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Garcinia isthmensis (Clusiaceae): a new tree species for Central America

THIAGO MOUZINHO[1,6*], JUAN F. CARRIÓN[2,3,7], LUCAS CARDOSO MARINHO[4,8] & LEANDRO LACERDA GIACOMIN[5,9]

[1]*Instituto Nacional de Pesquisas da Amazônia – INPA, Laboratório de Taxonomia Vegetal, Av. André Araújo, 2936, Petrópolis, 69060–001, Manaus, Amazonas, Brazil*
[2]*Departamento de Botánica, Facultad de Ciencias Naturales, Exactas y Tecnología, Universidad de Panamá, Campus Dr. Octavio Méndez Pereira, apartado 3366, Panama 4, Panama*
[3]*Sistema Nacional de Investigación (SNI), SENACYT, Ciudad del Saber, Clayton, Panama, Panama*
[4]*Universidade Federal do Maranhão, Centro de Ciências Biológicas e da Saúde, Departamento de Biologia, Av. dos Portugueses 1966, Bacanga 65080-805, São Luís, Maranhão, Brazil*
[5]*Universidade Federal da Paraíba, Centro de Ciências Exatas e da Natureza, Departamento de Sistemática e Ecologia, Campus I, 58051-900, João Pessoa, Paraíba, Brazil*
[6] *thiagomouzinhobio@gmail.com; https://orcid.org/0000-0002-3086-5262*
[7] *juan.carrion@up.ac.pa; https://orcid.org/0000-0003-4015-375X*
[8] *lc.marinho@ufma.br; https://orcid.org/0000-0003-1263-3414*
[9] *giacomin.leandro@gmail.com; https://orcid.org/0000-0001-8862-4042*
[*] *Corresponding author*

Abstract

We present a new species, *Garcinia isthmensis* Mouzinho, *sp. nov.* ined., known to occur in Costa Rica and Panama. *Garcinia isthmensis* is described and distribution data, photographs and preliminary conservation status are provided, as well as its diagnostic characteristics and morphological affinities.

Keywords: Guttiferae, jorco, Mesoamerica, Neotropics, satra

Introduction

Garcinia Linnaeus (1753: 443) (Clusiaceae: Garcinieae) is a pantropical genus comprising approximately 250 species (Stevens 2001 onwards). The American species, along with few African ones, form *Garcinia* sect. *Rheediopsis* Pierre (1883), totaling approximately 60 species (Gaudeul *et al*. 2024, Sweeney & Gaudeul 2024). Characters related to fruits, especially the texture of the epicarp (i.e., smooth or ornate), have been widely used for the delimitation of Neotropical species and are frequently employed in identification keys (Planchon & Triana 1860, van den Berg 1979). Recently, vegetative and floral characters have been incorporated as informative and diagnostic for the species (Mouzinho 2022).

Recent studies involving the *Garcinia* species of South America have led to discovery of new species and a revision of the specific and geographical limits of species considered to be widely distributed (Mouzinho *et al*. 2022, 2023). In the Neotropics, the diversity of the genus is centered in Central America and the Antilles, where 23 species are recognized; at least 13 of these are endemic to Cuba (Grisebach 1866, Urban 1899, Pittier 1912, Adams 1970, Borhidi 1981, Liogier 1986, Hammel 1989). In Central America, most species bear fruits with a smooth epicarp, except for *Garcinia madruno* (Kunth [1822: 202]) Hammel (1989: 928), which is the only species with an ornamented epicarp.

Here, we propose *Garcinia isthmensis* Mouzinho, *sp. nov.* ined., which bears fruits with a smooth epicarp and was previously misidentified as *G. magnifolia* (Pittier [1912: 454]) Hammel (1989: 928). We present a description, photographs, distribution map, suggest conservation status and, in addition, compare its morphological aspects with *G. intermedia* (Pittier [1912: 454]) Hammel (1989: 927), another related species.

