
A Third, New Species of *Cremosperma* (Gesneriaceae) from Panama

Laurence E. Skog

Department of Botany, National Museum of Natural History, MRC-166, Smithsonian Institution, P.O. Box 37012, Washington, D.C. 20013-7012, U.S.A. skogl@si.edu

Fred R. Barrie

Missouri Botanical Garden, 4344 Shaw Blvd., St. Louis, Missouri 63110, U.S.A.
Address for correspondence: Department of Science and Education, The Field Museum, 1400 S. Lake Shore Drive, Chicago, Illinois 60605, U.S.A. fbarrie@fieldmuseum.org

John L. Clark

The Lawrenceville School, 2500 Main Street, Lawrenceville, New Jersey 08648, U.S.A. and Department of Biological Sciences, The University of Alabama, Box 870345, Tuscaloosa, Alabama 35487, U.S.A. jclark@lawrenceville.org

Roy E. Gereau

Missouri Botanical Garden, 4344 Shaw Blvd., St. Louis, Missouri 63110, U.S.A. roy.gereau@mobot.org

ABSTRACT. A new species of *Cremosperma* Benth. is described from Panama, bringing the total for the country to three. One species, *C. maculatum* L. E. Skog, occurs in the province of Chiriquí and also in Colombia and Costa Rica; the second, *C. veraguanum* Wiehler, occurs in the provinces of Bocas del Toro, Coclé, and Veraguas; and the new species, *C. colonense* L. E. Skog, Barrie & McPherson, has only been found in the province of Colón and is distinguished from the others by having larger leaves and corollas white with yellow in the throat. The new species is distinguished from *C. ecuadoranum* L. P. Kvist & L. E. Skog of eastern Ecuador by its branched habit, sericeous peduncles, the corolla white with yellow in the throat and a longer tube, and the usually longer calyx with wider lobes. Based on IUCN criteria, *C. colonense* is provisionally assessed as Endangered. A key is provided to the Mesoamerican species.

Key words: *Cremosperma*, Gesneriaceae, Panama.

Until 1978 *Cremosperma* Benth. (Gesneriaceae) was thought to be limited to northwestern South America (Morton, 1935, 1944; Kvist & Skog, 1988). In that year two currently accepted species from Panama were published, *C. maculatum* L. E. Skog (Skog, 1978) and *C. veraguanum* Wiehler, along with a third, *C. occidentale* Wiehler (Wiehler, 1978), now considered a synonym of *C. maculatum*. Most *Cremosperma* species are low-growing terrestrial herbs, inhabiting the moss layer at the base of trees or on wet rocks near waterfalls or streams. Occasionally when the moss layer continues

up the trunk of a tree, or is present on low-growing branches, the plants may be epiphytes. The habitat for the Mesoamerican species is very similar to that of those in South America.

Kvist and Skog (1988) published a monograph of *Cremosperma* in Ecuador that included 14 species, several of which also occur in Colombia. The diversity of *Cremosperma* outside of Ecuador was estimated to be nine species (Keener & Clark, 2014). The following four species have been described since Kvist and Skog (1988): *C. micropecten* Fern. Alonso from Colombia (Fernández-Alonso, 2006); *C. anisophyllum* J. L. Clark & L. E. Skog from Ecuador (Clark & Skog, 2011); *C. verticillatum* J. L. Clark & B. R. Keener from Ecuador (Clark & Keener, 2011); and *C. inversum* B. R. Keener & J. L. Clark from Peru (Keener & Clark, 2014). Recent exploration in Panama has led to the discovery of the additional species described here, bringing the number of species described in the genus to 28.

Cremosperma colonense L. E. Skog, Barrie & McPherson, sp. nov. TYPE: Panama. Colón: Distr. Donosa, Conseción de Minera Panamá S.A. Heli-pad ZP-P9, 8°51'5"N, 80°40'19"W, 391 m, 20 July 2011, *J. L. Clark & L. Martínez 12575* (holotype, US!; isotypes, E!, MO!, NY!, PMA!, SEL!, STRI!, UNA!). Figures 1, 2.

Diagnosis. *Cremosperma colonense* L. E. Skog, Barrie & McPherson differs from *C. ecuadoranum* L. P. Kvist & L. E. Skog in the presence of branches 3–10 cm long (vs. an unbranched habit with a primary stem 10–25 cm long), leaf size 4–10 × 1.5–4.5 cm (vs. 3–9 × 2–5 cm), sericeous (vs.

