

The genus *Pera* (*Peraceae*: *Malpighiales*) in the West Indies: nomenclatural review and typification with a synopsis of the species

El género *Pera* (*Peraceae*: *Malpighiales*) en las Indias Occidentales: revisión nomenclatural y tipificación con una sinopsis de las especies

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ABSTRACT

Pera is a genus that comprises roughly 35 species across the Neotropics with two centers of species diversity, the Amazon basin and the West Indies. This study provides a comprehensive nomenclatural treatment of the Caribbean Region species, examining 92 type specimens housed in 23 herbaria through physical inspection and high-resolution digital images. We found 13 validly published names (12 species and one subspecies) and formally designated lectotypes for nine of them, an extra second-step lectotypification, thereby providing a permanent basis for the application of each name. All examined type material came from collections made on the Greater Antilles, ten from Cuba, two from Haiti, and one from the Dominican Republic, highlighting the pivotal role of the region in the Caribbean diversity of *Pera*. This nomenclatural baseline is essential for ongoing integrative taxonomic studies combining morphology, molecular data, and biogeography to refine species limits and assess conservation priorities in this poorly known genus.

Keywords: Caribbean biodiversity hotspot, Cuba, Hispaniola, holotype, lectotype

RESUMEN

Pera es un género que comprende aproximadamente 35 especies en el Neotrópico y presenta dos centros de diversidad de especies: la cuenca del Amazonas y las Indias Occidentales. Este estudio ofrece un tratamiento nomenclatural exhaustivo de las especies de la región del Caribe, mediante la revisión de 92 especímenes tipo alojados en 23 herbarios a través de inspección física e imágenes digitales de alta resolución. Fueron encontrados 13 nombres válidamente publicados (12 especies y una subespecie) y se designaron formalmente lectotipos para nueve de ellos, más una lectotipificación de segundo paso, lo que estabiliza la aplicación de cada nombre. Todo el material tipo examinado procedía de colecciones realizadas en las Antillas Mayores, diez de Cuba, dos de Haití y uno de la República Dominicana, lo que destaca el papel fundamental de la región en la diversidad caribeña de *Pera*. Esta base nomenclatural es esencial para los estudios taxonómicos integradores en curso que combinan morfología, datos moleculares y biogeografía para refinar los límites de las especies y evaluar las prioridades de conservación en este género poco conocido.

Palabras clave: Hotspot de biodiversidad en el Caribe, Cuba, La Española, holotipo, lectotipo

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INTRODUCTION

The genus *Pera* Mutis was first proposed by José Celestino Bruno Mutis y Bosio when he encountered a dioecious tree that was named *Pera arborea* Mutis (Mutis 1784). The original description was based on a collection by J.C.B. Mutis from Mariquita (Colombia), made during the “Real Expedición Botánica del Nuevo Reino de Granada” (Cardiel 1991). Originally, Mutis wanted to name the plant genus in honor of the botanist Anders Sparrman (Hernández de Alba 1957-1958), but the name *Sparrmannia* could not be used because Linnaeus (1782) already published a genus of *Tiliaceae* Juss (= *Malvaceae* Juss.) with that name. Therefore, Peter Jonas Bergius, a Swedish botanist who was responsible for the publication of the new species found by Mutis, changed that name to *Pera*, based on the sacchar appearance of the inflorescence involucre (Hernández de Alba 1983, Cardiel 1991).

Pera is now classified in the family *Peraceae* Klotzsch, with four other genera: *Clutia* Boerh. ex L., *Chaetocarpus* Thwaites, *Pogonophora* Miers ex Benth. and *Trigonopleura* Hook. f. (WFO 2026). These genera had been long classified in four different tribes within the subfamily *Acalyphoideae* Beilschm. of *Euphorbiaceae* Juss. *sensu lato* (Pax & Hoffman 1919, Webster 1994). Based on pollen (Nowicke & al. 1998) and ovule research (Tokuoka & Tobe 2003), and subsequent molecular phylogenetic evidence, Wurdack & al. (2005) placed those tribes in subfamily *Peroideae* Baill. ex Hassk., still in *Euphorbiaceae s.l.* Subsequently, in a phylogeny of *Malpighiales*, Wurdack & Davis (2009) segregated *Peraceae* from *Euphorbiaceae* due to the molecular phylogenetic placement of holoparasites *Rafflesiaceae* Dumort. in an intermediate position between *Euphorbiaceae s.str.* and *Peraceae*. However, these family circumscriptions, including segregation of *Peraceae*, were adopted by APG IV (2016),

