be separated from that of Pseuderanthemum principally by the second flowers (mostly opposite in the latter). However, whereas at least two Costa Rican species of Pseuderanthemum are heterostylyous, all Costa Rican material of Chamaeranthemum we have seen appears to be homostylyous. However, Lindau indicated that C. tonduzii Lindau had a style 15–16 mm long and a corolla with a 10 mm long tube. None of the type material, nor any other we have examined, confirms a style longer than ca. 9 mm. Lindau’s anomalous measurements are consistent with the long-styled form of a heterostylous plant, or a fairly extreme case of approach herkogamy. Neither of these seems to apply to extant Costa Rican material, but field observations are sorely lacking and more extensive collections are needed.


LAM has studied numerous specimens (including type material of C. durandii) of Costa Rican plants identified as the only two spp. known (also described) from the country, C. durandii and C. tonduzii. The former was said to be distinct from the latter by its hirsute leaves and inflorescence rachis. Indeed, one can separate specimens fairly consistently into those with glabrous leaves and a puberulous inflorescence rachis versus those with both leaves and inflorescence rachis sparsely pilose. A few specimens include material with both pubescence forms mounted on a single sheet. Also, plants of both pubescence forms rarely have
one or both of the lower stamens fertile, the anther monotheca.

Given these patterns, we consider this to be a species with intraspecific variation in trichome and androecial features, and here synonymize *C. durandii* with the older *C. tonduzii*. The latter name had two syntypes, both here considered to belong to this one species. We have chosen *Tondue* 8567 as the lectotype because it has more known duplicates (the one at CR being the one we have studied in formulating these understandings) and with more flowers than the remaining syntype. Furthermore, the image at F of the B duplicate (presumably destroyed) has sketches on it, most likely in the hand of Lindau, showing many of the very same floral measurements used by him in the protologue. This verifies that material of the chosen lectotype was seen by Lindau, and served as an important source for his original description. As per specimens at CR and US, “*Tondue* 8367” is actually *Condria lucidula* L.M. Johnst. (Boraginaceae—APG Cordiaceae).

**Dicliptera**

Three of eight Costa Rican species of *Dicliptera* Juss. have deep magenta-purple flowers > 25 mm long, borne in long pedunculate cymes and are subtended by green, relatively small bracts: *D. iopus* Lindau, *D. skutchii* Leonard and *D. trifurca* Oerst. Study of type material of these three species indicates that *D. trifurca* and *D. iopus* are conspecific and refer to plants that are less than 1 m tall (except when supported by other plants), have corollas 33–36 mm long that are resupinate through 180° and markedly bent 4–5 mm above the base resulting in a semipendent presentation, and capsules 12–14 mm long. Unfortunately, for some decades, the epithet *D. trifurca* has been applied to a different species that remains unnamed pending geographical comprehensive study of this group. Plants of the undescribed species are larger in stature (to 3 m tall), have longer flowers than the remaining syntype. Furthermore, displaced filaments (1) a rugula (i.e., stylar furrow), and (3) two stamens with bithecate anthers modified in various ways (e.g., connective tissue may be expanded and thecae may be of unequal size, inserted at different levels on the filament, displaced and/or appended). Here, we provide descriptions for two new species and make three new synonymies. The total number of species now known from Costa Rica is 40.

