

# A NEW COMBINATION IN *CROIZATIA* (EUPHORBIACEAE)

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## ABSTRACT

The unispecific genus *Pseudosagotia* is placed in synonymy under *Croizatia* and a new combination, *Croizatia brevipetiolata* (Secco) Dorr, is proposed for its sole species. An emended description is provided for *C. brevipetiolata*, a dioecious species that was known previously only from female flowers and fruits. *Croizatia brevipetiolata* is compared to *C. neotropica* and *C. naiguatensis*, two species from coastal Venezuela, and to *C. panamensis*, a species from Panama and Pacific Colombia.

## RESUMEN

Se ubica el género monoespecífico *Pseudosagotia* como sinónimo del género *Croizatia* y se propone una nueva combinación, *Croizatia brevipetiolata* (Secco) Dorr, para su única especie. Se presenta una descripción corregida de *C. brevipetiolata*, una especie dioica, de la cual previamente sólo se conocían las flores femeninas y los frutos. Se compara *C. brevipetiolata* con *C. neotropica* y *C. naiguatensis*, dos especies de la región litoral de Venezuela, y con *C. panamensis*, una especie de Panamá y el extremo occidental de Colombia.

When Secco (1985) described the genus *Pseudosagotia*, he failed to compare it to *Croizatia* Steyerf., which is not surprising given that the latter genus was then known from two imperfect collections that served as the types of two species. Had Secco read Steyerf.'s (1952, 1978) descriptions of these species or seen the accompanying figures he undoubtedly would have described his species of *Pseudosagotia* as a new species of *Croizatia* because the two genera are identical in all essential characters save one, which appears to have been misinterpreted. Subsequently, Webster et al. (1987) reviewed the genus *Croizatia*, which they placed in the Phyllanthoideae, and they described a third species. Most recently, Webster (1994) placed *Croizatia* in the Oldfieldioideae and created a new tribe, Croizatieae, to accommodate the genus, the correct placement of which he continued to debate. Webster and collaborators overlooked *Pseudosagotia* and its sole species and they cited no other generic synonyms of *Croizatia*.

Salient characters that Secco (1985) observed for *Pseudosagotia*, which also define *Croizatia*, included the following: pistillate flowers pedicellate; ca-

lyx 5-lobed, petaloid; petals 5, minute, alternisepalous; ovary 3-locular, with 2 ovules per locule; style 3-branched, each branch bifurcated; fruit capsular, with persistent sepal lobes; seeds ecarunculate. In addition, while not mentioned by Secco (1985), his illustration (Fig. 1) showed that the sepal lobes of *Pseudosagotia* are reflexed in fruit like those of *Croizatia*. Staminate flowers of *Pseudosagotia* were not available to Secco (1985), but these flowers (described below) also agree in shape, size, and ornamentation with those of *Croizatia*. Similarly, pollen of *Pseudosagotia* (described below) agrees with published descriptions (Webster et al. 1987; Levin & Simpson 1994; Simpson & Levin 1994) of pollen of *C. naiguatensis* Steyerem. (The number and nature of the pores of *Pseudosagotia* pollen were not visible with light microscopy). The only character of *Pseudosagotia* cited by Secco (1985) that does not agree with *Croizatia* (as defined by Webster et al. 1987; Webster & Huft 1988; Webster 1994) is the presence of endosperm, which has not been reconfirmed.

**Croizatia** Steyerem., *Fieldiana, Bot.* 28(2):308. 1952. TYPE: *Croizatia neotropica* Steyerem.

*Pseudosagotia* Secco, *Bol. Mus. Paraense Emílio Goeldi, Sér. Bot.* 2:23. 1985. TYPE: *Pseudosagotia brevipetiolata* Secco  $\equiv$  *Croizatia brevipetiolata* (Secco) Dorr.

**Croizatia brevipetiolata** (Secco) Dorr, comb. nov. BASIONYM: *Pseudosagotia brevipetiolata* Secco, *Bol. Mus. Paraense Emílio Goeldi, Sér. Bot.* 2:24, figs. 1, 2. 1985. TYPE: VENEZUELA. TRUJILLO: entre Boconó y Guaramacal, 2100–2300 m, 4 Sep 1966 (♀ fls., immature fr.), *Steyermark & Rabe 97322* (HOLOTYPE: NY n.v.; ISOTYPE: US!).

