OURISIA COTAPATENSIS (SCROPHULARIACEAE S.L.), A NEW SPECIES FROM BOLIVIA

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Abstract: A new, rare species of *Ourisia* from the department of La Paz in Bolivia is described based on three recent collections. The new species, **Ourisia cotapatensis,** is closely related to *Ourisia pulchella* from Bolivia and Peru and the other species of *Ourisia* from the central and northern Andes.

Resumen: Se describe una especie nueva y poco común de *Ourisia* del departamento de La Paz en Bolivia, en base a tres colecciones recientes. La nueva especie, **Ourisia cotapatensis,** está estrechamente emparentada con *Ourisia pulchella,* que ocurre en Bolivia y Perú, y con otras especies de *Ourisia* de las zonas norte y central de la cordillera de los Andes.

Keywords: Andes, Bolivia, *Ourisia,* Scrophulariaceae s.l.

In working toward the first comprehensive monograph of the genus *Ourisia* Comm. ex Juss. (Meudt, in prep.), it was noted that three recent collections (two made by the second author) did not match the types and descriptions of previously published species from the central and northern Andes. We describe here a new species, *Ourisia cotapatensis,* endemic to, and apparently rare in, the humid mountain forest in the department of La Paz, Bolivia. All measurements were taken on dried herbarium specimens; flowers were dissected when possible. Trichome cover (isolated, sparse, or dense) and indumentum were estimated as in Hewson (1988), and trichome length was categorized as tiny (<0.1 mm), short (0.1–0.5 mm), long (0.5–1.0 mm), or very long (>1.0 mm). All trichomes in *Ourisia* are uniseriate, but they may be glandular or eglandular.

Ourisia cotapatensis Meudt & S. Beck, sp. nov. (Fig. 1).

TYPE: **BOLIVIA.** LA PAZ. Nor Yungas: entre Cotapata y Chuspipata, 3000 m, campamentos mineros auriferos, restos de bosque alto-montano, sobre pared rocosa, dentro sombra, 2 Nov 1996, *S. Beck 22777* (HOLOTYPE: LPB!; ISOYPES: TEX!, AND 3 MORE DUPLICATES TO BE DISTRIBUTED TO BOLV, M, AND NY).

Ourisia pulchella Wedd. affinis sed floribus violaceis tubo corollae curvato luteo intus secus fundum maculis purpureis instructis, linea unica pilorum tubum intus inter duo stamina longa solum (vice ubique dense pilosum), calyce regulari, petiolis glabris.

Rhizomatous, repent, PERENNIAL HERBS, 24–39 mm tall (Fig. 1A). RHIZOMES 0.5–1.1 mm thick, with internodes 1.0–7.5 mm long, glabrous or with isolated, short (0.3 mm) eglandular trichomes. LEAVES opposite, slightly to strongly anisophyllous (Fig. 1B), lamina broadly to very broadly ovate, 1.9–5.4 mm long, 1.6–5.2 mm wide, length:width ratio 0.9–1.2:1; bases cuneate or broadly cuneate to truncate; margins subentire, or with irregular notches, not revolute; adaxial surface sparsely purple punctate with sparse to dense, short to long (0.2–0.8 mm) eglandular trichomes near the apex; abaxial surface green or purple, densely purple punctate, glabrous. PETIOLES green with purple patches, 0.6–2.4 mm long, 0.3–0.7 mm wide, glabrous or rarely with isolated short to long (0.3–0.7