**Justicia**

The “justicioid” lineage (sensu Kiel et al. 2017) comprises the largest genus of Acanthaceae, *Justicia* L. (ca. 700 species; Daniel 2011, 2016), and at least 15 additional genera (Kiel et al. 2017). *Justicia* is globally widespread in the tropics and subtropics with species richness centered in the New World. Although the genus is highly polyphyletic, New World *Justicia* along with five smaller New World genera, *Cephalacanthus* Lindau, *Clis-tax* Mart., *Harpochilus* Nees, *Megaskepasma* Lindau and *Poikilacanthus* Lindau, are together monophyletic (Kiel et al. 2017, 2018). *Justicia* can be characterized by flowers with (1) a zygomorphic corolla, (2) a rugula (i.e., stylar furrow), and (3) two stamens with bithecate anthers modified in various ways (e.g., connective tissue may be expanded and thecae may be of unequal size, inserted at different levels on the filament, displaced and/or appended). Here, we provide descriptions for two new species and make three new synonymies. The total number of species now known from Costa Rica is 40.
MO, no such specimen has been located at either of those institutions. Gómez-Laurito (1991) noted that long, petiolate leaves, non-imbricate bracts with glandular pubescence, five calyx segments of equal lengths and conspicuous verrucose seeds with waxy yellow projections distinguished *J. bitarcaraea* from other species of *Justicia*. Excluding the seed character from the description (because it is of *S. silvicatus*), this species is indistinguishable from *J. costaricana*. *Justicia bitarcaraea* thus becomes a synonym of the earlier *J. costaricana*.


In his description of *Justicia parvibracteata*, Leonard (1938) mentioned affinities to *J. pittieri* but noted the former could be distinguished by bract width (1 mm wide or slightly wider vs. 2 mm, respectively). Leonard also claimed, in his key and descriptions of these two species, that the calyx lobes of the former are equal or subequal while in the latter they are distinctly unequal, with one lobe smaller than the others. On examination of the type of *J. parvibracteata* and other similar material from near the type locality, we have found the calyx to be indistinguishable from that of *J. pittieri*. It is not clear to us that Durkee studied type material of *J. parvibracteata* and *J. pittieri* when he prepared the treatment of *Justicia* for the *Flora Costaricensis* (Durkee 1986). His key brings these two out together claiming that the first has “bracts apically obtuse; leaves narrowly elliptical oblong” and the latter “bracts acutely acute; leaves lanceolate elliptic.” However, even looking only at the types, it is clear that both have bracts with variably shaped apices, from acute to rounded, and both have very similarly shaped, elliptic or lanceolate elliptic leaves. His descriptions of these two don’t clearly distinguish them and he doesn’t compare them in notes after either. Durkee (1986) noted that *J. pittieri* was only known from two collections: the type, Pittier 8642, from the upper Rio Yorkin, Talamanca, and Sketch 4632 from the vicinity Pejijale in Cartago but the type of *J. parvibracteata*, Standley & Valerio 47001, is also from wet forests near Pejijale. Durkee’s concept of *J. parvibracteata* (1986) was clouded by having included specimens of the species newly recognized here, *J. lthophila*, a species with features of the inflorescence and seeds more like *J. candelariae*. Our study of the type material and recent collections from all along the Atlantic slope from where the two were originally described indicates that there are no traits that unambiguously separate these two species and we here synonymize *J. parvibracteata* with the older *J. pittieri*.


The characters cited by Durkee (1986) to distinguish *J. candelariae* from *J. valerii* in Costa Rica included stem pubescence (pilose vs. short retrorse), shorter leaf blades (2.5–6.5 cm vs. 3.5–10 cm) and calyx pubescence (cilidiate vs. glandular-puberulous). After careful comparison of type material in addition to study of numerous specimens of both species, these traits appear to be combined in various ways. Daniel (1995) also noted that these characters varied widely among specimens of *J. candelariae* from Chiapas, Mexico. Given these patterns, we synonymize *J. valerii* with the older *J. candelariae*.

**Justicia altior** Kiel & Hammel, sp. nov. (Fig. 3–4, 10–11).—**TYPE**: COSTA RICA. Puntarenas: Cantón de Osa, entre Palmar Norte y Puerto Cortés, 9 km de la entrada a camino (Cuesta del Burro) a Fila Retinta, 800–900 m, 6 Mar 2012, B. Hammel, C. Davidson & I. Pérez 26182 (holotype: CR; isotypes: MO, RSA).

This species is distinctive for the reddish-orange pubescence upon drying, inconspicuous cystoliths, and for its spicate inflorescences with densely imbricate bracts and light purple corollas. In those aspects it is very similar to *J. aurantiimutata* Hammel & Gómez Lau., but differs most notably by its corollas about twice as long as those of the latter.

