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Four New Species of Dragon's Blood *Croton* (Euphorbiaceae) from South America

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Abstract—We describe and illustrate four new species of dragon's blood trees (*Croton* sect. *Cyclostigma*) from western South America. Three of the species, *Croton beckii* from Bolivia and Peru, *C. camposii* from Peru, and *C. santamartensis* from Colombia, grow in montane Andean forest, whereas *C. tumbesinus* occurs in dry forest of the Tumbes/Piura ecoregion of western Ecuador and Peru. The characters that place them in *Croton* sect. *Cyclostigma* include the arborescent habit, the presence of reddish to yellowish latex, an indument of stellate trichomes, conspicuous and persistent stipules, acropetiole/basilaminar nectary glands, and terminal inflorescences with bisexual cymules at the base. These new species give additional support for the Andean region being the main center of diversity of this Neotropical *Croton* clade, as well as being a region whose biodiversity knowledge is still incomplete.

Keywords—Andes, Crotonaeae, diversity, dry forest, montane forest, Neotropics, taxonomy, Tumbes/Piura ecoregion.

The dragon's blood *Croton* sect. *Cyclostigma* Griseb. consists of 41 known species distributed from Mexico to northern Argentina (Van Ee et al. 2011), with its main center of diversity in the Andes region (Riina 2006). The four species described below, and the recently published *C. amentiformis* Riina, increase the number of species in the section to 46. Members of this group are trees that grow predominantly in moist forests, including riverine, lowland, and montane forests (Riina et al. 2009), with only two species, *C. churutensis* Riina & Cornejo and *C. charaguensis* Standl., known so far from dry forest in Ecuador and Bolivia, respectively (Riina et al. 2007). Most *Croton* sect. *Cyclostigma* species are commonly known as "dragon's blood" due to their abundant reddish latex, which is used for medicinal purposes across their geographical range (Jones 2003).

The tropical Andes are a well known hotspot for biodiversity (Myers et al. 2000), however knowledge of their biodiversity seems far from complete, with many new species, and even genera, being described in recent years in different lineages of organisms (e.g. Kaczmarek et al. 2014; Michelangeli et al. 2014; Shimbori and Shaw 2014; Lagomarsino and Santamaría-Aguilar 2016; Brito et al. 2017; Wurdack and Farfan-Rios 2017), including many new *Croton* species (Murillo 1999; Smith 2006; Riina and Berry 2010; Riina et al. 2007, 2014, 2015). This work represents one more contribution to this increasing list of taxonomic novelties for this genus in the Andes and adjacent areas, and also supports the claim about the importance of herbarium collections in the discovery of plant diversity (Bebber et al. 2010).

Three of the new species (*C. beckii*, *C. camposii*, and *C. santamartensis*) occur in Andean montane forest above 600 m elevation, whereas *C. tumbesinus* grows at lower elevations in dry forests of the Tumbes/Piura ecoregion, a biogeographic unit that covers coastal areas of southwestern Ecuador and northwestern Peru (Loaiza 2013). For each species we provide a full description, plates with images from herbarium specimens or from the field, recommendations regarding their conservation status, and comparisons with morphologically similar species among the dragon's blood *Croton*.

MATERIALS AND METHODS

Comparative morphological study of the new species was conducted using collections from the following herbaria: A, COL, DAV, E, F, GUAY, LPB, M, MA, MICH, MO, MOL, USM, and WIS. Protologues and type specimens of similar arborescent dragon's blood *Croton* from Andean montane forest and from the Tumbes/Piura dry forest ecoregion (www.worldwildlife.org/ecoregions/nt0232) were studied and compared with the new species. Terminology about trichomes and glandular structures follows Webster et al. (1996), Vitarelli et al. (2015), and Feio et al. (2016).

Information about habit, habitat, and distribution was taken from specimen labels and personal field observations. The distribution maps were created using QGIS 2.18.14 (Quantum GIS Development Team 2017). The online Geospatial Conservation Assessment Tool (GeoCAT) (Bachman et al. 2011, <http://geocat.kew.org>) was used to estimate extent of occurrence (EOO) and area of occupancy (AOO) for species with more than two different localities. EOO and AOO were used in turn to evaluate species conservation status under the IUCN criteria (IUCN 2012).

TAXONOMIC TREATMENT

Croton beckii Riina & Feio, sp. nov. TYPE: BOLIVIA. Dpto. La Paz: Prov. Sud Yungas, Centro Lavi, above Irupana, 2300 m, 19 Aug 1996, S. G. Beck 22759 (holotype: LPB!, isotypes: MA!, MO!, WIS!).

This species differs from the morphologically closest species *Croton pseudofragrans* Croizat in having stipitate, stellate-porrect trichomes on the leaf abaxial side, inflorescences with flowers regularly distributed along the axis, and sessile pistillate flowers with bifid styles (vs. appressed-stellate trichomes on the leaf abaxial side, congested inflorescences, and pedicellate pistillate flowers with four-fid styles in *C. pseudofragrans*).

