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Jatropha chazaroi (Euphorbiaceae), an endangered new species from Apazapan, Veracruz, Mexico

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Abstract

Jatropha chazaroi is described and illustrated as a new species from the state of Veracruz, Mexico. It is morphologically similar to *J. podagrica* but is distinguished by being a tree or shrub devoid of a caudex (vs. shrub with caudex) and lacking persistent and spinescent stipules (vs. having persistent and spinescent stipules). Its flowers possess connate staminate and pistillate calyces and corollas (vs. not connate). *Jatropha chazaroi* is only known from the municipality of Apazapan, Veracruz, and thrives in shady sites throughout intermittent waterways.

Keywords: Euphorbiaceae, *Jatropha*, Mexico, Neotropics

Introduction

The genus *Jatropha* Linnaeus (1753: 1006) has about 186 species (Govaerts *et al.* 2000), and its natural distribution is pantropical, with the exception of East Asia and the islands of the Pacific Ocean. There are 49 native species in Mexico (48 according to Jiménez-Ramírez & Vega-Flores 2011), if we consider the new species proposed here. Thirty-eight of these are endemic to the country, so that endemism reaches 77.5%, which far exceeds the 52% endemism registered for the entire Mexican flora (Rzedowski 1991). This fact suggests that the Mexican lineages of *Jatropha* have evolved essentially within Mexico. The subgenus *Curcas* (Adanson 1763: 356) Grisebach (1859: 36) has three sections and is almost entirely Mexican. This can be appreciated if we acknowledge that 41 of its 43 species inhabit the country. In contrast, there are only eight Mexican species of subgenus *Jatropha* that belong to two of the four sections currently recognized (*sensu* Dehgan 2012).

Eight species of *Jatropha* have been recorded from the state of Veracruz: *J. ciliata* Sessé (*in* Cervantes 1794: 4), *J. curcas* Linnaeus (1753: 1006), *J. dioica* Sessé (*in* Cervantes 1794: 4), *J. gossypiifolia* Linnaeus (1753: 1006), *J. podagrica* Hooker (1848: t. 4376), *J. pseudocurcas* Müller Argoviensis (1865: 208), *J. sotoi-nunyesii* Fernández-Casas & Martínez (2008*:* 471) and *J. sympetala* Blake & Standl. (*in* Blake 1920: 118) [= *J. standleyi* Steyermark (1940: 152), following Dehgan 2012, Barragán 2017, and personal observations]. *Jatropha gaumeri* (Watson 1891: 150) Greenman (1907: 256) has also been registered in a recent publication (Christensen *et al*. 2019), but its presence cannot be corroborated since no specimens could be found in any herbarium consulted. In addition, it is not cited for Veracruz in the monograph of the genus *Jatropha* in the Neotropics (Dehgan 2012).

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The species herein proposed as new was collected during botanical explorations for the project "Floristic study of the municipality of Apazapan, Veracruz" directed by Miguel Cházaro Basáñez, a researcher of the Universidad Veracruzana at Xalapa, Veracruz, Mexico.

Taxonomy

Jatropha chazaroi **O. Sánchez, J. Jiménez Ram. & Arzaba***, sp. nov.* Figs. 1, 2.

Similar to *J. podagrica* but differing by an arborescent or shrubby habit up to 5 m tall (vs. shrubs 1–2 m tall), lacking a caudex (vs. caudex present), leaves with deciduous, non-spinescent stipules (vs. persistent and spinescent stipules), leaf blades 25–36 × 30–35 cm [vs. 14–22.5(–32) × 8.5–19 (–23.5) cm], petioles 25–39 cm long (vs. 16–28 cm long), inflorescences 4–14.4 cm long [vs. (6–)12.5–36 cm long], connate calyces and corollas of flowers (vs. non-connate), and oblong-elliptic seeds, 1.1–1.3 cm long (vs. oval seeds, 0.55–0.6 cm long).