Herb 0.3–1 m tall; stems erect, terete, densely velutinous to almost lanate (the trichomes turning reddish orange, reddish brown or tan upon drying). Leaves isophyllous, subesissile or with petioles to 0.5 cm long; blade 3–14.5 × 1.2–4 cm, lanceolate to oblanceolate, basally acute to short attenuate, apically acute to acuminate, crenulate, pilose to hirsute on both surfaces with glandular and eglandular trichomes, cystoliths inconspicuous. Inflorescences terminal and axillary, spicate, 3–8 cm long, the peduncle ca. 4 cm long, the rachis pilose with glandular and/or eglandular trichomes; bracts imbricate, homomorhous to slightly heteromorphic, 7–10 mm long, 1.2–4 cm × 0.3 cm long, the base subequal, 6.5–7.5 × ca. 0.3 mm, linear subulate, pubescent with

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Fig. 10. *Justicia altior*. Photograph of living plant; insets show inflorescence and flower; vouchered by Hammel et al. 26182 (CR).
glandular and eglandular trichomes; corolla light purple, with white nectar guides, 25–26 mm long, finely pilose distally, tube ca. 10–13 × 2 mm, the upper lip 13 mm long, the lower lip 11–13 mm long, the lobes 3–4 × 3–3.5 mm; stamens 21–22 mm long, anther thecae equal, ca. 1.5 mm long, superposed, the lower theca minutely appended; pollen prolate-spheroidal to subprolate, 5-porate, interapertural surfaces psilate with discrete crateriform insulae evenly distributed throughout the equatorial region and reticulate sculpturing at polar region; style 20–21.5 mm long, the stigma capitate, bilobed, lobes equal. Fruits 0.9–1 × 0.3–0.4 cm, clavate, pilose; seeds ca. 3 mm in diam., suborbicular, finely and sharply tuberculate.

Known from the Pacific slope of the eastern Cordillera de Talamanca (faldas del Cerro Amuo), Fila Costeña, in tropical wet forests, from 800–1400 m elevation, this species has been collected in flower from January to March. The pollen of *J. altior* most closely resembles that of *Poikilacanthus macranthus* Lindau (Kiel et al. 2018: Fig. 21–J) and *P. skutchii* D.N. Gibson, which are 6- and 5-aperturate, respectively, and densely covered with insulae. However, in contrast to these, pollen of *J. altior* have insulae that are loosely spaced across the grain and are crateriform vs. planar. *Poikilacanthus macranthus* and *P. skutchii* are members of the “core Brandegeeanum lineage” which also contains four endemic Costa Rican taxa: *J. brenesi* (Leonard) D.N. Gibson, *J. densibracteata* Durkee & McDade, *J. peninsularis* Gómez-Laur., & Hammel and *J. orostensis* Durkee. Pollen of these species is similar to that of *J. altior* with respect to aperture number > 3 (four: *J. orostensis*, *J. densibracteata*, *J. peninsularis*, six: *J. brenesi*).


Etymology.—The epithet “altior” refers to this species occurring at higher elevation than the outwardly similar *Justicia aurantiimutata*.

This species is very similar to *J. aurantiimutata*; notably plants of these two species share remarkable trichomes that dry to a reddish-orange color (see Fig. 11). However, in pollen morphology, the two species are quite different and we predict that they are not closely related among New World ‘justicioïds.’ *Justicia aurantiimutata* occurs at lower elevations (0–450 m) and the two species are readily distinguished as indicated in the following key:

1. Bracts 3.5–4.5 mm wide; corolla 10–15 mm long; pollen 4-aperturate with broad reticulate bands flanking the apertures.................. *J. aurantiimutata*
1’. Bracts 4.5–7 mm wide; corolla 25–27 mm long; pollen 5-aperturate, psilate with crateriform insulae throughout equatorial regions and reticulate at poles.................... *J. altior*

*Justicia lithophila* Hammel & Kiel, sp. nov. (Fig. 5, 12).—TYPE: COSTA RICA. Guanacaste: Cantón Liberia. Parque Nacional Rincón de la Vieja, Quebrada Zopilote, 1200 m, 12 Jan 1991, Gerardo Rivera 950 (holotype: CR; isotypes: MO, RSA).