Monoecious trees, up to 15 m tall; young branches with a dense indumentum of stipitate stellate-porrect and fasciculate trichomes; latex reddish. **Leaves** alternate; stipules 2.8–5.2 mm long, linear-subulate, persistent, with dense indumentum of sessile stellate trichomes; petioles 0.8–2.7 cm long, with a dense indumentum of stipitate stellate-lepidote (15–30% webbing) trichomes; nectary glands 2, acropetiole, sessile to shortly stipitate, patelliform, incurved toward the abaxial side; blades

10–12 × 4.5–5.2 cm, ovate-lanceolate, base rounded to slightly truncate, apex acute, margin slightly denticulate and revolute, with minute ovoid colleters on the teeth, abaxial surface with stipitate stellate-porrect trichomes, adaxial surface with fasciculate to stipitate-fasciculate trichomes, venation brochidodromous, secondary veins in 10–12 pairs, prominent on the abaxial side. **Inflorescences** 8–10 cm long, axillary and terminal, erect, proximal cymules with 2–3 pistillate flowers, distal cymules with single staminate flowers regularly spaced along most of the axis; axis with a dense indumentum of stellate appressed trichomes; bracts triangular, 0.5–1 × 0.3 mm. **Staminate flowers** with pedicels 5–7 mm long; sepals 3–4 × 2–2.5 mm, ovate with acuminate apex, valvate, adaxial surface glabrous with tiny simple trichomes at the base, abaxial surface with a dense indumentum of stellate trichomes, margin pilose; petals 2.5 × 0.8–1 mm, oblong-lanceolate, with acute apex, abaxial side pilose, adaxial side with scattered trichomes, margin pilose; receptacle densely pilose; stamens 27–34, filaments 2–3 mm long, pilose, anthers 0.5–0.8 × 0.3–0.5 mm. **Pistillate flowers** sessile to subsessile; sepals 3.8–4 × 1.1–1.5 mm, partially fused at the base, abaxial surface with dense indumentum of stipitate to sessile stellate-lepidote trichomes, adaxial surface glabrous; ovary 3.8–4 × 2.0–2.2 mm, styles 3, bifid, with stellate trichomes at the base. **Capsules** and seeds unknown. Figures 1, 2.

Additional Specimens Examined—**Bolivia**.—LA PAZ. Prov. Sud Yungas, de Chulumani 7 km al NE, 2000 m, 24 Sep 1994, S. G. Beck 22223 (LPB). **Peru**. —PASCO. Prov. Pozuzo, Río Negro, 10°04'18"S, 75°34'14"W, 906 m, 1 May 2015, G. Gerlach s.n. (M, MA, photo vouchers).

Distribution and Habitat—Montane forest on the eastern side of the Andes. The species is known from two disjunct areas in Peru and Bolivia and it has been collected between 900–2300 m elevation (Fig. 1).

Phenology—This species has been collected with flowers in May and August.

Conservation Status—We suggest that if an evaluation were performed, *C. beckii* be categorized as data deficient (DD) because it is only known from two localities and three collections. The species is likely to be present in the intervening areas along the eastern slopes of the Andes of Peru and Bolivia.

Etymology—The specific epithet honors Prof. Stephan G. Beck from the National Herbarium of Bolivia (LPB).

Notes—*Croton beckii* is supported as a member of *Croton* sect. *Cyclostigma* based on DNA sequence data (Riina, unpubl. data) in addition to morphological evidence. This species could be unique in the section because of the lack of proximal bisexual cymules, however the plant material available does not allow us to be conclusive about this character. In overall appearance, *C. beckii* bears some resemblance to *C. pseudofragrans* in *Croton* sect. *Cleodora* (Klotzsch) Baill. (Caruzo et al. 2013) and with *C. condorensis* Riina & Cerón, a species of unknown sectional affinity (Riina et al. 2014). The three species occupy similar montane forest habitats along the eastern side of the Andes, have axillary inflorescences, and similar leaf shape and size. However, *C. beckii* can be distinguished from *C. pseudofragrans* by several characters, namely stipitate stellate-porrect trichomes on the leaf abaxial side, inflorescences with flowers regularly distributed along the axis, and sessile pistillate flowers with bifid styles (vs. appressed-stellate trichomes on the leaf abaxial side, congested inflorescences, and pedicellate pistillate flowers with four-fid styles in *C. pseudofragrans*). *Croton beckii* differs from *C. condorensis* by having acropetiole nectary glands and sessile pistillate flowers with narrow sepals (vs. basilar nectary glands and pedicellate pistillate flowers with large accrescent sepals in *C. condorensis*).

Croton camposii Riina & Ore-Rengifo, sp. nov. TYPE: PERU. San Martín: Rioja to Pedro Ruiz, border with Amazonas, 1800 m, 4 Dec 2003, T. D. Pennington, R. T. Pennington & A. Daza 17644 (holotype: E!, isotype: MOL).

This species is morphologically most similar to *C. perspicuosus* Croizat, but it differs from it in having subulate stipules, longer pedicellate pistillate flowers, and 34–38 stamens (vs. foliaceous and ciliate stipules, sessile to subsessile pistillate flowers, and ca. 45 stamens in *C. perspicuosus*).

