

Novae Gesneriaceae Neotropicarum XVI: *Cremosperma anisophyllum*, a new species of Gesneriaceae from the Chocó region of northern Ecuador and southern Colombia

JOHN L. CLARK^{1,2} AND LAURENCE E. SKOG²

¹Department of Biological Sciences, The University of Alabama, Box 870345, Tuscaloosa, AL 35487-0345, USA; e-mail: jlc@ua.edu

²Department of Botany, MRC-166, Smithsonian Institution, National Museum of Natural History, PO Box 37012, Washington, DC 20013-7012, USA; e-mail: skogl@si.edu

Abstract. A new species of *Cremosperma* (Gesneriaceae, tribe Beslerieae) is described from the Chocó floristic region of the western Andean slopes of northern Ecuador and southern Colombia. The dorsiventral shoots and strongly anisophyllous leaves differentiate ***Cremosperma anisophyllum*** from all other congeners.

Key Words: Beslerieae, Chocó, *Cremosperma*, Ecuador, Gesneriaceae.

Resumen. Se describe una nueva especie de *Cremosperma* (Gesneriaceae, tribu Beslerieae) de los bosques nublados de la región florística Chocó en las faldas de los Andes en el Norte de Ecuador y el Sur de Colombia. Las ramas dorsiventrales y la hojas anisófilas distinguen a ***Cremosperma anisophyllum*** de otras congéneres.

Cremosperma is a genus of small terrestrial or saxicolous herbs that range from Costa Rica to Peru. Kvist and Skog (1988) provided a thorough treatment of the *Cremosperma* species known from Ecuador and estimated the total diversity of the genus to be 24 species. A recent paper by Fernández-Alonso (2006) described an additional species known only from the type locality from the Pacific slopes of the Valle del Cauca department in Colombia. The description of *Cremosperma anisophyllum* brings the total diversity of the genus to 26 species.

The genus *Cremosperma* was first described by Bentham (1846a). Until 1935 it was monotypic, and known only from the type, *Cremosperma hirsutissimum* Benth. *Cremosperma* was considered a “Genera non satis nota” by Hanstein where he included it as one of two genera that lacked sufficient information to be classified in a tribe (1865). Bentham (1876) reduced *Cremosperma* to a section of the genus *Besleria*. Fritsch did not recognize *Cremosperma* at any level (e.g., section), and included *Cre-*

mosperma hirsutissimum in the genus *Besleria* (1893–1894). Morton resurrected the genus in a series of papers that dealt with new species (1935, 1938) including a later paper (Morton, 1944) that described three species of *Cremosperma* from Colombia and Ecuador.

The monophyly of *Cremosperma* and its placement in the tribe Beslerieae is strongly supported by molecular data from the nrDNA ITS region (Roalson & Clark, 2006) and a combined analysis of ITS and cpDNA *trnL-F* (Clark et al., 2010). Morphological features that distinguish *Cremosperma* from other genera in the Beslerieae include the presence of terminally clustered flowers on a well-developed peduncle and filaments of the stamens adnate to the corolla tube for half of their length. The capsule of *Cremosperma* is often referred to as irregularly dehiscent, bivalved, or 4-valved (Kvist & Skog, 1988). Most species descriptions of *Cremosperma* lack details on fruit morphology. For example, Morton’s revision of *Cremosperma* (1944) lacked any mention of fruit or fruit

dehiscence. Bentham's original description of the genus (1846a) simply referred to the fruit as a glabrous capsule. In a subsequent publication, Bentham described the fruit as a membranaceous capsule (1846b). As a result, fruit dehiscence in most species of *Cremosperma* is inadequately documented. We suspect that many of the "irregularly" dehiscent capsules appear so from being crushed during specimen preparation.

Cremosperma anisophyllum J. L. Clark & L. E. Skog, **sp. nov.** Type: Ecuador. Esmeraldas: Cantón San Lorenzo, Parroquia Alto Tambo, Awá Indigenous Territory, Río Bogotá community (future biological research station), 2 km south of Lita-San Lorenzo road, near Quebrada Pambilar, 00° 58'57"N, 078°35'50"W, 350–600 m, 11 Feb 2003, J. L. Clark, G. Zapata & G. Toasa 7111 (holotype: US; isotypes: AAU, COL, E, F, K, MO, NY, QCA, QCNE, SEL, UNA, VEN). (Figs. 1, 2)

Inter species generis *Cremospermatidis* ramis magnis dorsiventralibus et foliis valde disparibus distincta.