This species is similar to *Justicia candelariae*, also with mostly spicate inflorescences with strongly imbricate and similarly shaped bracts, flowers with an unequally five-lobed calyx and relatively small, white or lavender corolla, and seeds with hemispherical papillae. It differs by its preference for rocks along streams; plants also have smaller bracts and smaller seeds. It is also similar to *J. pittieri*, which differs most notably by its more spicate-fasciculate inflorescences and seeds with sharply conical papillae.

Herb 0.1–0.3 m tall; stems erect (often on rocks), quadrangular, ± densely puberulous. Leaves isophyllous, the petiole 0.2–0.7 cm long; blade 1–7 × 0.3–0.8 cm, elliptic, basally attenuate, apically acuminate, entire, very sparsely puberulous (mostly along the midrib), glabrate or glabrous on both surfaces, the cystoliths visible on both surfaces. Inflorescences terminal (rarely also axillary at terminal node), spicate or spicate–fasciculate, 0.5–6 × 0.5–1 cm, subsessile or with the peduncle to 3 cm long, the rachis puberulous; bracts opposite, strongly imbricate, homomorphic, 4–6 × 1.5–2 cm, elliptic to oblanceolate, ciliate; bracteoles 3.5–5.5 × 0.5–0.8 mm, narrowly elliptic, ciliate or ciliolate. Flowers 1 or 2 per bract; calyx 5-lobed, the lobes unequal, (1.5)–3 × (0.1–)0.3–0.4 mm, linear or narrowly subulate, ciliolate; corolla white or lavender, the lower lip minutely red-dotted, 7–8.5 mm long, glabrous to sparsely puberulous, the tube 3.5–4.5 mm long, the upper lip 2–3 × 1 mm, the lower lip 2.5–3.5 mm long, the lobes ca. 1 × 1 mm; stamens 2 mm long, anther thecae subequal to unequal, 0.3–0.4 mm long, closely superposed, not appended; pollen subprolate to prolate, 2-aperturate, 4-pseudocolpate, with one row of indiscernible insulae bilaterally flanking each aperture, interapertural surfaces reticulate; style 4–4.5 mm long, the stigma oblong, lobes +/– equal. Fruits 0.45–0.5 × 0.1–0.15 cm, clavate, puberulous to glabrous; seeds ca. 0.8–1 mm in diam., ± orbicular, papillate (the papillae ± hemispherical).

Known from both slopes of the Cordillera de Guanacaste and from the Atlantic slope of the Cordillera Central, from 450–1200 m elevation; this species has been collected in flower from January to April. One collection (Godfrey 66536, MO), supposedly from ca. 120 m elevation on “steep forested slope, vicinity of Rincón, Península de Osa,” is so far out of range for the species that a label mix-up is suspected. In fact, Tropicos
Fig. 11. *Justicia altior*. Scan of the holotype, *Hammel et al. 26182* (CR); note trichome color on this dried specimen.
Fig. 12. *Justicia lithophila*. Scan of the holotype, G. Rivera 950 (CR).
Ruella

Genus *Ruella* L. can be characterized by its flowers with a subactinomorphic or weakly zygomorphic and ± campanulate or funnel-shaped corolla, with four bithecate stamens, and seeds with hygroscopic trichomes. The fruits are capsule-like, with the retinacula persistent on the fruit wall except that species formerly treated in *Blechum* P. Browne have placentae and attached retinacula that split away from the fruit wall at dehiscence. The recent description of four new species and finding that *Blechum* (two species from Costa Rica) is nested within *Ruella* (McDade and Tripp 2007; Tripp et al. 2009) yields a total of 22 species in Costa Rica. Here, we provide a description of an additional species, which has never been fully characterized.


