



Croton maasii (Euphorbiaceae), a new species from the western Amazon region

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Key words

Amazon
Brazil
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Abstract *Croton maasii*, a new species from South America, is described and illustrated. The species is only known from terra firme forests of the extreme western Amazonian region, in W Brazil and adjacent E Peru. *Croton maasii* resembles *C. pachypodus*, a more abundant and widely distributed species in the Neotropics, but differs from it in its much smaller fruits, foliage colour, less dense leaf indumentum, and a more even position of the petiolar glands.

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INTRODUCTION

Recent and ongoing taxonomic and molecular phylogenetic studies on the genus *Croton* (Berry et al. 2005, Van Ee et al. 2008, 2011, Riina et al. 2009, 2010) have revealed many undescribed *Croton* species from South America and other regions. *Croton* is usually regarded as a predominant floristic element of dry habitats, however, it is also well represented in moist forests habitats of the Andes, Amazonia, and Mata Atlantica regions in South America. In this paper we describe a new species occurring in western Amazonia, which appears to be rare based on the few collections known to date, but it is distinct from any known species in the genus. This new finding adds to a series of recently described species from the Amazon region (Secco 2004, Secco et al. 2005, Riina & Berry 2010, Secco & Berry 2010). Based on morphological similarities we suggest that *Croton maasii* belongs to the clade of *C. pachypodus* G.L.Webster (the Sampatik clade sensu Riina et al. 2009). Van Ee et al. (2011) are formally describing this clade as a new section that includes *C. diasii* Pires ex Secco & P.E.Berry, *C. jorgei* J.Murillo (1999), *C. megistocarpus* J.A.González & Poveda (2003), *C. pachypodus*, and the new species described below.

Croton maasii Riina & P.E.Berry, *sp. nov.* — Fig. 1a, 2a, b

Ab *Croton pachypodae* G.L.Webster capsulis minoribus, marginibus foliorum glandularis, et glandulis petiolaris aequalis differt. — Typus: *P.J.M. Maas*, *K. Kubitzki*, *W.C. Steward*, *J.F. Ramos*, *W.S. Pinheiro* & *J.F. Lima* P12775 (holo NY; iso MICH), Brazil, Acre, Cruzeiro do Sul, Estrada Alemanha, forest on terra firme, 7 May 1971.

Etymology. The epithet honours the collector of the type specimen, Paul J.M. Maas, an authority on several tropical families like *Annonaceae*, *Cannaceae*, and *Gentianaceae*.

Monoecious trees 5–6 m tall; young branches with a dense, light yellowish indumentum of lepidote trichomes. *Stipules* linear-lanceolate, 2–3 mm long, sometimes slightly branching

with a glandular tip. *Leaves* alternate, the blades elliptic, 7–15 by 2.5–6.5 cm, apex acute, sometimes slightly acuminate, base acute, rarely rounded, margin entire or more or less sinuous, with sessile discoid glands on each sinus, mature blades glabrescent with a few scattered lepidote trichomes; venation pinnate, secondary veins 7–10, primary and secondary veins raised on both surfaces; petiolar glands patelliform, inconspicuous, sessile, epipetiole, adaxial, sometimes difficult to see because of the dense lepidote indumentum, on the same plane; petioles 0.7–1.6 cm long, deeply canaliculate on the adaxial side, densely lepidote. *Inflorescences* terminal and axillary, erect, 10–20 cm long, rachis angular, densely lepidote; bracts triangular lanceolate, 0.9–1.3 by 0.3–0.5 mm. *Staminate flowers* (in bud) lepidote, receptacle pilose, stamens 9. *Pistillate flowers* with a thick pedicel 4–9 by 1.8–2 mm; sepals 5, valvate, triangular, acute, 1.9–2 by 1.5–1.6 mm, externally densely lepidote, internally glabrous; petals lacking or reduced to a filament with an apical gland; ovary densely golden-lepidote, styles bifid, glabrous. *Capsules* globose, 1–1.3 by 1–1.3 cm; columella 1.1 cm long; seeds obovoid; 1–1.2 by 0.6–0.7 cm, mottled with grey spots on a brown background, rounded dorsally, ridged ventrally along the central axis; caruncle ovoid, 2 by 1.8 mm.

