



## *Helicteres pegueroi* (Malvaceae: Helicteroideae): A new species from the dry forests of the Dominican Republic

MARTHA MARTÍNEZ-GORDILLO<sup>1</sup>\*, TEODORO CLASE<sup>2</sup> & ITZI FRAGOSO-MARTÍNEZ<sup>3</sup>\*

<sup>1</sup>Herbario de la Facultad de Ciencias (FCME), Universidad Nacional Autónoma de México, Apartado Postal 70-399, 04510 Coyoacán, Mexico City, Mexico

[mjmg\\_unam@yahoo.com](mailto:mjmg_unam@yahoo.com); <https://orcid.org/0000-0002-3636-7416>

<sup>2</sup>Jardín Botánico Nacional “Dr. Rafael M. Moscoso”, Apartado Postal 21-9, Santo Domingo, Dominican Republic

[teodoroclase@gmail.com](mailto:teodoroclase@gmail.com); <https://orcid.org/0000-0003-0819-7277>

<sup>3</sup>Departamento de Botánica, Instituto de Biología, Universidad Nacional Autónoma de México, Apartado Postal 70–367, 04510 Coyoacán, Mexico City, Mexico.

[i.fragoso@ciencias.unam.mx](mailto:i.fragoso@ciencias.unam.mx); <https://orcid.org/0000-0003-3661-1076>

\*Author for correspondence

### Abstract

A new species of *Helicteres* from the Dominican Republic is described and illustrated; increasing the number of species occurring in the Caribbean to five. The new species, *H. pegueroi*, can be distinguished from *H. jamaicensis* and *H. semitriloba* by its habit and calyx and corolla colour, i.e. it is a shrub with red calyces and corollas; its pseudoactinomorphic flower due to a slight curvature at the base of the androgynophore; and its densely woolly, globose fruit. An artificial, dichotomous key is provided to distinguish the new species from the other species of the Caribbean region and Mexico.

### Resumen

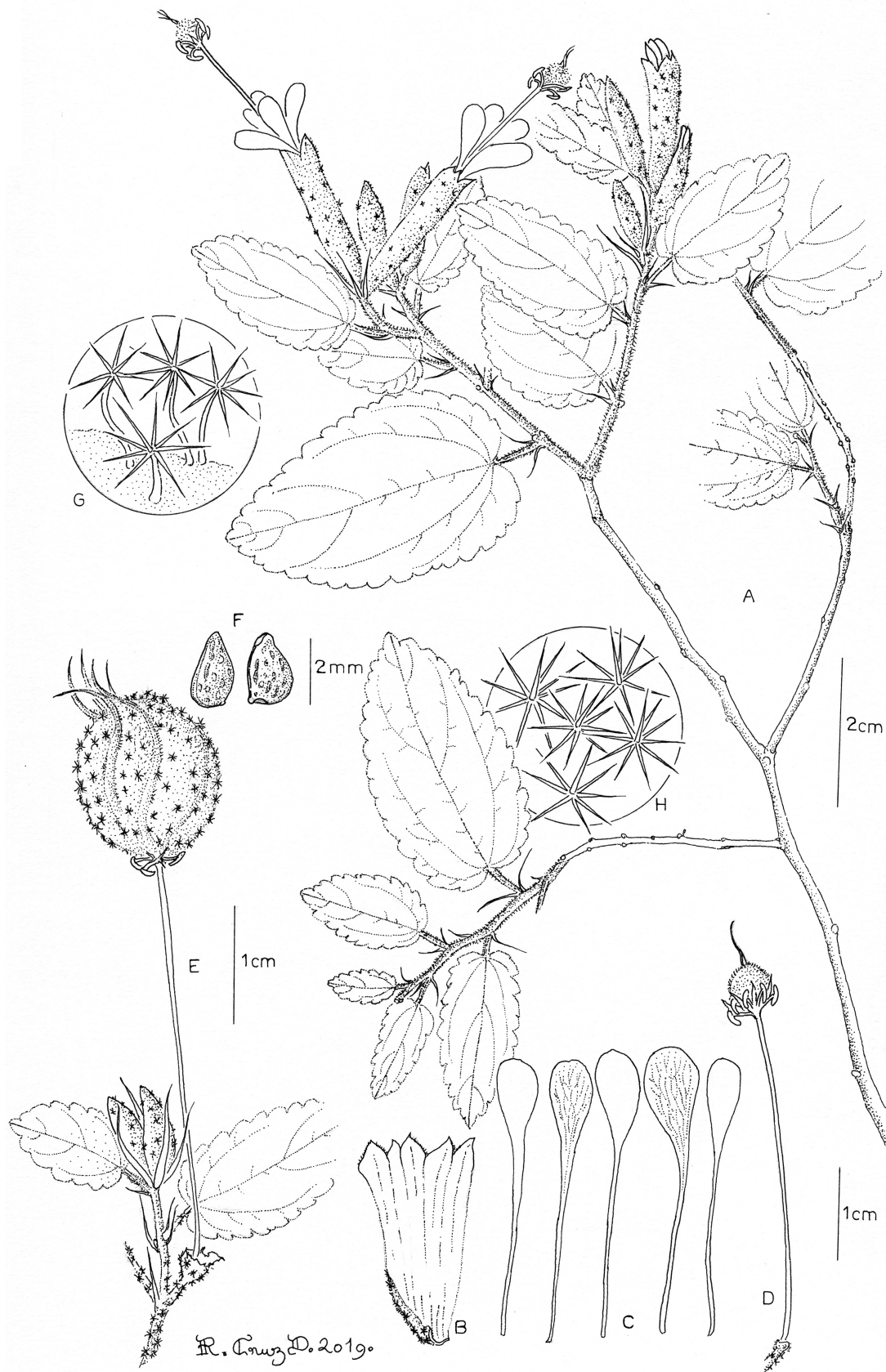
Una nueva especie del género *Helicteres* de República Dominicana es descrita e ilustrada; aumentando el número de especies distribuidas en el Caribe a cinco. La nueva especie, *H. pegueroi*, se distingue de *H. jamaicensis* y *H. semitriloba* por ser un arbusto con flores de cáliz y corola rojos; la flor es pseudoactinomórfica, debido a una ligera curvatura en la base del androginóforo y, la presencia de fruto densamente lanoso, globoso. Se proporciona una clave dicotómica para distinguir al nuevo taxón de las otras especies de la región del Caribe y México.