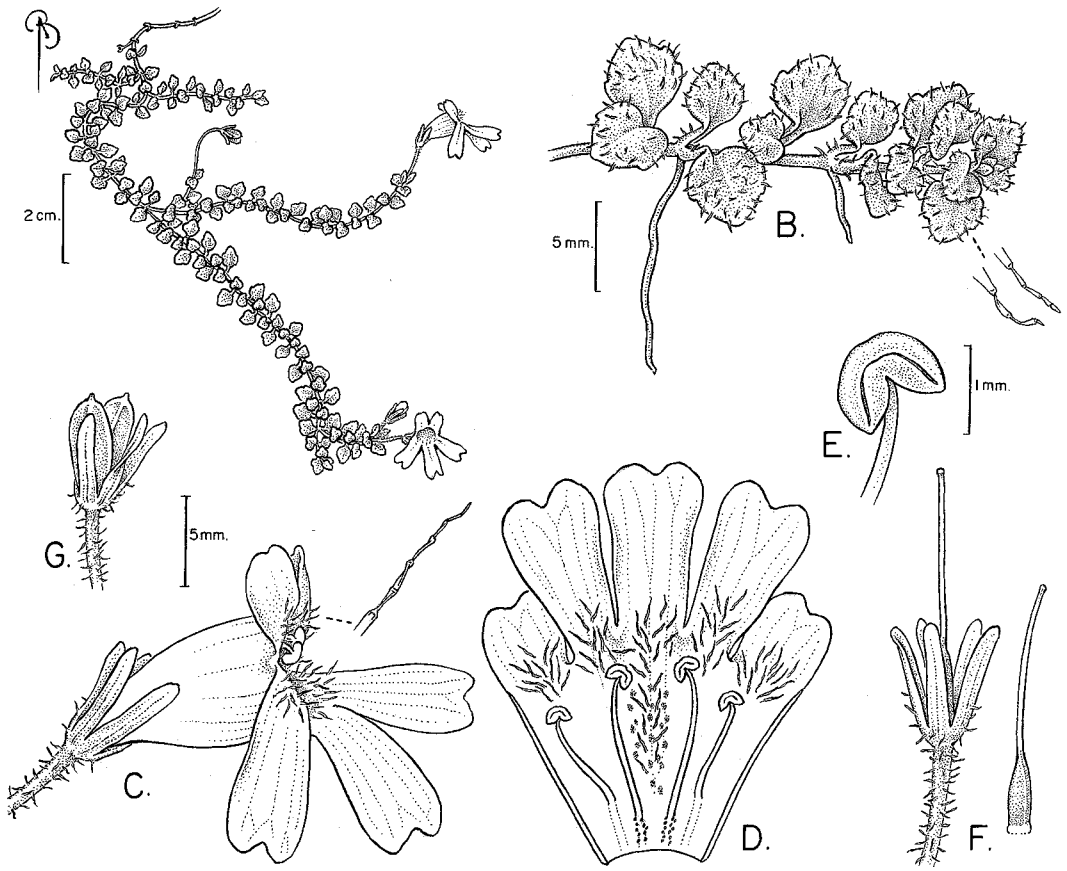

FIG. 1. *Ourisia cotapatensis* [*Beck 22777* (isotype at TEX)]. A. Habit. B. Detail of stem showing leaves, and magnified trichomes (lower right, ca. 20×). C. Flower, side view, and magnified trichome (upper right, ca. 30×). D. Corolla, dissected and laid flat (staminode between two short stamens not shown). E. Anther, with partial filament. F. Flower with corolla removed showing calyx and gynoecium (left) and gynoecium alone (right). G. Fruit, dehisced, with persistent calyx. Scale in C, D, and F same as G. Illustration by Bobbi Angell.

mm) eglandular trichomes. PEDICELS 6.6–11.0 mm long, with dense, short, eglandular trichomes. INFLORESCENCE racemose, ascending, bracteate, 22–39 mm long, with 1–3 flowering nodes per inflorescence, 2 bracts and 1 flower per node, and ca. 2–4 flowers per plant; peduncle 0.5–0.7 mm wide, bearing dense, short, eglandular trichomes. FLORAL BRACTS green above, purple beneath, 3.2–4.3 mm long, 2.3–2.4 mm wide (becoming smaller toward tip of inflorescence, to 2.8 mm long, 1.3–1.9 mm wide), length:width ratio 1.4–1.8:1, slightly petiolate to sessile, clasping at base, lanceolate to ovate; margins subentire, irregularly notched; with isolated to dense, short to long (to 0.6 mm) eglandular trichomes above and isolated to sparse, short to long (0.4–0.6 mm) eglandular trichomes beneath but becoming glabrous toward tip of inflorescence; glandular trichomes lacking or rarely isolated and short. FLOWERS 15.9–17.4 mm long, 9.3–14.3 mm wide, not angled with respect to pedicel. CALYX regular, 3.9–5.9 mm long, 4.2–4.7 mm wide. SEPAL LOBES externally green to purple, with 3 prominent veins each, internally green, all equally cleft to base, lanceolate or narrowly