Tree, 3–6(–15) m tall; leaf blades elliptic to lanceolate or oblanceolate, long-acuminate at apex, long-attenuate at base, (5–)8.5–21 cm long, (2–)3–6.5 cm broad, inconspicuously strigose or glabrous beneath, lateral nerves ca. 8–9 on each side, prominulous with the fainter and more delicate tertiary veins, glabrous above; petioles 4–6(–10) mm long, slender, canaliculate, strigose or glabrous; stipules subulate, ca. 4–5 mm long, scarious, sericeous, deciduous. Staminate flowers in dense axillary clusters; pedicel 5–8 mm long, strigose; sepals 5, elliptic, entire, more or less equal in size, 5.5–6 mm long, 4–5 mm broad, whitish-cream or yellowish-white; petals 5, obovate, subentire, ca. 1.25–1.8 mm long, ca. 1–1.2 mm broad, glabrous adaxially, densely sericeous abaxially; disk cupuliform, ca. 1 mm tall, 4–5 mm in diam., glabrous; stamens 5, free, filaments ca. 3 mm long, hirsutulous basally; anthers elliptic, ca. 1.5–2 mm long; pistillode 3–4-lobed, 4–5 mm tall, hirsutulous basally. Pollen spherical, ca. 40  $\mu$ m in diam., and echinate (Cuello et al. 992, US!). Pistillate flowers in 2–3-flowered axillary clusters; pedicel strigose, 12–28 mm long at anthesis and in fruit; sepals (4) 5, elliptic, slightly carinate (hooded), 8–10 mm long, 3–5 mm broad, unequal in size (one larger than the others), strigose adaxially near the base, strigose abaxially, greenish, becoming reflexed and persistent in fruit; petals (4) 5, elliptic, ca. 1.25

mm long, ca. 0.75 mm broad, glabrous adaxially, densely sericeous abaxially, disk cupuliform, ca. 1 mm tall, ca. 5 mm in diam., glabrous; ovary sericeous, hairs white; styles spreading, ca. 3.5 mm long, twice bifid, the undivided portion ca. 1.5 mm long, the primary branches ca. 1.5 mm long, ultimate tips ca. 0.5 mm long. Capsule obovate, 3-lobed, 1–1.5 cm tall, 1.5–1.8 cm in diam., reticulate, strigose to glabrate; columella ca. 7–10 mm tall, wings persistent. Seeds ovoid, flattened on one side, ca. 10 mm long, ca. 6–8 mm broad, testa smooth, hilum medial, exalbuminous (*Cuello et al.* 990, US!), cotyledons folded (contortuplicate).

*Distribution and ecology.*—Locally common on the slopes of the Andes in Barinas, Lara, Portuguesa, and Trujillo states, Venezuela, where it occurs from 1400–2300 (–2600) m elevation in lower montane (cloud) forest often dominated by *Wettinia praemorsus* (Willd.) Wess. Boer (Palmae). In the Ramal de Guaramacal (Trujillo state) Cuello (1997) found that *Croizatia brevipetiolata* was the most abundant species in vegetation plots she established at 2100 and 2300 m elevation. Also, apparently frequent at 1650 m elevation in dense forest on the slope of Pico Renjifo, Meta, Colombia. In Venezuela, flowering from (April) May through July and fruiting in October and November. In Colombia, known only from fruiting material collected in June.

In some Venezuelan populations, male plants appear to be less common (less conspicuous?) than female plants (fide *Dorr & Barnett* 8046).