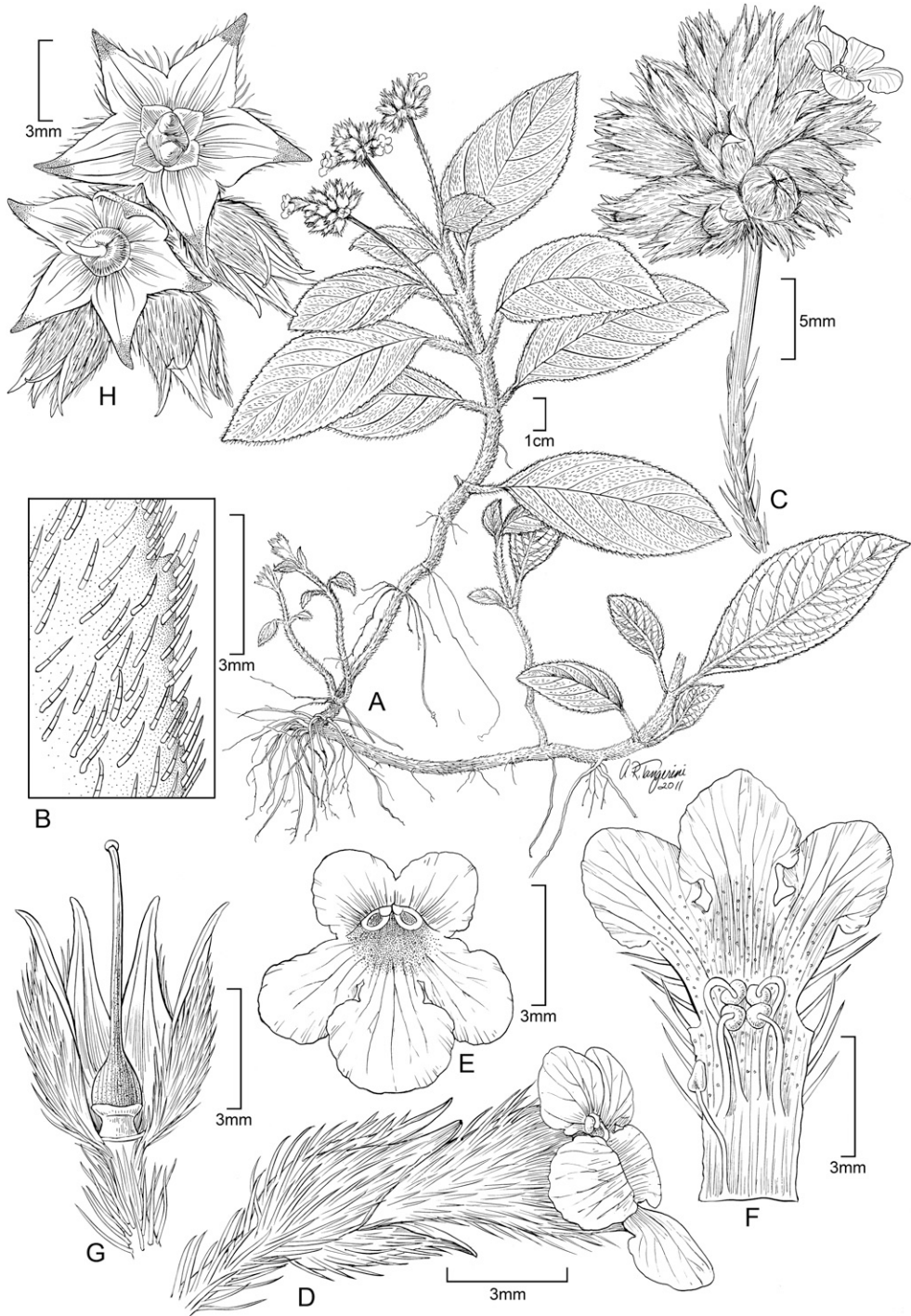


Figure 1. *Cremosperma colonense* L. E. Skog, Barrie & McPherson. —A. Habit. —B. Upper leaf surface. —C. Inflorescence. —D. Flower, lateral view. —E. Flower, face view. —F. Flower, longitudinal cutaway. —G. Calyx with lobe removed to show ovary and pistil. —H. Fruit views with calyx expanded. A–D, F–H based on *G. McPherson 20222* (USNH 3585842); E based on photographs of *J. L. Clark & L. Martínez 12575*, which were also used to reconstruct and supplement other details. Drawn by Alice Tangerini.