reason why Acevedo-Rodríguez & Strong (2012), in their Catalogue of Seed Plants of the West Indies listed the two genera that grow in the area (*Chaetocarpus* and *Pera*) under *Euphorbiaceae*.

Peraceae has a pantropical distribution and consists of five genera and ca. 110 species (WFO 2026) that contains diverse life forms, from herbs to trees (Stevens 2026+). Of its genera, *Clutia* contains the most species (54), and only grows in the Arabian Peninsula and Tropical and Southern Africa (Webster 1994, 2014). *Trigonopleura*, with three species, has a distribution range restricted to Malesia in the Eastern Asia region (van Welzen & al. 1995). *Pogonophora* and *Chaetocarpus*, with two and 16 species respectively, can be found either in the Old World and in the World. Otherwise, *Pera* is the only genus that is restricted to the Neotropics (Martínez-Gordillo & Morrone 2005, Webster 2014).

Pera contains shrubs and trees that grow in diverse habitats (Bigio & Secco 2012), but it remains a poorly known group. The genus can be easily recognized by the presence of stellate or lepidote trichomes and a unique of inflorescence: pseudanthia containing small unisexual flowers surrounded by a showy and globose involucre bract. The carpelate pseudanthia are reduced simple inflorescences, whereas staminate pseudanthia represent determinate panicles (Gagliardi & al. 2018). The distribution of *Pera* ranges from the West Indies to Mexico, Central and South America, and currently has 32 species and one additional subspecies accepted (WFO 2026). These species appear to be centered in the Amazon basin on the one hand and the West Indies on the other, with 13 and 10 species, respectively (Webster 1994, Acevedo-Rodríguez & Strong 2012, Bigio & Secco 2012).

In South America, species of *Pera* were examined using comparative morphology with the most complete study being the one of Bigio & Secco (2012). Those authors aimed to perform a taxonomic treatment of the *Pera* species occurring in the Brazilian Amazon, update their identification features, descriptions and distribution ranges (*op. cit.*). They also reduced the six sections proposed by Pax & Hoffmann (1919) to four as the infrageneric delimitation of the genus. However, research with a deeper nomenclatural focus is that of Gillespie (1993) who treated the six species, and their synonyms, growing in the Guianas; and also, the study of Alves (1993), who proposed new synonyms and designated lectotypes for some species in South America and the West Indies.

For the West Indies, a total of 13 names has been published for *Pera*. Starting in the nineteenth century, August Grisebach described two species (each one in a different section) for Cuba (Grisebach 1865). Pax & Hoffmann (1919) listed only one further species of *Pera*, described from the Dominican Republic (Urban 1912). Later on, ten additional species were described from Cuba and Hispaniola (Britton 1920, Urban 1924, 1926, 1929, Borhidi 1979), and Acevedo-Rodríguez & Strong (2012), in their checklist for the West Indies seed plants, listed all names but reduced two species to synonymy.

Despite previous regional treatments, the nomenclature of *Pera* species from the Caribbean Region has remained problematic, with many names lacking clear type designations. This uncertainty hinders accurate species delimitation, conservation assessments, and biogeographic analyses. The present study addresses this gap as part of a larger project aimed at understanding species limits and biogeography of *Pera* in the Caribbean region, which will ultimately lead to a taxonomic treatment for the Cuban Flora. Considering that Cuba harbors the highest species diversity in the West Indies, and that many species are morphologically similar, a wider regional scope is necessary for robust species delimitation.

