

THREE NEW SPECIES OF *TRAGIA* (EUPHORBIACEAE) FROM WESTERN MEXICO

ROBERTO J. URTECHO

College of the Sequoias
915 S. Mooney Blvd.
Visalia, California 93277
robertur@cos.edu

ABSTRACT

Three new species of *Tragia* are here described from western Mexico. ***Tragia moranii*** Urtecho, **sp. nov.**, from the Baja California Peninsula, is similar to *T. jonesii* of the Sonoran Desert. It differs in lower density of stipitate glands, longer petioles, and shorter pistillate pedicels. ***Tragia mcvaughii*** Urtecho, **sp. nov.**, is related to *T. pacifica* but is less glandular, has narrower leaves, and lacks a glandular ovary. ***Tragia gentryi*** Urtecho, **sp. nov.**, from Sinaloa and adjacent Nayarit is similar to *T. pacifica* but differs in its oblong leaves and subulate ovary glands.

Tragia Plum. ex L. (Euphorbiaceae) is a large genus of perennial shrubs, herbs, and vines found worldwide. Although most of the 154 accepted species occur in Africa, many species continue to be described in the Americas (POWO 2021). Mexico currently has 14 species, of which 3 are endemic (*T. potosina*, *T. chiltepeca*, and *T. affinis*), but there appears to be much more diversity among existing collections and there may be closer to 20 species of *Tragia* in Mexico (Martinez Gordillo et al. 2002, 2015; Steinmann & Felger 1997; Urtecho 1996).

Most Mexican species of *Tragia* are in sect. *Tragia* (Gillespie 1994). Cardinal-McTeague and Gillespie (2016) have proposed that sectional differences need evaluation and have recommended using stigmatic surfaces and stipitate glands as characters to separate sections.

The genus *Tragia* is known for urticating hairs that cause a painful sting when touched. In Mexico, *Tragia* species are commonly called quemador (burner), ortiguilla (small nettle), or chichicaste (from Tzitzicatzli (Nahuatl), nettle), a name shared with plants from other families bearing stinging hairs.

While completing a taxonomic study of the Mexican species of *Tragia* (Urtecho 1996), it became evident that several plant collections did not match the descriptions of known Mexican species. The primary challenge in this investigation was understanding the significance of the widespread presence of glands in many of the tropical *Tragia*. As a result of this inquiry, three new species with glandular inflorescences are described here for western Mexico.

1. TRAGIA MCVAUGHII Urtecho, **sp. nov.** **TYPE: MEXICO. Jalisco.** Dry, overgrazed, cactus-covered slopes, 1 mi S of Autlán [de Navarro], 21 Aug 1949, *Wilbur & Wilbur 2477* (holotype: MICH!; isotypes MO!, WIS!).

Tragia mcvaughii is a twining plant that can climb to a height of 2 m. It has a glandular inflorescence but does not have a glandular ovary like *T. pacifica*. Although similar to *T. jonesii*, *T. mcvaughii* differs in larger, thicker leaves, longer petioles, and has much fewer glands. It has undulate to subpapillate stigmatic surfaces that distinguish it from *T. nepetifolia* and *T. urticifolia*, which have very papillose stigmas.

Stems few to many from a woody taproot, 1–4 mm in diameter at the base, 0.5–2 m tall, green to mottled-brown, erect, decumbent, trailing or twining, indumentum with few stinging hairs on the

main stem, and with sparse, white, simple trichomes. Upper internodes 2.2–7 cm long, lower internodes 3.5–7.5 cm long. **Leaves** lanceolate to triangular-ovate, 1.7–8.5 cm long, 0.8–3.5(–6) cm broad, apically acute, basally cordate to truncate, margins serrate with as many as 20 teeth side, scattered stinging hairs on the adaxial surface and abaxial veins, apex acute; petioles 7–40 (–80) mm long, occasionally with basilar stipitate glands; stipules lanceolate, 2.5–3 mm long, 1–1.5 mm broad, densely covered with simple hairs and few stinging hairs. **Inflorescence** racemose, indumentum of scattered stipitate and sessile glands and long stinging hairs, a single pistillate flower at the lowest node, (8–) 13 to 60 staminate flowers per raceme; bracts of pistillate flowers lanceolate, 1–2 mm long, 0.5–1 mm wide, ciliate, acute pubescent; bracts of staminate flowers lanceolate, sub-cucullate, 0.8–1 mm long, 0.25–3 wide ciliate, entire margined. **Staminate flowers:** pedicels 0.9–2.5 mm long, with long, spreading simple trichomes, persistent base 0.25–1.1 mm long; sepals 3, reddish-green, ciliate margined, lanceolate, 0.7–1.5 mm long, 0.4–1.1 mm wide; stamens 3, introrse; filaments fleshy, 0.2–0.75 mm long, wide at the base, tapering near the attachment to the anther. **Pistillate flowers:** pedicels 1–3 mm long in flower 2–6 mm long in fruit; sepals ovate to lanceolate, ciliate 0.8–2 mm long, 0.5–0.75 mm broad; styles united from ½ length, stigma surface, undulate to subpapillate. **Fruit** 3–4 mm long, 3–6 mm broad, occasionally monocarpic, columella 2–2.5 mm long; seeds nearly spherical, 2–2.5 mm in diameter, mottled, microsculpture with insular cells occurring in pairs.

Tragia mcvaughii ranges in western Mexico from Sonora to Chiapas. It occurs in tropical dry forests and thorn scrub with succulent elements at altitudes from 30 to 1500 m above sea level (Fig. 7).

