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A new species of “sangre de drago” (*Croton* section *Cyclostigma*, Euphorbiaceae) from coastal Ecuador

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Abstract. *Croton churutensis* is described as a new species of *Croton* section *Cyclostigma* endemic to lowland deciduous forests in coastal Ecuador. Its red latex is used locally in Guayas Province to treat wounds, stomach ulcers, and some skin conditions caused by fungal infections. The new species differs from its closest apparent relative, *Croton hibiscifolius*, in its arching-pendent inflorescences, short-pedicellate female flowers with quadrifid stigmas, more numerous stamens, lacinate stipules, and lower elevation habitat.

Key words: *Croton churutensis*, sangre de drago, Euphorbiaceae, Ecuador, Guayas, Loja.

Croton (Euphorbiaceae s.s.) is a genus of over 1220 currently recognized species (Gov-aerts et al., 2000). In Webster's (1993) sectional synopsis of the genus, he recognized section *Cyclostigma* as a group of about 50 species from both the New and Old Worlds, defined by a suite of characters including a mainly arborescent to shrubby habit, stellate to stellate-lepidote indumentum, reddish trunk sap, glandular petiole apices, bisexual basal cymules of the inflorescence, and pedicellate pistillate flowers. Smith (2002) studied the Ecuadorian members of the section and recognized 11 species native to Ecuador. The first molecular study of the genus (Berry et al., 2005) sampled ten species in section *Cyclostigma* sensu Webster and concluded that the section is polyphyletic, with a core *Cyclostigma* group confined to Central and South America and characterized by arborescent habit and viscous, reddish sap known locally as “sangre de drago,” or dragon's blood. These species are widely used by local inhabitants for the treatment of diarrhea, cuts,

stomach ulcers, herpes infection, and the itching and swelling of insect bites (Meza & Pariona, 1999; Jones, 2003). In 2003, the senior author visited major herbaria in Ecuador and in several collections found material of an undescribed member of the section. The new species is described below, and occurs in seasonally dry areas in coastal Ecuador or somewhat inland at low elevations, unlike most species of section *Cyclostigma* that are restricted to moist, montane habitats.

Croton churutensis R. Riina & X. Cornejo, **sp. nov.** Type: Ecuador. Guayas: Reserva Ecológica Andrade, km 43 vía Guayaquil-Machala, bosque seco tropical, 79°40'W, 2°24'S, 20 m, 25 Jan 2003, X. Cornejo & C. Bonifaz 7590 (holotype GUAY; isotypes DAV, QCA, QCNE, WIS). (Fig. 1)

Croton hibiscifolius Kunth affinis sed inflorescentibus pendentibus, stigmatibus quadrifidis, floribus foemineis breviter pedicellatis, staminibus ca. 24, stipulis ovato-laciniatis differt.