Terrestrial or epiphytic herb; stems dorsiventral, rarely to frequently branched, 20–40 cm tall, herbaceous, terete, glabrescent below, pilose above. Leaves membranaceous, opposite, distichous, unequal in a pair; larger leaf with petioles terete, 3–8 mm long, usually oblong, occasionally obovate, (6–) 10–15 × (2–) 3–5 cm, base acute and asymmetrical, apex obtuse to rounded, margin crenate to serrate, adaxially pale green, uniformly pilose to densely pilose on veins and leaf margins, abaxially dark green, uniformly pilose; smaller leaf usually sessile or rarely petiolate, petiole terete, 1–3(–5) mm long, blade ovate to orbicular, 5–13 × 2–5 mm, vestiture and coloration same as larger leaf. Inflorescences in upper leaf axils, usually sessile or rarely pedunculate, flowers terminally clustered (pseudoumbellate), 1–2 mature flowers/inflorescence, when present peduncle 2–4 mm long, often with remnant pedicel scars appearing gland-like; bracts absent; flowers sessile to pedicellate, when present pedicels 1–2 mm long; calyx lobes 5, fused for 2/3 of their length, equal, lobes

erect during anthesis, persistent and spreading in fruit to form a splash cup to 5 mm wide in fruit, apex acute, uniformly green, outside pilose, inside glabrous; corolla to 5 mm long, tubular, base to mid-region 1 mm in diameter, becoming apically ventricose on lower side to 2 mm in wide at apex, throat appearing laterally compressed, inside mostly glabrous with gland-tipped trichomes near apex of throat, uniformly white or white suffused with red on upper region of throat, outside mostly glabrous at base to pilose near apex, uniformly white, limb bilaterally symmetrical, lobes reflexed and unequal, lower three lobes rotund, ca. 1 × 2 mm, upper two lobes rotund, 0.5 × 1 mm, margins serrulate; stamens 4, didynamous, included; filaments adnate to base of corolla for 2 mm and free for 1–1.5 mm, glabrous; anthers broader than long, ca. 0.25 × 0.5 mm; staminode absent; nectary annular, glabrous; ovary superior, glabrous, ca. 1 × 0.25 mm, style and stigma glabrous. Fruit a dry 4-valved capsule; seeds numerous, narrowly elliptic, ca. 0.3 × 0.2 mm, light brown, irregularly striate.

Distribution and ecology.—*Cremosperma anisophyllum* is a narrow endemic and locally abundant species in wet forests of northwestern Ecuador and adjacent Colombia. It is primarily known from Ecuador (ten collections), and the one locality in Colombia is based on a single collection made in 1944 (*Cuatrecasas 17013*). However, fieldwork in poorly researched forests in Colombia will likely result in the discovery of additional populations. Extensive fieldwork in northwestern Ecuador by the first author between 1994 and 2009 has revealed only one extant population of *Cremosperma anisophyllum*. Recent visits to Ecuadorian herbaria (e.g., Q, QAP, QCA, and QCNE) and many non-Ecuadorian herbaria have not revealed additional populations. The known distribution of *Cremosperma anisophyllum* suggests that the species is a narrow endemic that survives in remnant patches of primary forest along the San Lorenzo-Ibarra highway between the towns of Alto Tambo and Durango. The habitat from this area is transitional between lowland and montane wet forest. These forests have been classified as *bosque siempreverde piemontano* (Sierra et al., 1999); *selva ombrófila noroccidental del pie de cordillera* (Acosta Solís,



FIG. 1. *Cremosperma anisophyllum*. A. Habit showing a dorsiventral shoot. B. Abaxial leaf pubescence. C. Inflorescence showing terminally clustered flowers. D. Corolla and calyx. E. Face view of flower. F. Corolla opened to show stamens. G. Mature fruit showing 4-valved capsule and persistent calyx. H. Seeds. (A, C, D, E, G, H drawn from the holotype; B from *J. L. Clark et al. 7571*; F from *Oellgaard, Korning, Krogstrup 98727*.)