TYPE:—MEXICO. Veracruz: Municipality of Apazapan, Paraje de Poza Larga, por Las Carabinas, 600 m, 22 May 2021 (fl.), *M. Cházaro B., C. Arzaba V. & O. Sánchez S. 11120* (holotype: FCME!; isotypes: CIB!, MEXU!, XALU!).

Trees or shrubs, deciduous, up to 5 m tall, monoecious, secondary branching sympodial; bark greenish-yellowish, smooth, with prominent lenticels (1 cm long). Leaves glabrous; stipules reduced to glands, one apical, bilobed, ca. 3 mm long, and two lateral, inconspicuous, ca. 0.5 mm long; petiole 25–39 cm long; blade obovate, 5–7-lobed, peltate, 25–36 × 30–35 cm, lobes 9–12 × 2–4 cm, apex acute-cuspidate, base hastate, margin entire, dark-green, lower surface glaucous-green, primary venation palmate with prominent main nerves, secondary venation brochidodromous-semicraspedodromous. Inflorescences corymbose cymes, axillary, monotelic, 4–14.4 cm long, peduncle 4–6(–9.8) × 0.5–0.58 cm, usually with an apical pistillate flower surrounded by numerous staminate flowers, basal pistillate bracts up to 1 cm long, hirsute, pink, paraclades 0.5–2.5 cm long, red-orange. Staminate flowers red-orange, 4.5–5 × 3–3.2 mm, pedicel 1.3–1.5 mm long; calyx connate, 3.6–3.8 mm long, lobes 5, 2.6–3.3 × 1.1–1.2 mm, oblong-lanceolate, purplish, apex acute; corolla connate, 4.7–5 mm long, lobes 5, 3.1–3.8 × 1.2–1.7 mm, pink, broadly oblong, apex rounded; disc with 5 ellipsoid glands, 0.7–0.9 × 0.45–0.5 mm; stamens 10, connate, uniseriate, filaments 2.45–2.75 mm long, anthers 1.1 × 0.4–0.5 mm. Pistillate flowers red-orange, 7.2–9 × 3.4–3.5 mm, pedicel ca.1 mm long, calyx connate, 6.7–9 mm long, lobes 5, 6.7–9 ×1.4–1.5 mm, foliaceous, unequal, base keeled, apex acuminate; corolla connate, 6.2–6.9 mm long, lobes 5, 4.2–5.1 × 1.4–2 mm, upper surface pubescent; disc with 5 lenticular glands, 1.6–2 × 1–1.2 mm; pistil 5.4–6.7 mm long; styles 3, connate, stigmas 3, bifurcate. Capsules spherical, 21–21.3 × 24.7–25.5 mm, conspicuously trilocular, with (1–2–)3 oblong-elliptic seeds. Seeds beige, often with dark and linear marks, 1.1–1.3 × 1–1.16 cm, caruncle triangular.

Distribution and ecology:—The species is distributed in central Veracruz, at the Apazapan *ejido*, where it has only been collected in the Poza Larga canyon, which crosses the hills of Las Carabinas. It is a microendemic species, it could not be found outside the mentioned area despite intensive and careful exploration. It often occurs in sites close to intermittent water and places protected by north-south oriented walls on rocky volcanic soils. It grows in tropical deciduous forest, forming part of the tree canopy with *Ficus cotinifolia* Kunth (*in* Humboldt & Bonpland 1817: 49), *Luehea candida* (Mociño & Sessé ex de Candolle 1824: 517) Martius (*in* Martius & Zuccarini 1826: 102), *Margaritaria nobillis* Linnaeus (1782: 428), *Acacia cornigera* Willdenow (1806: 1080), *Plumeria rubra* Linnaeus (1753: 209), *Beaucaernea recurvata* Lemaire (1861: 59), *Croton niveus* Jacquin (1760: 32), and *Bauhinia divaricata* Linnaeus (1753: 374), among others.

Phenology:—It remains without leaves during the cold winter months (with temperatures oscillating between 14 and 16º C) and recovers its foliage during the first warm months. It begins flowering during the months of April or May; fruiting starts in mid-July, although it is most frequent from August to late October.