The present contribution provides a comprehensive nomenclatural revision of all West Indian *Pera* species, with formal typifications where necessary, thereby establishing the essential foundation for future integrative taxonomic studies. While this paper focuses exclusively on nomenclatural updates, the full distribution of each taxon is also provided based on examination of herbarium specimens from across the Caribbean islands.

MATERIALS AND METHODS

All protologues and relevant taxonomic literature were analyzed for existing effective typifications. Types mentioned here were examined physically or via high-resolution photographs, which were accessed via JSTOR Global Plants platform (www.plants.jstor.org), JACQ – Virtual Herbaria (www.jacq.org), as well as other online virtual herbaria of those mentioned hereafter. A total of 92 type specimens were examined from 23 herbaria: A, C, E, F, G, GDC, GH, GOET, HAC, HBG, JE, K, M, MA, MIN, MO, NY, P, S, U, US, W and YU, acronyms according to Thiers (2026+).

The names treated here are listed in alphabetical order and include the following data: taxon name, author, bibliography, type citation, herbarium codes, eponymy or etymology, and a relevant discussion. For most of the type specimens cited in the protologues, there is no clear indication in which herbaria they are deposited. In order to provide a solid base for necessary lectotypifications, we have included specimen IDs from the respective herbaria, usually barcodes. In the case of S, the respective specimen numbers were recorded, and for HAC, whose duplicates lack the specimen IDs, only the acronym is presented. We also attempted to verify the authorship of annotations using the handwriting section that appears in the Taxonomic Literature - 2 (<https://www.sil.si.edu/DigitalCollections/tl-2/search.cfm>), the Auxilium ad Botanicorum Graphicem (<https://collections.geneve.ch/cjbg/auxilium/index.php>) and the United States National Agricultural Library (<https://www.nal.usda.gov/>) webpages.

Lectotypes are designated in accordance with the relevant articles of the International Code of Nomenclature for algae, fungi, and plants (Madrid Code; Turland & al. 2025). For the names where only certain collections are mentioned, without stating them as type or naming the housed herbaria, all duplicates were considered syntypes, following Turland & al. (2025: Art. 40, Note 3).

For the types of names based on the collections of Charles Wright, the considerations proposed by Howard (1988) were followed. He outlined that those collections actually correspond with species numbers given by Asa Gray after receiving the samples collected by C. Wright (Howard 1988). Due to the uncertainty that “duplicates” of a collection number from C. Wright correspond to the same collection (as they mostly do not match on the same locality and date), such specimens were designated as possible type duplicates and indicated with the legend “isolectotypes?”. For the collections made by E.L. Ekman in Cuba, the provinces and municipalities of each locality were accurately placed following the work of Berazain & Rankin (2023).

To ensure that our study covered all species described so far for the West Indies, the catalogue of Acevedo-Rodríguez & Strong (2012) was followed. The main morphological features for the identification of samples were examined based on each species protologue, the work of Pax & Hoffmann (1919), and the floras of each island and archipelago: Britton & Millspaugh (1920) for The Bahamas, Alain (1953) for Cuba, and Liogier (1986, 1988) for Hispaniola and Puerto Rico, respectively. Of them, the most complete identification key was done by Alain (1953), although not all species are covered since that work only focused on Cuban plants, new species were described afterward, and some names were considered synonyms. In addition, nearly 350 herbarium specimens from Cuba and the Caribbean islands were examined to check if further species, not yet listed, were present in the region and to assess the distribution of the species.

RESULTS

After the revision of the specimens collected in the West Indies, a total of 13 validly published names were found and are listed below in alphabetical order. For each name, we provide complete nomenclatural information, including protologue citations, type specimen details, etymology, distribution, and taxonomic insights.

1. *Pera bumeliifolia* Griseb. in *Nachr. Königl. Ges. Wiss. Georg-Augusts-Univ.* 1: 180. 1865. Lectotype (**designated here**): Cuba: “Cuba occ.”, 1863. *C. Wright 1988* (“1217”) (GOET #003636!; isolectotypes?: HAC [ex HABA]!, K #000601110!, G #00618033, G-DC #00318850 [image!], GH #00048495 [image!], MO #260287!, P #00640248 [image!], S R-10648 [image!], W #0335210!, YU #244745 [image!]).

