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Blakea echinata (Melastomataceae: Blakeeae): a new species from the Caribbean rainforest of Panama

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Abstract

Blakea echinata from the lowland Caribbean rainforest of Panama is described, illustrated, mapped, and compared with superficially similar species. It is readily distinguished by its elongate internodes; indumentum of spreading smooth (sometimes gland-tipped) trichomes on distal branchlets, leaves, floral bracts, and calyx lobes intermixed with laterally compressed and somewhat roughened conic to clavate or ± triangular trichomes on distal branchlets, floral peduncles, and abaxial surfaces of floral bracts; rhombic reflexed basally clawed petals; yellow-orange unappendaged anthers; and ovary apex that is elaborated into a distally glandular-laciniate collar 5–6 mm long that envelops the style base. A conservation assessment of Critically Endangered is recommended for this species based on IUCN Red List Categories and Criteria.

Resumen

Se describe e ilustra *Blakea echinata* de la selva baja del Caribe de Panamá, se presenta un mapa y se la compara con especies superficialmente similares. Se distingue fácilmente por sus entrenudos alargados, indumento de tricomas suaves extendidos (a veces con punta glandular) en las ramitas distales, hojas, brácteas florales y lóbulos del cáliz entremezclados con tricomas cónicos a clavados o triangulares lateralmente comprimidos y algo rugosos en ramitas distales, pedúnculos florales y superficies abaxiales de las brácteas florales; pétalos rómbicos basalmente con una reflexa, anteras de color amarillo-naranja sin apéndice y el ápice de ovario que se elabora en un collar distalmente glandular-laciniado de 5–6 mm de largo que envuelve la base de estilo. Se recomienda una categoría de conservación de En Peligro Crítico para esta especie en base a las Categorías y Criterios de la Lista Roja de la UICN.

Key words: *Blakeeae*, conservation, epiphyte, neotropics, new species, Panama

Introduction

Blakea P. Browne (1756: 323) and the recently merged genus *Topobea* Aublet (1775: 1: 476) comprise a monophyletic assemblage of over 180 neotropical species distributed from southern Mexico (Guerrero and Veracruz southward), Central America, and the West Indies to Bolivia, Brazil, and the Guianas (French Guiana and Suriname) with primary and secondary centers of diversity in the Pacific drainage of Colombia and Costa Rica/Panama respectively. The genus is readily recognized by its axillary flowers that are subtended by two pairs of decussate bracts, prevailingly 6-merous diplostemonous flowers, isomorphic stamens, baccate fruits, ovoid to pyramidate ± smooth seeds, and wood with multiseriate rays and frequent occurrence of druses (Almeda 1990; Penneys & Judd 2011; Penneys & Judd 2013a, 2013b). With respect to habit which includes shrubs, trees, epiphytes, hemiepiphytes, and lianescent shrubs, it is one of the most diverse neotropical genera in the family. The prevalence of epiphytism in this genus probably contributes to the range-restricted distribution of many species that are often overlooked and highly vulnerable to anthropogenic habitat transformation.

The species proposed here is the fourth to be described from rainforests of the Caribbean versant in Costa Rica and Panama since the appearance of Flora Mesoamericana (Almeda 2013; Almeda & Penneys 2013; Kriebel & Santamaría

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2013). The Caribbean slopes and lowlands of these two countries are still woefully underexplored; other species will surely come to light with additional exploration of the region. The novelty described here now brings the number of Mesoamerican species in an expanded *Blakea* to 69.

Materials and methods

Measurements of gross morphological characters were based on dried material of the type gathering and the two other cited collections from close to the type locality. Measurements were done with a Mitutoyo digital caliper. The distribution map was constructed in Quantum GIS using coordinates provided on specimen labels. The conservation status was assessed using IUCN guidelines (IUCN 2017). GeoCAT (Bachmann *et al.* 2011) was used to calculate the extent of occurrence and area of occupancy with a user-defined cell width of 2 km.