Etymology:—The species name honors Dr. Miguel Cházaro-Basáñez, professor at the Facultad de Biología of the Universidad Veracruzana, Xalapa. He has been exploring and collecting botanical specimens for more than 40 years throughout the states of Veracruz and Jalisco. His work has allowed him to publish numerous articles on the vegetation and flora of both areas.

Local names and uses:—"Piñon" and "piñon de monte" are the common names. It has been documented that the seeds are used to make a type of stew called "pipián" in central Veracruz. The seeds of a non-toxic variety of *Jatropha curcas* are also traditionally used for the same purpose in the Totonacapan region located in the northern part of Veracruz (Sánchez-Sánchez *et al.* 2020). It is usually cultivated as an ornamental plant due to its very showy flowers, inflorescences and lobed leaves.

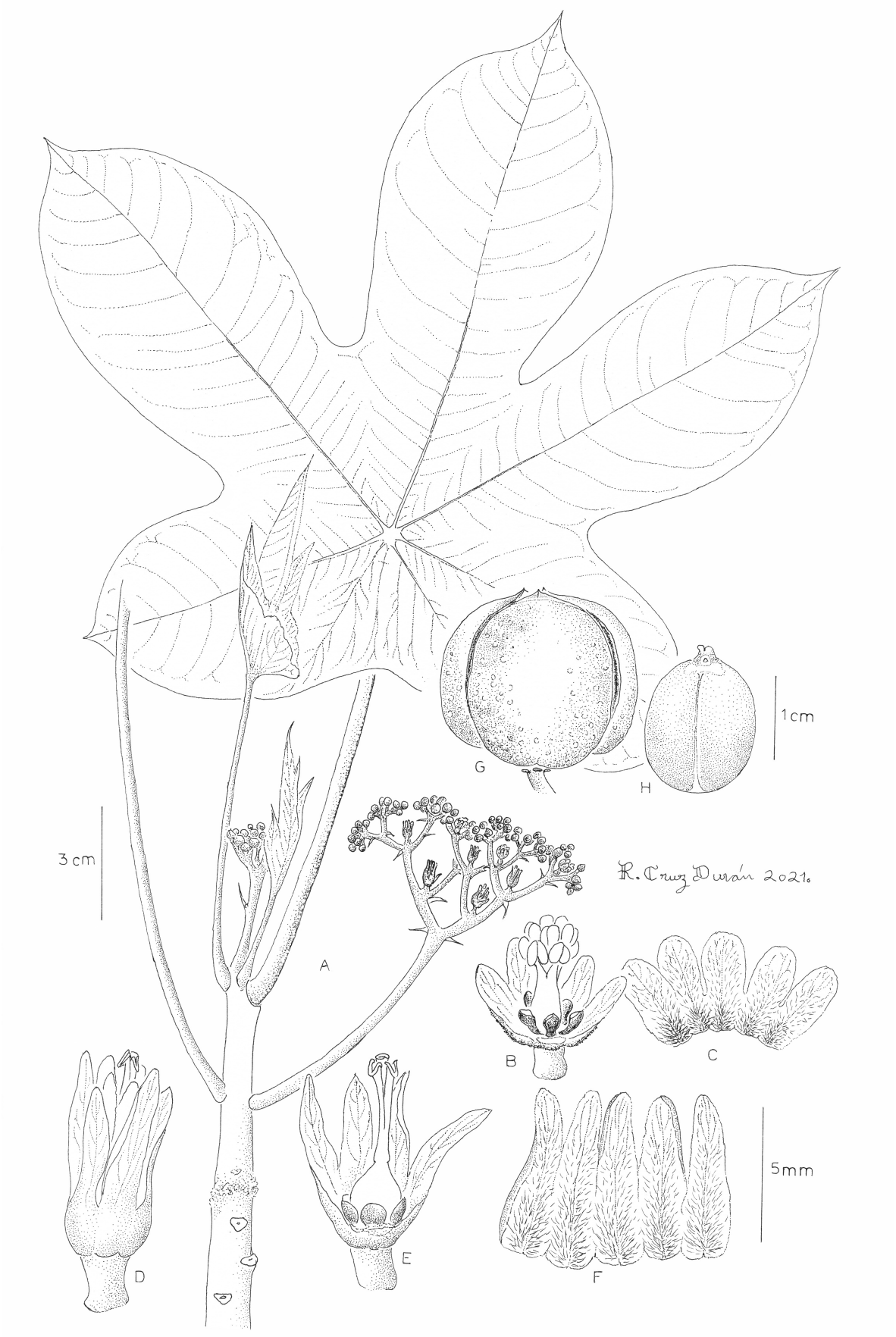

FIGURE 1. *Jatropha chazaroi*. A. Floral branch, B. and C. Staminate flower. D, E and F. Pistillate flower. G. Capsule. H. Seed. All drawn from *M. Cházaro B., C. Arzaba V. & O. Sánchez S. 11120* (FCME) by Ramiro Cruz Durán.