Herb, suffrutex or shrub 0.5–2(–3) m tall; stems erect, quadrangular, lanate. Leaves with the petiole 1–3.5 cm long; blade 10.5–19 × 4–9 cm, elliptic, cuneate to attenuate at the base, acute to (more often) acuminate at the apex, subentire to (more often) shallowly crenate, velutinous (often subapressed) on both sides, with patelliform glands ± conspicuous on the lower surface, apparently lacking on the upper. Inflorescences terminal, dense (but few-flowered), sessile or with a peduncle up to ca. 0.7 cm long, subscape-capitate, the rachis null or up to ca. 0.3 cm long; bracts ± involucrate-imbricate, 30–90 × 5–50 mm, foliaceous, elliptic, acute to acuminate at the apex, pubescent like the leaves; bracteoles not seen. Flowers sessile or subsessile with the pedicel to ca. 1 mm long, velutinous; calyx with the tube 0.5–1 mm long, the equal or subequal segments (4–)6–8 mm long, narrowly deltate to lanceolate, pilosulous and ciliate, often also with a few longer trichomes; corolla white, the tube 46–72 mm long, the proximal unexpanded part 20–37 mm long, the distal expanded part 21–35(–42) mm long, the mouth 15–18 mm wide, the lobes 8–10 × 6–10 mm, irregularly crenate-erose to emarginate, externally puberulous to tomentose; anthers included, 5.5–6 mm long; pollen spheroidal, 3-porate, surface verrucate, coarsely reticulate, reticulum homobrochate and psilate; style 31–55 mm, approximately equal in height to the anthers, the stigma to ca. 4 mm, bilobed and somewhat laminar, with one lobe smaller. Fruits ca. 1.2 cm long, ellipsoid, minutely puberulous, the placenta not fracturing; seeds potentially 6 (often only 2 develop), ca. 4 mm in diam., suborbicular, flattened, apparently glabrous.

Known from wet forest at 100–400(–800)+ m elevation on the southern Pacific slope of Costa Rica (Fila Costeña and Golfo Dulce region), with flowering collections from Jan, Feb and Oct through Dec. Also known from Colombia (Meta: near Villavicencio, 500 m).

*Costa Rican specimens examined.—Puntarenas: Cantón Golfito. La Gamba, alrededores de la estación, 100 m, 20 Dec 1999, *R. Aguilar* 5721 (CR); Estuquinas forest, 30 m, 26 Nov 1951, *Allen* 6316 (MO); Parque Nacional Pedras Blancas, sendero Don Tacho, 100 m, 1 Nov 1997, *E. Fletes* 517 (CR); Sector Río Esquinas, 400–500 m, 11 Feb 1991, *G. Induni* 221 (CR); Sector de Esquinas, 9 Feb 1990, *R. Soto* 4151 (US);
Fig. 13. **Ruellia leonardiana.** Scan of a representative specimen, *Chavarría et al. 495 (CR).*
Estación Esquinas, 100 m, 21 Nov 1993, M. Segura 239 (CR); Bosque de los Austriacos, 150 m, 15 Jan 1998, Hüber & Weissenhöfer 839 (CR); Parcela UCR en la margen izquierda de la Quebrada la Gamba, 140 m, 10 Dec 2006, E. Chacón et al. 758 (US); Reserva Nacional de Vida Silvestre Golfito, Fila Gamba, 100 m, 24 Oct 1993, Hamburger 19103 (CR, MO); 3 km al NW del campo de aterrizaje, 400 m, 27 Jan 1992, U. Chavarria, E. Bello, B. Hammel, A. Moreno & J. Marin 493 (CR); Cantón Osas. Cerro Anguciana, 800–900 m, 9 Dec 1993, B. Hammel, R. Aguilar & M. Grayum 19243 (CR, MO).

Etymology.—The epithet chosen is in keeping with the botanical tradition of honoring the author of a replaced name. In the case of Leonard, prolific student of New World Acanthaceae (author of more than 500 epithets in the family), the wonder is that he had yet to be so honored in *Ruellia*.