Monoecious trees, ca. 8 m tall; young branches with dense indumentum of fasciculate and rosulate trichomes, sometimes with a porrect ray; latex clear to reddish. **Leaves** alternate; stipules 5–8 mm long, subulate, densely covered by fasciculate or rosulate porrect trichomes, colleters minute along the margins and tip; petioles 4–15 cm long, with dense indumentum of fasciculate trichomes; blades 13–30 × 11–25 cm, ovate, base cordate, apex acute to acuminate, margins entire with minute ovoid colleters towards the base; nectary glands 6–8, basilar, patelliform, stipitate or sessile, mostly on the abaxial side, venation brochidodromous, abaxial surface densely covered with rosulate trichomes, adaxial surface with scattered fasciculate and rosulate trichomes, primary and secondary veins raised and densely covered with rosulate trichomes on both surfaces. **Inflorescences** 15–30 cm long, terminal, erect, proximal cymules bisexual, distal cymules unisexual (staminate), staminate flowers regularly spaced along the axis; axis costate, with a dense indumentum of fasciculate and rosulate trichomes; bracts ca. 0.6–1.2 × 0.3–1.0 mm, triangular. **Staminate flowers** with pedicels 0.7–1.1 cm long; sepals 1.5–2 × 2–3 mm, valvate, ovate, adaxial and abaxial surfaces with fasciculate and rosulate trichomes; petals 1–1.5 mm long, ovate with acuminate apex, valvate, adaxial and abaxial surface glabrous with abundant pilose trichomes along the margin; receptacle densely pilose; stamens 34–38, filaments 3–5 mm long, pilose at the base, anthers 0.5–0.8 × 0.3–0.5 mm. **Pistillate flowers** with pedicels 1.1–1.9 cm long, densely covered by fasciculate and rosulate trichomes; sepals 4.3–7.5 × 2.9–3.8 mm, cuneate, valvate, adaxial surface with scattered rosulate trichomes, abaxial surface with dense rosulate trichomes, sometimes with a porrect ray, apex acute; ovary densely covered with fasciculate and rosulate trichomes, styles 3, twice bifid (12 tips), with a few fasciculate trichomes at the base. **Capsules** 6–8 × 8–9 mm, globose, trilobed, densely covered with rosulate-porrect trichomes, columella 6.0–6.5 mm long; seeds 5–5.5 × 3.7–4.0 mm, ellipsoid, rugose, light brown; caruncle 0.7–0.8 × 1.4–1.5 mm, trapezoidal. Figures 1, 3.

Additional Specimens Examined—**Peru**.—AMAZONAS. Prov. Rodríguez de Mendoza, Sector Vista Alegre, home at roadside, 05°40'12"S, 77°45'21"W, 1820 m, 19 May 2004, R. Riina & J. Campos 1463 (MA, MICH, USM); Prov. Utcubamba, Dist. Bagua, Poblado "Alto Perú", 05°55'39"S, 78°27'15"W, 2171 m, 02 Jun 2017, L. Santa 3552 (MA).

Distribution and Habitat—Dwarf montane forest in Amazonas Province near the border with San Martín Province in northern Peru, between 1800–2200 m elevation (Fig. 1).

Etymology—The specific epithet honors the Peruvian plant collector José Campos, who collected one of the paratypes of this species with the last author.

Phenology—This species has been collected with flowers and fruits from May to December.

Conservation Status—As with many *Croton* species, *C. camposii* grows in secondary successional environments, so forest perturbations likely promote its persistence. The extent of occurrence (EOO) is more than 20,000 km², and the area of occupancy (AOO) is greater than 2000 km². Therefore we suggest that if