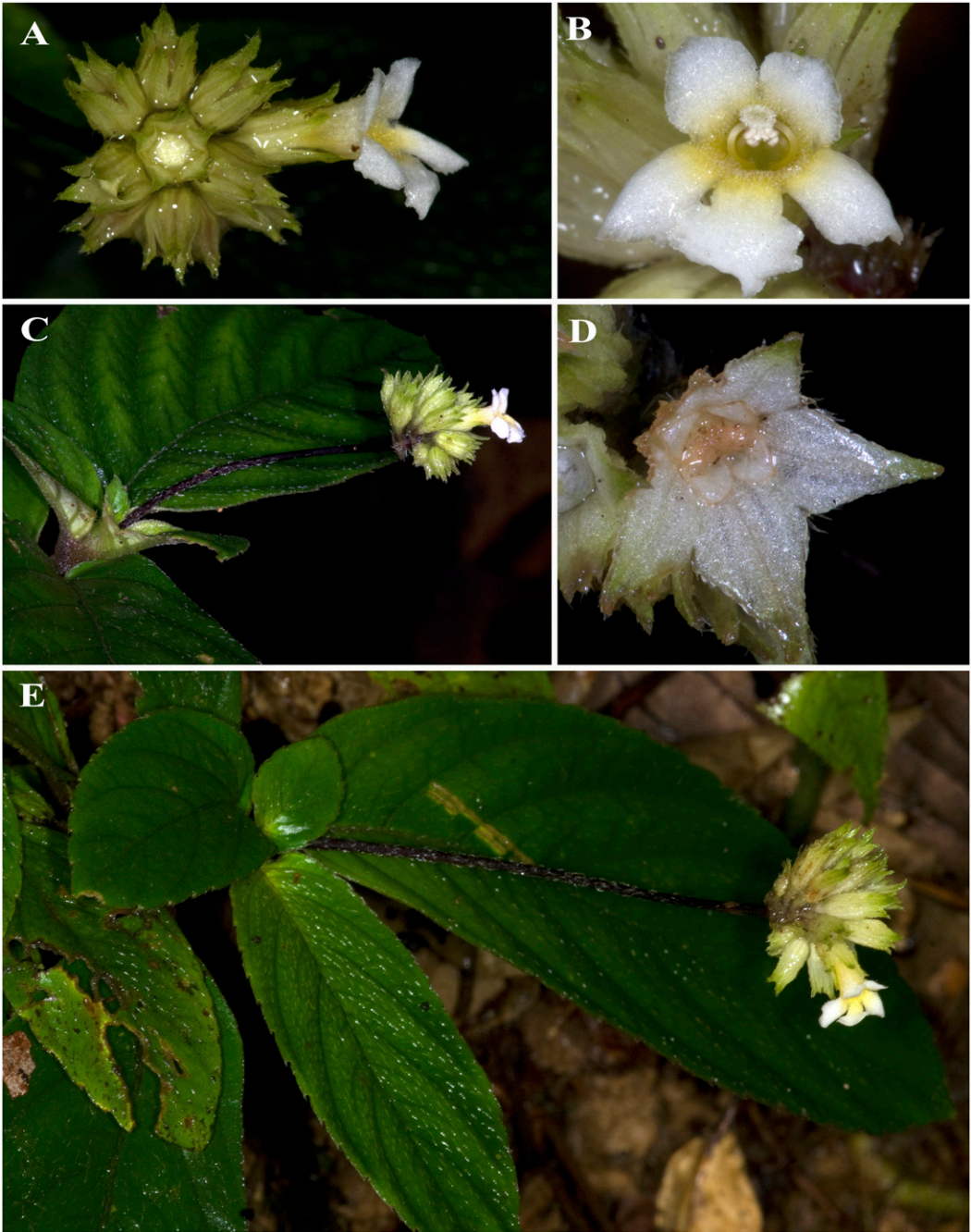


Figure 2. *Creemosperma colonense* L. E. Skog, Barrie & McPherson. —A. Top view of inflorescence with unexpanded flower at center of inflorescence and lateral view of open flower. —B. Face view of open flower with stigma at upper side of corolla, and stamens just below. —C. Inflorescence from stem apex, showing peduncle, cluster of flower buds, and open flower. —D. Mature fruit showing four reflexed valves within persistent calyx. —E. Habit, showing stem apex and inflorescence. A–E photographs of J. L. Clark & L. Martínez 12575.