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Materials and Methods

Specimens from the NY and PMA herbaria (acronyms according to Thiers 2025 updated continuously) were analyzed, as well as high-resolution images from the CR, LI and MO herbaria that are available in the GBIF (https://www.gbif.org/) and REFLORA (http://reflora.jbrj.gov.br/) databases. The terminology used follows Radford *et al*. (1974) for vegetative characters and Gonçalves & Lorenzi (2011) for reproductive ones. *Garcinia*-specific characters follow Mouzinho (2022) and those related to exudate follow Mouzinho & Ferreira-Silva (2024). The morphological aspects of *Garcinia magnifolia* and *G. intermedia* were obtained from Pittier (1912) and Medellín-Zabala (2015), respectively. The types of both species were consulted via the Global Plants JSTOR platform (https://plants.jstor.org/). The maps were prepared using the online tool SimpleMappr (Shorthouse 2010). The online tool GeoCAT (Bachman *et al*. 2011) was used to assess preliminary conservation status of the species, taking into account criterion B and the respective IUCN categories (IUCN 2012) and a standard cell size of 2 km^2 for the calculation of Area of Occupation (AOO).

Taxonomic treatment

Garcinia isthmensis Mouzinho, *sp. nov.* (Figs 1–2).

Type:—COSTA RICA. Puntarenas: Mun. Sierpe, Cantón Osa; Reserva Forestal Golfo Dulce; Rincón, Cuenca de la Quebrada Aguabuena, fin del Camino, finca Montoya, 08°42’19”N, 83°31’9”W, elev.: 163 m, 01 January 2008, fl. ♂, *R. Aguilar 10734* (holotype: NY barcode NY-1095906!; isotype: PMA barcode PMA-104857!).

Diagnosis:—*Garcinia isthmensis* is vegetatively similar to *G. magnifolia* due to its elliptical to elliptic-oblong shape and size of the leaf blades (≥ 19 cm long), but differs from it due to its slightly verrucose branches (vs. smooth in *G. magnifolia*), conspicuous exudate canals (vs. inconspicuous in *G. magnifolia*), staminate flowers with 40–55 stamens per flower (vs. ca. 30 stamens in *G. magnifolia*), non-rostrate fruits (vs. rostrate in *G. magnifolia*) and fruit pedicels of 33.5–44 mm long (*vs*. 7–10 mm long in *G. magnifolia*).

Description:—Trees with up to 15 m height and up to 30 cm DBH; stems with reticulated rhytidome, yellow exudate after cutting on the trunk; branches angular, striated with slightly verrucose texture *in sicco*, exudate yellow after cutting, orange when oxidized. Petioles 15.7–25.6 mm long; dilatation of the base of the petioles oblong *in sicco*. Leaf blades 19–36.2 × 6.2–11 cm, subcoriaceous, pale, greenish-brown and opaque on both surfaces *in sicco*, elliptic to elliptic-oblong, apex rounded to acute, base attenuated, margin revolute *in sicco*; secondary veins ≥ 20 pairs, reaching the margin of the blade, intersecondary veins parallel to the secondary veins with 2–3 pairs per intercostal area; intramarginal vein present, leaves with conspicuous *in sicco*; exudate canals conspicuous *in sicco*. Inflorescences axillary, the staminate fasciculate, with up to 10 flowers, with a mild aroma; bracteoles 2 per flower; pedicels 20–50 mm long, greenish, slightly verrucose. Staminate floral buds 4.5–6.1 × 5.8–6.6 mm, greenish, globose. Staminate flowers with 2 sepals, 5.5–6.8 × 5.5–5.7 mm, greenish, fleshy, rounded; petals 4, white, chartaceous, concave, the outer ones ca. 12 × 7.7 mm, rounded, the inner ones 11.5–12 × 5.4–6.5 mm, oblong; nectariferous disc ca. 6 mm diam., dark yellow, dome-shaped with a depression in the apex; stamens 40–55 per flower, arranged around the disc in 3 series, filaments 4.4–6 mm long, teretes, white to hyaline, anthers ellipsoid, orange, darkened when senescent, thecae 0.69–0.72 × 0.42–0.45 mm. Pistillate inflorescence and flowers not seen. Fruits berries, smooth epicarp; sepals, staminodes and stigmas persistent; when ripe ca. 72.4 × 60 mm, orange, ovoid, rostrum absent; pedicels 33.5–44 mm long. Seeds 2–3, 39.3–44.4 × 20.6–22.6 mm, ellipsoid.