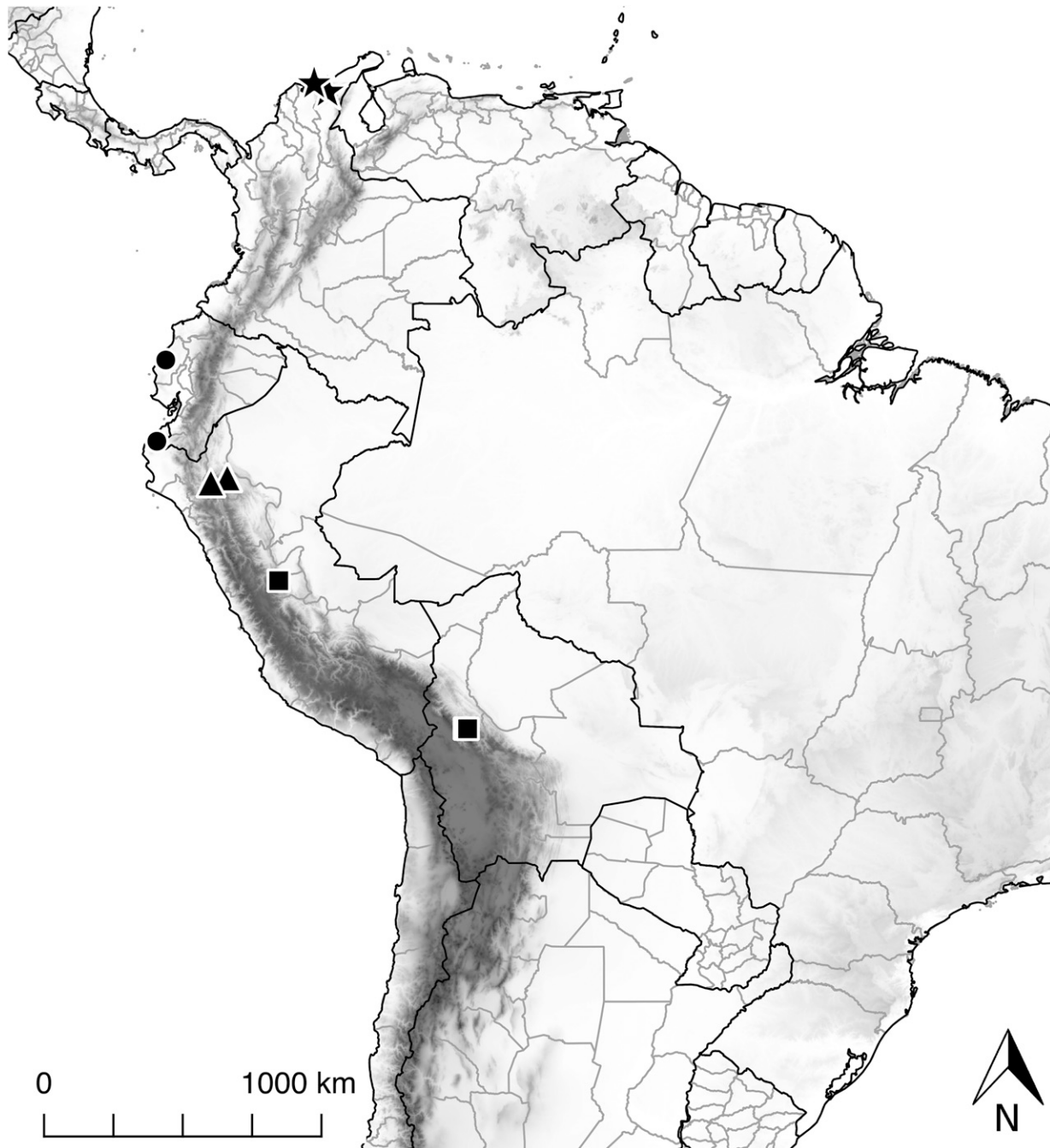


FIG. 1. Distribution map showing known localities of the four new species. *Croton santamartensis* (stars), *C. tumbesinus* (circles), *C. camposii* (triangles), and *C. beckii* (squares).

an evaluation were performed the species be considered as least concern (LC).

Notes—*Croton camposii* is most similar to *C. perspicuosus* in overall aspect, but it can be easily distinguished from the latter in having subulate stipules, fasciculate trichomes, pedicellate pistillate flowers with cuneate sepals, and 34–38 stamens. *Croton perspicuosus* has large, foliose stipules with highly dissected or ciliate margins, stellate porrect trichomes with the central ray much longer than the others, and sessile to subsessile pistillate flowers with ovate-lanceolate sepals and ca. 45 stamens on average.

Croton santamartensis Riina & P.E.Berry, sp. nov. TYPE: COLOMBIA. Magdalena: Municipio de Santa Marta, from

Cerro Quemado to Cincinnati, 2600–2800 m, 19 Apr 1959, R. Romero-Castañeda 7781 (holotype: COL!).

Croton santamartensis differs from its most similar species, *C. purdiei* Müll.Arg., in its shorter and entire stipules, 4–12 acropetiolear nectary glands, and wide stigmatic surface (vs. longer and branched stipules, 2 acropetiolear nectary glands, and narrow stigmatic surface).

Monoecious trees, 4–9 m tall; young branches with a dense indumentum of rosulate and stellate appressed trichomes; latex reddish. **Leaves** alternate; stipules 3.3–4.9 mm long, linear, with scattered appressed rosulate trichomes, and minute ovoid colleters along the margins; petioles 2–10 cm long, with a sparse indumentum of stellate and rosulate