Representative collections. MEXICO: Chiapas. Berriozábal Las Vistas, 22 Oct 1950, *Miranda 6721* (MEXU); Mpio. Chiapa de Corzo, a 50 m al NE de El Chorreadero, sobre la carretera Tuxtla Gutiérrez-San Cristóbal de Las Casas, 11 Dec 1987, *Reyes García, 88* (MEXU); Mpio. Comitán, Rancho Yerba Buena, 2150 m, 16°28'36" N, 92°17'54" W, 10 Jul 1994, *Martinez-Ico 90* (MEXU); Arriaga, 15 Oct 1933, *Mell 2187* (MICH). **Durango.** Mpio. Mezquital, 2 km al N de Paura, carretera a Durango, 1460 m, 23° 35' N y 104° 23' W, 7 Mar 1985, *Tenorio 8113* (MEXU); **Guerrero.** Cutzamala, Coyuca District, *Hinton 5790* (G). **Jalisco.** Semi-arid Hills above Amacueca in the basin of Lake Sayula, 3 Nov 1960, *McVaugh 20726* (MICH); Mpio. La Huerta, Estación de Biología Chamela, 19° 30' N, 105° 03' W, 23 Sep 1981, *Lott 514* (DAV, MEXU); Mpio. La Huerta 26.1 km al NW de la Estación de Biología, La Chamela, 25 Oct 1985, *Lott 2696* (MEXU); Mpio. La Huerta Estación de Biología, La Chamela, 29 Jul 1984, *Lott 2302* (MICH); Mpio. La Huerta, Antiguo camino a Nacastillo, 30 m, 22 Oct 1985, *Lott 2690* (MICH); México 33, 73 km S of Guadalajara, 30 Aug 1971, *Burch 5169* (MO); Mpio. Autlán de Navarro at southern margins of the city, 6 Jul 1993, *Urtecho 1054* (DAV, not distributed). **Mexico.** Temascaltepec, 21 Aug 1933, *Hinton 4562* (CAS-DS, G). **Michoacan:** Mpio. Aquila, near the banks of the Rio de Ostula, *Hassler-Hill 7* (MICH). **Nayarit:** Valley of Rio Jesús María near village of Jesús María, 19 Sep 1960, *Feddema 1293* (MICH); San Blas, 24 Mar 1910, *Rose 13380* (US). **Nayarit.** Mpio. Nayar, 1–2 km al NW de Jesús María, 22° 16' N 104° 32' W, 500–600 m, 22 Oct 1989, *Flores 1746* (MEXU); 18 km al NE de Jesús María, Camino a Huejequilla. 22° 20' N, 104° 30' W, 11 Jul 1988, *Télliz 11630* (MEXU). **Oaxaca.** Picacho de Gerónimo, Oct 1913 *Purpus 6799* (MICH); Picacho San Gerónimo, Oct 1913, *Purpus 6800* (MICH). **Puebla.** Acatlán, 11 Oct 1942, *Miranda 2456* (MEXU). **Sinaloa.** Pueblo de Coyotitlán, San Ignacio, 14 Jan 1919, *Nevárez Montes 691* (US); 19 mi N of Mazatlán, 17 Mar 1955, *Wiggins 13159* (CAS-DS); Mazatlán, 30 Mar. 1910, *Rose 13704* (US); Mazatlán, El Quelite, El Quemado, n.d., *González Ortega 223* (MEXU); Mpio. Mazatlán, La Noria, Dec 1925, *González Ortega 6.048* (ANSPHILA); Culiacán, 25 Oct 1891, *Palmer 1784* (GH); La Noria, n.d., *Mexia 277.5* (CAS-DS); San Blas, 28 Jan 1927, *Jones 23298* (CAS-DS, RSA-POM); Goros, pueblo Ahome, 30 m, area perturbada (orilla de cultivo), 17 Aug 1995, *Márquez Salazar 126* (MEXU); El arroyo-Agua Caliente de Zevada, April 8, 1975, *Shapiro 43* (MEXU). **Sonora.** Álamos in the Sierra de Álamos, 15 Mar. 1910, *Rose 12879* (US); Palo Parado, Rio Yaqui, 7.3 km SW of Potam, 27° 35' N, 110° 28' 30", 19 Nov 1985, *Felger 85-1400* (SD, TEX-LL); Rio Chuchujaqui crossing at San Vicente, 25 Sep 1993, *Van Devender 93-1129* (AZ, DAV); Rancho la Sierrita (= R. El Negrito), E

slopes of the Sierra de Álamos, ca. 6 km (by air) SSE of Álamos, 26 Nov 1993, *Van Devender 93-1402* (AZ, DAV); Arroyo Masiaca, ca. 0.5 km N of Teachive de Masiaca, Mpio. de Navojoa, 21 Sep 1993, *Van Devender 93-961* (AZ, DAV); Mpio. de Álamos, ca. 14 km (by air) NW of Álamos at the S base of Cerro Las Tatemias along the road to Microondas La Luna, 31 Dec 1994, *Steinman 94-147* (AZ); Mpio. de Álamos, Sierra de Álamos, NE side of the range, Arroyo El Huirtal, 1 Jan 1995, *Steinman 95-06* (DAV, RSA-POM); Mpio. de Álamos, ca. 12 km (by air) WNW of Álamos and 1 km N of El Carrizal along the road to Microondas La Luna, 31 Dec 1994, *Steinman 94-143* (AZ, DAV); Álamos in the Sierra de Álamos, *Rose 12879* (US); El Guayabo crossing of Rio Cuchujaqui, 2.6 km NE of Sabinito Sur, 14 km (air) SE Álamos [27° 00' 05" N, 108° 47' 08" W], 10 Oct 1992, *Van Devender 92-1301* (DAV); Mpio. Alamos, Ranchería crossing of the Rio Cuchujaqui, 22.5 km S of Alamos, 108° 55' W, 26° 51' N, 10 Oct 1992, *Sanders 12811* (DAV); Mpio. Huatabampo, ca. 6 km NW of Camahuiroa on road to Las Bocas, 24 Nov 1998, *Reina 98-2127* (AZ); Rancho La Sierrita, Sierra de Álamos, 700 m, 26 Nov 1993, *Van Devender 93-1402* (DAV); El Paso, above Rio Chuchujaqui, 150 m, 25 Feb 1995, *Van Devender 95-100* (DAV); Arroyo Los Cochis, 220 m, 2 Dec 1994, *Van Devender 94-877* (DAV).

In his *Euphorbiaceae novae novo-galicianae*, McVaugh (1961) drew attention to an unusual collection of *Tragia* (*Wilbur & Wilbur 2477*) from the dry cactus-covered hills of Autlán, Jalisco. He mentioned that the plant superficially resembles *T. yucatanensis* Millspaugh and that he was uncertain of the taxonomic position of this collection. This collection has been designated the holotype for *T. mcvaughii*.

Tragia mcvaughii is different from all other *Tragia* found in this part of Mexico (Fig. 1, Table 1). It has subpapillate stigmas that suggest some relationship to *T. nepetifolia* or *T. brevispica*, two species that occur at higher elevations and farther east. *Tragia mcvaughii* also has floral stipitate glands that are sporadic, some specimens with few. The density of these glands is much lower than *T. pacifica*, *T. gentryi*, or *T. jonesii*. Like these three species, the female pedicel of *T. mcvaughii* regularly has stipitate glands. Unlike these sister species, there are no glands on the staminate pedicels of *T. mcvaughii*.