Additional material examined. **VENEZUELA.** Barinas: Dto. Pedraza, NE of Alto de La Aguada (ca. 8° 37'N, 70° 40'W) in an area known locally as "Montañas de Tierra Blanca," 18 Apr 1988 (fl bud), *Dorr et al.* 4858 (NY, PORT–2 sheets, VEN). Lara: Dto. Morán, las cabeceras del Río Tocuyo, 20–21.5 kms al sur de Humocar Alto, hacia Guaitó, 13 Oct 1974 (fr), *Steyermark & Carreño Espinoza* 111112 (VEN); carretera desde Humocar Alto hacia Guaitó, 14 Nov 1984 (fr), *van der Werff & Rivero* 7915 (NY, PORT). Portuguesa: Dto. Sucre, Parque Nacional Guaramacal, Sector El Paramito, Camino Real La Aguadita—El Batatal (ca. 9° 19'N, 70° 04'W), 8 Jul 1999 (st), *Dorr & Yustuz* 8555 (PORT, US). Trujillo: Dto. Boconó, 25 km al SE de Boconó, 26 Jul 1984 (♀ fls), *Aymard et al.* 2948 (NY, PORT, US); Parque Nacional Guaramacal, vertiente norte, 17–18 Jun 1995 (♀ fls), *Cuello et al.* 990 (MO, US), *Ibid.*, 17–18 Jun 1995 (♂ fls), *Cuello et al.* 992 (PORT, US); Parque Nacional Guaramacal, road from Boconó to Guaramacal, SE of Boconó, N slope of mountain, 13 Jul 1995 (♀ fls), *Dorr & Barnett* 8044 (K, NY, PORT, US, VEN), *Ibid.*, 13 Jul 1995 (♂ fls), *Dorr & Barnett* 8046 (DAV, F, PORT, US, VEN); Páramo de Guaramacal, SE of Boconó on road from Boconó to Guaramacal, 19 Oct 1990 (fr), *Dorr et al.* 7437 (NY, PORT); Parque Nacional Guaramacal, road from Boconó to Guaramacal, SE of Boconó and just above park headquarters, N slope of mountain, 5 Jul 1995 (♂ fls), *Dorr et al.* 7963 (CANB, K, MO, NY, PORT, US, VEN); Parque Nacional Guaramacal, en la vertiente norte, 27 May 1995 (♀ fls), *Licata & Cuello* 151 (COL, MO, PORT, US), *Ibid.*, 27 May 1995 (♂ fls), *Licata & Cuello* 152 (DAV, F, PORT, US), *Ibid.*, 15 Jul 1995 (♀ fls), *Licata & Niño* 304 (COL, PORT, US). Dto. Carache, Burbusay, Sector El Alto, 27 Jul 1995 (fl), *Licata & González* 412 (PORT). **COLOMBIA.** Meta: Sierra de la Macarena, Central Mountains, Pico Renjifo, 22 Jan 1950 (fr), *Philipson et al.* 2154 (US).