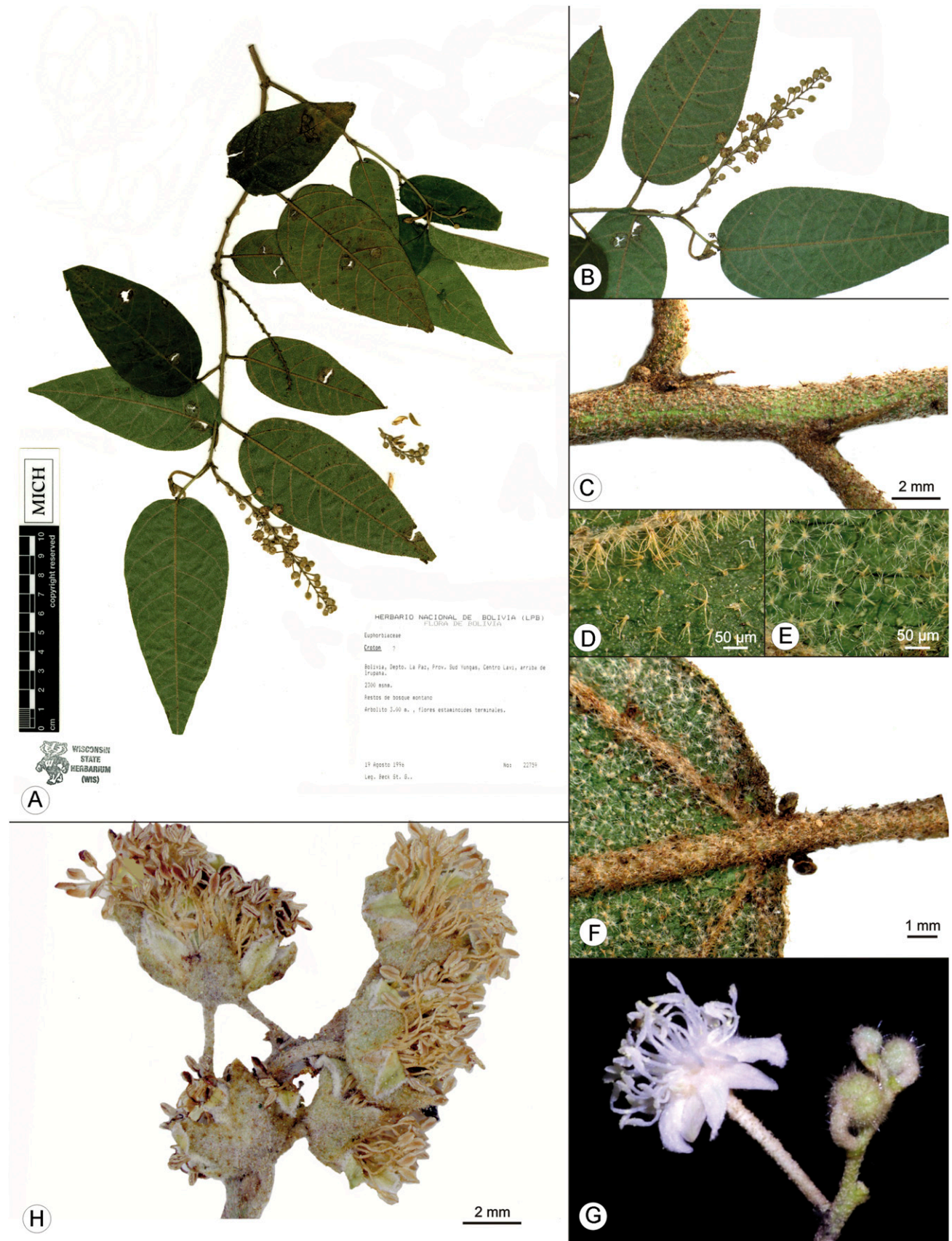


FIG. 2. *Croton beckii*. A. Image of the holotype showing a flowering branch. B. Detail of inflorescence. C. Apical part of a branch showing the stipules. D. Trichomes on the adaxial side of the leaf. E. Trichomes on the abaxial side of the leaf. F. Acropetiole nectary glands incurved towards the abaxial side. G. Detail of staminate flower and staminate flower buds. H. Part of inflorescence showing staminate flower. Photo G courtesy of G. Gerlach (*Gerlach s.n.*). A–F, H: Beck 22759.



FIG. 3. *Croton camposii*. A. Image of the isotype (MOL) showing a flowering branch. B. Adult individual in its natural habitat with J. Campos, after whom this species is named, holding a specimen (inset). C. Detail of staminate flowers. D. Apical part of a branch showing the stipules, young leaf and stem apex. E. Part of inflorescence showing cymules with pistillate flowers and buds of staminate flowers. F. Young fruits. G. Basilaminar nectary glands mostly on the abaxial side. A, E: Pennington et al. 17644; B–D, F–G: Riina & Campos 1463. Photos: R. Riina.

appressed trichomes; nectary glands 4–12, acropetiole, stipitate, attached to the petiole on the adaxial side, with scattered stellate and rosulate appressed trichomes on the stipe, nectary surface convex to patelliform; blades 4–25 × 2–15 cm, ovate-lanceolate, base rounded (young leaves) to cordate (mature leaves), apex acute-acuminate, margins entire with minute ovoid colleters, adaxial surface with sparse indumentum of stellate and rosulate appressed trichomes, abaxial surface with similar but denser indumentum; venation brochidodromous, secondary veins 8–10 pairs, brochidodromous, with secondary veins raised on the abaxial surface. **Inflorescences** 8–21.5 cm long, terminal, erect, proximal and distal cymules usually bisexual, regularly spaced from base to apex, with 3–7 pistillate flowers at the base of the inflorescence axis; axis costate, with a dense indumentum of stellate and rosulate trichomes; bracts triangular, 2–2.5 × 1 mm. **Staminate flowers** with pedicels 3.5–8.1 mm long; sepals 2–3.3 × 1–2.0 mm, valvate, triangular with an acute apex, abaxial surface densely covered with rosulate trichomes, adaxial surface with a dense indumentum of stellate-porrect rosulate trichomes; petals 2–3.5 × 0.7–0.9 mm, oblong-cuneate, with simple and trichomes on abaxial surface, margins entire; receptacle densely pilose; stamens 35–44, filaments 2–3 mm long, pilose, anthers 0.6–1 × 0.3–0.5 mm. **Pistillate flowers** with pedicels 1.5–2 mm long, with stellate-porrect and rosulate trichomes; sepals 3–6 × 2–3.5 mm, valvate, oblong-ovate, apex acute, abaxial side covered with stellate and rosulate appressed trichomes, adaxial side with scattered simple trichomes, margins pilose; petals highly reduced, linear; ovary densely covered with stellate and rosulate appressed trichomes, styles 3, bifid, flattened and widened in their apical portion, stellate and rosulate appressed trichomes on the lower part of the style branches. **Capsules** 6–8 × 5–7 mm, subglobose, densely covered with stellate and rosulate appressed trichomes; columella 6–9 mm long; seeds unknown. Figures 1, 4.

Additional Specimens Examined—**Colombia**. —CÉSAR: Sierra Nevada de Santa Marta, southeastern slopes. Trail between Sogrome and Sacarecungue along Rio Donachui, 5500 ft (1670 m), 9 May 1975, *T. Plowman & W. Davis* 3653 (COL). —MAGDALENA: San Lorenzo, San Lorenzo (Sierra Nevada), 2100 m, 10 Jul 1969, *N. de López* 242 (COL); ca. 2200 m, 26 Feb 1927, *A. Schultze* 779 (A); cuchilla de San Lorenzo a orillas de la carretera que conduce a Cerro Kennedy, 2100–2475 m, 7 Dec 1977, *C. Barbosa et al.* 313 (COL); Cuchilla de San Lorenzo, alrededores del Centro Forestal, 18 Jun 1969, *S. Diaz P.* 117 (COL); same locality, same date, *S. Diaz P.* 142 (COL); Sierra Nevada de Santa Marta, 74°07'23"W, 11°08'53"N, 615 m, 22 Nov 2008, *R. Cortez* 2584 (COL); 2200 m, 09 Aug 1984, *E. Carbonó* 1042 (COL); Cerro Kennedy, near top of higher peak in N massif of Sierra Nevada de Santa Marta, 74°01'W, 11°05'N, 2580–2600 m, 24 Aug 1986, *A. Gentry & H. Cuadros* 55553 (MO); Cerro Kennedy, near top of higher peak in N massif of Sierra Nevada de Santa Marta, 2550–2570 m, Transect 3, 24 Aug 1986, *A. Gentry & H. Cuadros* 55568A (F, MO); Cerro Kennedy, Transect 7, 74°01'W, 11°05'N, 2620 m, 14 Jan 1989, *A. Gentry & H. Cuadros* 64648 (MO); carretera arriba de Minca, 74°04'47"W, 11°07'05"N, 1200–1550 m, 4 Nov 2008, *G. Galeano* 7595 (COL); Municipio de Santa Marta, Cerro Quemado, 2600–2800 m, 15 Apr 1959, *R. Romero-Castañeda* 7695 (COL); entre Cerro Quemado y Cerro San Lorenzo, 2600–2800 m, 16 Apr 1959, *R. Romero-Castañeda* 7725 (COL); Entre la Estación Forestal del INDERENA y Cerro Quemado, 8 Aug 1971, *R. Romero-Castañeda & S. Llinás* 11260 (COL).