Taxonomic Treatment

Blakea echinata **Almeda & Penneys,** sp. nov. (Figures 1 & 2)

Diagnosis: Distinguished by its epiphytic habit with elongate internodes, distal branchlets moderately to sparingly covered with a mixture of smooth (sometimes gland-tipped) spreading trichomes (1–3 mm long) that are white when fresh but dull yellow-brown when dry, and early deciduous laterally compressed and somewhat roughened conic to clavate or ± triangular trichomes up to 0.5 mm long, inner and outer floral bracts that are connate basally for 2–6 mm to form a tight collar enveloping the hypanthium, calyx tube 2–3 mm long, oblong-obovate calyx lobes, rhombic commonly reflexed petals with a basal claw, yellow-orange unappendaged anthers, and ovary apex elaborated into a distally glandular-laciniate collar 5–6 mm long that envelops the style base.

Type:—PANAMA. Colón: Donoso Distrito. Corregimiento de San Juan del General, área de la Concesión del Proyecto Mina de Cobre, cerca de Río del Medio, 8°52’44”N, 80°39’14”W, 27 Julio 2013, fl., *J.E. De Gracia 765* (holotype: CAS!; isotypes: CR!, MEXU!, MO!, NY!, PMA!).

Epiphytic shrub with elongate internodes. Distal branchlets rounded-quadrangular, moderately to sparingly covered with a mixture of smooth (sometimes gland-tipped) spreading trichomes (1–3 mm long) that are white when fresh but dull yellow-brown when dry, and early deciduous laterally compressed and somewhat roughened conic to clavate or ± triangular trichomes up to 0.5 mm long. The distal branchlets with conspicuous, broadly U-shaped leaf scars at the somewhat swollen internodes. Internodes of the older branches ± terete and essentially glabrous, the nodes swollen but nodal lines not evident. Mature leaves of a pair equal to somewhat unequal in size, the adaxial surfaces with an indumentum like that of distal branchlets; petioles 5–21 mm long, ± flattened adaxially, moderately to copiously covered with an indumentum like that of the distal branches and vegetative buds; blades 4.5–12.6 × 2.5–5.2 cm, ovate to elliptic-ovate, apex acute to obtuse varying to bluntly attenuate or short-acuminate, base rounded to truncate or subcordate, margin entire, subcoriaceous, 5–7-nerved or 5–7-plinerved (the outermost pair often inconspicuous) with the innermost pair of secondary veins symmetrically diverging from the primary vein at the blade base or 2–8 mm above the base, abaxial surface uniformly beset with erect to antrorsely spreading smooth trichomes 1.5–3 mm long on primary, secondary, and higher order veins and sparsely intermixed with rusty brown laterally ± compressed roughened trichomes (like those of the distal branches and vegetative buds) on primary and higher order veins, transverse tertiary veins spaced 2–4 mm apart at the widest portion of the blade; domatia absent. Flowers erect, solitary in the uppermost leaf axils, subsessile or with terete peduncles 2–4 mm long that are copiously covered with the roughened ± laterally compressed brown trichomes like those of the uppermost branchlets. Floral bracts foliaceous, outer bracts 1-nerved, equal or somewhat unequal in size, connate basally for 2–5 mm to form a collar, the free lobes ca. 9 × 9 mm, ovate to bluntly triangular, obtuse to rounded apically, sparsely covered with smooth spreading trichomes (some gland-tipped) 2–5 mm long abaxially and along the margins, intermixed with a few roughened brown trichomes, the adaxial surface beset with similar smooth spreading (some gland-tipped) trichomes for its entire length or along the distal half; inner bracts also 1-nerved, equal in size, connate basally for 5–6 mm to form a tight collar enveloping the hypanthium, the free lobes 8–9 × 8–9 mm, ovate, rounded apically, sparsely beset with roughened ± compressed brown trichomes abaxially and moderately covered with smooth spreading (some gland-tipped) trichomes 3–5 mm long both distally and along the margins. Hypanthium (at anthesis) 6–7 mm long to the torus and 11–12 mm in diameter distally at the

