Ipomoea electrina (Convolvulaceae): A New Name for *Exogonium luteum* House

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ABSTRACT. The history of a southern Mexican endemic *Ipomoea* is summarized, beginning with its publication in 1908 as *Exogonium luteum* House. Because of a previously existing *Ipomoea lutea* Hemsley, the new name *Ipomoea electrina* is proposed to refer to the unique amber-colored flowers of these plants. Since two distantly related congeners, *Ipomoea lutea* and *I. urbinei*, have nomenclatural and misidentification histories interlaced with *I. electrina*, they are also discussed and compared with this taxon.

RESUMEN. Se presenta un resumen de la historia de una *Ipomoea* endémica del sur de México, empezando con su publicación en 1908 como *Exogonium luteum* House. Debido a la previa existencia de una *Ipomoea lutea* Hemsley, se propone el nuevo nombre *Ipomoea electrina* en referencia al característico color ámbar que poseen las flores de estas plantas. Dos congéneres lejanamente relacionados, *Ipomoea lutea* e *Ipomoea urbinei*, con historias de nomenclatura y erróneas identificaciones entrelazadas con *Ipomoea electrina*, también se discuten y comparan con este taxón.

Key words: biodiversity, convergence, Convolvulaceae, *Exogonium*, *Ipomoea*, Mesoamerica, morning glories, New World.

Homer D. House described numerous New World Convolvulaceae (House, 1905, 1906a–d, 1907a–e, 1908a–d, 1909), among them *Exogonium luteum*, a name and species that has proven controversial in recent years (Austin, 1978, 1983; McPherson, 1979). House (1908d) originally put the species in *Exogonium*, a genus that he considered to be distinct and closely related to *Ipomoea*, but distinguishable on the basis of its exserted stamens and style (i.e., *exo-gonia*). New World morning glories of this type, usually presenting yellow, orange, or red, salverform corollas, are generally associated with bird pollination, or the occasional visitations of butterflies (Austin, 1978, 1997; McDonald, 1987, 1991). Subsequent authors have recognized that this ornithophilous syndrome has arisen on numerous occasions within New World Convolvulaceae, especially within the genus *Ipomoea* s.l., including most of the original elements that House assigned to *Exogonium*. Consequently, modern students of the family have considered the exogonioid taxa largely as derivative species that should be accommodated in various sections within *Ipomoea* (Austin, 1997; McDonald 1987, 1991; McPherson, 1979). Some species of *Exogonium* sensu House were retained in *Ipomoea* sect. *Exogonium* (Choisy) Grisebach (McDonald, 1987), while others were transferred to *Ipomoea* sect. *Mina* (Cervantes) Grisebach (Austin, 1978, 1980) and *Ipomoea* sect. *Eriospermum* Hallier f. (Austin, 1980), and yet others to *Turbina* (Austin & Staples, 1991), and even *Ruellia* (Austin & Wasshausen, 1973) of the Acanthaceae. *Exogonium luteum* requires the same consideration, though its legitimate transfer to *Ipomoea* has yet to take place.

TAXONOMIC PROBLEM

Austin (1978) maintained *Exogonium luteum* in *Ipomoea*, but noted that the specific epithet of the basionym could not be applied to the genus due to the priority of *Ipomoea lutea* Hemsley. Austin therefore proposed a new name for the species, *I. shinnersii*, under which was also recognized *Ipomoea shinnersii* var. *woronovii* (Standley) D. F. Austin (1978). Unfortunately, the epithet *woronovii* in fact has priority over the epithet *shinnersii* due to its earlier publication date, and therefore renders *I. shinnersii* as an incorrect name under Article 52.3 of the *Code* (Greuter et al, 2000). Later, Austin (1983) corrected that mistake by creating *I. woronovii* (Standley) D. F. Austin, while still interpreting *E. luteum* as a synonym of *I. woronovii*.