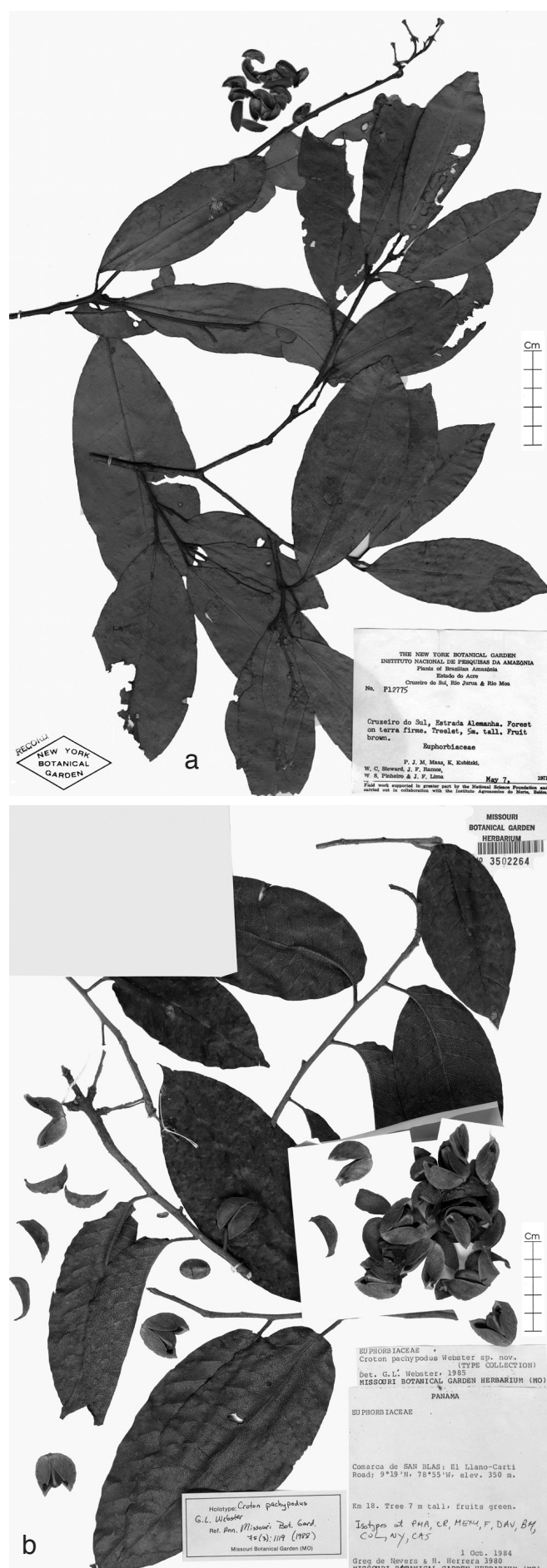
Distribution & Habitat — The species is known from extreme western Amazonian Brazil (Acre) and adjacent Peru (Loreto), where it grows in terra firme forest at low elevations, 120–130 m.

Additional specimens examined. BRAZIL, Acre, Município Cruzeiro do Sul, BR 364, Km from Cruzeiro do Sul to Tarauacá, linha no. 01, 13 Sept. 1985, *A. Rosas Jr.*, *J.L. dos Santos*, *D. Campbell* & *D. Coelho* 288 (INPA, MICH, MPEG, NY). — PERU, Loreto, Maynas, Distrito Fernando Lores, caserío Constanca (Quebrada Tamshiyacu), 04°08'S, 72°55'W, 120–130 m, 8 May 1991, *C. Grández*, *J. Ruiz* & *J. Jaramillo* 2532 (COL, MO).

Note — *Croton maasii* is similar to *C. pachypodus* (Webster & Huft 1988) and *C. diasii* (Secco et al. 2001), which belong to an early diverging clade in the *Croton* phylogeny (Van Ee et al. 2008, Riina et al. 2009). *Croton maasii*, *C. pachypodus* (Fig. 1b, 2c–f), and *C. diasii* have similar lepidote indumentum with a glabrous adaxial leaf surface, two epipetiole glands in the adaxial position (sometimes visible from the abaxial side), linear-lanceolate stipules with tiny branches and glandular tips,

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thick pedicels (pistillate flowers), and bifid styles. The new species differs from both *C. pachypodus* and *C. diasii* in several morphological features (see Table 1). It should be noted that *C. pachypodus* was erroneously described as having 4-fid styles (Webster & Huft 1988), but it was later confirmed, after examination of the holotype and numerous collections, that it has 2-fid styles instead. Numerous specimens of *C. pachypodus* from South America have been erroneously determined in many herbaria as *C. tessmannii* Mansf. (Fig. 1c), which belongs to a different lineage of *Croton*, namely *C. sect. Cuneati* Riina & P.E. Berry, and is characterized by a different suite of morphological features (Riina et al. 2010).