Additional specimens examined (Paratypes):—COSTA RICA. Limón: Cordillera de Talamanca, 10°01’N, 83°25’W, alt: 100-300 m, 20 October 1988, fl. ♂, *G. Herrera & H. Martínez 2223* (CR image!). Puntarenas: Reserva Forestal Golfo Dulce, Osa Península, rancho Quemado, 08°42’N, 83°33’W, Elev.: 250–350 m, 31 May 1988, fr., *B. Hammel 1690* (CR image!, MO image!). Dist. Golfito, Parque Nacional Piedras Blancas, 08°41’N, 83°15’W, Elev.: 250 m, 25 February 1999, fl. ♂, *W. Huber & A. Weissenhofer 1495* (CR image!, LI image!); ibid., Parque Nacional Esquinas, 08°39.868’N, 83°15.139’W, Elev.: 200 m, 16 August 2000, st., *W. Huber & A. Weissenhofer 1977* (LI image!). PANAMA. Coclé: tramo en Potrero Llano, La Pintada y Llano Grande hasta Volteadero, 18 February 2000, bot., *C. Guerra 1100* (PMA!). Veraguas: Montijo, Isla Coiba, 07°38’N, 81°44’W, 23 February 1995, fr., *C. Galdames et al. 2183* (PMA!).

Etymology:—The epithet refers to the Panama isthmus, that connects Meso- and South American regions.

Vernacular name:—Costa Rica: jorco, Panama: satra (Hammel 2010).

FIGURE 1. Holotype of *Garcinia isthmensis* Mouzinho at the NY herbarium (NY-1095906). Image courtesy of the C.V. Starr Virtual Herbarium (http://bluegum.nybg.org/science/vh/).