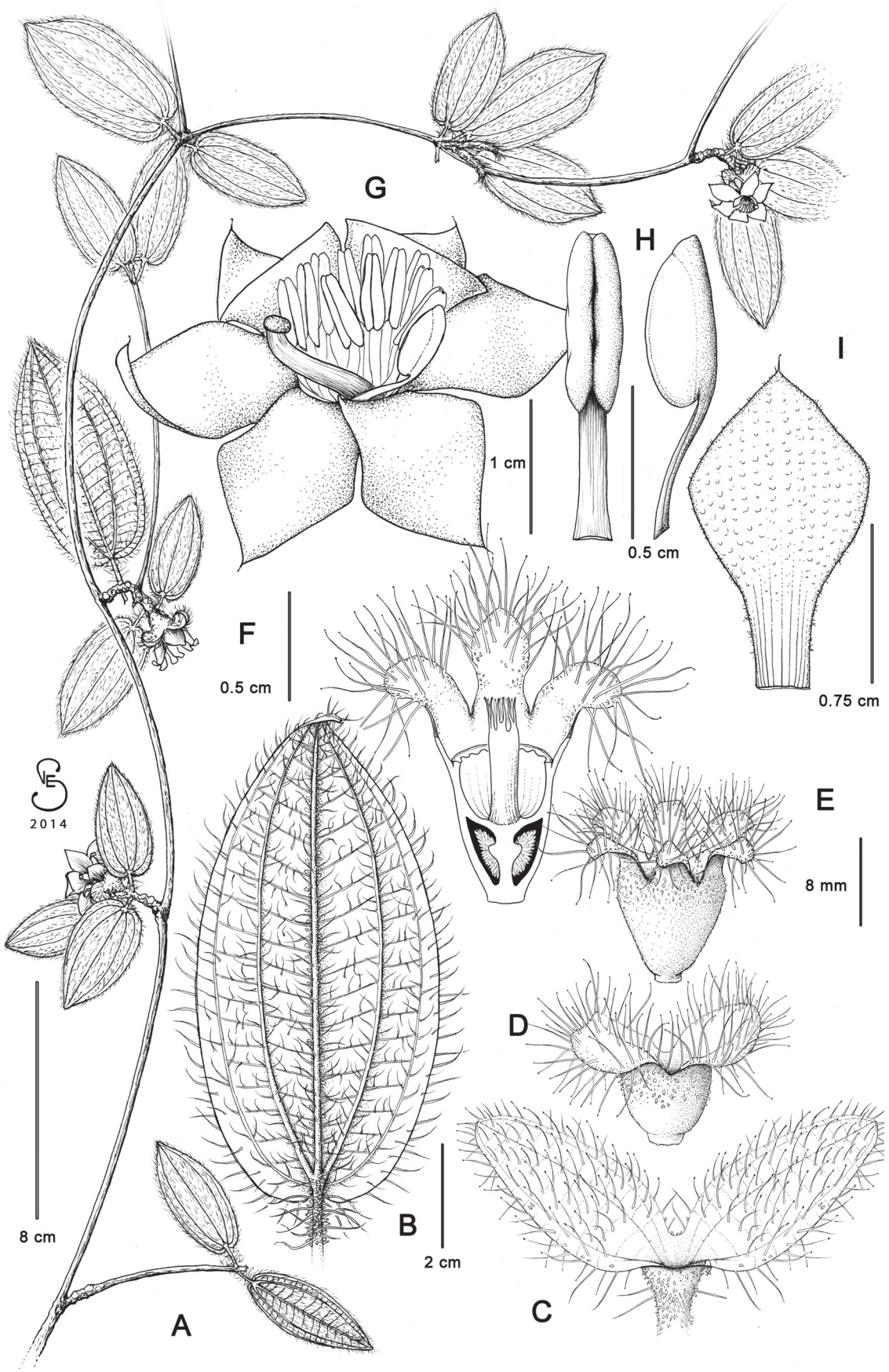


FIGURE 1. *Blakea echinata.* A. Habit. B. Representative leaf (abaxial surface) C. Distal portion of peduncle and outer floral bracts. D. Inner floral bracts. E. Hypanthium and calyx lobes. F. Longitudinal section of flower showing ovary, collar, and calyx lobes. G. Flower at anthesis. H. Stamens, ventral view (left) and profile view (right). I. Petal (adaxial surface). All drawn from *De Gracia 765.*