lanceolate, tapering to a rounded apex, not emarginate, 3.8–4.9 mm long, 1.1 mm wide, with isolated to sparse, short, eglandular trichomes externally, glabrous internally. COROLLA violet, bilabiate, tubular-funnelform, curved, 19.1–21.0 mm long, 16.2 mm wide (when dissected and laid flat), glabrous externally. COROLLA TUBE violet above but yellow with purple spots and streaks along the bottom, and with dense, 8.9–11.4 mm long, 6.6–6.9 mm wide at top, 1.9–3.5 mm wide at base, not constricted near base; long trichomes in a ring within the tube opening and in one longitudinal line between the two long stamens (Fig. 1C–D). PETAL LOBES widely spreading, slightly obtuse, rounded at tip, apically deeply emarginate (Fig. 1C); anterior lobes 6.5–7.8 mm long, 2.7–4.7 mm wide at widest point, 2.1–2.9 mm wide at base, posterior lobes 2.8–3.2 mm long, 3.1–3.8 mm wide at widest point, 3.0–3.7 mm wide at base. STAMENS four, didynamous; two long stamens 9.1–11.2 mm long, reaching the tube opening, with a dense patch of sessile glandular trichomes (ca. 25 total) on the filament bases, inserted 1.4–2.2 mm from base of corolla; two short stamens 8.2–10.2 mm long, included, or reaching the tube opening, inserted 1.7–1.9 mm from base of corolla. ANTHERS white, dorsifixed, reniform when dehisced (Fig. 1E), 0.8–1.0 mm long, 1.1–1.4 mm wide. STAMINODE present between two short stamens, filiform and very rudimentary, 1.0–1.8 mm long, inserted 0.6–1.7 mm from base of corolla. STYLE straight or curved with tube (Fig. 1F), not exserted, 7.4–8.4 mm long (including stigma). STIGMA capitate, ca. 0.3 mm wide. OVARY 2.1–3.3 mm long, 1.1–1.2 mm wide, glabrous or with sessile glandular trichomes. NECTARY DISC present as a ring at the base of the ovary. FRUIT a glabrous capsule, 4.0 mm long, 2.6 mm wide, with loculicidal dehiscence and persistent calyx (Fig. 1G). SEEDS 0.3 mm long, 0.1 mm wide, number per capsule unknown.

PHENOLOGY: Flowering in October, November, and February, fruiting period unknown (measurements taken on old, dehisced fruits from previous reproductive season).

ADDITIONAL SPECIMENS EXAMINED: **BOLIVIA.** LA PAZ. Nor Yungas: Chuspipata hacia Chairo, sobre nuevo camino, cerca entrada al Tunel, 3000 m, bosque húmedo montano de los Yungas, 21 Oct 2001, *S. Beck 25989* (LPB(2)!; one to be sent to TEX); 1.2 km E de Cotapata-Santa Barbara, sendero a la Estación de Electricidad Chuspipata, 3200 m, ceja de la montaña, nearly vertical wet slope in the shade, 2 Feb 2002, *M. Lehnert 594* (LPB!).