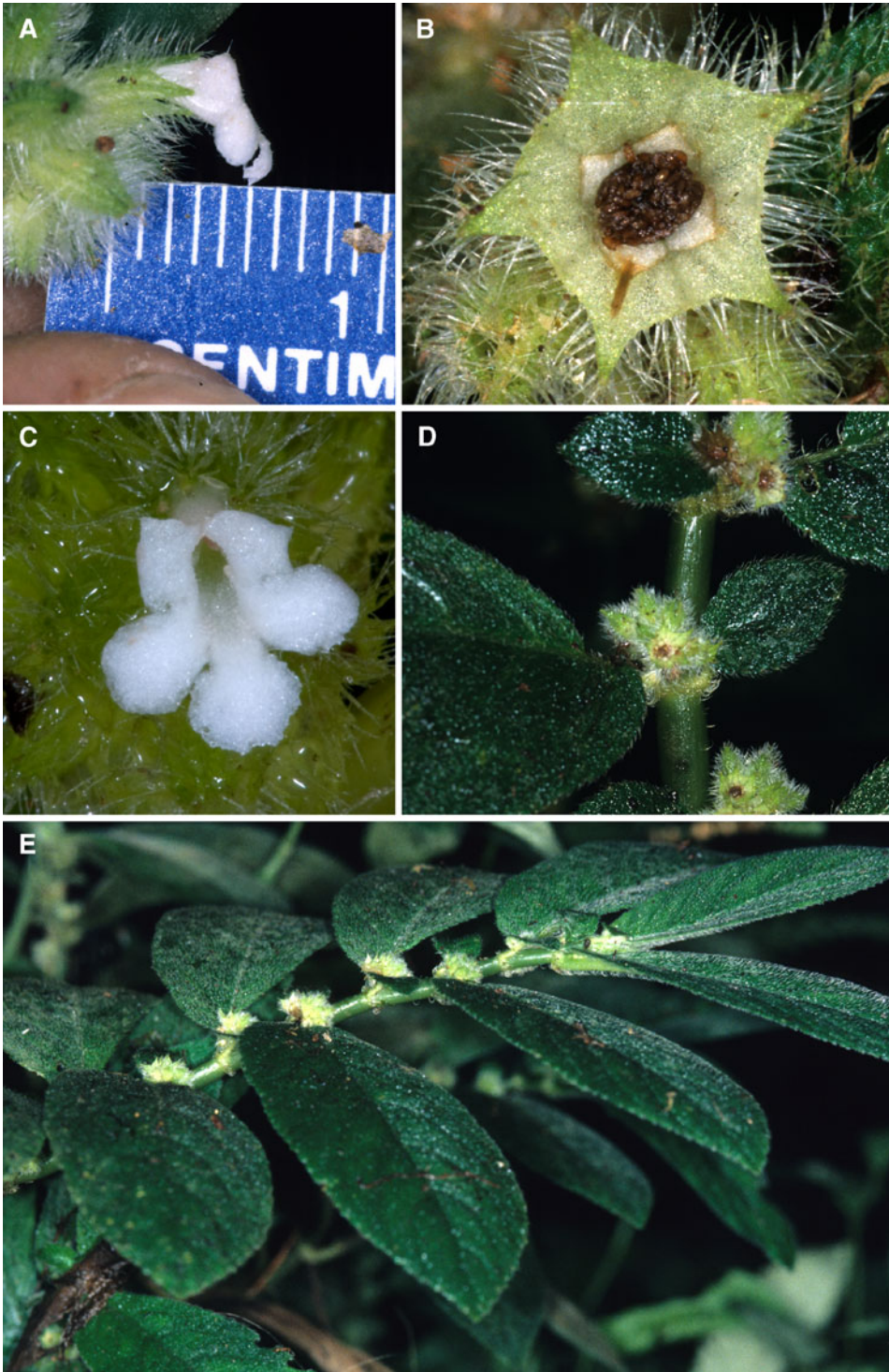


FIG. 2. *Cremosperma anisophyllum*. A. Side view of flower (ruler=1 cm). B. Splash fruit showing 4-valved capsule. C. Face view of flower. D. Section of main shoot showing anisophyllous leaves. E. Habit showing a dorsiventral shoot. (A, B, D, E from the holotype, *J. L. Clark et al.* 7111; C from *J. L. Clark et al.* 11196.)

1968); *bosque muy húmedo premontano* (Cañadas, 1983); and *bosque lluvioso montano bajo* (Harling, 1979).

The discovery of *Cremosperma anisophyllum* is notable because it is locally abundant in an area that is relatively accessible and has received attention from many recent botanical expeditions. It is also noteworthy that *Cremosperma anisophyllum* was not collected or described in recent publications that focused on the *Cremosperma* from Ecuador (Morton, 1944; Kvist & Skog, 1988).

The initial discovery in 2003 of *Cremosperma anisophyllum* was a result of an invitation by David A. Neill to the first author to accompany a team of biologists who were facilitating the establishment of a projected biological research station in collaboration with the Awá Indigenous Centro [community] Río Bogotá. This expedition was coordinated by Galo Zapata Rios from the Herbario Nacional del Ecuador (QCNE). A subsequent expedition during the same year resulted in the discovery of additional populations immediately adjacent and outside the Awá Indigenous Centro Río Bogotá. An expedition in June of 2009 resulted in locating one population from a forest near the main highway. Unfortunately, between 2003 and 2009 it was noted that most of the forest along the San Lorenzo-Ibarra highway had been converted to African Palm plantations.

Phenology.—Flowering from January through June. Collected in fruit in February, May, and June.

Etymology.—The specific epithet *anisophyllum* refers to the anisophyllous leaf arrangement. Other species in *Cremosperma* have unequal leaves (e.g., *C. filicifolium* L. P. Kvist & L.E. Skog, *C. reldioides* L.P. Kvist & L.E. Skog, *C. congruens* C.V. Morton), but not to the extreme found in *C. anisophyllum*. The combination of strongly anisophyllous leaves and dorsiventral habit gives it the appearance of *Columnnea* L. (Tribe Episceae), a habit rarely found in the Tribe Beslerieae.