**Keywords:** Barahona, Helicteroideae, Hispaniola, Malvales, Sierra Martín García

### Introduction

*Helicteres* Linnaeus (1753: 963) (Malvaceae, Helicteroideae), formerly placed in Sterculiaceae (Cronquist 1981, Hutchinson 1967) is a genus of ca. 60 species that are distributed in the tropical regions of the Old and New World (Bayer & Kubitzki 2003). However, as result of phylogenetic analyses based on molecular data, in the context of the whole angiosperms (Angiosperm Phylogeny Group 2016) and of the Malvales order (Alverson *et al.* 1999, Judd & Manchester 1997), the genus is now in the Helicteroideae subfamily, within the Malvaceae (Bayer *et al.* 1999); with *Triplochiton* Schumann (28: 1900) and *Reevesia* Lindley (1827: 112) considered as related genera (Nyffeler *et al.* 2005). These species are either short trees or shrubs, with simple leaves; extrafloral nectaries; unguiculate petals; an androgynophore that is usually longer than the corolla; petaloid staminodes; 5-carpellate gynoecium and straight or spiral, woody fruits (Cristóbal 2001).

In the most recent infrageneric classification of *Helicteres*, seven sections were recognized, and five of them include the 38 New World species (Cristóbal 2001). In the Caribbean region four species of *Helicteres* have been registered, two of which can be found in Dominican Republic: *H. semitriloba* Bertero ex DC. (1824: 476) and *H. jamaicensis* Jacquin (1970: 30). Both species are white-flowered and while the former is endemic to the Caribbean, the latter is broadly distributed and is also found from Mexico to Colombia.



**FIGURE 1.** *Helicteres pegueri*. A: Branch with flowers. B: Dissected calyx with one lobe slightly different from the rest. C: Clawed petals. D: Androgynophore. E: Lanate fruit. F: Triangular seeds. G: Stipitated stellate trichomes from the stem and, H: lower surface of the leaf with trichomes lacking stipe. All drawn from *Clase et al. 9925* (JBSD), by Ramiro Cruz Durán.