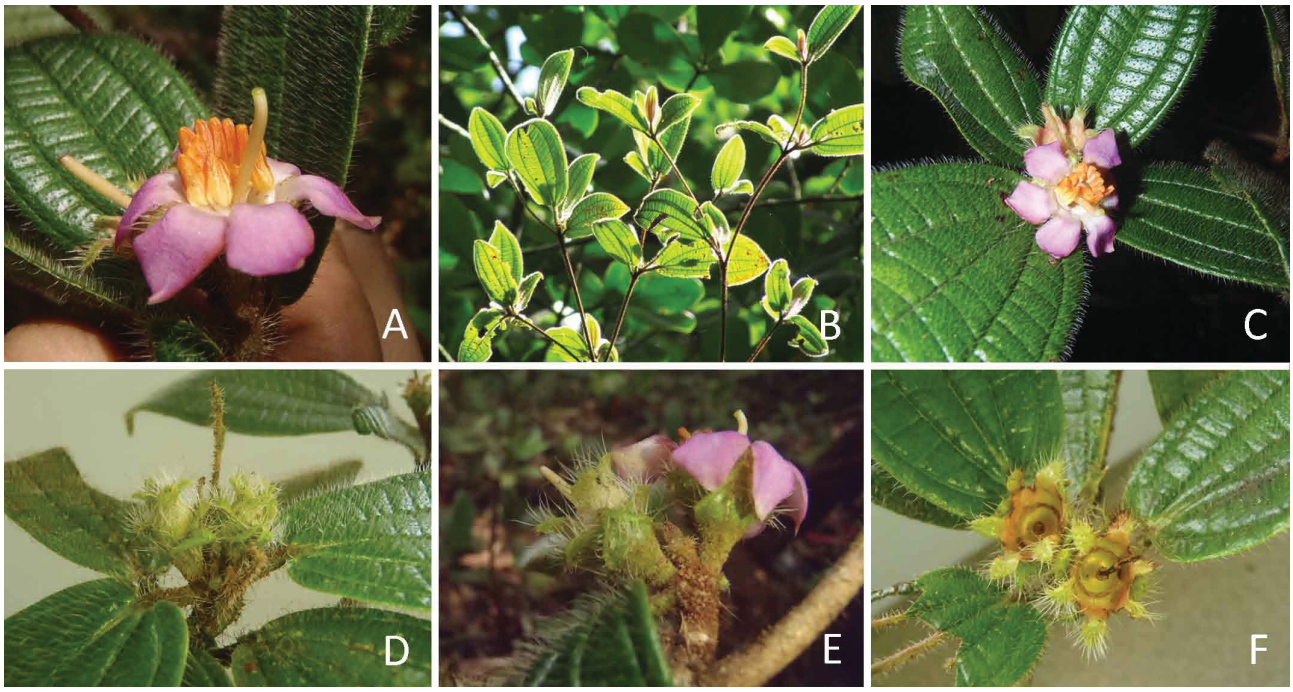


FIGURE 2. Images of *Blakea echinata.* A. Flower. B. Habit. C. Flowers and subtending leaves. D. Hypanthia and subtending floral bracts. E. Flower showing reflexed petals (right) and flower at post anthesis (left). F. Young fruiting hypanthia with spreading calyx lobes and subtending floral bracts. Image credits: A–F (*De Gracia 763*) by J. E. De Gracia.

torus, campanulate, light green, glabrous, and largely concealed by the inner bracts; inner torus summit glabrous. Calyx tube 2–3 mm long, light green; calyx lobes erect, commonly recurved distally, ca. 9 mm long and ca. 5 mm wide basally between the sinuses, oblong-obovate, light green, distal adaxial surface and distal margins beset with smooth gland-tipped spreading trichomes 3–5 mm long that are white when fresh but dull yellow-brown when dry, abaxial surface sparsely covered with brown conic or laterally compressed trichomes like those of the floral bracts. Petals 6, 11–16 × 7–12 mm, ± rhombic with a basal claw, commonly reflexed, pink-lilac but whitish toward the base adaxially, apex acute with a single deciduous trichome (sometimes gland-tipped), otherwise glabrous and entire but distinctly verrucose when dry. Stamens 12, isomorphic; filaments 3–4 mm long, complanate, white, glabrous, somewhat declined to one side of the flower opposing the style; anthers 4–5.5 × 1.5–2 mm, oblong (ventral view) and ovoid-oblong (profile view), orange distally and ± yellow-orange proximally, laterally compressed and free for their entire length, each anther bearing two minute ± truncate pores at the bluntly rounded summit; connective somewhat thickened dorsally but unappendaged. Ovary completely inferior, 6-locular, ± conic apically and elaborated into a smooth, erect, distally glandular-laciniate collar 5–6 mm long that envelops the base of the style. Style 10–15 × 1.5 mm, yellow-white, somewhat declinate and slightly curved distally, glabrous; stigma light green, somewhat expanded. Mature berries and seeds not seen.