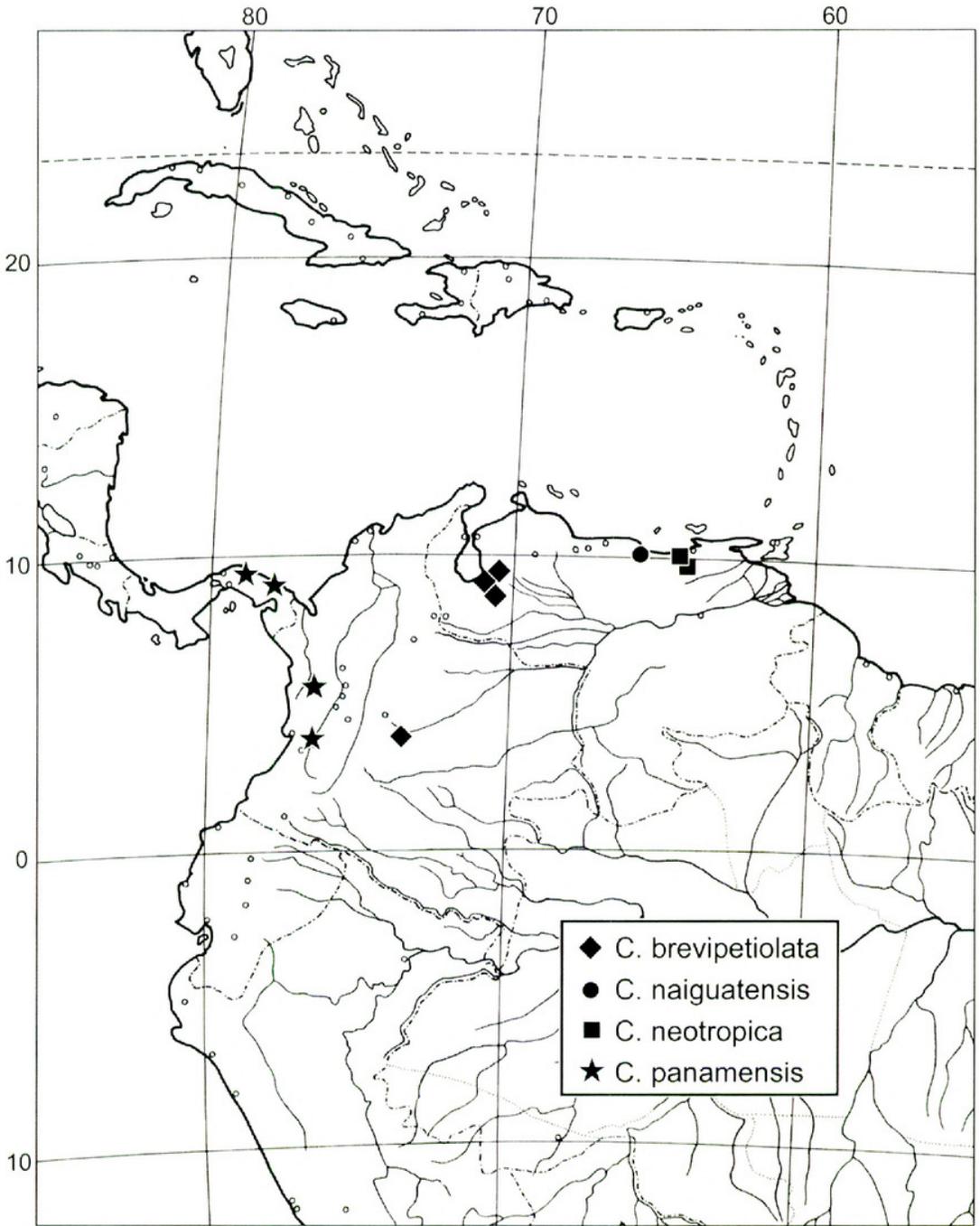


FIG. 1. Distribution of *Croizatia* species (Euphorbiaceae) in Central and northern South America.

The paucity and incompleteness of the available material make interpreting the species boundaries of *Croizatia* difficult. *Croizatia brevipetiolata* is very similar morphologically to *C. naiguatensis*, which is known from a few collections from the Cerro Naiguatá in the Coastal Cordillera of the D.F., Venezuela. *Croizatia brevipetiolata* differs from *C. naiguatensis*, however, in that the leaf

apices are long-acuminate (versus acute or obtuse) and the leaf bases are long-attenuate (versus attenuate); the staminate flowers are larger in all measurable characters (pedicels 5–8 versus 3–4 mm long; sepals 5.5–6 × 4–5 versus 4–4.5 × 2.5–3 mm; disk 4–5 versus ca. 3 mm in diam.; filaments ca. 3 versus 2.2–2.5 mm long; anthers 1.5–2 versus 1.2–1.4 mm long; and pistillodes 4–5 versus 1.8–2.2 mm tall); and the pedicels of pistillate flowers are longer both in flower and fruit (12–28 versus 8–12 mm long). Collectors' notes also indicate that the perianth of pistillate flowers of *C. brevipetiolata* is greenish in color (fide *Licata & Cuello 152*, *Licata & Niño 304*, etc.), while that of *C. naiguatensis* is cream-colored (fide *Berry et al. 4121, 4125*, US!). Both *C. brevipetiolata* and *C. naiguatensis* can be distinguished from *C. panamensis* G.L. Webster by having staminate flowers with free (versus connate) stamens. Likewise, the two species can be distinguished from the enigmatic *C. neotropica* by having shorter (8–28 versus 35–45 mm long) pistillate flower pedicels. Good flowering material (both staminate and pistillate) of *C. neotropica* is still lacking. *Croizatia brevipetiolata* and *C. naiguatensis* also can be distinguished from the other two described species by having fewer (7–10 versus 12–15) lateral nerves on each side of the midvein of the leaf blade.

The few collections of *Croizatia* begin to suggest distinct geographic ranges for the species (Fig. 1). *Croizatia brevipetiolata* evidently is restricted to forested slopes of the northern Andes at elevations ranging from 1400–2300(–2600) m. *Croizatia naiguatensis* and *C. neotropica* are both found in the Coastal Cordillera of northern Venezuela, but the former occurs in cloud forest at 1900–2150 m in the central portion of this cordillera, while the latter occurs at 1000–1350 m in the eastern portion of the same cordillera (Steyermark 1978). *Croizatia panamensis* has been collected only in primary forest at (50–) 300–500 m in Panama and the Chocó region of neighboring Colombia. Additional material from Amazonian Ecuador and Peru, which Webster et al. (1987) mentioned, may represent new species and could extend the range of *Croizatia* further south, but none of this material was examined for this note.

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