The new species, *Ourisia cotapatensis,* is known only from three neighboring localities about 40 km north of La Paz on the road to Coroico in the Cotapata National Park (hence the epithet). Because of the extremely narrow range of this new species, we have excluded the precise latitude and longitude of these collections. Like most species of *Ourisia, O. cotapatensis* occurs in moist, rocky places high in the mountains. Whereas the majority of species in the genus are typically found in open or partially protected, non-forested areas, the new species is unique in that it occurs in densely shaded, humid evergreen mountain forest, in small patches on bare soil or above rocks between bryophytes along trails, where it receives more light. This Yungas cloud forest (the local name for the eastern slopes of the Bolivian Andes) is characterized by several woody species of *Clusia* (Guttiferae), *Weinmannia* (Cunoniaceae), *Miconia, Tibouchina, Meriania* (Melastomataceae), *Freziera* (Theaceae), *Symplocus* (Symplocaceae) and many ferns and fern allies. Other small rhizomatous herbs such as *Nertera* (Rubiaceae), *Hydrocotyle* (Apiaceae), *Viola* (Violaceae), and *Arenaria* (Caryophyllaceae) also occur in open areas. Several new species of *Symplocus, Freziera, Greigia* (Bromeliaceae) and orchids also have been described recently from this area.

Using a key to the *Ourisia* of Peru (Ed-

win, 1971), *Ourisia cotapatensis* best keys to *O. pulchella* Wedd. (called *O. pratioides* Diels in the key). Edwin's treatment, however, is geographically limited and may not be widely accessible. We thus present a new key to all five north-central Andean species of *Ourisia.*

KEY TO THE NORTH-CENTRAL ANDEAN SPECIES OF *OURISIA*

1. Corolla regular, flowers small, 3.1–8.9 mm long, leaves 1.4–6.1 mm long.
   2. Plants diminutive, 5.8–12.9 mm tall; leaves entire, 1.4–3.3 mm long, narrowly to broadly ovate or elliptic; flowers 3.1–5.3 mm long, white with dense, short to long (0.4–0.7 mm) yellow hairs inside corolla tube near the throat opening; sepals ovate to very broadly ovate, lacking eglandular hairs but sometimes isolated to dense ciliate on distal margins only; pair of subtending floral bracts directly below each flower covering calyx; widespread from Colombia to northern Chile (I Region) . . . . . *Ourisia muscosa*
   2. Plants 11.6–18.2 mm tall; leaves obscurely crenate, undulate or subentire, 3.5–6.1 mm long, narrowly ovate to ovate; flowers 5.6–8.9 mm long, white to pinkish or slightly lilac with dense, short hairs inside corolla tube near the throat opening; sepals lanceolate to narrowly ovate, with dense, short eglandular hairs, not marginally ciliate; pair of subtending floral bracts much lower on pedicel and not covering calyx; rare and endemic to Bolivia . . . . . *O. biflora*
1. Corolla bilabiate, flowers 11.3–30.0 mm long, leaves 1.9–19.9 mm long.
   3. Flowers orange-red to red, 12.6–30.0 mm long; corolla tube usually internally glabrous; bases of all four stamens covered with dense sessile glandular trichomes; leaves 3.0–19.9 mm long; common and widespread from Venezuela to Bolivia . . . . . *O. chamaedrifolia*
   3. Flowers white to violet, 11.3–18.8 mm long; corolla tube internally hairy; bases of two long stamens only covered with dense sessile glandular trichomes (bases of two short stamens glabrous); leaves 1.9–9.2 mm long; rare in Peru and Bolivia.
      4. Flowers violet, curved corolla tube yellow with purple spots along bottom, inside tube with one line of hairs between two long stamens and a ring of hairs near the throat opening; calyx with all sepal lobes cleft to base; petioles glabrous or rarely with isolated short to long (0.3–0.7 mm) eglandular trichomes; leaves 1.9–5.4 mm long, evenly spaced 1.0–7.5 mm apart along prostrate, creeping rhizome; rare and endemic to Bolivia . . . . . *O. cotapatensis*
      4. Flowers white to pale violet, corolla tube without spots and straight or only slightly curved, inside tube with dense hairs throughout; calyx with three sepal lobes cleft to halfway down length of calyx and two cleft to near base; petioles with sparse, long eglandular trichomes; leaves 3.6–9.2 mm long, up to 4.4 mm apart along rhizome but often packed tightly together and not measurable; Bolivia and Peru . . . . *O. pulchella*

The genus *Ourisia* has historically been placed in the large family Scrophulariaceae *sensu lato.* Results of recent molecular phylogenetic studies of Scrophulariaceae and related families in Lamiales (e.g., Olmstead et al., 2001) have led to proposed changes in familial circumscriptions and the familial placement of many genera (APG II, 2003). Preliminary conclusions based on these and other molecular phylogenies (e.g., Albach & Chase, 2001) suggest that *Ourisia* belongs in a much-expanded Plantaginaceae (alternatively called Veronicaceae by some authors).