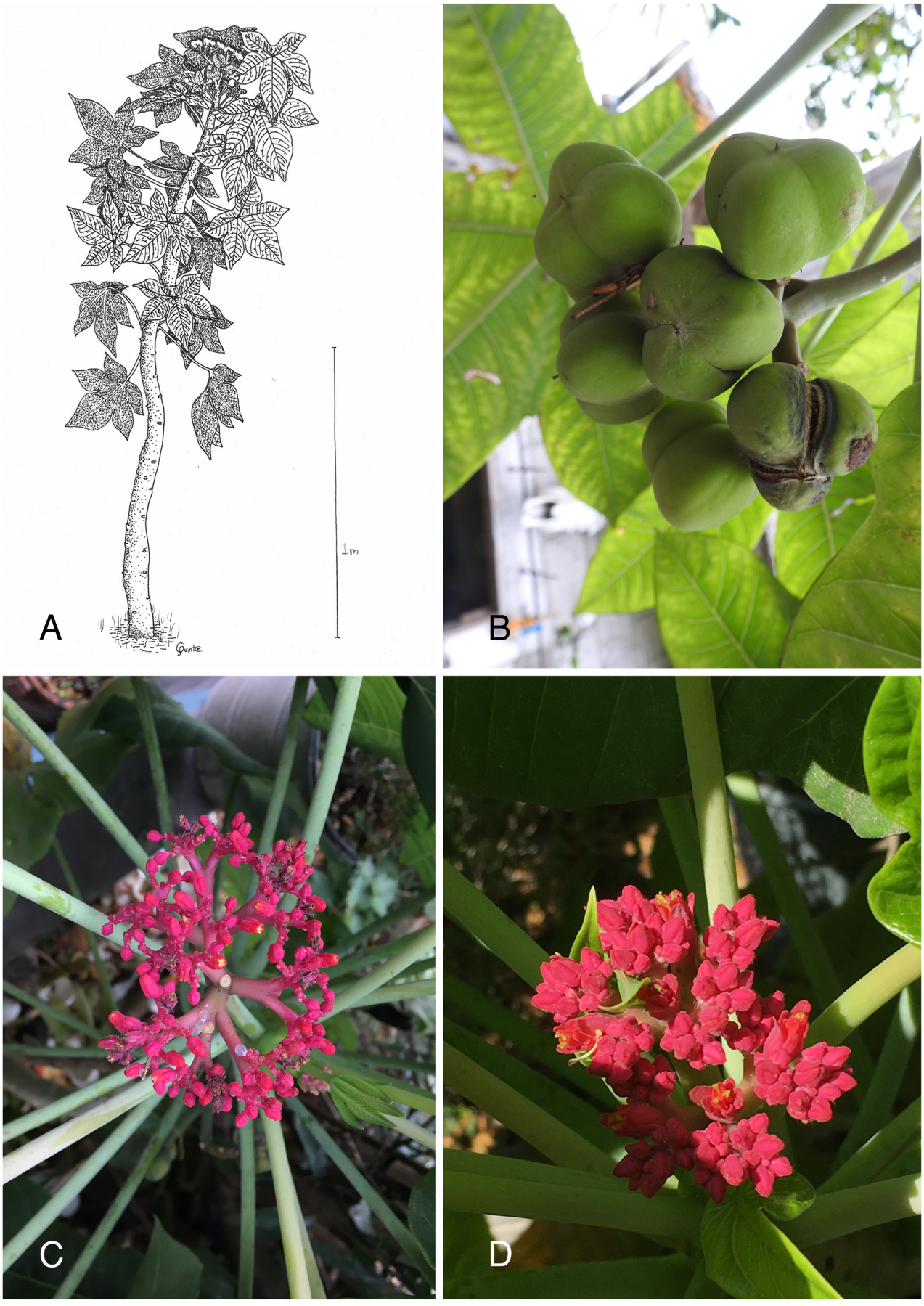

FIGURE 2. *Jatropha chazaroi*. A. Habit of young shrub. B. Capsules. C. Inflorescence with open staminate flowers. D. Inflorescence with open pistillate flowers. A drawn by Gerardo Quintas Andrade; photographs B, C and D by Odilón Sánchez-Sánchez.

Conservation status:—There is only one known population of this new species with of 45 individuals located in the Poza Larga canyon (in the *ejido* of Apazapan, Veracruz). Therefore, it should be considered as a microendemic species and be included as a category EN species at the IUCN List of Threatened Species (Endangered) (IUCN 2022).

Additional specimens examined (**paratypes**):—MEXICO. Veracruz: Municipality of Apazapan, Ejido Las Carabinas, cañada de la Poza Larga, 600 m, 8 August 2015 (immat. fr.), *L. Rosales-Lara 425* (CIB, FCME, MEXU, XAL); 1 May 2016 (fl.), *L. Rosales-Lara 580* (CIB, FCME, MEXU, XAL), 1 May 2016 (fl.), *L. Rosales-Lara 596* (CIB, FCME, XAL).

Discussion

The new species has orbicular, peltate and lobed leaves, long-pedunculate corymbose cymes, pink flowers, monadelphous and uniseriate stamens, and trilocular capsules with three carunculate seeds. Therefore, based on morphology, it can be placed in section *Peltatae* Pax (1910: 43), subsection *Multifidae* Pax (1910: 40) of the subgenus *Jatropha*. This sectional and subsectional circumscription coincides with the molecular phylogeny reported for the genus (LeClear 2019). it is related to *J. podagrica*, but