Additional specimens examined. COLOMBIA. Valle del Cauca: Pacific coast, Rio Cajambre, Barco, 5–80 m, 21–30 Apr 1944, *Cuatrecasas 17013* (F, US).

ECUADOR. Esmeraldas: Cantón San Lorenzo, Parroquia Alto Tambo, Awá Indigenous Territory, Centro [comunidad] Río Bogotá (future biological research station), 2 km south of highway Lita-San Lorenzo, near Quebrada Pambilar, 00°58'57"N, 078°35'50"W, 350–600 m, 13 Feb 2003, *J. L. Clark 7187* (AAU, NY, QCA, QCNE, SEL, UNA, US), 00°58'57"N, 078°35'50"W, 350–600 m, 14 Feb 2003, *J. L. Clark 7203* (AAU, F, K, MO, QCA, QCNE, SEL, UNA, US); Cantón San Lorenzo, Parroquia Alto Tambo, small patch of forest along highway San Lorenzo-Ibarra (26 road-km NW of Lita), 00°57'27"N, 078°33'37"W, 450 m, 26 Mar 2003, *J. L. Clark et al. 7548* (NY, QCNE, UNA, US); Cantón San Lorenzo, Parroquia Alto Tambo, small patch of forest along highway San Lorenzo-Ibarra (16 road-km NW of Lita), 00°53'31"N, 078°32'01"W, 900 m, 26 Mar 2003, *J. L. Clark, Hall & Nicolalde 7571* (COL, K, MO, QCA, QCNE, SEL, UNA, US); Cantón San Lorenzo, Parroquia Alto Tambo, remnant patch of primary forest on north side of road between Durango and Alto Tambo on highway San Lorenzo-Ibarra, 00°57'34"N, 078°33'36"W, 688 m, 29 May 2008, *J. L. Clark et al. 10424* (QCNE, SEL, UNA, US); Cantón San Lorenzo, remnant patch of forest along highway Ibarra-San Lorenzo, between Durango and Alto Tambo, 00°53'23"N, 078°31'41"W, 840 m, 2 Jun 2009, *J. L. Clark et al. 11097* (QCNE, SEL, UNA, US); Cantón San Lorenzo, highway San Lorenzo-Ibarra, remnant patch of primary forest in area where cable system (ca. 2 km long) is used for transporting logs from primary forest, along main road between Alto Tambo and Durango, 00°57'31"N, 078°33'37"W, 647 m, 5 Jun 2009, *J.L. Clark et al. 11196* (QCNE, SEL, UNA, US); Cantón San Lorenzo, highway San Lorenzo-Ibarra, remnant patch of primary forest along highway east of Alto Tambo at trail that leads to Río Negro Chicito, 00°53'45.5"N, 078°32'30"W, 842 m, 5 Jun 2009, *J.L. Clark et al. 11225* (QCNE, SEL, UNA, US); road Lita-Alto Tambo, km 18, 00°47'N, 078°30'W, 900 m, 12 Jan 1991, *Oellgaard, Korning & Krogstrup 98727* (AAU, QCA).

Cremosperma anisophyllum is easily distinguished from all other congeners by the large dorsiventral shoots (Fig. 2E) and strongly anisophyllous leaves (Fig. 2D). The dorsiventral habit is common in *Columnnea* (tribe Episceae), but seen in few other genera in the Gesneriaceae. Some small epipetric herbs of *Cremosperma* are slightly dorsiventral such as *C. reldioides*, but this is a small herb to 15 cm tall. The strongly anisophyllous leaves are also unusual in *Cremosperma* and the Beslerieae. A few other species of *Cremosperma* have anisophyllous leaves, but they are usually weakly unequal such as in *C. muscicola* L. P. Kvist & L. E. Skog, *C. congruens*, and *C. reldioides*. Based on vegetative characters alone it would be difficult to place *Cremosperma anisophyllum* in the tribe Beslerieae because it appears more like a *Columnnea*.

Acknowledgments

Support for this study was provided by The Gesneriad Society and the National Science Foundation (DEB 0841958). Fieldwork in 2003 was conducted while the first author was supported by a Fulbright Graduate Study and Research Abroad Fellowship. We are grateful to Alice Tangerini for preparing the illustration of the new species; to William Anderson (MICH) for providing the Latin diagnosis; and to Silvana Marten-Rodriguez (USJ) for the Spanish translation of the abstract. Herbaria MO, QCNE, and SEL are acknowledged for making their collections available to us. We thank John R. Clark (SEL) and Christian Feuillet (US) for providing helpful reviews and input to the manuscript.

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