Phenology:—The type and one of the paratypes, both of which were collected in July, are in flower; no fruiting material has been collected to date.

Habitat and distribution:—This species has been collected in mature secondary rainforest in the Caribbean lowlands of Panama at 100–150 m elevation where it is known from a small area in the Donoso District of Colón province (Figure 3).

Conservation status:—*Blakea echinata* is known from a limited area in lowland rainforest on the Caribbean versant of Panama. The EOO is 0.101 km² and the AOO is 8 km². The only known population of this species is within the Concesión del Proyecto Mina de Cobre, a large-scale open-pit copper mine development project in Panama. The concession consists of four zones totaling 13,600 hectares (https://www.first-quantum.com). However, we have no exact information on the occurrence of *B. echinata* within these four concession zones. In view of its limited range, small population size, epiphytic habit, and potential threat of habitat degradation or destruction from the mining concession we recommend a classification of Critically Endangered (CR): B1ac(ii) + B2ac(ii).

Etymology:—The epithet for this species, *echinata,* highlights the copious and conspicuous indumentum of stiff smooth and/or gland-tipped spreading trichomes on leaves, petioles, floral bracts, and calyx lobes.

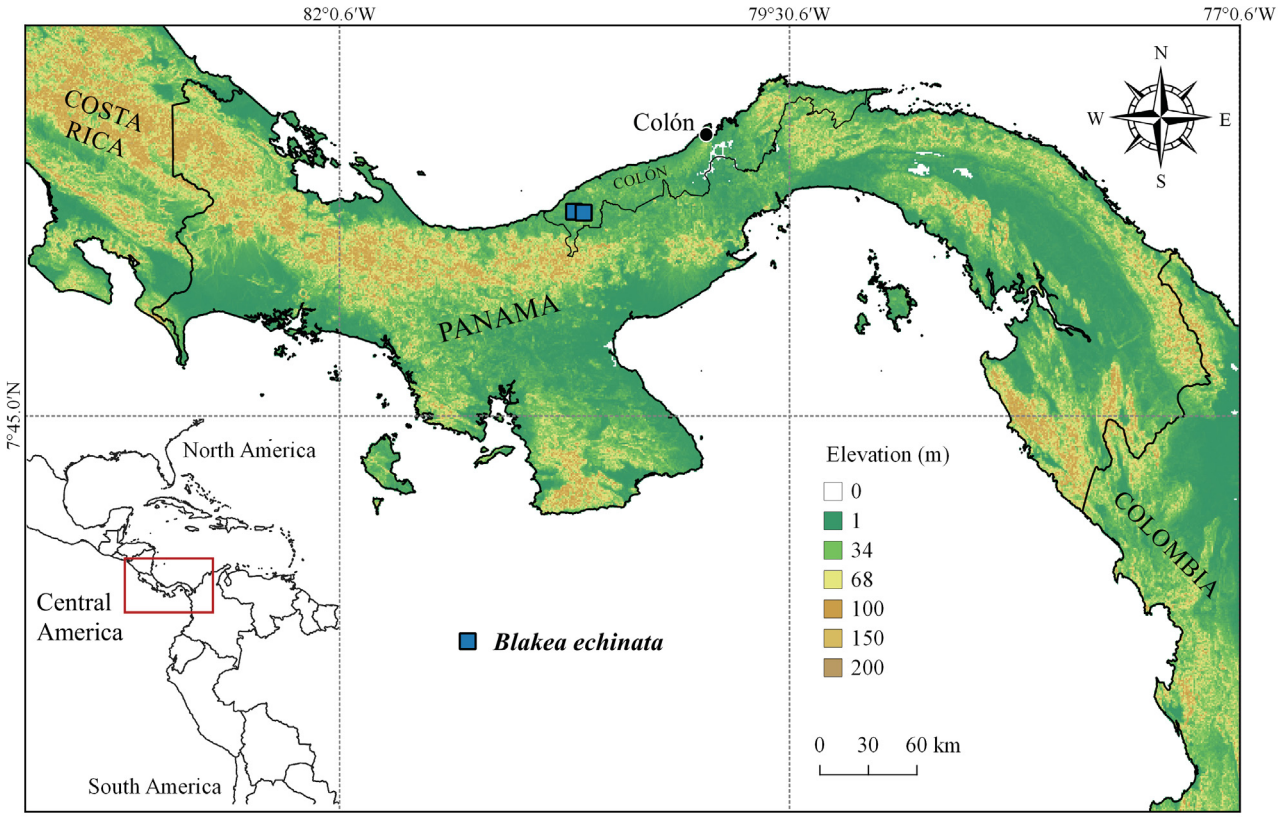


FIGURE 3. Geographic distribution of *Blakea echinata*.