differs from it, by the arborescent or shrubby habit up to 5 m tall, lacking a caudex, leaves with deciduous, non-spinescent stipules, leaf blades 25–36 × 30–35 cm, petioles 25–39 cm long, inflorescences 4–14.4 cm long, connate calyces and corollas and oblong-elliptic seeds, 1.1–1.3 cm long, as seen in the following key.

Key to distinguish *Jatropha chazaroi* within the subsection *Multifidae*, modified from Dehgan (2012)

1. Plants herbaceous; caudex subterranean ..... *J. cathartica* Terán & Berlandier (1832: 9–11).
- Plants woody; caudex absent or aerial..... 2
2. Leaves with 9–11 lobes, margin incised; stipules 6–15(–25) mm long; capsules 3–5 cm in diameter; seeds without caruncle .... *J. multifida* Linnaeus (1753: 1006)
- Leaves with 3–5(–7) lobes, margin entire; stipules 4 mm long or less; capsules 2.55 cm in diameter or less; seeds with caruncle.
3. Trees or shrubs up to 5 m tall, without a caudex; stipules deciduous, non-spinescent; leaf blade 25–36 × 30–35 cm; petiole 25–39 cm long; inflorescence 4–14.4 cm long; calyx and corolla connate; capsule spherical, conspicuously trilobed; seeds oblong-elliptic, 1–1.3 cm long ..... *J. chazaroi*
- Shrubs 1–2 m tall, with a conspicuous aerial caudex; stipules persistent, spinescent; leaf blade 14–22.5(–32) × 8.5–19(–23.5) cm; petiole 16–28 cm long; peduncle (6–)12.5–36 cm long; calyx and corolla not connate; capsule cylindrical, slightly trilobed at maturity; seeds ovoid, 0.55–0.6 cm long..... *J. podagrica*