glabrous) peduncles, and flowers with the corolla white with yellow in throat, the tube 7–9.5 mm long (vs. white with purple markings on upper lobes and yellow markings on

lower lobes, the tube 5–6 mm long) and the calyx 5–6 mm long with lobes 3 mm wide (vs. 4.5–5.5 mm long with lobes 1.5 mm wide).

Terrestrial herbs, stems creeping with erect, lateral branches 3–10 cm, sericeous. Leaves crowded at branch terminus or with 1 or 2 remote lateral pairs, with leaves in a pair subequal, the larger usually at most twice as long as the smaller; petiole 5–25 mm, sericeous; blade obovate, 4–10 × 1.5–4.5 cm; base cuneate or narrowly cuneate; apex acute; margin remotely serrulate, with 1 or 2 teeth/cm, antrorse-ciliate; veins 6 to 10, curving-ascending, prominent abaxially; adaxial surface dull, dark green, uniformly and sparsely sericeous, midvein remotely sericeous; abaxial surface olive, sericeous along veins, hairs ca. 1–2 mm, 3- to 6-celled. Inflorescence axillary, from the upper leaves, solitary at a node; peduncle erect, 3.5–7 cm, ca. 0.75 mm diam., green, sericeous with hairs like those of the leaf blade, terminating in a compact subglobose to ellipsoid head of 10 to 30 flowers; pedicels 0–3.5 mm, densely pubescent. Flowers with calyx pale green, subcyathiform, 5–6 mm long including lobes, 2–3 mm wide at apex of tube, 10-costate, pubescent abaxially, glabrous adaxially, lobes 3 mm, unequally wide (1–2 mm at base), acute; corolla white with yellow in throat, tube funnel-form, 7–9.5 mm, 1–1.3 mm diam. at base, ampliate distally to 2.5–3.5 mm diam. at throat, abaxially pubescent over ampliate portion, adaxially glabrous but papillose distally starting from level of anthers, the limb bilabiate, upper 2 lobes obtuse, 1.5–2 × 1.5–2 mm, lower 3 lobes 2–3.5 × 1.5–2 mm, pubescent abaxially, papillose adaxially, entire to somewhat crenulate on drying; stamens included; filaments didynamous, glabrous, the lower pair adnate to corolla tube for 3 mm, free part 1.5 mm and slightly curved, the upper pair adnate to corolla tube for 3.5 mm, free part 3 mm and more strongly curved; anthers ca. 0.5 × 0.75 mm, coherent by their apices; disk cyathiform, ca. 0.75 mm high, unlobed; ovary ovoid, ca. 1.5 mm, glabrous; style 5–6 mm, glabrous, stigma obconic in outline, bilobed, ca. 0.5 mm, papillose distally. Capsule surrounded by the persistent calyx, globose, ca. 2 mm diam., glabrous; seeds ca. 0.5 mm long, 0.25 mm diam., brown, subsinuately wrinkled and somewhat roughened with short prickles, the fruit also containing pale, vermiform, somewhat subsinuately striate structures (undeveloped ovules?).

Phenology. Plants have been collected in flower in February, June, September, and December. Mature fruits have not been seen, but are not expected to be significantly larger than the immature fruits measured. This is the case in the other species of *Cremosperma*, which have fruits that are dry, brown, and dehisce irregularly when ripe.

Distribution and habitat. *Cremosperma colonense* is endemic to Panama and is known only from a very small

area in Colón Province at the Conseción de Minera Panamá S.A., previously known as the Teck Cominco Petaquilla mining concession, at 90–400 m, growing on forested slopes, at stream sides, or on rocks near a waterfall.