Etymology—The specific epithet refers to the occurrence location of this species in the Sierra Nevada de Santa Marta.

Distribution and Habitat—*Croton santamartensis* occurs in montane forest at mid and high elevations, 650–2800 m, and it is only known from few localities in the Sierra de Santa Marta Massif in northern Colombia (Fig. 1).

Phenology—Flowering from January to August.

Conservation Status—We suggest that if an evaluation were performed, *C. santamartensis* should be categorized as Vulnerable (VU B1ab[iii]) because it has been collected in fewer than ten locations, and its geographic range is smaller than 20,000 km². The specimens examined are from two disjunct areas outside Sierra Nevada de Santa Marta National Natural Park. Northwest of the national park is the La Mica-Cuchilla San Lorenzo-Cerro Kennedy area in Magdalena Department, where most of the collections are from, and the second locality is SSE of the park (between Sogrome and Sacarecungue) in César Department. It is likely that *C. santamartensis* occurs inside the national park in montane forest areas similar to the ones where it has been collected.

Notes—The new species is most similar to *C. purdiei* Müll. Arg., but *C. santamartensis* differs from that species in its shorter and entire stipules (3.3–4.9 mm long), greater number of petiolar nectary glands (4–12), widened stigmatic surface (vs. stipules 11.6–20.5 mm and usually branched, paired petiolar nectary glands, and stigmatic surface not widened in *C. purdiei*).

Croton tumbesinus Riina, sp. nov. TYPE: PERU. Tumbes: Tumbes, Pampas de Hospital El Caucho, quebrada Faical between El Caucho and Campo Verde, 370 m, 21 Jan 1989, *C. Diaz, T. Pennington & C. Reynel* 3199 (holotype: MO!, isotypes: FI, MICH!, MOL!).

Croton tumbesinus differs from its morphologically and geographically closest species, *C. churutensis*, in having filiform and entire stipules, unlobed leaves, and bifid styles (vs. dissected stipules, usually 2–3-lobed leaves, and tetrafid styles in *C. churutensis*).

Monoecious trees, 2.5–5 m tall; young branches with a sparse to dense indumentum of stellate-porrect trichomes; latex unknown. **Leaves** alternate; stipules 1–2.7 mm long, linear, filiform with a glandular tip (colleter), glabrous or with sparse stellate trichomes; petioles 2–6 cm long, with a more or less dense indumentum of stellate appressed trichomes; blades 5–15 × 3–9 cm, ovate to broadly ovate, base slightly cordate to rounded, apex acute to mucronate, margins entire, with tiny ovoid colleters and sparse simple trichomes, adaxial surface with indumentum sparse to almost glabrous, trichomes stellate-multiradiate, sessile, sometimes porrect, abaxial surface with dense to sparse indumentum, trichomes stellate-multiradiate, sessile, sometimes porrect; nectary glands 2–4, basilaminar, patelliform, stipitate; venation 3–5-plinerved, secondary veins 3–5, tertiary veins scalariform, primary and secondary veins raised on the abaxial leaf surface. **Inflorescences** 20–30 cm long, terminal, delicate, nodding, proximal cymules bisexual, distal ones unisexual (staminate), regularly spaced along the axis; axis costate, with a sparse indumentum of stellate-multiradiate trichomes; bracts linear-lanceolate, ca. 0.8–1.0 × 0.1–0.3 mm, usually glandular at the base and apex. **Staminate flowers** with pedicels 1.4–5 mm long with scattered stellate trichomes; sepals 1.2–1.3 × 0.5–1 mm, valvate to slightly imbricate, ovate-lanceolate, adaxial surface glabrous, abaxial surface glabrous, sometimes with sparse stellate trichomes at the base, apex lanate; petals 1.2–1.3 × 0.2–0.8 mm, narrowly elliptical, cuneate, glabrous on both surfaces, margins and apex lanate, receptacle densely pilose; stamens 16, filaments 1.5–2.5 mm long, hairy at the base, anthers 0.6–0.7 × 0.4–0.5 mm. **Pistillate flowers** with pedicels 3–7.3 mm long, with sparse stellate-multiradiate trichomes; sepals 2.1–2.3 × 0.9–1.4 mm, valvate to slightly imbricate, broadly ovate, adaxial surface glabrous, abaxial surface almost