Ourisia comprises approximately 31 (sub)alpine species that are distributed in the South American Andes from Venezuela to Tierra del Fuego (16 species), and in the mountains of New Zealand (ca. 14 species) and Tasmania, Australia (1 species). Just five species, including the new species described here, only occur in the Andes north of the Atacama Desert.

Molecular phylogenetic analyses based on four DNA regions (Meudt & Simpson, unpublished data) consistently show a well-supported monophyletic clade comprised of four species of *Ourisia* from the northern and central Andes in which *O. cotapatensis* is most closely related to *O. pulchella* and *O. chamaedrifolia* (*O. biflora* was not sampled). This clade is embedded within the southern Andean species of *Ourisia.* This pattern of relationships suggests that the

common ancestor of the clade probably dispersed to the region from the southern Andes, a remarkable feat given the presence of the dry mountains surrounding the Atacama Desert, where no *Ourisia* are currently found.

Floral and vegetative characters easily distinguish *Ourisia cotapatensis* from the rest of the north-central Andean species, as is illustrated in the key above. *Ourisia cotapatensis* and *O. pulchella* are both small, creeping plants with hairy, subentire leaves, densely hairy pedicels and peduncles, and solitary flowers in each node of their short, racemose, bracteate inflorescences. The flowers of both species are tubular-funnelform with widely spreading petal lobes, sessile glandular trichomes on the filament bases of the two long stamens, and a capitate stigma. The key highlights the number of ways that *Ourisia cotapatensis* differs from *O. pulchella.* Most notably, *Ourisia pulchella* has white to pale violet flowers and a nearly straight or only slightly curved corolla tube, whereas the new species has curved, violet corollas with corolla tubes that are internally yellow with purple spots or streaks along the bottom. *Ourisia pulchella* also has a calyx with three sepal lobes cleft to halfway down length of calyx and two cleft to near base; *O. cotapatensis,* in contrast, has a regular calyx (where all sepal lobes are cleft to the base).

With respect to the southern Andean species (Rossow, 1986; Meudt, unpublished data), *Ourisia microphylla* Poepp. & Endl., *O. polyantha* Poepp. & Endl., and *O. serpyllifolia* Benth. are suffruticose, and have ebracteate, solitary, axillary flowers and (sub)sessile, opposite or decussate leaves that distinguish them from all other (herbaceous) *Ourisia,* including *O. cotapatensis.* The eight remaining southern Andean species are herbaceous, and have internally glabrous corollas that may be white, pink, violet, or red. *Ourisia ruellioides* (L.f.) Kuntze, *O. coccinea* (Cav.) Pers., and *O. alpina* Poepp. & Endl. are tall plants with large, long-petiolate leaves and conspicuous, red (pink in *O. alpina*), bilabiate corollas. *Ourisia fragrans* Phil. has white, pink, or violet, regular corollas, five fertile stamens of equal length, and a dense glandular vestiture on many vegetative parts. *Ourisia breviflora* Benth., *O. fuegiana* Skottsb., *O. pygmaea* Phil., and *O. uniflora* Phil., like the new species, are all small to medium-sized plants with small, subentire to irregularly notched or undulate-margined leaves, 1–3 flowers per plant, bilabiate corollas, and emarginate petals. However, their much smaller flowers (ranging from 4.7–15.7 mm in length), straight or only slightly curved corolla tubes, glabrous (but ciliate) sepals, and stamens that are attached comparatively high in the corolla tube, among other character states, clearly distinguish them from the new species. Of these species, perhaps *Ourisia pygmaea* is the most similar to *O. cotapatensis,* but in addition to the above features it is further distinguished by its white flowers and longer, usually glabrous pedicels.

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