IUCN Red List category. *Cremosperma colonense* has been collected at 13 different sites, all within the mining concession, which consists of the mine itself and the surrounding dedicated conservation zone (Fig. 3). Seven collecting sites are within the footprint of the mine and will be lost, but the other six are located within the Donoso conservation zone and are protected, giving two locations with respect to the threat of mining activity. As calculated using GeoCAT (Bachman & Moat, 2012), the extent of occurrence (EOO) based on these 13 sites is 99.15 km² and the area of occupancy (AOO) is 36 km². With a projected continuing decline in the EOO and AOO, the area, extent and/or quality of habitat, number of locations or subpopulations, and number of mature individuals, *C. colonense* may be provisionally assessed as Endangered, EN 1B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v) (IUCN, 2012). Future management of the Donoso conservation area should include research to determine the number and size of *C. colonense* subpopulations.

Etymology. *Cremosperma colonense* is named for the Panamanian province of Colón, to which it is apparently endemic.

Notes. Two additional species of *Cremosperma* are known from Panama, *C. maculatum* and *C. veraguanum*. *Cremosperma maculatum* has smaller leaves than *C. colonense*, 1.2–3.2 × 0.6–2.6 cm, fewer flowers per inflorescence (four to seven vs. 10 to 30), and white corollas with purple spots or pink in the throat. *Cremosperma colonense* differs from *C. veraguanum* in having subequal leaves in a pair, the larger seldom more than 2 times the length of the smaller; the leaves of *C. veraguanum* are very unequal, the larger ca. 6 times the length of the smaller. In addition, the inflorescences of *C. veraguanum* are 1- to 4-flowered.

Paratypes. PANAMA. **Colón:** Donoso, Teck Cominco Petaquilla mining concession, 8°52'43"N 80°48'37"W, 20 July 2012, J. Aranda et al. 4277 (MO, PMA); 8°52'20"N 80°50'51"W, 35 m, 25 July 2012, A. Espinosa et al. 6075 (MO, PMA); 8°51'43"N 80°46'43"W, 15 Mar. 2010, C. P. Guerra et al. 1352 (MO, PMA); 8°49'31"N 80°40'11"W, 291 m, 18 May 2012, B. Hammel 26247 (MO); 8°51'43"N 80°46'39"W, 14 Mar. 2010, L. Martínez & B. Fuentes 557 (MO, PMA); 8°50'54"N 80°49'26"W, 39 m, 25 Aug. 2012, L. Martínez et al. 985 (MO, PMA); 8°50'25"N 80°41'52"W, 107 m, 17 Sep. 2007, G. McPherson 19619 (MO, PMA not seen, US); 8°49'29"N 80°40'12"W, 323 m, 2 Dec. 2007, G. McPherson 19932 (MO, PMA not seen); 8°50'14"N 80°41'17"W, 91 m, 6 Dec. 2007, G. McPherson 19992