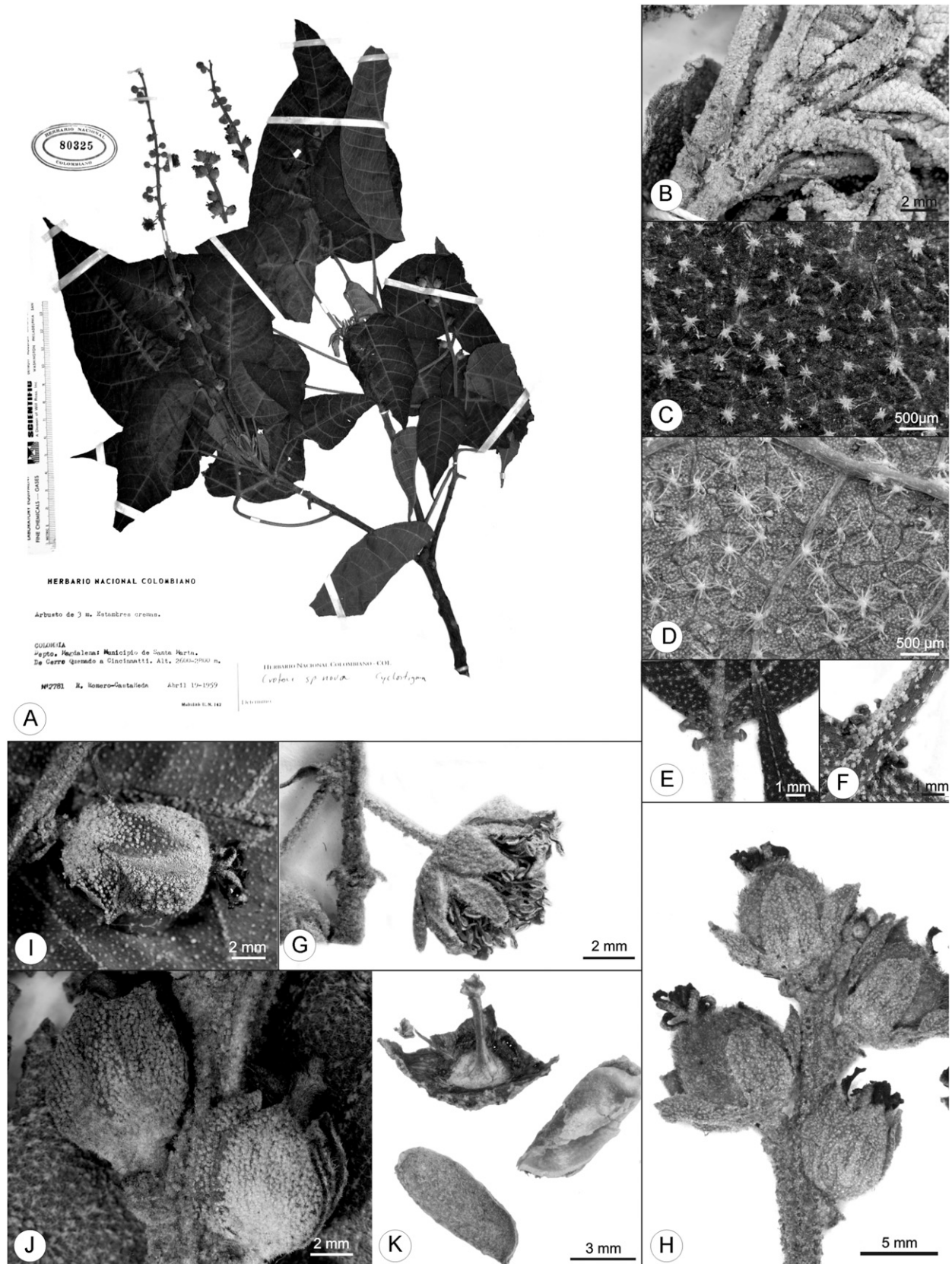


FIG. 4. *Croton santamartensis*. A. Image of the holotype showing a flowering branch. B. Apical part of a branch showing the stipules and young leaf. C. Trichomes on the adaxial side of the leaf. D. Trichomes on the abaxial side of the leaf. E. Acropetiole nectary glands seen from the adaxial side. F. Acropetiole nectary glands seen from the abaxial side. G. Detail of staminate flower. H. Part of inflorescence with pistillate flowers in different stages of maturity. I. Immature fruits. J. Young pistillate flowers. K. Remains of two mericarps; persistent calyx and columella. A, H: Romero-Castañeda 7781; B, K: Romero-Castañeda 7695; C–D, F: Díaz et al. 117; E, G: Romero-Castañeda & Llinás 11260; I: Gentry & Cuadros 55568A; J: Romero-Castañeda 7725.