The Dominican Republic is situated on the island of Hispaniola, which harbors ca. 6,000 plant species, 34% endemic (Mejía 2006). From these taxa, 10% are exclusive to the Dominican Republic, where new species are described every year as a result of a continuous exploration and collection efforts by the botanists of the country (Peguero & Jiménez 2011). During fieldwork conducted at the Sierra Martín García, the researchers of the Jardín Botánico Nacional of Santo Domingo collected specimens of a red-flowered species of *Helicteres*. The taxon presents two-flowered cincinnus; red calyces with a parietal, nectary on the inner surface, with a slightly curved apex; pseudoactinomorphic corolla, longer than the calyx; androgynophore with a very slight curvature at the base, and densely woolly globose fruits. This combination of characters does not occur in other species of *Helicteres* known from Hispaniola and the Caribbean. Thus, it is proposed as a new species described and illustrated here.

## Taxonomy

*Helicteres pegueroi* Mart.Gord. & Clase *sp. nov.* (Fig. 1)

*Frutex calycibus et corollis rubris, calyx nectario parietali completo et undulatus, corolla exserta, inflorescentia cincinnus biflorus, flores pedicellis nectariis patelliformibus, androgynophoro parce curvato ad basim, fructibus globosis dense lanatis.*

**Type:**—DOMINICAN REPUBLIC. Barahona: Vicente Noble, Sierra Martín García, subiendo hacia la antena de Alto de La Bandera, 600 m, 18° 23'55.7" N, 71° 04'02.6" W, 10 November 2016, *Clase, Majure & Encarnación 9925* (Holotype: JBSD!; Paratype: MEXU!)

Decumbent shrubs, 3 m tall. Stems glabrescent, covered in stellate trichomes, trichomes stalked when young. Leaves simple, petiolate; petioles 3.9–6.6 mm long, surface densely stellate-pubescent; stipules 3.5–5.6 mm long, linear, with stellate trichomes. Leaf blades 1.6–4.1 × 0.8–2.2 cm, oblong to oblong-ovate, base cordate, apex acute to rounded, margin crenate, upper leaf surface stellate-pubescent, trichomes stipitate, lower leaf surface 5-veined, more densely pubescent than the upper leaf surface, trichomes stellate, stipitate. Inflorescences terminal or sometimes axillary, usually bearing 2 flowers; bracteoles 5 per inflorescence, 7.3–8.3 mm long, linear, pubescent with stellate trichomes. Flowers pedicellate, pedicels 1–3 mm long, glabrate. Calyx red, tubular, 1.5–2.3 cm long, 5-toothed; one tooth slightly longer than the rest, surfaces with stellate trichomes; nectary found on the inner surface, parietal, basal and slightly undulated at the distal end. Corolla red, 3–3.1 cm long, slightly asymmetrical, exserted from the calyx; petals 5, spatulate, erect, both surfaces with simple, short trichomes, one petal slightly smaller and narrower than the rest; claw not clearly delimited from the petal blade, linear-subulate, margin wingless. Androgynophore 3.9–5 cm long, with 3–4 branched, appressed trichomes, slightly curved at the base. Androecium with 8–10 stamens, equal, divided into 2 whorls, filaments free, glabrate; anthers punctate, glabrate; thecae divergent; staminodes 5, free, glabrate, longer than the stamens, elliptical-lanceolate, apex acute. Gynoecium with a slightly curved style, glabrescent, with stellate trichomes, pilose at the base; stigma surface papillate. Fruit capsular, globose, almost straight (subspiraled), 1.5–1.8 cm long, densely woolly, trichomes stellate-ferruginous, slightly stipitate. Seeds trigone, black, 2–2.1 mm long, triangular, verrucose.

**Etymology:**—The name of the new species honors the Dominican botanist Brigido Peguero, who is the head of the Botany department at the National botanical garden of Dominican Republic (Jardín Botánico Nacional “Dr. Rafael Ma. Moscoso”), and part of the editorial board of the journal *Moscosoa*. Professor Peguero has dedicated his academic life to the study of the Hispaniolan flora from different perspectives, such as: economic botany, ecology and taxonomy. Together with other botanists he has collected over 15, 000 specimens in the Dominican Republic, Haiti and Puerto Rico.