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Fig. 1 a. *Croton maasii* Riina & P.E. Berry. Image of the holotype. — b. *C. pachypodus* G.L. Webster. Image of the holotype, from Tropicos, botanical information system at the Missouri Botanical Garden, www.tropicos.org. — c. *C. tessmannii* Mansf. Image of isotype, from the C. V. Starr Virtual Herbarium (<http://sciweb.nybg.org/science2/vii2.asp>). (a: Maas et al. P12775, NY; b: Nevera & Herrera 3980, MO; c: Tessmann 3438, NY).

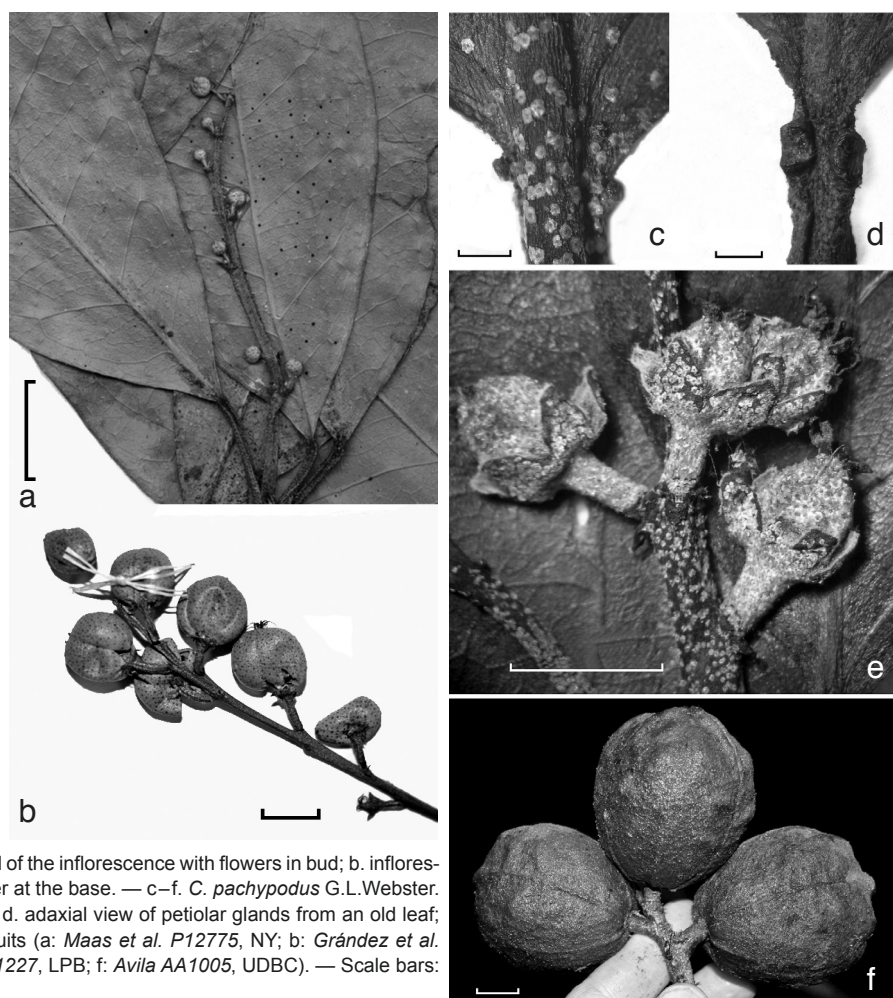


Fig. 2 a, b. *Croton maasii* Riina & P.E. Berry. a. Detail of the inflorescence with flowers in bud; b. inflorescences with mature fruits and a young pistillate flower at the base. — c–f. *C. pachypodus* G.L. Webster. c. Abaxial view of petiolar glands from a young leaf; d. adaxial view of petiolar glands from an old leaf; e. young pistillate flowers; f. fresh, nearly mature fruits (a: *Maas et al.* P12775, NY; b: *Grández et al.* 2532, MO; c, e: *Foster 11858*, LPB; d: *Villavicencio 1227*, LPB; f: *Avila AA1005*, UDBC). — Scale bars: a, b, e, f = 1 cm; c, d = 1 mm.