Following the taxonomy of Tripp and Luján (2018), the treatment of *Ruellia* for the Manual of Plantas of Costa Rica (Hammel et al. 2003+) will again recognize *Ruellia tetrastichantha* Lindau [syn. *R. tubiflora* var. *tetrastichantha* (Lindau) Leonard] at the level of species. Likewise, *R. tubiflora* var. *hirsuta* Leonard is easily recognized and we here elevate it to species level. Both of these species have pure white corollas, whereas *R. tubiflora*, not known from Costa Rica, has corollas with a purple spot in the throat (corolla lobes may also be suffused with purple). *Ruellia leonardiana* may be distinguished from *R. tetrastichantha* by its very different pubescence (leaf blades velutinous vs. glabrous or at most pilosulose in *R. tetrastichantha*), and by its consistently terminal inflorescences (vs. both terminal and axillary) with persistent bracts (vs. soon deciduous) that thus apparently do not produce the notably naked condensed racih—cone-like in fruit—that is so characteristic of *R. tetrastichantha*. We note that extreme variation is reported in the length of the corolla tube in both of these species, as well as in the lengths of the unexpanded basal portion and the expanded distal portion (see McDATE and Tripp [2007] for explanation of terms). This variation, based apparently on open flowers on herbarium specimens, merits further examination, ideally including population-level samples of fresh flowers. The new species can be confused with *R. odorata* E. Tripp & McDATE, which has the leaf blades at most striigose and appressed puberulous along the principal veins, smaller bracts (10–23 × 2–5 mm), longer calyx lobes (10–14–18 mm long), and is known only from the nearby, but biogeographically distinct, Osa Peninsula. The Costa Rican species of *Ruellia* with pure white flowers may be distinguished by the following key:

Key to the Costa Rican species of *Ruellia* with corollas uniformly white:

1. Corollas (excluding lobes) ca. 30 mm long

1’ Corollas (excluding lobes) > 45 mm long

2. Inflorescences of dense, short spikes; bracts leaf-like (sometimes pale green to whitish), ovate to elliptic; calyx lobes < 10 mm long

3. Leaf blades velutinous; inflorescences terminal; bracts persistent in fruit, old inflorescences not cone-like

3’ Leaf blades glabrous to sparsely striigose or puberulous on veins; inflorescences axillary and terminal; bracts deciduous soon after flowering, old inflorescences often appearing as scarred, cone-like stumps

2’ Inflorescences of axillary or terminal few-flowered clusters, not as above; bracts not leaf-like; calyx lobes > 15 mm long

4. Herbaceous to woody plants to 2(–3) m tall; calyx lobes (26–)37–55 mm long; narrow, basal portion of corolla tube approximately equal to or shorter than expanded portion; anther thecae > 5 mm long; fruits > 2.5 cm long

4’ Herbaceous plants to 1.3 m tall; calyx lobes < 30 mm long; narrow, basal portion of the corolla tube ca. 2× longer than expanded portion; anther thecae ≤ 5 mm long; fruits < 2.5 cm long

5. Calyx (in flower) 10–14 × 1–2 mm, villosus; bracts 10–23 × 2–5 mm; fruits to 1.7 cm long; forest understory; Pacific slope, Osa Peninsula

5’ Calyx (in flower) 25–30 × 4–5 mm, puberulous; bracts 22–40 × 0.6–2.3 mm; fruits 2–2.3 cm long; swamps and water-logged soils; Atlantic slope, Guanacaste and Central mountain ranges

Stenostephanus

The genera *Habracanthus* Nees and *Hansteinia* Oerst., both with Costa Rican species, have been accepted on morphological grounds as synonyms of *Stenostephanus* Nees, with some new combinations already made. *Kulbreyleriella* Lindau and *Racjisea* Oerst., also with Costa Rican species, have been suspected as possibly also better placed in *Stenostephanus* (see, e.g., Daniel 1999). More recent molecular phylogenetic studies (e.g., Kiel et al. 2006) have supported the inclusion of all these genera within a thus monophyletic *Stenostephanus*, characterized by bilabiate, more or less tubular corollas lacking a rugula, two stamens with monothecate anthers, these held, with the style, adjacent to the upper lip of the corolla, staminodia lacking, and capsular fruits with the retinaculum remaining attached to the fruit wall. These plants also share pollen that is banded or “girdled” (i.e., "Gürtelpollen" sensu Lindau 1895). We here provide the remaining new combinations, a few new synonymies and one new species description that are necessary to accommodate the Costa Rican species of *Stenostephanus*. Note that we use “T.F. Daniel ex” in cases where our colleague Tom Daniel has proposed the new combinations via Tropicos as well as annotations on specimens at various herbaria (e.g., K, MO, US), but the changes have not yet been published. This brings the total species known for the country to 12.