Additional specimens examined:—PANAMA. Colón: Donoso Distrito. Corregimiento de San Juan del General, área de la Concesión del Proyecto Mina de Cobre de Minera Panamá, sendero cercano a Río del Medio, 8°52'43"N, 80°39'15"W, 13 Julio 2013, fl., *De Gracia 763* (CAS!, CR!, MEXU!, MO!, PMA!); Westernmost part of province, site of proposed copper mine (INMET). Along route of proposed road, 8°53'04"N, 80°42'27"W, 12 April 2009, sterile, *McPherson 20892* (CAS!, MO).

Discussion:—*Blakea echinata* can be placed in the "fused bract clade" (Penneys & Judd 2011) on the basis of its fused inner and outer floral bracts, roughened conic trichomes on the outer floral bracts, and apico-laterally narrowed ovary locules. *Blakea echinata* does not appear to be particularly close to any of the described species of *Blakea* included in regional accounts of the genus for tropical America (Macbride 1941; Wurdack 1973, 1980; Wurdack *et al.* 1993; Almeda 2009). It is also unlike any of the recently described species of *Blakea* from Costa Rica (Almeda 2013), Panama (Almeda & Penneys 2013; Kriebel & Santamaría 2013), Ecuador (Cotton & Matezki 2003; Penneys & Jost 2009; Fernández *et al.* 2016), and Peru (Bussmann 2013). In the most recent keys to species of Mexico and Central America (Almeda 2000, 2009) it comes closest to the Costa Rican endemic *B. grandiflora* Hemsley (1878: 13) based on similarities in the connation of inner and outer floral bracts and floral peduncle length. The latter is a variable species that can be an epiphytic shrub or small tree. Some populations of *B. grandiflora* are glabrous whereas other have vegetative buds, distal branchlets, peduncles, and immature outer floral bracts that are moderately to sparsely covered with dendritic, pinoid, and/or scurfy trichomes. *Blakea grandiflora* differs consistently from *B. echinata* in the nature of the indumentum as noted above, in its glabrous calyx lobes and adaxial foliar surfaces, larger (2.8–3.8 × 2–3.2 cm) white petals flushed with pink, yellow anthers with apical pores positioned toward the ventral face, and anther connectives that are dilated dorso-basally ca. 1 mm above the filament insertion into a blunt appendage. The ovary apex of *B. grandiflora* also differs in being bluntly conic and lacks a collar surrounding the base of the style. The laterally compressed roughened conic or clavate trichomes and verrucose or tuberculate petals of *B. echinata* are also found in *B. elliptica* (Gleason 1950: 353) Almeda (1984: 270), *B. calycosa* Gleason (1939: 342), and *B. tuberculata* Donnell Smith (1901: 111) but all of these species otherwise differ markedly from *B. echinata. Blakea elliptica* differs most notably by its sessile leaves that are auriculate to cordate-clasping at the base, triangular calyx lobes, white petals flushed with pink, and deflexed dorso-basal truncate anther appendages 0.5–1 mm long. *Blakea calycosa* and *B. tuberculata* collectively differ by their caudate to caudate-acuminate leaf apices, calyx lobes that are elaborated

into deflexed foliaceous appendages on the distal abaxial surfaces, yellow anther thecae that form a complete circle around the straight glandular-puberulent style at anthesis, and anther connectives that are prolonged dorso-basally into acute spurs 1.5–3 mm long. *Blakea echinata* has an ovary collar that is similar to, but much shorter than, that of *B. tuberculata.*

Acknowledgments

We are grateful to Gordon McPherson for initially bringing this species to our attention and subsequently arranging to have it collected in flower, J.E. De Gracia for images taken in the field, Sean V. Edgerton for the line drawings, Ricardo B. Pacifico for the distribution map, Mary Beth Almeda for assembling Figure 2, Zachary Guignardi for assistance with specimen scoring, and the Missouri Botanical Garden for a gift of specimens.

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