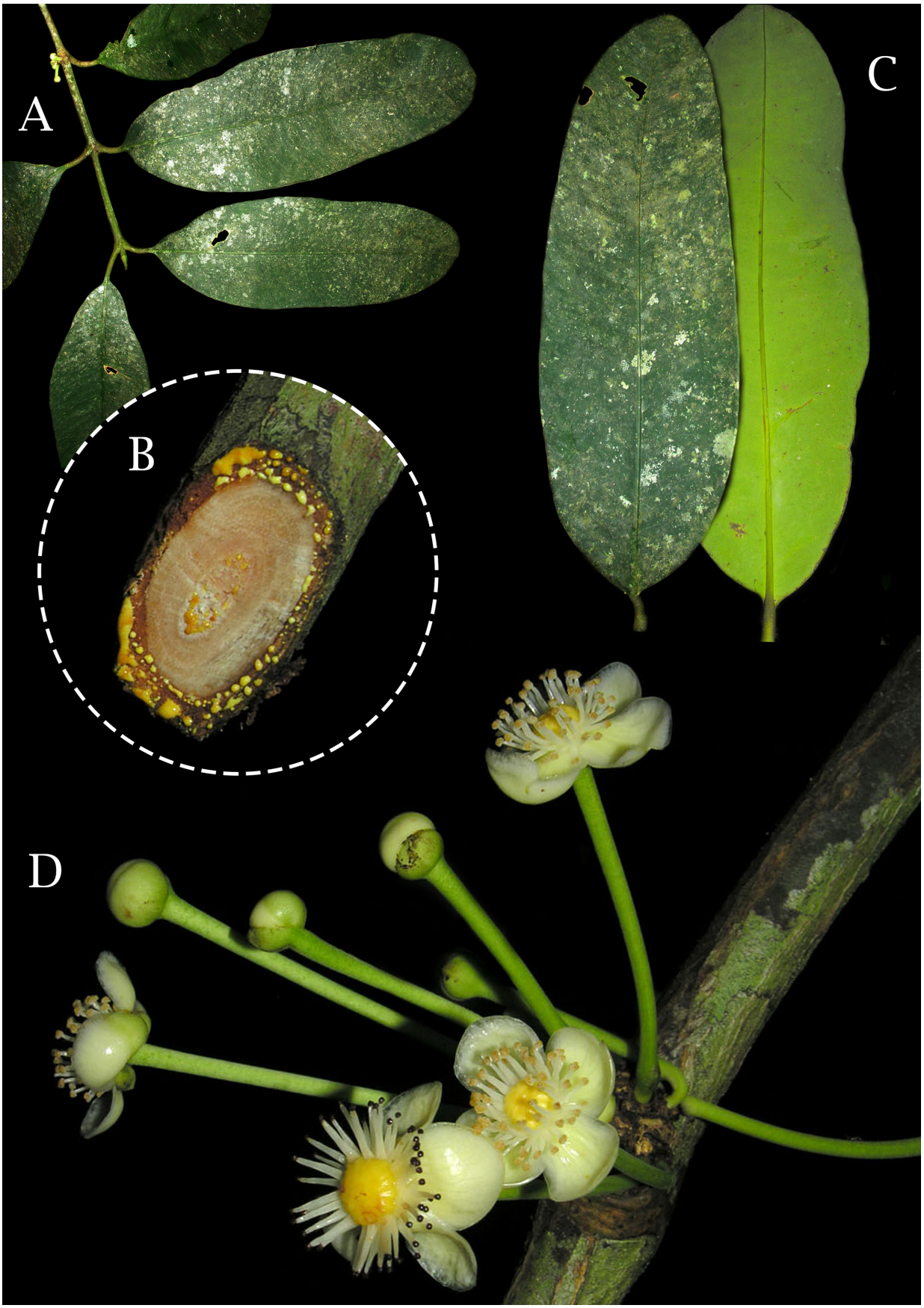

FIGURE 2. *Garcinia isthmensis* Mouzinho (*R. Aguilar 10734*). **A.** Branch. **B.** Cut branch, showing the exudate with orange-colored oxidation. **C.** Leaf blades. **D.** Staminate inflorescence. Photos: Reinaldo Aguilar. Image courtesy of the C.V. Starr Virtual Herbarium (http://bluegum.nybg.org/science/vh/).

Distribution, habitat and preliminary conservation status:—*Garcinia isthmensis* is restricted to southern Central America, in Costa Rica (Prov. Limón and Puntarenas) and Panama (Prov. Coclé and Veraguas), occurring in elevations between 200–350 m a.s.l. (Fig. 3). The preliminary conservation status of *G. isthmensis* is assessed Vulnerable (VU), based on its extent of occurrence (EOO) of 22,964 km² and its area of occupancy (AOO) of 20 km² [B1a + B2ai,ii] (IUCN 2012). *Garcinia isthmensis* occurs in protected areas in Costa Rica, such as the humid forests of the Golfo Dulce Forest Reserve and the Piedra Blanca National Park, both locations that are part of the Osa Conservation Area (ACOSA). In Panama, *G. isthmensis* occurs in the humid forests of the Isla Coiba National Park.

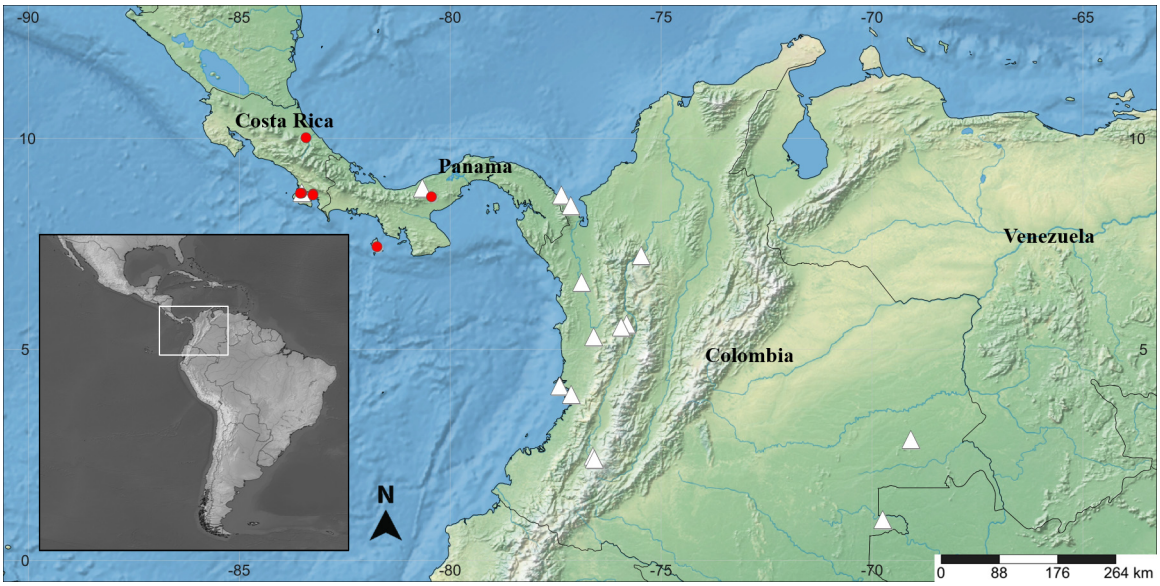

FIGURE 3. Distribution of *Garcinia isthmensis* Mouzinho (red circles) and *G. magnifolia* (white triangles).