Traditionally it has been mentioned that *J. podagrica* is a mostly cultivated species that occasionally escapes from cultivation and becomes naturalized, but Grady Webster, the foremost American specialist in Euphorbiaceae, pointed out that *J. podagrica* is most likely native from Mexico to eastern Guatemala and Nicaragua, where it is found in the wild on rocky locations at low elevations (Webster 1987). This circumstance contrasts greatly with the habitat of *J. chazaroi,* along the banks of intermittent waterways in sites protected by the walls of the ravines. The strong resemblance between the new species and *J. podagrica* suggests that they are very closely related. Perhaps it originated from the separation of the same lineage through habitat change, since one thrives in humid, protected places (*J. chazaroi*) and the other (*J. podagrica*) in stony sites exposed to high insolation. This is a frequent phenomenon present in other Mexican lineages of angiosperms, possibly facilitated, among other things, by the numerous climatic changes that occurred throughout the complex geological history of the country, and particularly during the last Pleistocene glaciation.

In the chronogram of Mexican *species of Jatropha* and their related lineages, the clade formed by *J. podagrica* and *J. multifida* originated in the late Miocene, just under 6 million years ago (LeClear 2019). This suggests that the *J. podagrica* lineage has long thrived in the country and in Central America, which could have allowed *J. chazaroi* to originate in some time at Veracruz state.

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References

Adanson, M. (1763) *Familles des plantes* 2. Vincent, Paris, 640 pp. https://doi.org/10.5962/bhl.title.271

Barragán, S.B. (2017) *Distribución y usos del género Jatropha L. (Euphorbiaceae) en Veracruz*. Facultad de Biología, Universidad Veracruzana. Xalapa, Veracruz, 65 pp.

Blake, S.F. (1920) New trees and shrubs from Mexico and Guatemala. *Proceedings of the Biological Society of Washington* 33: 117–20.

Cervantes, V. (1794) Discurso pronunciado en el Real Jardín Botánico el 2 de junio por el catedrático Don Vicente de Cervantes. *Gazeta de Literatura de México* 3 (Suppl.): 1–9.

Christensen, C.S.L., Seal, C.E. & Rico-Arce, L. (2019) Threatened status of neglected and underutilised *Jatropha* (Euphorbiaceae) species endemic to Mexico. *Revista Mexicana de Biodiversidad* 90. https://doi.org/10.22201/ib.20078706e.2019.90.2903

de Candolle, A.P. (1824) *Prodromus Systematis Naturalis Regni Vegetabilis* 1. Treuttel & Würz, Paris, 748 pp

Dehgan, B. (2012) *Jatropha* (Euphorbiaceae). Flora Neotropica Monograph 110. Published for The Organization for Flora Neotropica by The New York Botanical Garden Press, New York, 273 pp.

Fernández-Casas, F.J. & Martínez, E. (2008) Jatropharum notulae (Euphorbiaceae) 5. *Fontqueria* 55 (62): 471–480.

Govaerts, R., Frodin; D.G. & Radcliffe-Smith, A. (2000) *World checklist and bibliography of Euphorbiaceae (and Pandanaceae)* Royal Botanic Gardens, Kew, 1661 pp.

Greenman, J.M. (1907) New or Noteworthy spermatophytes from Mexico, Central America, and the West Indies. *Publications of the Field Columbian Museum, Botanical Series* 2 (6): 247–287. https://doi.org/10.5962/bhl.title.2239

Grisebach, A.H.R. (1859) *Flora of the British West Indian Islands* 1 Reeves, & Co. London, 96 pp.