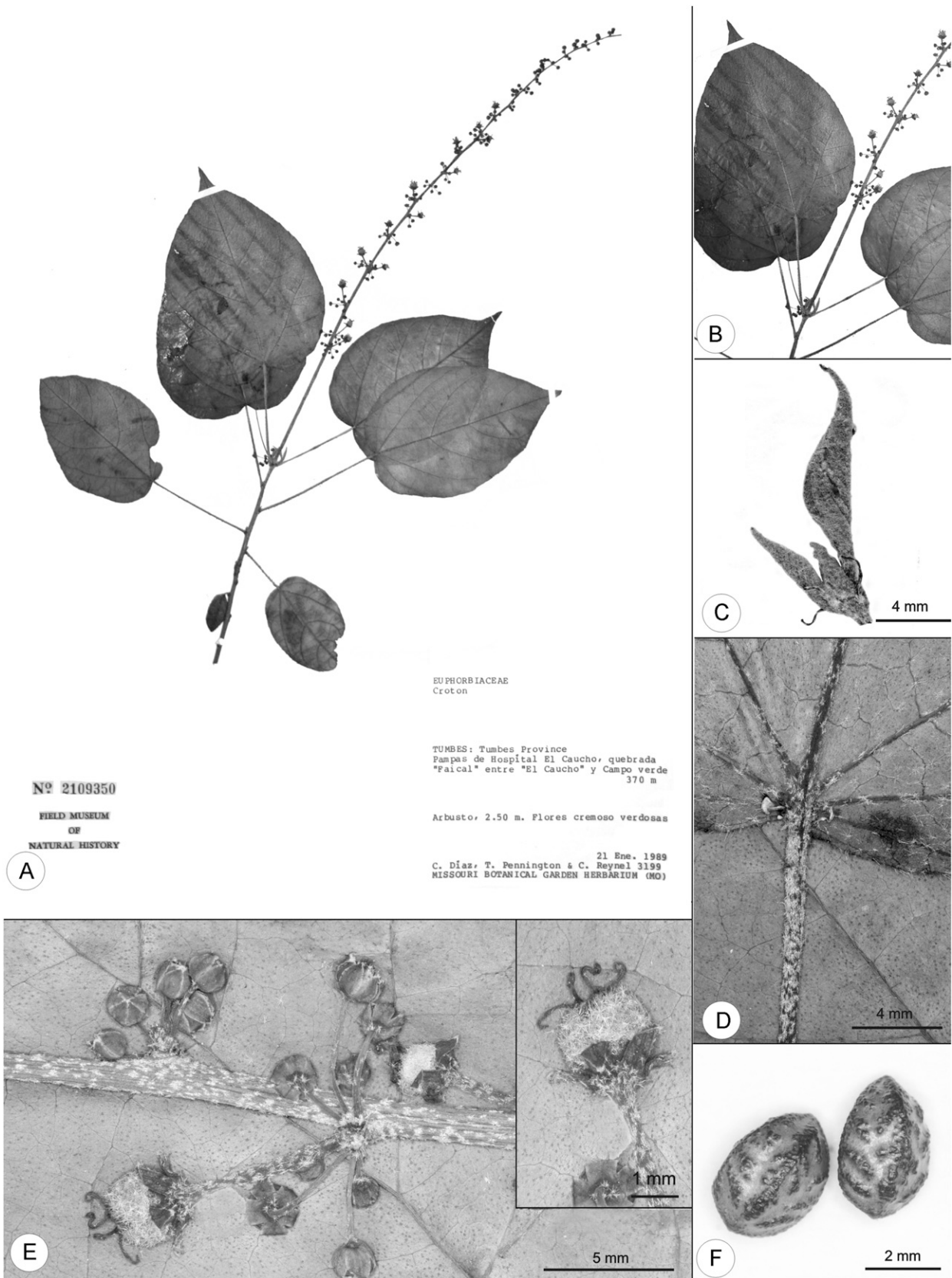


FIG. 5. *Croton tumbesinus*. A. Image of the holotype showing a flowering branch. B. Apical part of a branch showing the stipules and part of inflorescence. C. Apical part of a branch showing the stipules and young leaf. D. Trichomes and basilaminar nectary glands on the abaxial side; adaxial surface of another leaf on the lower part of the photo. E. Part of inflorescence with pistillate flowers and staminate flower buds; inset with pistillate flower. F. Seeds, ventral side. A–B, D–F: Diaz et al. 3199; C: Cornejo & Bonifaz 1755.

glabrous, sparse stellate multiradiate trichomes at the base, apex lanate; petals absent or reduced to a sessile gland; ovary densely covered with stellate-multiradiate trichomes, styles 3, bifid, glabrous or with a few stellate trichomes at the base. **Capsules** 5–6 × 5–6 mm, globose, trilobed; columella 3.0–4.0 mm long; seeds 3.9–4.0 × 2.6–2.9 mm, ovoid, light brown with dark brown muri, rugose; caruncle trapezoidal, ca. 0.4 × 0.8 mm. Figures 1, 5.

Additional Specimens Examined—Ecuador. —MANABI: Bahía de Caráquez, tropical forest very dry to dry, in front of Isla Corazón, 00°40'S, 80°22'W, 190 m, 18 Feb 1994, X. Cornejo & C. Bonifaz 1755 (DAV, GUAY, WIS). Peru. —TUMBES: Zarumilla, Región below El Caucho, dry tropical forest, 350–450 m, 18 Feb 1976, T. Plowman 5487 (DAV).

Etymology—The specific epithet refers to the Tumbes-Piura dry forest ecoregion located between Ecuador and Peru, where the species appears to be endemic.

Distribution and Habitat—This species is only known from dry coastal forests of Tumbes Department in Peru and Manabí Province in Ecuador, where it grows at 190–450 m elevation (Fig. 1). The known populations appear to be disjunct, but they occupy the same type of dry coastal forest vegetation.

Phenology—This species has been collected with flowers in January and February.

Conservation Status—We suggest that if an evaluation were performed, *C. tumbesinus* should be categorized as Data Deficient (DD) because it is only known from two localities and three collections. The species is likely to be present in the intervening areas along the northwestern coastal of Peru and western of Ecuador.

Notes—*Croton tumbesinus* shares the same type of habitat, dry forest, with *C. churutensis*, another dragon's blood tree that is only known from Ecuador. It is possible the two species co-occur in some areas of the Tumbes/Piura dry forest ecoregion, but so far there are no records of them growing in sympatry. The two species differ in several morphological features, but the most obvious ones are leaves, stipules, and styles. *Croton churutensis* has lobed leaves, stipules ovate-lanceolate, and conspicuously lacinate, and multifid styles (12 to 14 tips), where in *C. tumbesinus* the leaves are unlobed, stipules are filiform and entire, and styles are bifid (6 tips).

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