*Stenostephanus blepharorrhachis* (Lindau) T.F. Daniel ex Hammel, comb. nov.


BEH has examined numerous specimens of this Costa Rican endemic and has studied and collected material at one population in the field. The type specimen—with no known duplicates, no paratypes cited, nor other material known to have been used—is represented only in photos produced by McBride’s Berlin negatives, made available online at F: http://emuweb.fieldmuseum.org/botany/search_berlin.php.

While these specimens do not themselves serve as types, they unquestionably help to understand the species. In this particular case, an illustration of floral parts (including a pollen grain!), most likely in Lindau’s hand, is clearly visible and gives the very measurements used in the protologue description. One might consider that an uncited illustration that comprises part of the original material and use it as lectotype according to Article 9.12 of the Code (Turland et al. 2018). But since there is no longer any physical specimen, nor illustration, we chose a neotype. Although the protologue shows “Costa Rica et Veragua [i.e., Panama]” as the locality, the label itself says only “Costa Rica.” Furthermore, the species is not otherwise known from Panama and was not treated in the protologue. Although the protologue shows “Costa Rica et Veragua [i.e., Panama]” as the locality, the label itself says only “Costa Rica.” Furthermore, the species is not otherwise known from Panama and was not treated in the Flora of Panama (Durkee 1978). The neotype we chose has numerous duplicates, some of which have been available to us for study and allow us to determine that it coincides with Lindau’s protologue. The duplicate at US is scanned and available on the NMNH Botany Collections site: http://fn2t.net/ark:/65665/3r333371c-b932-4979-963d-1342f9eebca1.

Stenostephanus strictus (Leonard) T.F. Daniel ex Hammel, comb. nov.


Had BEH had access to relevant phylogenetic information when attempting to identify the material that he went on to describe as Kalbreyeriella roquebradisana, he would have realized the necessity of studying species then treated as Hansteinia (especially H. stricta, of which there were no named specimens at MO nor Costa Rican herbaria, at the time) as possibly relevant to his putative new taxon. The fact that some of these plants are poorly collected and not easy to capture in descriptions adds to the challenge.

Stenostephanus ventricosus (Donn. Sm.) T.F. Daniel ex Hammel, comb. nov.


Stenostephanus villosus (Gómez-Laur. & Hammel) McDade, comb. nov.


Stenostephanus vilburrii (McDade) McDade, comb. nov.


Kjøbenhavn 1854 (8–12): 143 (1855).—TYPE: Costa Rica, San José, Mt. Jarijas [name not on current maps, but presumably close to the town of Jarijas], Nov 1846, Oersted 10660 (holotype: C; isotype: CAS; probable isotype: K).


On transferring Hansteinia gracilis to Stenostephanus, Daniel mentioned G. Herrera et al. 292, the type of Habracanthus tilaranensis, without making the latter a synonym, nor even mentioning the name. BEH has studied said type and other material so identified, as well as recent material collected from near the type locality of S. gracilis, and concluded that all material pertains to this one species.

Stenostephanus chavesii Hammel, sp. nov. (Fig. 7, 14–15).—TYPE: COSTA RICA. Guanacaste: Cantón Bagaces, Zona Protectora Miravalles, sector Caralampio, 1200–1300 m, 7 Feb 2000, J. L. Chaves 137 (holotype: CR; isotype: MO).

This species is similar to Stenostephanus leiorhachis, also with relatively large red corollas with the tube gradually expanded from the base to the mouth, but differs most notably by its leaves with the blade basally rounded to coriaceous and long decurrent, with the upper surface pilosulose (vs. usually glabrous).