McPherson (1979) also realized the misinterpretation, and proposed *Ipomoea crocea* as a new name for *Exogonium luteum* in his dissertation. Unhap-

pily, he did not formally publish this name. Breedlove (1986), apparently finding the McPherson name on an annotation label, published it as a *nomen nudum*. Thus, the third attempt to provide a name for these Mexican plants created yet another unusable name.

McDonald (1987) later recognized *Ipomoea woronovii* as a synonym of *I. urbinei*, but did not discuss *Exogonium luteum*, having recognized that it referred to a distinct, and indeed, distantly related species. McDonald (1987) did not propose a new name for House's species, as his treatment did not discuss the group to which *E. luteum* belongs. Thus, *E. luteum* has been recognized as an *Ipomoea* by all modern students of the genus, even though it still lacks a legitimate name.

Taxonomic Resolution

Because three distinctive species are involved with this confusion, we present the nomenclature and a brief description of each, to help clarify the matter for our upcoming treatment of the Convolvulaceae in *Flora Mesoamericana*.

1. Ipomoea lutea Hemsley, Diagn. Pl. Nov. Mexic. 2: 34, tab. 60. 1879, non *Exogonium luteum* House, Bull. Torrey Bot. Club 35: 103. 1908. *Quamoclit lutea* (Hemsley) Hallier f., Bot. Jahrb. Syst. 16: 537. 1893. TYPE: Guatemala. *O. Salvin & C. Godman* (holotype, K not seen, photo).

Ipomoea lutea f. *rubra* O'Donell, Lilloa 29: 67. 1959. TYPE: Mexico. Chiapas: from Chicharras, alt. 3000–6000 ft., 6 Feb. 1896, *E. W. Nelson 3768* (holotype, GH; isotype, US).

Twining herbs, probably perennial, stems climbing or prostrate, probably to 5 m, glabrous or sometimes pilose on the nodes. Leaves 3–15 × 3–15 cm, ovate, entire, with undulate borders, irregularly dentate, 3-lobed or 3-parted, glabrous or pilose on the base, the base cordate, the apex acute to acuminate, at times obtuse, mucronate. Inflorescences in cymes, ± corymbiform. Flowers 4 to 14, rarely solitary; sepals 2–3 mm, the outer ovate to elliptic, glabrous, with subterminal arista 1–8 mm, glabrous or finely pilose, the inner 3–4 mm, ovate, narrowly elliptic to ± orbicular, obtuse to truncate or emarginate, glabrous, borders hyaline, arista 3–7 mm, glabrous or pilose; corolla 4–6 cm, ± tubular, yellow, red, or orange, somewhat curved, the limb 5-lobed, the lobes 4–6 mm long, narrow, obtuse, glabrous; stamens 5.5–7 cm, exserted from corolla tube 1 cm or more. Fruits 8–10 mm, globose, capsular; seeds 1 to 4, 4–4.5 mm, globose, brown, tomentose, with patches of longer clear trichomes.

Distribution. Forests; 1200–1500 m. Endemic to southern Mexico and nearby Guatemala. Flowering December–February.

Following the taxonomic precedent set by O'Donell (1959), we retain *Ipomoea lutea* in *Ipomoea* sect. *Mina* on the basis of its highly diagnostic sepals, which present long and fleshy, subterminal aristae. This taxon is the sister species of *I. hastigera* Kunth, which is distinguished primarily by its smaller corolla and pseudo-umbellate cymes.

Specimens examined. GUATEMALA. *Kellerman 557* (GH, US). MEXICO. **Chiapas:** *Matuda 16190* (F, GH, MEXU, US).

2. Ipomoea urbinei House, Muhlenbergia 3: 41, pl. 2, fig. 2. 1907. TYPE: Mexico. Colima: slopes of Volcan de Colima, 1881, *M. Bárcena 214* (plate selected as lectotype by McDonald, 1987: 51).