**Distribution, habitat and phenology:**—The new species is found in the Sierra Martín García, in the province of Barahona, from where it seems to be endemic. It is only known from dry forests at 600 m of elevation, sharing habitat with the following species: *Bursera simaruba* (L.) Sargent (1890: 260), *Exostema caribaeum* (Jacq.) Roemer & Schultes (1819: 19) and *Guaiacum sanctum* Linnaeus (1753: 382). Flowers from august to November.

**Additional specimen examined:**—DOMINICAN REPUBLIC. Barahona: Vicente Noble, Sierra Martín García, subiendo hacia la antena de Alto de La Bandera, 600 m, 18° 23'55.7" N, 71° 04'02.6" W, 30 August 2013, *Clase, Encarnación & Toribio 8114* (JBSD!).

## Discussion

Cristóbal (2001) subdivided the genus *Helicteres* into seven sections, based on reproductive characters. Five of these sections are endemic to the Americas, and three of these five are monotypic and found only on the continental part of the Americas: *Alicteres* (Neck. ex Schott & Endl.) Cristóbal (2001: 31), *Polyandra* Cristóbal (2001: 29) and *Stegogamos* Cristóbal (2001: 26). The remaining two American sections—*Sacarolha* K. Schum. (1890: 94) and *Orthothecium* (C. Presl) Cristóbal (2001: 34)—have a wider distribution. Section *Orthothecium* includes 17 species, four of them distributed in the Caribbean, representing the totality of the genus in that region: *H. calcicola* Alain (1953: 28–29), *H. trapezifolia* A. Rich. (1841: 170), *H. jamaicensis* Jacq. and *H. semitriloba* Bertero ex DC. From these species, the latter two are found in the Dominican Republic (León & Alain 1953).

Despite all known species from *Helicteres* in the Dominican Republic belong to section *Orthothecium*, the distinctive red calyx and corolla observed in *Helicteres pegueroi* places the new species in the section *Sacarolha*. Additional characters from *Sacarolha*, also found in the new species are the presence of pseudoactinomorphic flowers and lack of extrafloral nectaries (Cristóbal 2001). *Sacarolha* includes 18 species, 13 endemic to Brazil (53%) and only one that is widely distributed—*H. guazumifolia* Kunth (1822: 304)—found also in Mexico.

Since the new species has strikingly different morphological characters than the remaining species in the Dominican Republic, we decided to compare *H. pegueroi* with the widely distributed *H. guazumifolia*. In *Helicteres pegueroi* the stipules are linear (vs. subulate in *H. guazumifolia*), the leaf margin is crenate (vs. serrate), the leaf blade base is cordate (vs. rounded), the bracteoles are linear (vs. ovate), the parietal nectary in the calyx is undulate (vs. 5-toothed), the claw of the petal is linear (vs. rectangular), the wings from the claw are absent (vs. present), the androgynophore is slightly curved at the base (vs. straight), and its surface is glabrescent (vs. covered with glandular trichomes), the filaments are glabrate (vs. covered with glandular trichomes), the staminodes are elliptic-lanceolate (vs. spatulate), the fruit surface is lanose (vs. pubescent), and the seed shape is trigone (vs. polyhedral).

Although studies by Cristóbal (2001) have advanced the taxonomy and understanding of *Helicteres* further phylogenetic studies in the genus are needed to make more accurate decisions on section placement of the new species. These studies could shed light into the relationships among species and allow reinterpretation of morphological characters to provide a new natural infrageneric classification of *Helicteres*.

### Key to the species of *Helicteres* sections *Sacarolha* and *Orthothecium* from Mexico and the Caribbean

1. Extrafloral nectaries on the pedicel absent ..... *H. guazumifolia*  
- Extrafloral nectaries on the pedicel present
2. Fruit glabrous, ovoid ..... *H. calcicola*  
- Fruit cylindrical, ovoid or globose
3. Flowers geniculate, corolla asymmetrical ..... *H. jamaicensis*  
- Flowers straight, corolla symmetrical
4. Leaf blades lobed; seeds white, winged ..... *H. semitriloba*  
- Leaf blades entire; seeds black or brown, winged or not
5. Capsule straight, inflorescence with more than 2 flowers ..... *H. trapezifolia*  
- Capsule subspiraled, inflorescence 2-flowered
6. Calyx and fruit with a velutinous surface; fruit cylindrical ..... *H. baruensis*  
- Calyx and fruit with a woolly surface; fruit globose ..... *H. pegueroi*