Leaf morphology of *Tragia mcvaughii* is highly variable (Urtecho 1996). Some collections have triangular-ovate blades with serrate-dentate margins (Fig. 5). Other collections are narrowly lanceolate with serrate margins. In all cases, the leaves tend to be longer and thicker than *T. jonesii* but do not approach the thickness observed in *T. yucatanensis*. Although their leaves are similar, the twining and high-climbing *T. pacifica* is easily distinguished from *T. mcvaughii* by its ovaries covered with dark, branching, cristate glands (Urtecho 1996). In disturbed areas or rocky outcrops, *T. mcvaughii* tends to be shorter and have narrower leaves. These plants are also prostrate or erect and covered with painfully stinging hairs that are ca. 2 mm long (Steinmann & Felger 1997; Urtecho 1996).

Seed coat microsculpture provides helpful information for distinguishing between *Tragia* species (Urtecho 1996). The seed microsculpture consists of long rows of ridge cells, usually dark amber to brown, surrounded by low relief lighter colored facet cells (Fig. 2B). In *T. mcvaughii*, the paired, short, oval, insular cells on the seed surface can be easily observed using 30X magnification (Fig. 2B) and serve as an excellent character to distinguish this species from other glandular *Tragia* (Urtecho 1996).

Basilaminar glands are common in several species of *Tragia* (i.e., *T. pacifica*, *T. gentryi*, *T. laciniata*). In *T. mcvaughii*, the glands are found on some leaves of a given specimen but are less consistent than seed coat structures. Both *T. nepetifolia* and *T. moranii* lack such glands.

Glandular *Tragia* Species

Characters	<i>T. pacifica</i>	<i>T. jonesii</i>	<i>T. mcvaughii</i>	<i>T. gentryi</i>
Inflorescence glands	densely stipitate	densely stipitate	variably stipitate	densely stipitate
Glandular ovary	present, cristate	absent	absent	present, subulate
Leaf base	cordate	cordate	cordate	truncate-cordate
Petiole length	18–40 mm	3-9(–25) mm	7–40(–80) mm	3–30 mm
Number of staminate flowers per inflorescence	3–40	25–30	(8–)13–60	15–67
Petiolar-laminal junction glands	present	absent	variably present	present
Pistillate pedicel in fruit	2.5–4.5 mm	5–11 mm	2–6 mm	4–5 mm
Persistent staminate base	0.2–1.2 mm glandular	1.8–2 mm glandular	0.25–1.1 mm eglandular	1.5–2 mm glandular

Table 1. Comparison between four glandular species of *Tragia* from Western Mexico.

Collections of gland-bearing *Tragia* from western Mexico are frequently mistaken for *T. amblyodonta* (Wiggins 1955, 1964), but these are not conspecific (Miller & Webster 1967; Steinmann & Felger 1997; Urtecho 1996). Pax and Hoffman (1919) mistakenly applied a nonrelated specimen with a twining habit and glandular inflorescences to their recombination of the species. *Tragia amblyodonta* was one of the eight varieties of *Tragia nepetifolia* described by Mueller (1866). His description of *T. nepetifolia* var. *amblyodonta* was based on the type collection, *Wright 1793*, a non-twining and non-glandular plant from Val Verde Co., Texas (*Wright 1793*, GH). In the original description of this variety, Mueller stated that the plant is scandent or climbing/twining. Examination of the type indicates that the collections have flexuous apices but are not twining vines. Perhaps this description of the scandent habit spurred Pax and Hoffman (1919) to accept another twining plant from the region, *Pringle 10351* from Hacienda El Carrizo, Nuevo Leon (US!), as an additional cited collection. This plant is not conspecific with *Wright 1793* and appears to be a robust *T. glanduligera* Pax & Hoffm. (Miller & Webster 1967). Unfortunately, it was the only material they had available to study and the reason *T. amblyodonta* was erroneously described as glandular (Miller & Webster 1967).