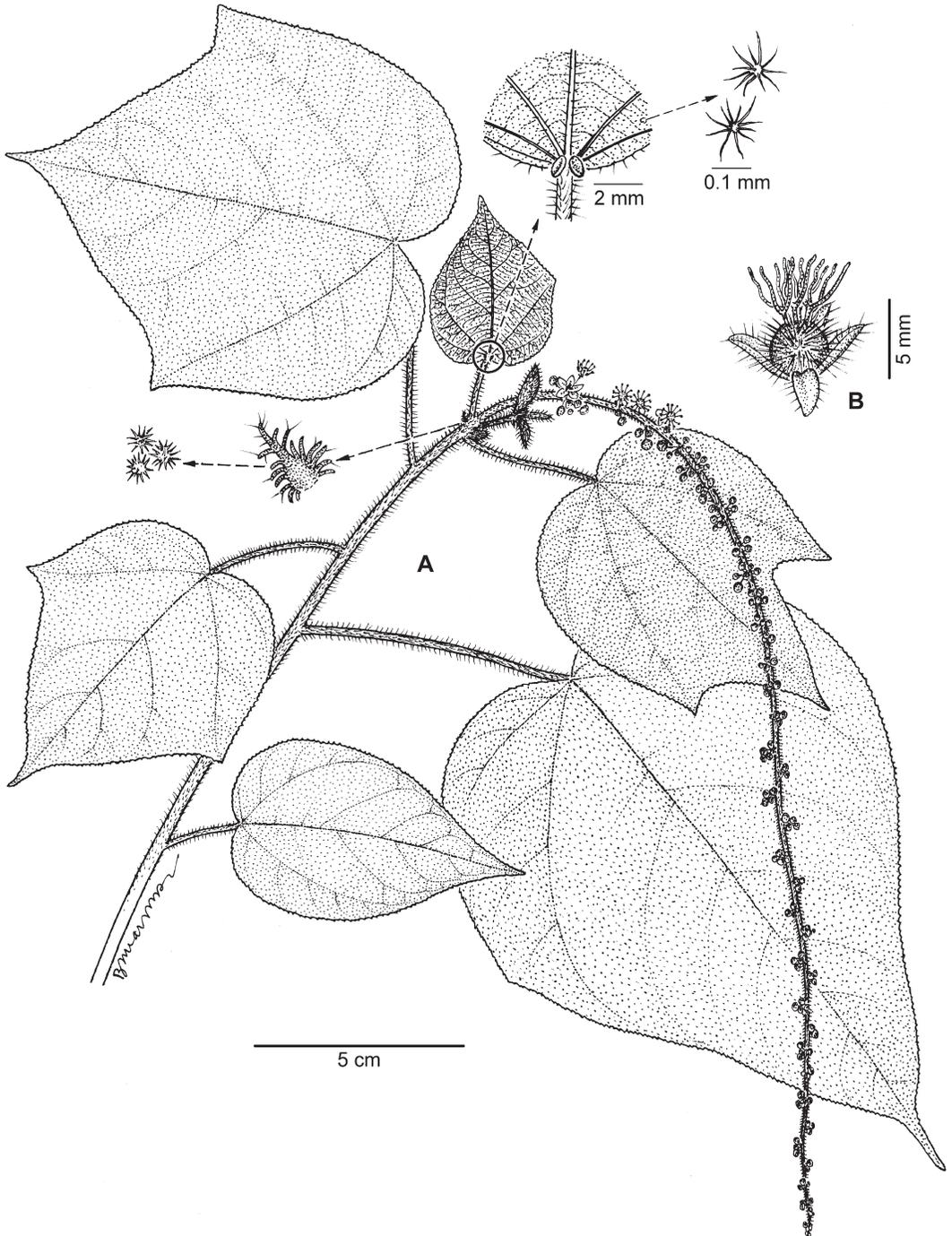


FIG. 1. *Croton churutensis*. **A.** Flowering branch showing details of stipules and petiolar glands. **B.** Pistillate flower. (From Cornejo & Bonifaz 7590, WIS).

Tree 3–8 m high, ca. 20 cm DBH; young branches covered with dense whitish to golden yellow indumentum of stellate-porrect trichomes with central porrect rays 1.5–2 mm long; upper surface of foliage dark green, lower surface pale green; latex from the stem and young branches dark red. Stipules ovate-lanceolate, 3–6 mm long, 1–3 mm wide, persistent on young branches, margins conspicuously lacinate, with 12–16 nonglandular laciniae. Leaves alternate, membranaceous to papery (when dry), with a pleasant smell when fresh leaves are rubbed; leaf blade unlobed or with 2 or 3 acute to acuminate lobes in the upper third of the blade, 5–15(–20) × 3–14(–16) cm; apex sharply-acute to caudate-acuminate; base usually cordate or less commonly truncate; margin minutely denticulate with numerous ovoid glands; venation actinodromous, palmnerved with 3–5 veins from base and 5–8 lateral veins per side of midrib further up the lamina, tertiary veins scalariform, weakly sinuous, the primary and secondary veins raised on the abaxial surface; foliar glands 2, acropetiolar, attached to the petiole on the abaxial surface, discoid, elliptic, 0.7–1 mm in diam., glandular surface lustrous and yellow in life, sessile to shortly stipitate; petioles 1.5–10 cm long, with dense indumentum of stellate-porrect trichomes, rays 0.08–0.10 mm long, central porrect ray 1–1.5 mm long; adaxial leaf indumentum sparse, trichomes stellate-porrect, denser along the veins; abaxial leaf surface with denser indumentum of stellate-porrect trichomes, those along the veins with longer porrect central rays. Inflorescences terminal, arching-pendent, 5.5–30 cm long; upper cymules with 3–5 flowers, rachis angular, golden brown with dense covering of stellate-porrect trichomes, lower cymules bisexual with 3–8 staminate flowers and 1 or 2 pistillate flowers; pistillate bracts widely triangular, ca. 2 × 1 mm; staminate bracts linear, 1–1.2 × 0.2–0.4 mm. Staminate flowers distributed along the inflorescence from base to top; pedicels 4–6 mm long; sepals 5, valvate, ovate, acute, 2–3 × 1.5–2.5 mm, adaxial surface glabrous, abaxial surface with a dense indumentum of rosulate and/or multiradiate porrect trichomes; petals 5, oblong to oblong-lanceolate, cream-colored, 2–3 × 1–1.2 mm, the adaxial surface glabrous except for a cluster of long hairs at