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## Literature

- Angiosperm Phylogeny Group (2016) Update of the Angiosperm Phylogeny Group Classification for the orders and families of flowering plants: APG IV. *Botanical Journal of the Linnean Society* 181: 1–20.  
<https://doi.org/10.1111/boj.12385>
- Bayer, C., Fay, M.F., Bruijn, A.Y.D., Savolainen, V., Morton, C.M., Kubitzki, K., Alverson, W.S. & Chase, M.W. (1999) Support for an expanded family concept of Malvaceae within a recircumscribed order Malvales: a combined analysis of plastid atpB and rbcL DNA sequences. *Botanical Journal of the Linnean Society* 129: 267–303.  
<https://doi.org/10.1111/j.1095-8339.1999.tb00505.x>
- Bayer, C. & Kubitzki, K. (2003) Flowering plants, dicotyledons: Malvales, Capparales and non-betalain Caryophyllales. In: Kubitzki, K. (Ed.) *The families and genera of vascular plants*. Berlin, Heidelberg, Germany, pp. 225–311.  
[https://doi.org/10.1007/978-3-662-07255-4\\_28](https://doi.org/10.1007/978-3-662-07255-4_28)
- Cristóbal, C.L. (2001) Taxonomía del género *Helicteres* (Sterculiaceae). Revisión de las especies americanas. *Bonplandia* 12: 1–206.  
<https://doi.org/10.30972/bon.111-43944>
- Cronquist, A. (1981) *An integrated system of classification of flowering plants*. Columbia University Press, New York, USA, 1262 pp.
- Jacquin, N.J. (1760) *Enumeratio Systematica Plantarum, quas in insulis Caribaeis* 30.  
<https://doi.org/10.5962/bhl.title.100687>
- Judd, W.S. & Manchester, S.R. (1997) Circumscription of Malvaceae (Malvales) as determined by a preliminary cladistic analysis of morphological, anatomical, palynological, and chemical characters. *Brittonia* 49: 384–405.
- Hutchinson, J. (1967) *The Genera of Flowering Plants (Angiospermae)*, vol. II. Clarendon Press, Oxford, England.
- León, H. & Alain, H. (1953) Malpighiaceae-Myrtaceae. In: Flora de Cuba. *Revista de la Sociedad Cubana de Botánica* 13 (3).
- Lindley, J. (1827) An account of a new genus of plants called *Reevesia*. *The Quarterly Journal of Science, Literature and the Arts* 2: 112.
- Linnaeus, C. (1753) *Helicteres*. *Species Plantarum* 2: 963.
- Mejía, M. (2006) La flora de La Española: conocimiento actual y estado de conservación. In: Mejía, M. (Comp.) *Libro de resúmenes, IX Congreso Latinoamericano de Botánica*. Santo Domingo, Dominican Republic. pp. 11–12.
- Nyffeler, R., Bayer, C., Alverson, W.S., Yen, A., Whitlock, B.A., Chase, M.W. & Baum, D.A. (2005) Phylogenetic analysis of the Malvadendrina clade (Malvaceae s.l.) based on plastid DNA sequences. *Organisms, Diversity & Evolution* 5:109–123.  
<https://doi.org/10.1016/j.ode.2004.08.001>
- Peguero, B. & Jiménez, F. (2011) Inventario y estado de conservación de plantas exclusivas de la República Dominicana. *Moscosa* 17: 29–57.
- Roemer, J.J. & Schultes, J. (1819) *Systema vegetabilium: secundum classes, ordines, genera, species. Cum characteribus differentiis et synonymis* 5: 17–21.
- Sargent, C.S. (1890) Notes on North American trees XVII. *Garden and Forest; a Journal of horticulture, landscape art and forestry* 3: 260.
- Schumann, K. (1890) Sterculiaceae. In: Engler, A. & Prantl, K. (Eds.) *Die Natürlichen Pflanzenfamilien* 3: 69–99.
- Schumann, K. (1901) Eine neue Familie der Malvales. *Botanische Jahrbücher für systematik, Pflanzengeschichte und Pflanzengeographie* 28: 330–331.