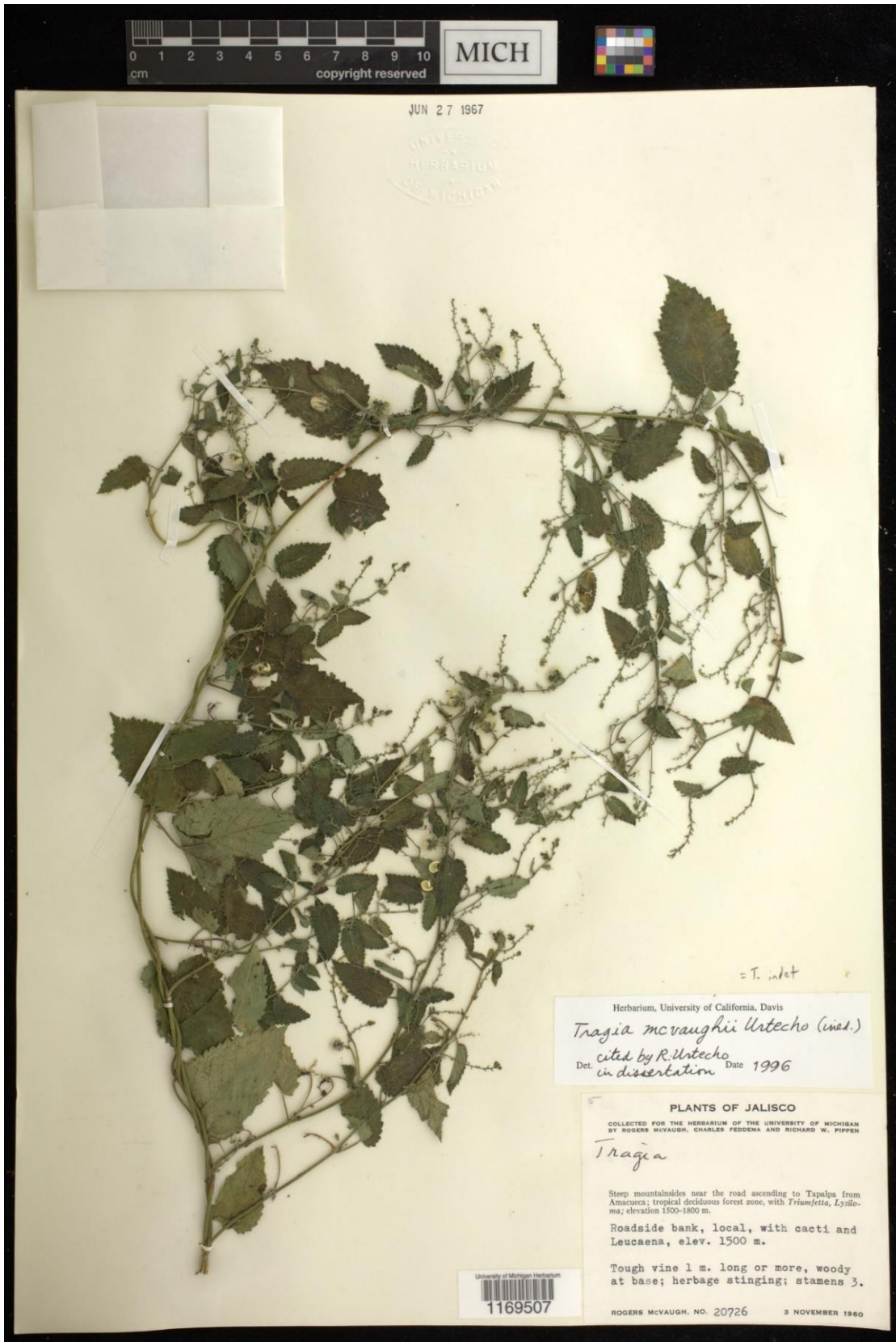


Figure 1. *Tragia mcvaughii*, McVaugh 20726 (MICH). Courtesy of University of Michigan.

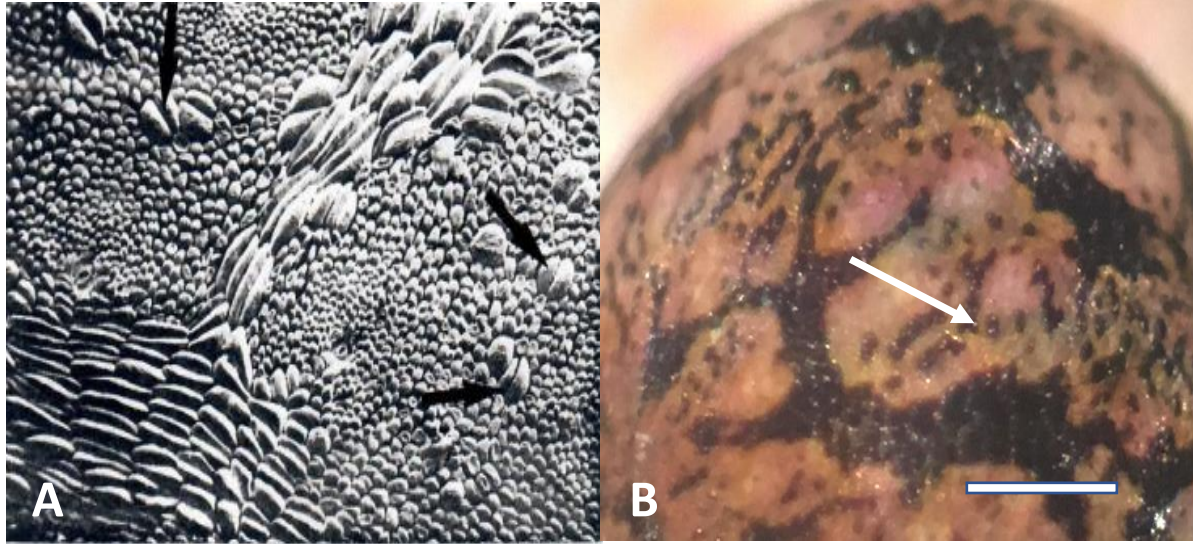


Figure 2. A. SEM image of *Tragia mcvaughii* seed coat microsculpture showing distinct paired insular cells (arrows); 1 cm = 60 μ m (Lott 514). B. LM image of *T. mcvaughii* seed surface, the arrow indicating paired insular cells; bar = 0.5 mm.

Tragia mcvaughii somewhat resembles the glandular *Tragia bahiensis* Mull. Arg. of South America. It differs by having a twining or trailing habit and a less glandular inflorescence. Cardinal-McTeague & Gillespie (2016) have shown that the gland bearing *Tragia* species of South America and North America are more closely related to each other than to those plants in the *Tragia nepetifolia* complex. Future studies should include *T. mcvaughii* to confirm that it is part of the clade dominated by glandular species.

The specific epithet of *Tragia mcvaughii* honors Dr. Rogers McVaugh, an American botanist and the Harley Harris Bartlett Professor of Botany at the University of Michigan. He is best known for his many contributions to our understanding of the flora of Jalisco and western Mexico.

2. TRAGIA MORANII Urtecho, *sp. nov.* TYPE: MEXICO. Baja California Sur. Sierra de La Giganta, summit of Cerro Mechudo, 24.8° N 110.717° W, 1025 m, 3 Nov 1971, R. Moran 18958 (holotype: DAV!; isotypes UC-JEPS!, SD!).

Tragia moranii is an erect to trailing perennial herb that grows up to 50 cm tall. The leaves are wide-ovate to lanceolate with serrated margins and cordate bases, are often tinted red, and have a high density of stinging hairs on the abaxial surface and petiole. It is similar to *T. jonesii* in having glandular peduncles and many staminate flowers per inflorescence. It differs by not twining, having longer petioles, shorter pistillate pedicels, and fewer stalked glands.

Stems few to many from a slender woody taproot, 1.5–2 mm in diameter at the base, up to 50 cm tall, green to reddish-green to brown, ribbed, erect, decumbent or trailing; upper internodes 1.5–3.5 cm long, lower internodes 1.5–4.4 cm long; covered with white, spreading simple hairs and urticating trichomes. **Leaves** often reddish-green, broadly ovate to narrow ovate, 2.9–6 cm long, 0.9–5 cm broad, apically acute, basally cordate, margins serrate with a terminal gland at tooth apex, stinging hairs abaxially on prominent foliar veins, few scattered on the adaxial surface; petioles 16–37 mm long, densely covered with a combination of stinging and spreading hairs; stipules lanceolate, 4–6.5 mm long, 1–1.5 mm broad, entire, abaxial surface glabrous. **Inflorescence** racemose, commonly red-tinted, villose with many stinging hairs found at the proximal end, sessile and thin, stalked glands found most commonly at the distal end, especially near the apex, upper (7–) 15–17 (–35) nodes with staminate

flowers, the lowest node with 1–2 pistillate flowers; bracts of pistillate flower lanceolate, 1–1.2 mm long, red to green, ciliate, acute; bracts of staminate flower lanceolate, sub-cucullate, 1–1.3 mm long, ciliate. **Staminate flowers:** pedicels 1–1.3 mm long, not stipitate-glandular, persistent base 0.4–0.9 mm long; sepals red to green, ovate, ciliate ca. 1 mm long, 0.5 mm broad; stamens 3; filaments fleshy, 0.4–0.5 mm long, connate at base. **Pistillate flowers:** pedicels 1–2 mm long at anthesis, 1.5–2.1 mm long in fruit; sepals green to red, ovate, ciliate, 1.5–2.6 mm in long, 0.7–1.3 mm broad; styles united to 1/3 of length, stigma surface undulate to subpapillate; columella 1.1–2 mm long. **Fruit** ca. 4 mm long, 7 mm broad; seeds nearly spherical, 2.5–3 mm in diameter, dark, mottled brownish, burgundy red, microsculpture of many isolated, insular cells.