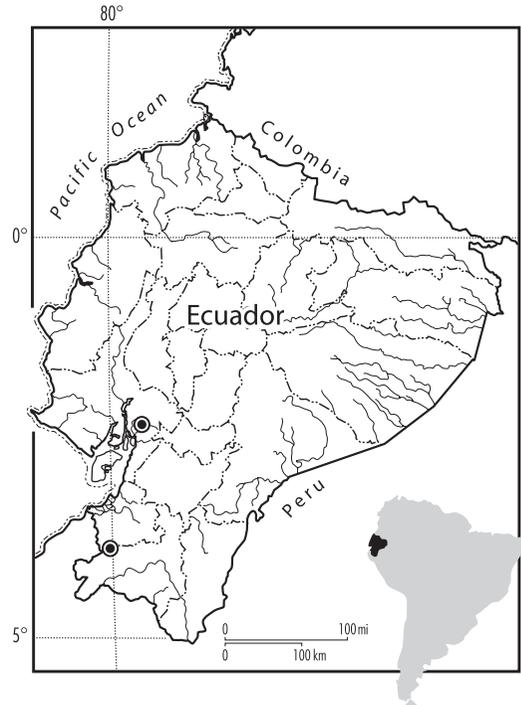


FIG. 2. Geographical distribution of *Croton churutensis*.

the base, abaxial surface sparsely pilose, edges lanate; receptacle densely pilose; stamens ca. 24; filaments 2–3 mm long, glabrous, inflexed in bud; anthers 0.8 × 0.3–0.4 mm. Pistillate flowers subsessile or short-pedicellate, pedicels 0.5–1.5 mm long; sepals 5, valvate, broadly lanceolate to oblong, somewhat unequal, 2.4–3 × 1–1.5 mm, apex acute, adaxial surface densely pilose toward the edges, abaxial surface densely covered with multiradiate, tall stellate-porrect trichomes; malformed petals generally present, more rarely a stalked or sessile gland present in the same position; ovary 3 × 2.5 mm, covered with golden-yellow multiradiate and tall stellate-porrect trichomes; styles quadrifid, with 12 (–14) stigmas, the nonreceptive surfaces covered with sparse stellate trichomes. Mature fruits and seeds unknown.

Distribution and habitat. Coastal Ecuador, known mainly from Guayas Province in deciduous forests on sedimentary, basic, and/or well drained rocky soils, from sea level to 700 m elevation; also known from one location along the coast in Loja Province (Fig. 2).

TABLE I
PRINCIPAL DIFFERENCES THAT DISTINGUISH *Croton churutensis* FROM *C. hibiscifolius*

Character	<i>C. churutensis</i>	<i>C. hibiscifolius</i>
Trichomes on young branches	Stellate-porrect	Stipitate-rosulate, tall dendritic
Stipules	Ovate-lanceolate; margins lacinate, with 12–16 laciniae	Lanceolate to linear, entire
Inflorescences	Arching-pendent	Erect
Stamens	ca. 24	15–21
Length of pedicel of pistillate flowers	0.5–1.5 mm	2–10 mm
Styles	Quadrifid	Bifid
Altitudinal range in Ecuador	0–700 m	800–1300 m

Etymology. The specific epithet refers to one of the ecological reserves where the species is found, in the Reserva Ecológica Manglares de Churute (“REMCH”), located in the Churute hills area of Guayas Province in coastal Ecuador.

Uses and common names. The red latex of *Croton churutensis* is used locally in Guayas Province to treat wounds, stomach ulcers, and some skin conditions caused by fungal infections. Local common names of the species are “Chalá grande” and “Sangre de drago.”

Additional specimens examined. Ecuador.