= *Pera domingensis* Urb., *Symb. Antill.* 7: 261. 1912. Lectotype (**designated here**): Dominican Republic, Barahona: “La Loma. Bl. weiss. “Palo Damaso” incol.”, VII.1911. *M. Fuertes 1022* (A #00048497 [image!]; isolectotypes: E #00326475 [image!], F #0056948F [image!], F #0056949F [image!], G ##00441959-00441960 [images!], GH #00048496 [image!], HBG #507553, K #000601109 [image!], M #0153354 [image!], MIN #1002012 [image!], NY #00083593 [image!], P #00640247 [image!], S R-10650 [image!], U #0002041 [image!], US #00096468 [image!], W #0335209!).

= *Pera depressa* Urb. & Ekman in *Ark. Bot.* 22A (17): 112. 1929. Lectotype (**designated here**): Haiti, Île de la Gonâve: “Île La Gonave, Lotoroué, on the plain, 575 m.”, 08.II.1928. *E.L. Ekman H9564* (S R-10649 [image!]; isolectotypes: K #000601108 [image!], NY #00083592 [image!], S 12-16325 [image!]).

Etymology: The specific epithet “bumeliifolia” refers to the resemblance of the leaves to those of the genus *Bumelia* Sw. (now *Sideroxylon* L.), combining the genus name with the Latin *folium* (“leaf”). The epithet “domingensis” derives from Santo Domingo (an historical name for the French colony on Hispaniola, now the southwestern Dominican Republic) with the Latin suffix *-ensis* (“originating from, belonging to a place”), indicating the geographic origin of the type specimen. The epithet “depressa” comes from the Latin *depressus* (“flattened, pressed down”), alluding to the depressed-spheroid shape of the staminate involucre noted in the original description.

Notes on lectotypes: In the protologue of *Pera bumeliifolia*, Grisebach (1865) only mentions the number *C. Wright 1988* without designating any specimen as the type. He also does not clarify in which herbarium the “duplicates” were consulted, meaning that all specimens under this “collection” should be considered syntypes (Turland & al., 2025: Art. 40, Note 3). Following the recommendations made by Howard (1988), lectotypes for the species described by A. Grisebach should be selected from specimens deposited in GOET. Of the specimens consulted, only one was found in the GOET herbarium. This specimen bears annotations made by A. Grisebach himself (Burdet 1975) that he would later include in the original publication of the species. Therefore, the specimen GOET #003636 is here designated as the lectotype.

Urban (1912) only mentions the collection *M. Fuertes 1022* in the protologue of *Pera domingensis*, without indicating in which herbaria the specimens he checked were found. Thus, all of his duplicates must be considered syntypes (Turland & al. 2025: Art. 40, Note 3). Of the 17 specimens consulted with this collector number, none showed the handwriting of I. Urban following its characterization by Burdet (1979). However, only the label of the specimen housed in A (#00048497) shows, although typed, a determination made by I. Urban; in addition, the common name “Palo Damaso” stated in the taxon’s protologue is indicated. Therefore, this specimen is here designated as lectotype.

When describing *Pera depressa*, Urban (1929) mention three collections, and specify *E.L. Ekman H9564* as the type. However, they do not clarify in which herbarium such a sheet is deposited, so all duplicates of this one should be considered syntypes (Turland & al. 2025: Art. 40, Note 3). Of the type collection, four duplicates were found. Since the possible sheets deposited in B were presumably destroyed, the lectotype must be selected from the materials deposited in S, which are the most likely to have been consulted by the authors for the description of the taxon. In S herbarium there are two specimens, and the lectotype chosen has a collection label

written by E.L. Ekman (Berazaín & Rankin 2023) and a label of the herbarium, which shows the name of the species, the authors, and the term “typus” with the handwriting of I. Urban (Burdet 1979). The protologue also mentions the collections *E.L. Ekman H3421* and *E.L. Ekman H8696*, as sterile samples, therefore all duplicates of this collection should be considered as paratypes (Turland & al. 2025, Art. 9.7).