FIGURE 4. Type specimens. **A.** *Garcinia intermedia* (Pittier) Hammel in the US herbarium (US-01014026). **B.** *Garcinia magnifolia* (Pittier) Hammel in the US herbarium (US-01049910). Image courtesy of the Smithsonian National Museum of Natural History (https://collections.nmnh.si.edu/).

Note:—In addition to its similarity with *G. magnifolia* (see diagnosis) (Fig. 4), *G. isthmensis* can be confused with *G. intermedia*, the species with the largest extent of occurrence in Central America, but differs by striate branches with a slightly verrucose texture (vs. smooth in *G. intermedia*), branches with orange exudate when oxidized (vs. yellowish-

green in *G. intermedia*), leaf blade with round to acute apex (vs. acuminate in *G. intermedia*), staminate flowers with pedicels 20–50 mm long (vs. 8–10 mm in *G. intermedia*) and staminate flowers with 40–55 stamens per flower (*vs*. ca. 20 in *G. intermedia*).

Garcinia isthmensis has orange exudate on its branches when oxidized (Fig. 2B), unlike most Neotropical species for which yellowish-green exudate when oxidized is reported (see Mouzinho 2022). Observations related to the variation in exudate coloration in *Garcinia* have also been reported for *G. leptophylla* Bittrich (2018: 20 in Bittrich & Marinho 2018), which is an Amazonian species that has exudate on the branches with a reddish coloration when oxidized (Mouzinho *et al*. 2024). In this context, this study, together with that of Mouzinho *et al*. (2024), reinforces the importance of inform the part of the plant where the color of the exudate is observed, as demonstrated by Mouzinho & Ferreira-Silva (2024).

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References

Adams, C.D. (1970) *Flowering Plants of Jamaica*. University of the West Indies, Glasgow, 312 pp.

Bachman, S., Moat, J., Hill, A., de la Torre, J. & Scott, B. (2011) Supporting red list threat assessments with GeoCAT: Geospatial conservation assessment tool. *ZooKeys* 150: 117–126. https://doi.org/10.3897/zookeys.150.2109

Bittrich, V. & Marinho, L.C. (2018) Validation of the name *Garcinia leptophylla* (Clusiaceae). *Boletim do Museu Paraense Emílio Goeldi – Ciências Naturais* 13 (1): 19–23. https://doi.org/10.46357/bcnaturais.v13i1.98

Borhidi, A. (1981) New names and new species in the flora of Cuba, II. *Acta Botanica Academiae Scientiarum Hungaricae* 26: 255–275.

Gaudeul, M., Sweeney, P. & Munzinger, J. (2024) An updated infrageneric classification of the pantropical species-rich genus *Garcinia* L. (Clusiaceae) and some insights into the systematics of New Caledonian species, based on molecular and morphological evidence. *PhytoKeys* 239: 73–105. https://doi.org/10.3897/phytokeys.239.112563

Gonçalves, E.G. & Lorenzi, H. (2011) *Morfologia Vegetal: organografia e dicionário ilustrado de morfologia de plantas vasculares*. Ed.2. Instituto Plantarum de Estudos da Flora, Nova Odessa, 512 pp.

Grisebach, A. (1866) *Catalogus plantarum cubensium exhibens collectionem Wrightianam aliasque minores ex insula Cuba missas*. Apud Gulielmum Engelmann, Leipzig, pp. 37–38.

Hammel, B. (1989) New combinations and taxonomies in Clusiaceae. *Annals of the Missouri Botanical Garden* 76: 927–929.