Tragia moranii is found on mountain summits (sky islands) and ridges from southern Baja California to Baja California Sur (Fig. 7). Collectors have noted that the plant grows on lava rock, pumice, and bare volcanic soils. Some collections are from inland arroyo beds, oak forests, and cactus scrub.

Additional collections examined. MEXICO. Baja California. Occasional at summit, Cerro San Juan, 1250 m, 27°58'N 113° 00' W, 4 Feb 1964, *Moran 11594* (CAS-DS, SD); NE slope of Cerro San Juan de Dios, 950 m, 30° 08'N 115°07' W, 31 Dec 1963, *Moran 11460* (DAV, CAS-DS, SD); occasional in arroyo bed, Tinajas de Moraga SE base of Cerro Matomi, 1150 m, 30°22'N 115°07'W, 4 May 1973, *Moran 20843* (SD); Sierra La Libertad, vicinity of Las Cuevas in Arroyo La Soledad and surrounding lower slopes, 2083 ft, 28.42136° N 113.67077°W, 22 Apr 2009, *Rebman 17152* (SD). **Baja California Sur.** Sierra de La Giganta, N-facing slope of ridge S of Tinaja de Naucajoa, Cerros de Naucajoa, W of llanos de San Juan, 26°15'N 111°38'W, 25 Nov 1962, *Carter 4490* (DAV, UC-JEPS); Mesa del Portero de San Javier, NE of Misión San Javier, 800–850 m, 25°52'N 111°32'W, 19 Sep 1965, *Carter 4974* (DAV, UC-JEPS); summit of Cerro Azufre seen from 1200 m, 1650 m, 27°30'N 112°36'W, 20 Oct 1971, *Moran 18732* (DAV, SD); occasional at N base of Volcán las Tres Vírgenes, 950 m, 27° 29'N 112° 36'W, 13 Apr 1973, *Moran 20458* (DAV, SD); rather common on barren lava at N base of Volcán Las Tres Vírgenes, 27°29'N 112°36'W, Oct 1, 1974, *Moran 21368* (SD); 2.5 mi NE of the summit Volcán Tres Vírgenes, 4 Apr 1973, *Henrickson 9009a* (SD); occasional among rocks, Rancho La Laguna, Sierra San Francisco, seen to summit, 1550 m, 23 Nov 1976, *Moran 23825* (SD); small picacho between two peaks, directly S of Cerro de la Giganta, 3700 ft, 28 Mar 1960, *Carter 4003* (UC-JEPS); Sierra de la Giganta, vicinity of Rancho Agua Escondido, ca. 90 km E from Villa Constitucion), 390m, ca 25° 06'N, 111°W, 17 Oct 1964, *Carter 4743* (UC-JEPS); Sierra de la Giganta, trail W from Rancho Santa María to La Victoria, 1800 ft, 20 Mar 1960, *Carter 3882* (UC-JEPS); Sierra de la Giganta, ridge SW of La Victoria summit NE-facing slope, W of Notri, 2000 ft, 25.30° N, -111.19° W, 20 Mar 1960, *Carter 3901* (UC-JEPS); Sierra de la Giganta, Cajon de la Tinaja de San Alejo, W of San Javier, 2900 ft, 12 Mar 1961, *Carter 4201* (SD); La Paz, along road to the W of Llanos de Kakiwi, Sierra de La Giganta, SW of Misión Dolores, NW of San Evaristo, 24.98875°N -110.90153°W, 18 Nov 2015, *Rebman 31005* (SD); rocky, montane flats at San Francisco de la Sierra, 27° 36'N 113°1'W, 28 May 1992, *Rebman 1419* (SD).



Figure 3. *Tragia moranii*. A. Habit. B. Inflorescence. C. Leaves of trailing plant. D. Pistillate flower with a subpapillate stigmatic surface. Use of images courtesy of Jon Rebman and the Natural History Museum of San Diego.

***Tragia* of Baja California Sur**

Characters	<i>T. moranii</i>	<i>T. jonesii</i>	<i>T. nepetifolia</i> var. <i>setosa</i>
Inflorescence glands	sessile and thin stalked	densely stipitate	few sessile
Peduncle gland density, glands per mm ²	ca. 3–8	ca. 13–15	ca. 2–3
Petioles	16–37 mm	3–9(–25) mm	1–4 mm
Staminate flowers per Inflorescence	(7–)15–17(–35)	25–30	15–20
Pistillate pedicel in Fruit	1.5–2.1 mm	7–11 mm	1.9–3 mm
Persistent staminate pedicel base	0.4–0.9 mm eglandular	1.8–2 mm glandular	0.1–0.4 mm eglandular
Leaf shape	ovate-lanceolate	ovate to broadly ovate	ovate to linear
Stigmatic surface	undulate to subpapillate	undulate to subpapillate	papillate

Table 2. Comparison of characters of *Tragia* from Baja California Sur.

Tragia moranii appears to be most similar to *T. jonesii*. Wiggins (1955, 1964) noted the very dense stipitate glands found on *T. jonesii* (then identified as *T. amblyodonta*) that easily separate it from other *Tragia* species found in the Sonoran Desert. The glands of these two species differ in size and thickness: *T. jonesii* has stipitate glands that are ca. 0.2 mm tall with a gland diameter ca. 1/5 the height; *T. moranii* has stalked glands that are ca. 0.1 mm tall with a gland diameter ca. 1/3 the height. Compared to *T. moranii*, gland densities are much greater in *T. jonesii* (Table 2). The glands of *T. jonesii* also darken with age, giving the peduncle a spotted appearance. In comparison, the glands of *T. moranii* remain white as the inflorescence ages.