Taxonomic insight: The previous inventories of Greuter & Rankin (2022) and Leyva (2024), followed the criteria of Liogier (1986) and Acevedo-Rodríguez & Strong (2012) by treating *Pera bumeliifolia* with two heterotypical synonyms, *P. depressa* and *P. domingensis*. After reviewing the herbarium specimens linked to the three names, we find that the leaf shape and the indumentum are highly variable, both within individual islands and among them, resulting in unclear species boundaries. This extensive morphological overlap indicates that a more rigorous morphometric analysis is essential to resolve the limits of these taxa.

Distribution: Endemic to the Caribbean, growing in Cuba, Hispaniola (Dominican Republic and Haiti) and The Bahamas. Introduced in Puerto Rico by the U.S. Forest Service (Liogier 1988).

2. *Pera ekmanii* Urb., *Symb. Antill.* 9(2): 206. 1924. Lectotype (designated by Alves 1993: 151, **second step designated here**): Cuba, Holguín, Mayarí: “prov. Oriente; Sierra de Nipe in “manacales” ad Rio Piloto, c. 350 m alt.”, 13.III.1915. *E.L. Ekman 4999* (S R-10651 [image!]; isolectotypes: G #00441958 [image!], K #000601105!, NY #00083594!, S 12-6326 [image!]).

Eponymy: The specific epithet honors Erik Leonard Ekman (1883-1931), a Swedish botanist who was an important plant collector in the Caribbean Islands, especially in Cuba between 1914 and 1924 (Berazaín & Rankin 2023) and is the collector of the type specimen.

Note: In the prologue, Urban (1924) mentions four collections of E.L. Ekman (4999, 5141, 6851, 9765) and states *E.L. Ekman 4999* as the type collection. Afterwards, Alves (1993) effectively designated a lectotype from the collection materials housed in S. However, in that herbarium there are two duplicates of the type collection, thus a second-step lectotypification to designate a single specimen is necessary (Turland & al. 2025: Art. 9.17). Of these, the material that is designated as lectotype, *S-R-10651*, has annotations by I. Urban in his typical handwriting (Burdet 1979) with the name of the species, stating that the plant contains staminate “male” flowers and the term “typus”. The specimen also contains an annotation label by M. Alves where he designates it as “Holotypus”.

Distribution: Endemic to Cuba.

3. *Pera glomerata* Urb. in *Ark. Bot.* 20A(15): 62. 1926. Lectotype (designated by Alves 1993: 151): Haiti, Tortuga

Island: “Ile La Tortue, main ridge, at Mare-Rouge”, 3.VI.1925. *E.L. Ekman H4220* (S R-10653 [image!]; isolectotypes: A #00048498 [image!], C #10011327 [image!], G #00441955 [image!], GH #02410081!, K #000601104 [image!], NY #00083595 [image!], US #00096469 [image!], US #00854626 [image!]).

Etymology: The specific epithet derives from the Latin *glomeratus* (“gathered into a ball, clustered”), referring to the compact, clustered arrangement of the inflorescences.

Note: In the species description, Urban (1926) only mentions the collection *E.L. Ekman H4220* without naming it as type or mentioning in which herbarium it is deposited, so all duplicates should be considered syntypes (Turland & al. 2025: Art. 40, Note 3). Later, Alves (1993) designated a specimen from this collection located in S as lectotype. In this paper we specify the barcodes or reference numbers of the type specimens consulted and declare the duplicate specimens deposited in A, GH, NY and US as isolectotypes, which were not mentioned by Alves (1993).

Distribution: Endemic to Tortuga Island (*Île de la Tortue*), Haiti.

4. *Pera longipes* Britton & P.Wilson in *Mem. Torrey Bot. Club* 16: 76. 1920. Lectotype (**designated here**): Cuba, Guantánamo, Baracoa: “Trail, Navas to Camp Buena Vista, Oriente”, 23.III.1910. *J.A. Shafer 4416* (NY #00086596!; isolectotypes: A ##00048499-00048501 [photos!], HAC!, US #00096473 [image!]).