Hammel, B. (2010) Clusiaceae. *In*: Hammel, B., Grayum, M.H., Herrera, C. & Zamora, N. (Eds.) *Manual de Plantas de Costa Rica*. *Vol. V: Dicotiledóneas (Clusiaceae-Gunneraceae)*. Monogr. Syst. Bot. Missouri Bot., pp. 1–54.

IUCN (2012) *IUCN Red List Categories and Criteria: Version 3.1*. Second edition. Gland, Switzerland and Cambridge, UK: IUCN. Available from: http://www.iucnredlist.org/technical-documents/categories-and-criteria (accessed 20 April 2024)

Kunth, K. (1822) *Guttiferae*. *In*: Humboldt, A., Bonpland, A. & Kunth, K. (Eds.) *Nova Genera et Species Plantarum,* vol. 4. Chez N. Maze, Libraire, pp. 202–203.

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

Liogier, A.H. (1986) Novitates antillanae XII. *Phytologia* 6: 353–360.

Medellín-Zabala, D.M. (2015) *Sistemática del género Garcinia (Clusiaceae): revisión taxonómica para Colombia y filogenia de las especies Neotropicales*. MSc. Thesis. Universidad Nacional de Colombia, Bogotá, 113 pp.

Mouzinho, T. (2022) *Estudos taxonômicos do gênero Garcinia L. (Clusiaceae) na Amazônia brasileira*. MSc. Thesis. Instituto Nacional de Pesquisas da Amazônia, Manaus, Brazil, 137 pp.

Mouzinho, T.M., Cabral, F.N., Soares, M.L. & Marinho, L.C. (2023) *Garcinia apostoloi*: a new species of Clusiaceae from the Brazilian Amazon forest. *Brittonia* 75 (1): 62–68.

Mouzinho, T.M., Soares, M.L., del Hierro, V.S. & Marinho, L.C. (2024) Primer registro de *Garcinia leptophylla* Bittrich (Clusiaceae) para Colombia y Perú. *Caldasia* 46 (1): 1–13.

Mouzinho, T. & Ferreira-Silva, S.L. (2024) A importância do exsudato em Clusiaceae – uma característica pouco explorada. *Botânica Pública* 5: 1–4.

Pierre, J.B.L. (1883) *Flore forestière de la Cochinchine*, fasc. 5–7. Paris: Octave Doin.

Pittier, H. (1912) *New and noteworthy plants from Colombia and Central America*. Contributions from the United States National Herbarium, Washington, pp. 453–456.

Planchon, J.E. & Triana, J. (1860) Mémoire sur la Famille des Guttifères. *Annales des Sciences Naturelles, Botanique* 4. Victor Massonet Fils, Paris, pp. 303–376.

Radford, A.E., Dickison, W.C., Massey, J.R. & Bell, C.R. (1974) *Vascular Plant Systematics*. New York: Harper & Row Publishers.

Shorthouse, D.P. (2010) *SimpleMappr, an online tool to produce publication-quality point maps*. Available from: http://www.simplemappr.net (accessed 24 April 2024)

Stevens, P.F. (2001 onwards) *Angiosperm Phylogeny Website*. Version 14, July 2017 [and more or less continuously updated since]. Available from: http://www.mobot.org/MOBOT/research/APweb/ (accessed 20 April 2024)

Sweeney, P. & Gaudeul, M. (2024) Revisiting the infrageneric classification of *Garcinia* L. (Clusiaceae): an updated sectional name and new, legitimate names in *Garcinia* for *Allanblackia gabonensis* (Pellegr.) Bamps and *A. parviflora* A. Chev. *PhytoKeys* 243: 63–66.
https://doi.org/10.3897/phytokeys.243.124751

Thiers, B. (2025) [continuously updated] Index Herbariorum: *A global directory of public herbaria and associated staff. New York Botanical Garden's Virtual Herbarium*. Available from: http://sweetgum.nybg.org/ih/ (accessed 20 April 2024)

Urban, I. (1899) *Symbolae Antillanae: seu, Fundamenta florae Indiae Occidentalis*. Ed.1. Berlin, Borntraeger, pp. 367–370.

van den Berg, M.E. (1979) Revisão das espécies brasileiras do gênero *Rheedia* L. (Guttiferae). *Acta Amazonica* 9: 43–74.
https://doi.org/10.1590/1809-43921979091043