Unlike *Tragia moranii*, which grows in the dry mountainous slopes of the Baja peninsula, *T. jonesii* is found in the coastal scrub and some inland sites of both Sonora and the Cape Region of Baja California Sur (Steinmann & Felger 1997). Field notes from several collections indicate that *T. jonesii* is often found in the shade. Conversely, *T. moranii* has been collected on the exposed northern and eastern slopes of several peaks composed of volcanic rocks and soils (Figs. 3-4).

Tragia moranii superficially resembles *T. urticifolia* Michx. and has resulted in many misidentifications of herbarium collections. These two species differ in both vegetative and reproductive structures. For example, the leaves of *T. urticifolia* are lanceolate like some *T. moranii* plants but much narrower and, unlike *T. moranii*, found chiefly on solitary stems (Fig. 4). *Tragia*



Figure 4. *Tragia moranii*, Carter 4490. Courtesy of UC-JEPS.

urticifolia is found on sandy soils in the central USA (Miller 1964; Miller & Webster 1967; Urtecho 2016). The presence of scattered stalked and sessile glands, undulate to subpapillate stigma, and persistent staminate pedicel bases that are shorter than their subtending bract distinguishes *T. moranii* from *T. urticifolia*.

Two varieties of *Tragia nepetifolia* occur in mesic pine and oak woodlands of western Mexico (Urtecho 1996). A recent collection of *T. nepetifolia* var. *setosa* from the Sierra de La Laguna in Baja California Sur (Dominguez 2065, SD!) is the first record of this taxon on the peninsula. Although similar to *T. moranii*, it differs in several reproductive and vegetative features (Table 2).

Tragia moranii is named in honor of Dr. Reid Venable Moran, a California botanist and longtime curator of botany at the San Diego Natural History Museum. He is best known for his expertise in the Crassulaceae and his extensive contributions to the flora of Baja California.

3. TRAGIA GENTRYI Urtecho, **sp. nov.** **TYPE: MEXICO. Sinaloa.** Capadero, Sierra Tacuichamona, rocky canyon bottom, short tree forest, 3500 ft, 13 Feb 1940, *H.S. Gentry 5613* (holotype: MEXU! isotypes: MICH!, CAS!, MO!, RSA-POM!).

Tragia gentryi is similar to *T. pacifica* in both habit, presence of basilaminar glands, and in possessing glandular fruits and flowers. It differs by having oblong leaves with truncate to cordate bases and subulate stalked glands on the ovary and fruit.

Stems few to many from a woody taproot, ca. 2 mm in diameter, length 1m or greater, light green to tan, decumbent or trailing; upper internodes 0.8–2 cm long, lower internodes 5–9 cm long. **Leaves** oblong to narrow triangular-ovate, 2–9.5 cm long, 0.7–5 cm broad, apically acute to acuminate, basally cordate, truncate to shallowly cordate, margins serrate, with few scattered stinging hairs on the upper surface, most hairs along upper and lower primary and secondary veins; petioles 3–30 mm long, woolly with basilaminar stipitate glands; stipules lanceolate, 2.5–4 mm long, 1.25–1.5 mm broad, ciliate, basally glandular. **Inflorescence** racemose, 15–21 cm long, peduncle 2.2–3.5 cm long to the first node, densely stipitate-glandular with a single pistillate flower at the lowest node, occasionally branching, 15–67 staminate flowers per raceme; bracts of pistillate flowers lanceolate, 1.75–3 mm long, ciliate, acute, sometimes 3-lobed and glandular; bracts of staminate flowers lanceolate, sub-cucullate, 1–1.5 mm long, ciliate with scattered stipitate glands, entire margined. **Staminate flowers:** pedicels long, 2.5–3 mm long, persistent base regularly exceeding the length of the subtending bract, 1.5–2 mm long, densely covered with long stipitate glands, especially near the point of articulation; sepals 3, ciliate, ovate, 1.25–1.5 mm long; 0.75–1 mm wide; stamens 3; filaments fleshy, 0.5–0.7 mm long, connate at base, narrowing at the attachment to anther, anthers introrse. **Pistillate flowers:** pedicels 3–3.25 mm long in anthesis, 4–5 mm long in fruit; sepals lanceolate, ciliate, 2.5–3 mm long, 0.5–0.75 mm broad; densely covered with acicular and subulate stipitate glands; styles united from 3/4 their length, stigma surface smooth on an undulating surface. **Fruit** ca. 5 mm long, 8 mm broad, columella ca. 2 mm long; seeds nearly spherical, 2 mm in diameter, mottled brown-tan, microsculpture of long, narrow, low relief ridge cells.

Tragia gentryi grows in short tropical deciduous forests of Nayarit and Sinaloa from 480–1000 m (Fig. 7).

Representative collections. MEXICO. Nayarit. Maria Madre, Tres Marias Islands, 1 m W of Penal Colony, 13 Oct. 1925, *Ferris 5655* (US, MO); Mpio. Tuxpan, Las Penitas, 15 Nov. 1943, *Hernández 65* (TEX-LL). **Sinaloa.** Mpio. Escuinapa, El Camarón, 14 km al E de Escuinapa, Brecha Escuinapa-Corral de Piedra, 4 Dec 1982, *Tenorio 2881* (MEXU, RSA-POM); Mpio. Rosario, Cacolotan, El Habal, n.d., *Ortega 975* (MEXU); State of Sinaloa, 1922, *Ortega 4786* (US).

In the original description of *Tragia pacifica*, McVaugh cited several collections from Sinaloa as conspecific with his Jalisco holotype. These collections had oblong rather than the cordate leaves of the type (Table 1, Fig. 5B). Although both collections are densely glandular, there appear to be differences in the gland morphologies found on the ovaries. The original species diagnosis distinguishes between two types of ovary glands on *T. pacifica* — subulate or cristate. The cristate gland type is found on the holotype's ovaries. This gland forms a crest-shaped structure made by adnate gland stalks forming a gland complex with as many as eight gland heads per unit. The cristate gland structure is found throughout the range of *T. pacifica* (Jalisco, Mexico to El Salvador) and is a unique character found only in this species.