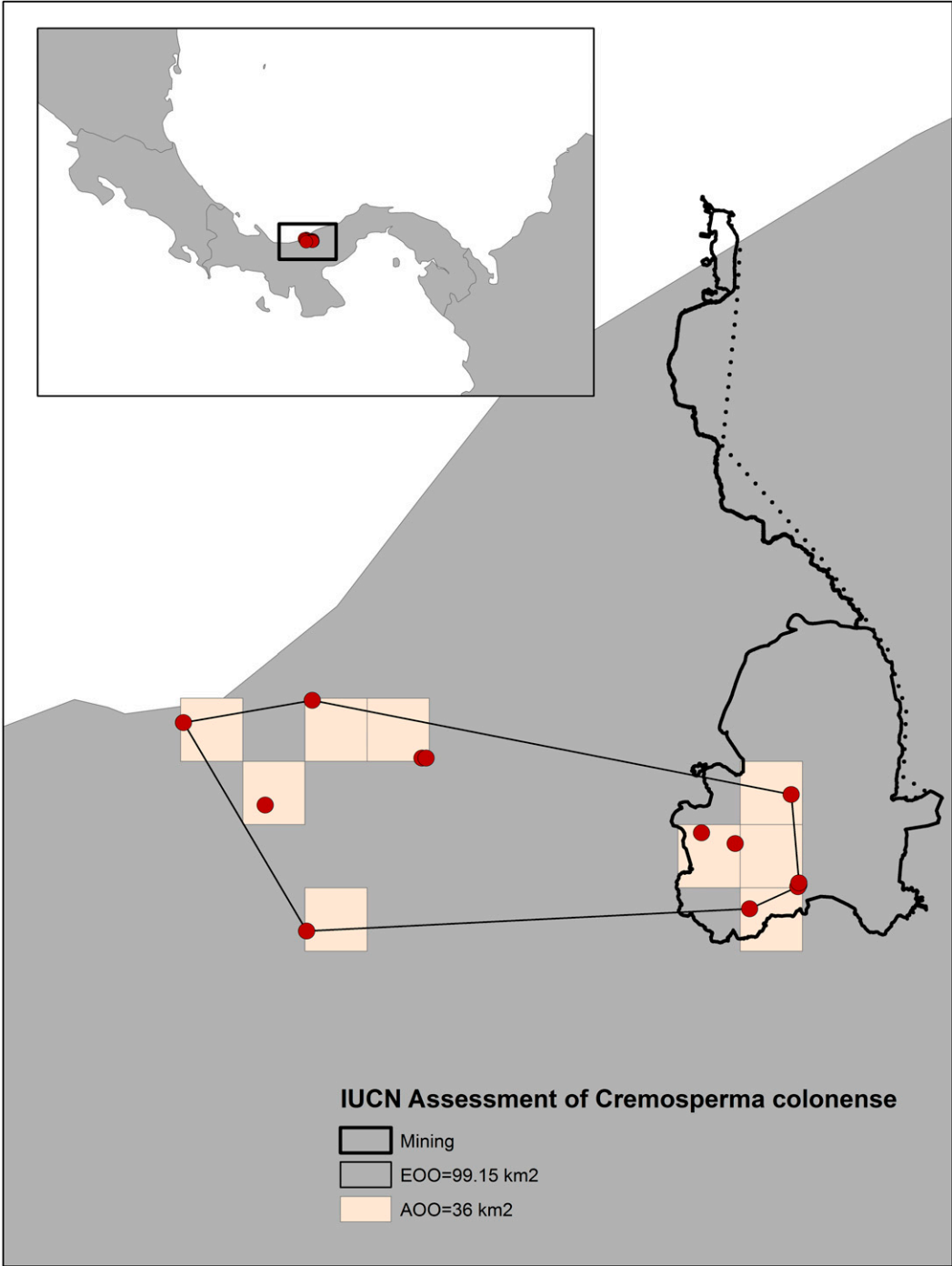


Figure 3. Map of *Creemosperma colonense* L. E. Skog, Barrie & McPherson collection sites, indicating populations within the mine footprint (sites on right) and those within the surrounding Donoso conservation zone (sites on left).

(MO, PMA not seen); 08°50'14"N 080°41'17"W, 90 m, 6 Dec. 2007, *G. McPherson 20001A* (MO, PMA not seen); 8°49'33"N 80°40'11"W, 300 m, 23 Feb. 2008, *G. McPherson & M. Merello 20181* (MO, PMA not seen); 24 Feb. 2008, *G. McPherson 20222* (F, MO, PMA not seen, US); 8°49'06"N 80°41'02"W, 180 m, 22 June 2008, *G. McPherson 20593* (MO, PMA not seen, US); 8°48'43"N 80°48'43"W, 15 Mar. 2010, *A. Zapata & J. González 2527* (MO, PMA not seen).

KEY TO THE SPECIES OF *CREMOSPERMA* IN MESOAMERICA

1. Leaves strongly unequal in a pair, the larger leaf ca. 6 times the length of the smaller, not furrowed above along the veins; flowers per inflorescence 1 to 4. *C. veraguanum* Wiehler
- 1'. Leaves nearly equal in a pair, the larger leaf seldom more than 2 times the length of the smaller, in 1 species sometimes furrowed above along the veins; flowers per inflorescence more numerous.
2. Leaves 1.2–3.2 × 0.6–2.6 cm, sometimes furrowed above along the veins; inflorescence of 4 to 7 flowers; corolla white with purple spots or pink in the throat. *C. maculatum* L. E. Skog
- 2'. Leaves 4–10 × 1.5–4.5 cm, not furrowed above along the veins; inflorescence of 10 to 30 flowers; corolla white with yellow in the throat.
. *C. colonense* L. E. Skog, Barrie & McPherson

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