Herb or shrub 0.5–3 m tall; stems tomentose to glabrescent. Leaves with the petiole 0.5–10 cm long, the blade 18–26 × 8–13 cm, ovate, the base rounded, often cordate, rarely obtuse, the apex acuminate, ± appressed pubescent (on the principal veins) on both sides, the surface glabrous below and pilose above, with 12–17 secondary veins per side. Inflorescences terminal and (rarely) axillary, racemose or racemose-fasciculate, dense, 13–36 × 3–8 cm (including the corollas), with the peduncle 1–7 cm long, the rachis tomentose; bracts opposite, 5–7 mm long, narrowly lanceolate, ciliate; bracteoles 3–4 mm long, narrowly lanceolate, ciliolate. Flowers 1 per bract or sometimes in fascicles of 2 or 3 per bract; the pedicel 1–3 mm long; calyx 5-lobed, the lobes equal, 7–9 × 0.8–1 mm, minutely ciliate and sometimes appressed pubescent; corolla bilabiata, red, the tube (40–)45–50 mm long, gradually inflated from the base, 10–14 mm wide at the mouth, puberulous (mostly on the principal nerves and distally), the upper lip subentire, 9–13 mm long (held horizontal or curved upward), the lower lip minutely 3-lobed, barely distinct from the mouth of the tube; anders 4–5 mm long; pollen spheroidal to prolate-spheroidal, verrucate, 2-porate, each pore surrounded by a circular psilate region separated by a poorly defined peripheral band; style 59–65 mm long, the stigma clavate or entirely or minutely bilobed, lobes equal. Fruits 2–2.5 cm, glabrous; mature seeds not seen, submature seeds ca. 2.5 mm in diam., ovate or orbicular, flattened, rugose-mattic.

Known from the Atlantic slope and near the Continental divide of the Cordilleras of Guanacaste, de Tilarán and Central, this species has been collected in flower from February to May and September to November.


Etymology.—We name this species in honor of former parataxonomist José Luis Chaves Chaves, who made the type collection (and many others) of this new species as well as many other interesting collections from the Cordillera de Guanacaste, especially on the slopes of the Tenorio and Miravalles volcanos.

Among the Stenostephanus species with the corolla tube gradually expanded from the base towards the mouth and spicate to narrowly racemose (flowers short pedicellate) inflorescences, S. chavesii stands out for its leaves with the blade rounded to often cordate at the base, and pilosulose on the upper surface. In leaf shape, it can be very similar to S. citrinus, which differs markedly by its widely paniculate (vs. narrowly racemose) inflorescences and bright yellow flowers. Likewise, S. wilburii can also have leaf blades that are basally obtuse, if not cordate, but that species has shorter corollas. The following key will distinguish among the red-flowered species of Stenostephanus with a narrowly racemose inflorescence and corollas with a tube that gradually expands from the base:

1. Leaf blades cuneate and often long decurrent at the base; corolla tube 35–55 mm long ……………. S. leiorhachis
   1’ Leaf blades cuneate but not decurrent, or (more often) obtuse to rounded and sometimes cordate at the base; corolla tube 23–30 mm long
2. Corolla tube 23–27 mm long; leaf blades glabrous on both surfaces ……………. S. wilburii
   2’ Corolla tube 30–50 mm long; leaf blades villous or pilosulose, at least on the upper surface
3. Leaf blades cuneate at the base, villous on both surfaces, with 8–11(–16) secondary veins per side; bracts 4–5 mm long; corolla tube 30–35 mm long ……………. S. villosus
   3’ Leaf blades obtuse or, more often, rounded and sometimes cordate at the base, ± appressed pubescent on the principal veins on both surfaces, the surface
Fig. 14. *Stenostephanus chavesii*. A. Leaf; scale bar = 5 cm. B. Inflorescence; scale bar = 50 mm. C. Inflorescence bracts showing close-up of the margin of one bract; scale bar = 5 mm. *Chaves 137 (CR).*
Fig. 15.  *Stenostephanus chavesii*. Scan of the holotype, *Chaves 137* (CR).
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LITERATURE CITED