GUAYAS: cantón Naranjal, parroquia Taura, 2°27'S, 79°40'W, 700 m (MO, WIS) & 6–200 m (QAP), 31 Dec 1991, *Cerón 17917* (MO, QAP, WIS); base del cerro Perequetre Grande, de frente a la Laguna del Canclón, 2°27'S, 79°40'W, 150–200 m, 2 Oct 1992, *Cerón et al. 20617* (QAP); Reserva Ecológica Manglares Churute [REMCH], cumbre del cerro Perequetre Grande, 2°27'S, 79°40'W, 340–370 m, 17 Aug 1992, *Cerón et al. 20327* (QAP); REMCH, cumbre del cerro Gallo, 2°27'S, 79°40'W, 250–270, 29 Sep 1992, *Cerón et al. 20482* (QAP); REMCH, sendero a cerro Mate, 2°27'S, 79°40'W 50–350 m, 27 Dec 1991, *Cerón et al. 17782* (QAP); REMCH, base del cerro Masvale, 2°27'S, 79°40'W, 50 m, 30 Sep 1992, *Cerón et al. 20518* (QAP); REMCH, 79°38'W, 2°26'S, 300 m, 5 Jan 1994, *Cornejo & Bonifaz 1131* (GUAY, QCNE 2 sheets); Reserva Ecológica Andrade, km 43 vía Guayaquil-Machala, 79°40'W, 2°24'S, 20 m, 25 Jan 2003, *Cornejo & Bonifaz 7593* (GUAY, QCA, QCNE, WIS); REMCH, Milagro, carretera Guayaquil–Puerto Inca, Sector Norte del Cerro Masvale, 02°20'S, 29°50'W, 200–300 m, May 1993, *Núñez & Hernández 148* (QCNE, MO). **LOJA:** Bosque Petrificado Puyango, quebrada El Limón, 80°02'W, 3°52'S, 350 m, 20 Jun 1995, *Cornejo & Bonifaz 4181* (GUAY).

Nuclear ITS and plastid *trnL-trnF* intron and spacer DNA sequence data from *Cornejo & Bonifaz 7590* (Riina, in prep.) places *Cro-*

ton churutensis within the core *Cyclostigma* clade identified by Berry et al. (2005), but its close sister species within that clade have not yet been resolved. In several of the Ecuadorian herbaria and in previous floristic publications such as Cerón (1996), *C. churutensis* was treated as *C. gossypifolius* Vahl. However, that species does not occur in Ecuador and is native to Trinidad and northern Venezuela and Colombia (Smith, 2002). A close relative of *C. gossypifolius* that occurs in north-central Ecuador and in Colombia and western Venezuela is *C. hibiscifolius* Kunth. According to Smith (2002), most of the other specimens that have been identified as *C. gossypifolius* in Ecuador are actually *C. hibiscifolius*. The leaves of *C. churutensis* are similar to those of *C. hibiscifolius*, but the species differ in several other morphological and ecological features that are summarized in Table I. *Croton churutensis* resembles another species of section *Cyclostigma* from eastern Bolivia, *C. charaguensis* Standl., in having entire to lobate leaves with basal ovoid glands, minutely denticulate leaf margins, lacinate stipules, quadrifid stigmas, a small tree habit, and a similar habitat in deciduous forests. However, *C. charaguensis* differs from *C. churutensis* in its much shorter inflorescences, four to six long-stipitate petiolar glands, and more numerous stamens (40 or more).

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Literature Cited

- Berry, P. E., A. L. Hipp, K. J. Wurdack, B. Van Ee & R. Riina. 2005. Molecular phylogenetics of the giant genus *Croton* and tribe Crotonae (Euphorbiaceae sensu stricto) using ITS and *trnL-trnF* DNA sequence data. *American Journal of Botany* 92(9): 1520–1534.
- Cerón, C. E. 1996. Diversidad, especies vegetales y usos en la Reserva Ecológica Manglares-Churute, Provincia del Guayas-Ecuador. *Revista Geográfica* No. 36. Instituto Geográfico Militar Quito, Ecuador.
- Govaerts, R., D. G. Frodin & A. Radcliffe-Smith. 2000. World checklist and bibliography of Euphorbiaceae and Pandaceae. 4 vols. Royal Botanic Gardens, Kew, England.
- Jones, K. 2003. Review of Sangre de Drago (*Croton lechleri*) –A South American Tree Sap in the Treatment of Diarrhea, Inflammation, Insect Bites, Viral Infections, and Wounds: Traditional Uses to Clinical Research. *The Journal of Alternative and Complementary Medicine* 9: 877–896.
- Meza, E. N. & M. Pariona. 1999. Nombres aborígenes peruanos de las especies de *Croton* que producen el látex denominado “Sangre de Drago”. Pp. 25–44. In: E. N. Meza, (ed.), *Desarrollando nuestra diversidad biocultural: “Sangre de drago” y el reto de su producción sustentable en el Perú*. Universidad Mayor de San Marcos, Fondo Editorial, Lima.
- Smith, B. A. 2002. A systematic revision of *Croton* section *Cyclostigma* (Euphorbiaceae) in Ecuador. Ph.D. thesis, University of California-Davis.
- Webster, G. L. 1993. A provisional synopsis of the sections of the genus *Croton* (Euphorbiaceae). *Taxon* 42: 793–823.