Etymology: The specific epithet derives from the Latin *longus* (“long”) and *pes* (“foot”), meaning “long-footed” or “long-legged,” in reference to the elongated peduncles of the staminate pseudanthia described in the protologue.

Note: In the protologue, Britton (1920) only cited one collection, *J.A. Shafer 4416*, but without indicating it as type or mentioning in which herbaria the consulted specimens are found, so that all its duplicates must be considered syntypes (Turland & al. 2025: Art. 40, Note 3). Of such duplicates consulted, the specimen NY #00083596 contains the handwriting of N.L. Britton (Anonymous 2025) on its label with the species name and the indication “type”; additionally, it is found in the herbarium where both authors worked. Therefore, this specimen is here designated as lectotype.

Distribution: Endemic to Cuba.

5. *Pera microcarpa* Urb., *Symb. Antill.* 9(2): 208. 1924. Lectotype (**designated here**): Cuba, Santiago de Cuba, Guamá: “prov. Oriente; Sierra Maestra, Manacal prope Sevilla in “manacales” sicc. 800-900 m. alt.”, 05.VII.1918. *E.L. Ekman 9349* (S R-10654 [image!]; isolectotype: NY #00083597!).

Etymology: The specific epithet is derived from the Greek *mikros* (“small”) and *karpos* (“fruit”), meaning “small-fruited”,

in reference to the reduced size of the fruits noted in the protologue.

Note: In the species protologue, Urban (1924) only mentions the collection *E.L. Ekman 9349*. Since he neither declares it as type material nor mentions in which herbarium any specimens he consulted can be found, all duplicates must be considered syntypes (Turland & al. 2025: Art. 40, Note 3). Of the original material located, the specimen in S contains annotations by I. Urban, the handwriting of which is identified according to Burdet (1979). On the label, Urban wrote the name of the species and “typus”, so this specimen is designated as a lectotype.

Distribution: Endemic to Cuba.

6. *Pera oppositifolia* Griseb. in *Nachr. Königl. Ges. Wiss. Georg-Augusts-Univ.* 1: 181. 1865. Lectotype (**designated here**): Cuba: “Cuba occ.”, 1863. *C. Wright 1987* (“178”) (GOET #003638!; isolectotypes?: G #00202000 [image!], GH ##00048909-00048911 [images!], GOET #006439!, HAC [ex HABA]!, K #000601106!, K #000601107 [image!], MA #608702, MO #260335, NY #00083598 [image!], NY #00083599!, P ##00640253-00640254 [images!], S R-10656 [image!], S 12-16610 [image!], US #00096475 [image!], US #00997764 [image!], W #0335208!, YU #244746 [image!]).

Etymology: The specific epithet combines the Latin *oppositus* (“opposite”) and *folium* (“leaf”), alluding to the unusual phyllotaxis within the genus, where leaves are borne opposite rather than the more common alternate arrangement.

Notes: In the original description of the species, Grisebach (1865) only mentions the number *C. Wright 1987*, without citing it as type or mentioning in which herbarium the specimen(s) he consulted is deposited. Thus, all “duplicates” of this “collection” must be considered syntypes (Turland & al. 2025: Art. 40, Note 3). Later on, Alves (1993) designated “*C. Wright 1987, W*” as the lectotype of *Pera oppositifolia*, but attributed the authorship of the species to J. Müller Argoviensis, a combination that is considered invalid or *nom. nud.* (TROPICOS 2025 v3.4.2, <https://www.tropicos.org>). However, in the Vienna herbarium there are (at least) two sheets of this collection, W #0335207 and W #0335208; neither was annotated by A. Grisebach (Burdet 1975), nor do they present original collection labels. According to the definition of original material (Turland & al. 2025, Art. 9.4) duplicates of syntypes can serve as types. But since it is doubtful whether these materials in Vienna are duplicates of the material seen by A. Grisebach, which according to the protologue was collected “in ripis S. Cruz”, while other sheets of *C. Wright 1987* were collected in “El Retiro”, there are good reasons to reject the lectotypification made by Alves (1993) and replace it by a lectotype in GOET, as suggested by Howard (1988).