Collections from Sinaloa and Nayarit have very different ovary gland arrangements. These plants have subulate-acicular glands that are never cristate (Fig. 5A). Such awl-shaped glands are also found in other described species (i.e., *Tragia potosina*). These species are very different and cannot be confused with *T. pacifica*. The subulate glands found in the Sinaloa collections are long and originate

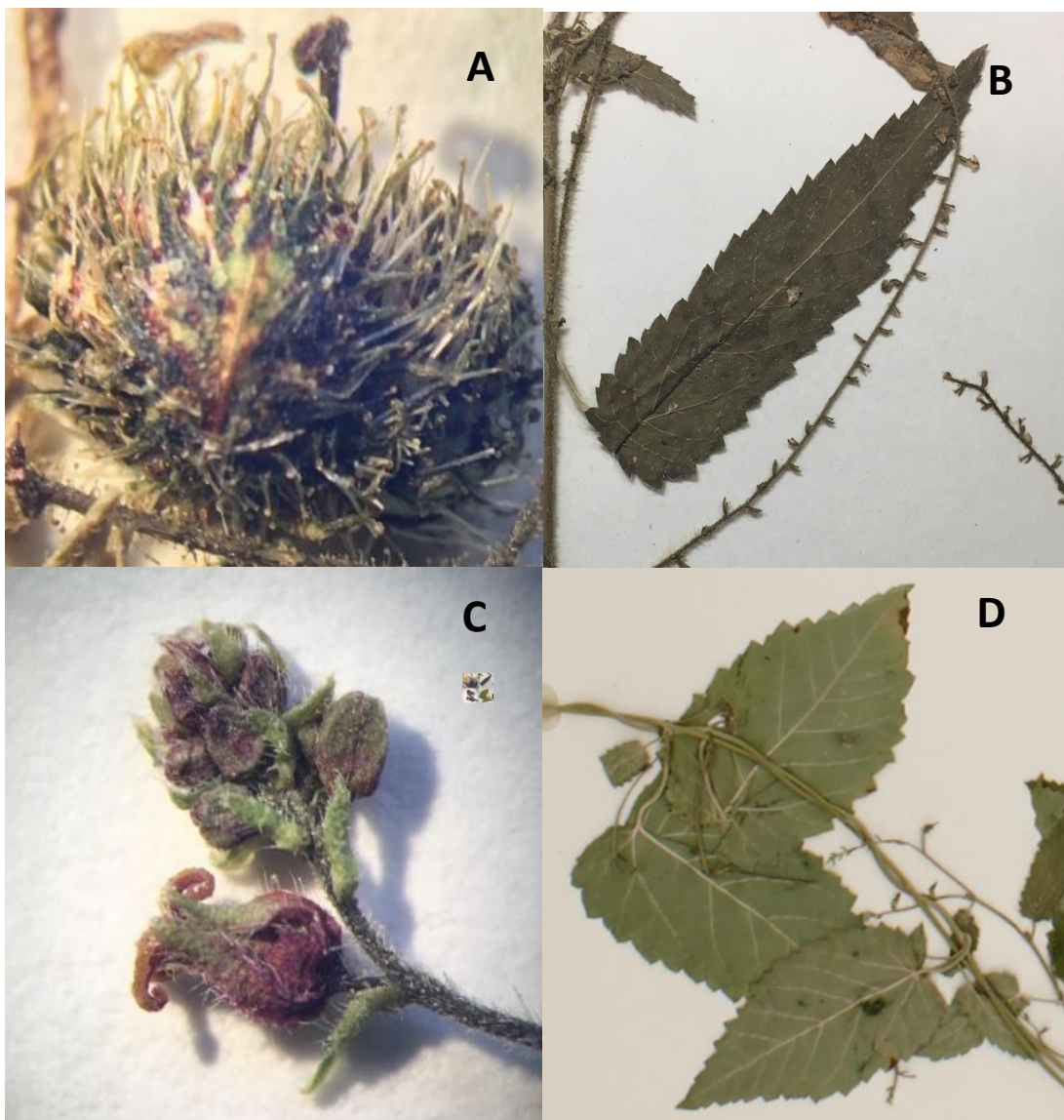


Figure 5. *Tragia gentryi*. A. Fruit covered with subulate ovary glands. B. Oblong leaf (*Gentry 5613*). *Tragia mcvaughii*. C. Inflorescence. D. Detail of leaves (*Van Devender 94-877*).