Hooker, W.J. (1848) *Jatropha podagrica*. *Curtis´s Botanical Magazine* 74: t. 4376.

Humboldt, F.W.H.A. von & Bondpland, A.J.A. (1817) *Nova genera et species plantarum (quarto ed.)* 2. Greek-Latin-German Library, Paris, 324 pp.

IUCN (2022) *Guidelines for Using the IUCN Red List Categories and Criteria. Version 15*. Prepared by the Standars and Petitions Subcommittee. Available from http://www.iucnredlist.org./documents/RedListGuidelines.pdf (accessed 23 May 2022)

Jacquin, N.J. (1760) *Enumeratio systematica plantarum*. Apud Theodorum Haak, Lugduni Batavorum, 41 pp.

Jiménez-Ramírez, J. & Vega-Flores, K. (2011) *Jatropha mirandana* (Euphorbiaceae), especie nueva de la Cuenca Oriental del río Balsas de los estados de Guerrero y Puebla. *Novon* 21: 193–195. https://doi.org/10.3417/2009100

LeClear, N.M. (2019) *Evolution of Jatropha: phylogenetics, biogeography, and phylogeography* (Doctoral dissertation). The University of Texas at Austin, Austin, Texas, 176 pp.

Lemaire, A.C. (1861) Genre nouveau de la famille des Asparagacées. *L´illustration Horticole* 8 (misc.): 57–62.

Linnaeus, C. (1753) *Species Plantarum*. Salvius, Stockholm, 1200 pp.

Linnaeus, C. (1782) *Supplementum Plantarum.* Salvius, Stockholm, 468 pp.

Martius, C.F.P. von & Zuccarini, J.G. (1826) *Nova genera et species plantarum* 1. Typis Lindaueri, München, pp. 1–158.

Müller Argoviensis, J. (1865) Euphorbiaceae. Vorläufige Mittheilungen aus dem für De Candolle´s Prodromus bestimmten Manuscript über diese Familie. *Linnaea* 34: 1–224.

Pax, F. (1910) Euphorbiaceae—Jatrophae. *In*: Engler, H.G.A. (ed.) *Das Pflanzenreich* IV. 147 (Heft 42). Wilhelm Engelmann, Leipzig, pp. 1–148.

Pérez-Cálix, E. & Castillo-Campos, G. (1988) Una especie nueva de *Hyperbaena* (Menispermaceae) de Veracruz, México. *Acta Botánica Mexicana* 4: 15–19. https://doi.org/10.21829/abm4.1988.570

Rzedowski, J. (1991) El endemismo en la flora fanerogámica mexicana: una observación preliminar. *Acta Botánica Mexicana* 15: 47–64. https://doi.org/10.21829/abm15.1991.620

Sánchez-Sánchez, O.M., Váldes-Rodríguez, O., Martínez-Herrera, J. & Sánchez-Herrera, D.E. (2020) *El piñón mexicano no tóxico (Jatropha curcas L.): importancia y fundamentos prácticos para su propagación siembra y cuidados*. Instituto Literario de Veracruz S.C. Xalapa, Veracruz, pp. 1–81.

Steyermark, J.A. (1940) Studies of American Plants XI. *Publications of the Field Museum of Natural History, Botanical Series* 22 (3): 133–288.

Terán, M.M. & Berlandier, J.L. (1832) *Memorias de la comisión de límites*. Matamoros, México, pp. 1–16.

Watson, S. (1891) Contributions to American botany. *Proceedings of the American Academy of Arts and Sciences* 26: 124–164. https://doi.org/10.2307/20013481

Webster, G.L. (1987) A new species of *Jatropha* (Euphorbiaceae) from Nicaragua. *Annals of the Missouri Botanical Garden* 74: 117–120. https://doi.org/10.2307/20013481

Willdenow, C.L. (1806) *Species Plantarum. Editio quarta* 4 (2). Impensis G.C. Nauk, Berlin, 1157 pp. https://doi.org/10.2307/2399266