Grisebach (1865, 1866) only cites the species number, “1987”, and not one of the provisional numbers in his

herbarium (178 and 964). The vernacular name and locality of collection mentioned in the protologue are not mentioned in the GOET sheets and must have been taken from a written communication with A. Gray (Howard 1988), probably unpreserved. Out of the three Wright sheets in this herbarium attributed to *Pera oppositifolia*, GOET #006438, corresponds to a misidentification, since it only consists of an envelope with a fragment of a paniculate inflorescence, not the signature pseudanthia of *Pera*, which might belong to a species of *Lasiocroton* Griseb. (*Euphorbiaceae*). The remaining specimens, GOET #003638 and GOET #006439, each have a provisional number of A. Grisebach, 178 and 964, respectively. Of these, the specimen GOET #003638 presents a detailed description of the species, very similar to the one published later in the protologue (Grisebach 1865). In addition, it contains an identification label by R.A. Howard, where he declares it as lectotype. But, considering that this determination was not effectively published, since it is found in one of the microfiches of his work (Howard 1988), it should not be considered as an effective lectotypification (Turland & al. 2025, Art. 30.1). Therefore, here we designate that specimen as lectotype.

The designated lectotype does not have the usual printed *Plantae Cubenses Wrightianae* collection label of C. Wright that matches the nine types described by Howard (1988). However, by analyzing the information available on the sheet, it is possible to rule out some of them, either by locality, collection date or label color. That is why only those materials of *C. Wright 1987* with the labels type 7 and 8, according to Howard (1988), are considered possible isolectotypes of this name. The only exceptions to this are one specimen in Geneva (G #00082097!) and another in New York (NY #01431931!), which even though they have a type 7 label, also possess another label indicating a collection time and locality different than the one in the protologue, “Retiro, June 8” and “Retiro, Ap 21”, respectively.

The following specimens were not considered isolectotypes because they do not contain any original collection label from C. Wright: JE #00004476!, NY #00053600!, P #00640255 [image!] and W #0335207!. Moreover, there is one specimen in Missouri (MO #260336!) with a label that reads: “Probably Wright 1987 (then isotype)”. Since we do not have robust evidence that this specimen belongs to a collection from C. Wright, we cannot consider it as a possible isolectotype.

Taxonomic insights: *Pera oppositifolia* is an easily recognizable species in the genus by the presence of opposite, 10-15 cm long, membranaceous leaves. While long considered endemic to Cuba (Acevedo-Rodríguez & Strong 2012, Greuter & Rankin 2022), it has been discovered in Central America, first in Costa Rica in 2000, where it is used as a living fence (González-Ramírez 2010) and later in Panama (Ortiz & al. 2019). This species is morphologically similar to *P. benensis* Rusby, another species with opposite leaves from South America. These two species share leaf characteristics,

but differ in the seed size (Rusby 1920, Bigio & Secco 2012). Therefore, further studies are required to verify species limits and test the status of the Cuban populations.

Distribution: Costa Rica, Cuba and Panama.

7. *Pera orientensis* Borhidi in *Acta Bot. Acad. Sci. Hung.* 25 (1-2): 43. 1979. Holotype: Cuba, Holguín, Mayarí: “Montes de Cayo La Plancha, S. de Nipe, Mayarí”, 21.IV.1960. *Bro. Alain 8039 & al.* (HAC [ex SV]!; isotypes: HAC [ex LS]!, *Bro. Alain 8037 & al.* [ex SV]!).

Etymology: The specific epithet derives from the Latin *oriens* (“east”) and the suffix *-ensis* (“originating from, belonging to a place”), meaning “from the east”, in reference to the Oriente region of eastern Cuba, the type locality and primary distribution area of the species.

Notes: In the protologue (Borhidi & Muñiz 1979), it is explicitly stated that the holotype is a staminate plant from the collection *Bro. Alain 8039*, deposited at HAC (ex SV), with a label from the Herbarium of the Estación Experimental Agronómica. Regarding the isotype, the authors state that it is housed in SV (today included in HAC), although still with a label of the Herbarium of La Salle (ex LS). However, by showing an image of the holotype in the publication, there is no doubt which specimen was designated by the authors and, therefore, it is the holotype. In NY there is also a sheet (NY #01431935 [image!]) containing a photograph of the holotype designated by Borhidi & Muñiz (1979), but since it is not a proper duplicate of the type collection, it is not considered here as an isotype following Turland & al. (2025, Art. 9.5).