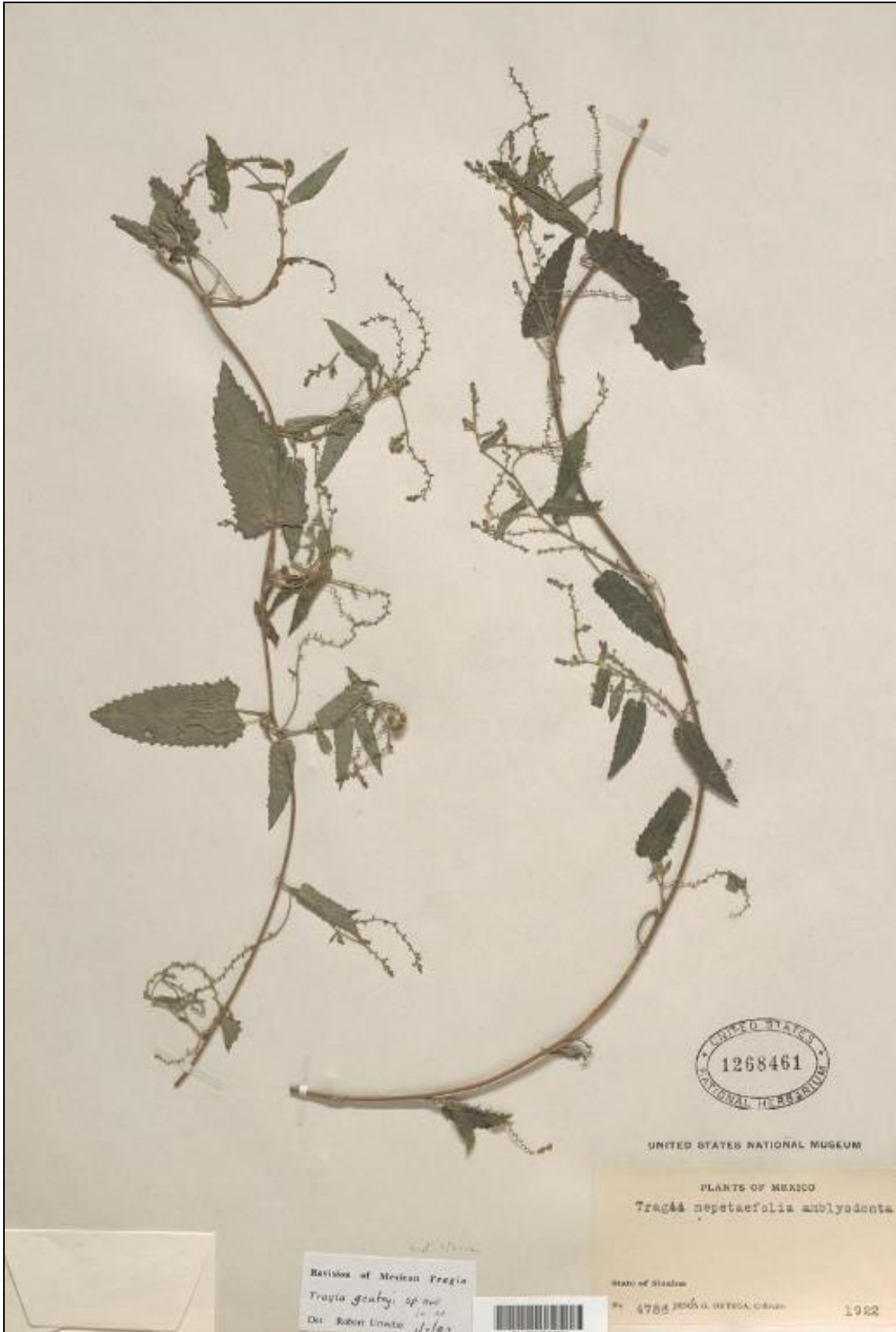


Figure 6. *Tragia gentryi* Urtecho. Courtesy of the US National Herbarium.

from a broad base that forms a pedestal (Fig. 5A). The gland head is large and multicellular. Like *T. pacifica*, the gland stalks and bases remain persistent on the surface of the ovaries in fruit, where they darken and give the fruit a spotted appearance. It is recorded on a few collection labels of *T. gentryi* that the plant is prostrate and trailing. This habit would separate it from the twining *T. pacifica*, which climbs to 3 meters in the coastal forests of western Mexico. The leaves of *T. gentryi* tend to be longer and less cordate than the *T. pacifica* collected and described by McVaugh. Some of the larger-leaved collections of *T. mcvaughii* from Sonora superficially resemble *T. gentryi*, differing only in the absence of long ovary glands and oblong leaves (Fig.5).

The species is named in honor of the original collector of the Sinaloa plants, Howard Scott Gentry. Dr. Gentry was an expert in the plants of northwestern Mexico, especially those of the Sierra Madre Occidental of Chihuahua and the Rio Mayo region of Sonora.

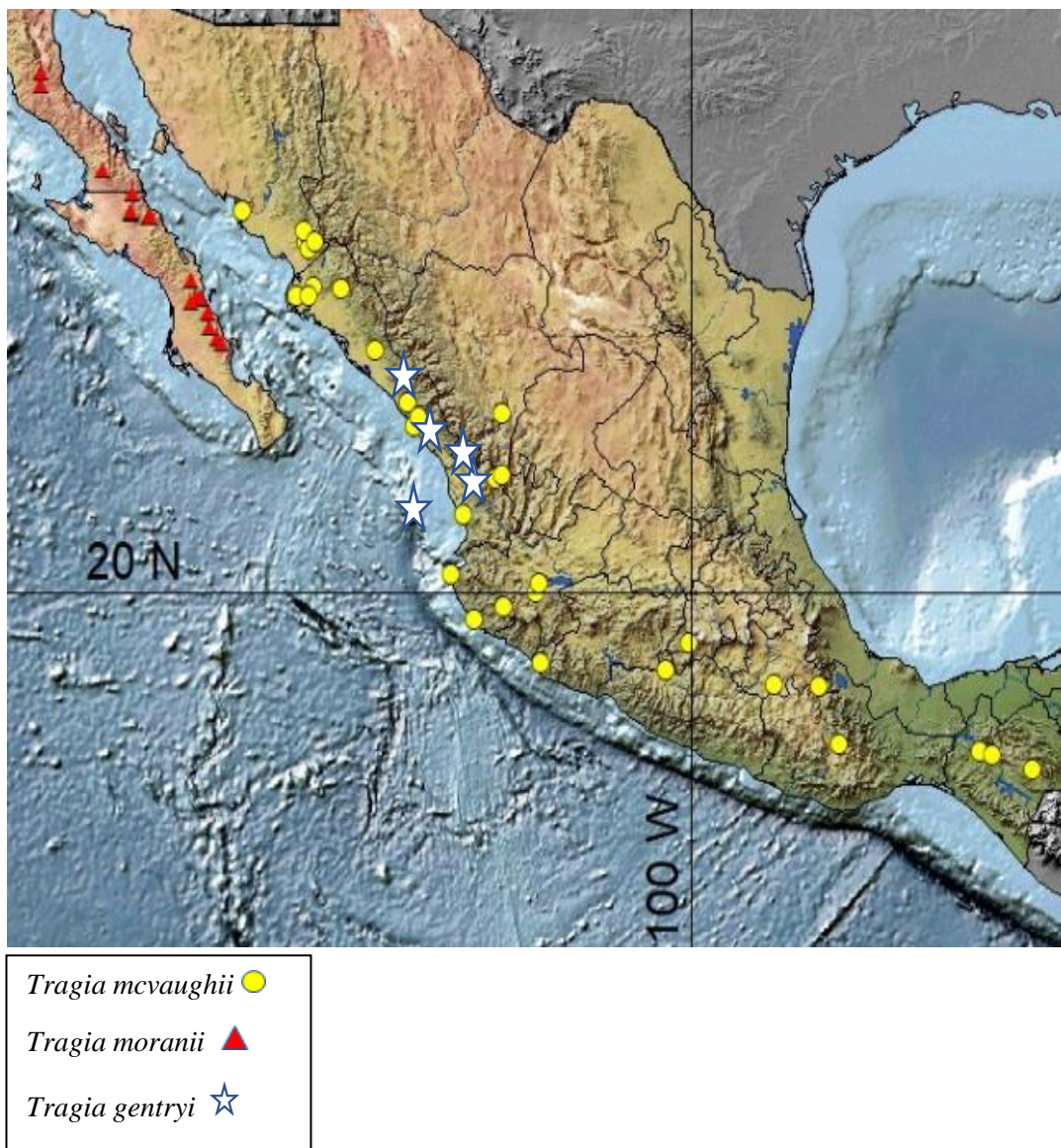


Figure 7. Distribution of three species of *Tragia* in Mexico.

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