Quamoclit tubulosa M. Martens & Galeotti, Bull. Acad. Roy. Soc. Bruxelles 12: 270. 1845. *Ipomoea tubulosa* (M. Martens & Galeotti) Hemsley, Biol. Centr. Amer. Bot. 2: 395. 1882, non *Ipomoea tubulosa* Roemer & Schultes, Syst. Veg. 4: 789. 1819. *Exogonium uhdeanum* Fenzl ex Hallier f., nom. illegit., Bot. Jahrb. Syst. 16: 559. 1893. *Ipomoea uhdeana* (Fenzl ex Hallier f.) D. F. Austin, nom. illegit., Ann. Missouri Bot. Gard. 64: 332. 1978. TYPE: Mexico. Michoacán: "dans les champs d'Uruapan, à 4000 pieds, Fl. rouge," *H. Galeotti 1393* (holotype, BR; isotypes, BR, P, W).

Ipomoea woronovii (Standley) D. F. Austin, Taxon 32: 626. 1983. *Exogonium woronovii* Standley, Field Mus. Natl. Hist., Bot. Ser. 11: 171. 1932. *Ipomoea shinnersii* D. F. Austin var. *woronovii* (Standley) D. F. Austin, Ann. Missouri Bot. Gard. 64: 332. 1978. TYPE: Mexico. Michoacán: *G. J. N. Woronow 2906* (holotype, F).

Herbs, perennials; the stems woody at least near the base, to 3 m, often purple-pigmented, mostly glabrous. Leaves 4–7 × 3–5.5 cm, ovate or ovate-elongate, glabrous or densely puberulent with minute yellow trichomes on lower surface, the base cordate and occasionally enveloping inflorescences on fertile branches, the apex attenuate, mucronulate. Inflorescence in monochasial cymes. Flowers 2 to 5, with peduncles 1.4–3.3 cm long, with pubescence like the leaves; sepals unequal, the outer shorter, 3–4 mm, coriaceous, the inner 7–9 mm, membranous, the apex acute to obtuse on outer, obtuse to emarginate on inner, glabrous; corolla 3–4 cm long, ± salverform, red, the tube almost constituting the whole perianth, the limb 5 distinct

short triangulate lobes, 5–7 mm long; stamens exserted, exceeding the limb by 3–5 mm. Fruits capsular, conical, 11–12 mm long, 2-locular, 4-valvate; seeds 4, 6–10 mm long, 4–5 mm wide, dark brown, puberulent.

Distribution. Mountain forests; 1300–1640 m. Endemic to Colima and Michoacán, Mexico. Flowering September–January.

Illustrations. House (1907d: 41, pl. 2, fig. 2); McDonald (1987: 80, fig. 9b).

Hallier created an illegitimate superfluous name because he included only indirectly (he did not cite the basionym directly, only the combination based on it) the type of the earlier name *Quamoclit tubulosa* M. Martens & Galeotti. In other words, Hallier should have used the available epithet *tubulosum* instead of adopting the herbarium name written by Fenzl on the sheet as a determination. Therefore, *Ipomoea uhdeana* (Fenzl ex Hallier f.) D. F. Austin was based on the illegitimate basionym *Exogonium uhdeanum* Fenzl ex Hallier f. Since usage of an illegitimate basionym is prohibited by the *Code* (Greuter et al., 2000), we use the next available name. *Ipomoea tubulosa* (M. Martens & Galeotti) Hemsley cannot be used because *Ipomoea tubulosa* Roemer & Schultes has priority over this binomial. In the absence of specimen at MEXU, McDonald (1987) designated the plate as the lectotype.

As indicated by McDonald (1987), *Ipomoea urbinei* is a member of *I.* sect. *Exogonium*. The species shares many traits, including unequal, acute, membranaceous sepals, salverform corolla, and exserted stamens, with *I. dumosa* (Bentham) L. O. Williams and that is surely the sister taxon.

Additional specimen. MEXICO. **Michoacán:** *G. Hinton et al. 12254* (NY, TEX, US).