Table 1 Main morphological differences between *C. maasii*, *C. pachypodus*, and *C. diasii*.

	<i>C. maasii</i>	<i>C. pachypodus</i>	<i>C. diasii</i>
Foliage colour (herbarium specimens)	Light yellow-brown	Dark brown-grey or dark green	Dark brown
Indumentum on abaxial side of mature leaves	Glabrescent with a few scattered lepidote trichomes	Evenly sparse lepidote trichomes	Evenly sparse lepidote trichomes
Position of petiolar glands	Evenly situated on petiole	Obliquely situated on petiole	Obliquely situated on petiole
Petiolar glands	Inconspicuous and sessile	Conspicuous, sessile or shortly stipitate	Conspicuous, sessile or shortly stipitate
Marginal discoid sessile glands	Present	Absent	Absent
Fruit length	1–1.3 cm	2.5–3.7 (dry) 4–4.8 (fresh)	1.5–1.7 cm*

* Since seeds are not known (not seen in the original description of *C. diasii*) we suspect that fruits may be bigger when mature.

REFERENCES

- Berry PE, Hipp AL, Wurdack KJ, Van Ee B, Riina R. 2005. Molecular phylogenetics of the giant genus *Croton* and tribe Crotonaeae (Euphorbiaceae sensu stricto) using ITS and trnL-trnF DNA sequence data. *American Journal of Botany* 92: 1520–1534.
- González J, Poveda L. 2003. Dos nuevas especies de *Croton* (Euphorbiaceae) en el neotrópico. *Lankesteriana* 8: 7–12.
- Murillo J. 1999. Composición y distribución del género *Croton* (Euphorbiaceae) en Colombia, con cuatro especies nuevas. *Caldasia* 21: 141–166.
- Riina R, Berry PE. 2010. Two new South American species of *Croton* (Euphorbiaceae) and their phylogenetic affinities. *Anales del Jardín Botánico de Madrid* 67: 23–27.
- Riina R, Berry PE, Van Ee BW. 2009. Molecular phylogenetics of the dragon's blood *Croton* section *Cyclostigma* (Euphorbiaceae): a polyphyletic assemblage unraveled. *Systematic Botany* 34: 360–374.
- Riina R, Van Ee B, Wiedenhoeft AC, Cardozo A, Berry PE. 2010. Sectional rearrangement of arborescent clades of *Croton* (Euphorbiaceae) in South America: evolution of arillate seeds and a new species, *Croton domatifer*. *Taxon* 59: 1147–1160.
- Secco RD. 2004. *Croton dissectistipulatus*, a new species of Euphorbiaceae from Amazonian Brazil. *Brittonia* 56: 353–356.
- Secco RD, Berry PE. 2010. *Croton borbensis*, a new species of Euphorbiaceae from white sands of Amazonian Brazil. *Brittonia* 62: 116–119.
- Secco RD, Berry PE, Rosa NA. 2001. *Croton diasii* and *Croton trombetensis*, two new Euphorbiaceae from Amazonian Brazil. *Novon* 11: 119–123.
- Secco RD, Berry PE, Rosario CS. 2005. A new species of *Croton* sect. *Luntia* (Euphorbiaceae) from western Amazonian Brazil. *Novon* 15: 583–585.
- Van Ee BW, Berry PE, Riina R, Gutiérrez Amaro JE. 2008. Molecular phylogenetics and biogeography of the Caribbean-centered *Croton* subgenus *Moacroton* (Euphorbiaceae s.s.). *Botanical Review (Lancaster)* 74: 132–165.
- Van Ee BW, Riina R, Berry PE. 2011. A revised infrageneric classification and molecular phylogeny of the New World *Croton* (Euphorbiaceae). *Taxon* 60: 791–823.
- Webster GL, Huft MJ. 1988. Revised synopsis of Panamanian Euphorbiaceae. *Annals of Missouri Botanical Garden* 75: 1087–1144.