3. Ipomoea electrina D. F. Austin & J. A. McDonald, nom. nov. Replaced name: *Exogonium luteum* House, Bull. Torrey Bot. Club 35: 103. 1908, non *Ipomoea lutea* Hemsley, Diagn. Pl. Nov. Mexic. 2: 34, t. 60. 1879. *Ipomoea shinnersii* D. F. Austin, nom illegit. sed non superfl. [see Taxon 32: 626. 1983], Ann. Missouri Bot. Gard. 64: 337. 1977 [1978]. *Ipomoea woronovii* (Standley) D. F. Austin var. *lutea* (House) D. F. Austin, Taxon 32: 626. 1983. TYPE: Mexico. Oaxaca: Cuesta de Chiquihuetlan, 3300 ft. alt., 2 Sep. 1895, *C. Conzatti & J. Gonzalez 668* (holotype, GH; isotype, NY).

Herbs, perennial; the stems woody at the base, herbaceous toward the apex, reaching 2–3 m or more, densely or sparsely pubescent. Leaves 4–9 × 2.5–7 cm, ovate, pubescent above, the base cordate, the apex acuminate. Inflorescence in dichasial cymes. Flowers 3–18, with peduncles 1.5–4(10) cm, with pubescence like the leaves; sepals unequal, the outer 5–6 mm, the inner 6.6–8.5 mm, coriaceous, often verrucose at least on the base, the apex acute on the outer, obtuse on the inner; corolla 5–6.5 cm, hippocrateriform, yellow or orange-gold, the tube 3.5–4 × 4–6 mm, the limb with 5 distinct linear lobes 1.5–2.3 cm long; stamens exserted > 5 mm. Fruits seen only in immature stage, conic, 2-locular, 4-valvate; seeds dark brown, pubescent with long, brown trichomes.

Distribution. Mesophyllous forests, pine-oak forests, low deciduous forests, oak forests; 700–2100 m. Endemic to Mexico. Flowering July–September, January.

Illustrations. House (1908b: pl. 2, fig. c).

Common name. Frijol de la virgen (Oaxaca); flowers are said to be edible.

Etymology. The epithet *electrina* refers to the "amber" color (yellow-orange) of the corollas. The base *electrinus, -a, -um* derived by combining the noun *electrum* (Greek *elektron*, usually meaning amber), with the Greek adjectival suffix *-inus, -a, -um* indicating the color of amber. Information on orthography was extracted partly from Nicolson and Brooks (1974).

Ipomoea electrina bears only a superficial resemblance to *I. urbinei*. House described and illustrated the species as having linear limb segments, much as in agreement with the type specimen. This feature contrasts dramatically with the much reduced, scarcely triangulate limb segments of *I. urbinei* (see McDonald, 1987: 80, fig. 9b). Moreover, the corollas of *I. urbinei* are red, with stamens exserted but a few millimeters beyond the plane of the limb. In contrast, corollas of *I. electrina* are bright yellow-orange, the stamens and style exceeding the corolla by more than 5 mm. In all likelihood *I. electrina* is a relative of *I. conzattii* Greenman and allies, belonging to *Ipomoea* sect. *Eriospermum*. With them, it shares the long woolly trichomes on the margins of the seeds.

Specimens examined. MEXICO. **Oaxaca:** Distr. Tehuantepec, Cerro Marimba, *Martínez 1035* (MEXU); S del Cerro Guiengola, *Torres & Cabrera 6310* (MEXU), *Torres & Torres 194* (MEXU), *Torres & Torres 202* (MEXU); Santa Lucia, *Martínez 133* (MEXU); SO de Buenos Aires, *Torres & Martínez 7349* (MEXU); San Carlos Yautepec, SE de el Camerón, *Torres & Martínez 12582* (MEXU); Santiago Lachiguiri, Cerro de Las Flores, *Campos 3803* (MEXU). **Chiapas:** *Purpus 9189* (US).

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Literature Cited

Austin, D. F. 1978. Realignment of the species placed in *Exogonium* (Convolvulaceae). Ann. Missouri Bot. Gard. 64: 330–339.

———. 1980. Additional comments on infrageneric taxa in *Ipomoea* (Convolvulaceae). Taxon 29: 501–502.

———. 1983. New combinations in Mexican *Ipomoea* (Convolvulaceae). Taxon 32: 625, 626.

———. 1997. Dissolution of *Ipomoea* ser. *Anisomerae* (Convolvulaceae). Bull. Torrey Bot. Club 124: 140–159.

——— & G. W. Staples. 1991. A revision of the neotropical species of *Turbina* Raf. (Convolvulaceae). Bull. Torrey Bot. Club. 118: 265–280.

——— & D. C. Wasshausen 1973. A *Ruellia* (Acanthaceae) species in *Exogonium* (Convolvulaceae). Phytologia 25: 433–437.

Breedlove, D. E. 1986. Convolvulaceae. Pp. 74–77 *in* Listados Florísticos de México IV. Flora de Chiapas. Instituto de Biología, Universidad Nacional Autónoma de México, Mexico City.

Greuter, W., J. McNeill, F. R. Barrie, H. M. Burdet, V. Demoulin, T. S. Filgueiras, D. H. Nicolson, P. C. Silva, J. E. Skog, P. Trehane, N. J. Turland & D. L. Hawksworth (editors). 2000. International Code of Botanical Nomenclature (Saint Louis Code). Regnum Veg. 138.

House, H. D. 1905. Two new species of *Convolvulus* from the western United States. Bull. Torrey Bot. Club 32: 139–140.

———. 1906a. A new southern *Convolvulus*. Torreya 6: 149, 150.

———. 1906b. A new species of *Dichondra*. Muhlenbergia 1: 130–131.

———. 1906c. Studies in the North American Convolvulaceae—I. Bull. Torrey Bot. Club 33: 313–318.

———. 1906d. Studies in the North American Convolvulaceae—II. The genus *Operculina*. Bull. Torrey Bot. Club 33: 495–503.

———. 1907a. A new species of *Evolvulus* from Colombia. Torreya 7: 61–62.

———. 1907b. New species of *Ipomoea* from Mexico and Central America. Muhlenbergia 3: 37–46, pl. 31–33.

———. 1907c. Studies in the North American Convolvulaceae—III. Bull. Torrey Bot. Club 34: 143–149.

———. 1907d. New species of *Ipomoea* from Mexico and Central America. Muhlenbergia 3: 37–46.

———. 1907e. New or noteworthy North American Convolvulaceae. Bot. Gaz. 43: 408–414.

———. 1908a. Two Bahamian species of *Evolvulus*. Bull. Torrey Bot. Club 35: 89–90.

———. 1908b. Studies in the North American Convolvulaceae—IV. Bull. Torrey Bot. Club 35: 97–107, pl. 101–102.

———. 1908c. The North American species of the genus *Ipomoea*. Ann. New York Acad. Sci. 18: 181–263.

———. 1908d. Studies in the North American Convolvulaceae—IV. The genus *Exogonium*. Bull. Torrey Bot. Club 35: 97–107, pl. 1–2.

———. 1909. Studies in the North American Convolvulaceae—V. Bull. Torrey Bot. Club 36: 595–603.

McDonald, J. A. 1987. Revision of *Ipomoea* section *Exogonium* (Choisy) Griseb. (Convolvulaceae). Brenesia 28: 41–87.

———. 1991. Origin and diversity of Mexican Convolvulaceae. Anales Inst. Biol. Univ. Autón. México, Ser. Bot. 62: 65–82.

McPherson, G. D. 1979. Studies in the Genus *Ipomoea* (Convolvulaceae). University of Michigan University Microfilms, Ann Arbor.

Nicolson, D. H. & R. A. Brooks. 1974. Orthography of names and epithets: Stems and compound words. Taxon 23: 163–177.

O'Donell, C. A. 1959. Las especies americanas de *Ipomoea* L. sect. *Quamoclit* (Moench) Griseb. Lilloa 29: 19–86.