Also in HAC, another specimen has the same locality, date, collectors, and label (*Bro. Alain 8037 & al.* [ex SV]) as the holotype, differing only by an annotation over the label with the ♀ symbol. According to the definitions of the terms “duplicate” and “collection” in the Code (Turland & al. 2025, Art. 8.2 and 8.3 footnote), this specimen constitutes a duplicate of the holotype and therefore an isotype (Turland & al. 2025, Art. 9.5). Although the species author designated it as a “paratype” in the protologue (Borhidi & Muñiz 1979), this designation is inconsistent with the definition of “paratype” (Turland & al. 2025, Art. 9.7). Consequently, under the Code (Turland & al. 2025, Art. 9.10), it should be corrected to “isotype.”

Distribution: Endemic to Cuba.

8. *Pera ovalifolia* Urb., *Symb. Antill.* 9: 207. 1924. Lectotype (**designated here**): Cuba, Camagüey, Guáimaro: “prov. Oriente (ad limit prov. Camaguey). prope Galbis in sylvá”, 18.VIII.1916. *E.L. Ekman 7465* (S R-10657 [image!]).

Etymology: The specific epithet combines the Latin *ovalis* (“oval”) and *folium* (“leaf”), referring to the distinctive leaf shape noted in the original description.

Note: Urban (1924) does not cite an herbarium for the specimens of *E.L. Ekman 7465*, which he designated as type in the protologue, so all its duplicates are to be considered syntypes (Turland & al. 2025: Art. 40, Note 3). Here we designate as lectotype the only found specimen of that collection, which is located in S and shows the handwriting of I. Urban (Burdet 1979) in naming the species and the label “typus.” The protologue also mentions the collection *E.L. Ekman 6293* to give observation on the fruit and seeds for the species, so all duplicates of this collection should be considered as paratypes (Turland & al. 2025, Art. 9.7), of which we could only find the specimen NY #01341936.

Distribution: Endemic to Cuba.

9. *Pera pallidifolia* Britton & P.Wilson in *Mem. Torrey Bot. Club* 16: 76. 1920. Lectotype (**designated here**): Cuba, Holguín, Moa: “Trail, Rio Yamanigüey to Camp Toa, Oriente”, 22-26. II.1910. *J.A. Shafer 4183* (NY #00083601!; isolectotypes: GH #00048502 [image!], HAC!).

Etymology: The specific epithet combines the Latin *pallidus* (“pale”) and *folium* (“leaf”), meaning “pale-leaved,” in reference to the pale green color of fresh leaves described by the authors, which fades to a bluish-gray shade in dried specimens.

Note: Only a single collection, “*Shafer 4183*”, is cited in the protologue by Britton (1920), but without indicating it as type or mentioning in which herbaria the specimens reviewed by the authors are found, so that all duplicates of the type collection are to be considered syntypes (Turland & al. 2025, Art. 40, Note 3). We located three specimens of this collection in the GH, HAC, and NY herbaria. The specimen NY #00083601, which contains the handwriting of N.L. Britton (Anonymous 2025) in the species name and the indication of “type”, is designated here as the lectotype.

Distribution: Endemic to Cuba.

10a. *Pera polylepis* Urb. **subsp. *polylepis***, *Symb. Antill.* 9(2): 206. 1924. Lectotype (**designated here**): Cuba, Holguín, Mayarí: “prov. Oriente; Sierra de Nipe, Loma de Estrella [Alto de La Estrella] in charrascales”, 08.VI.1915. *E.L. Ekman 5948* (S R-10658 [image!]; isolectotypes: G #00441952 [image!], K #00601103!, NY #00083602!, S 12-816611 [image!]).

Etymology: The specific epithet combines the Greek *polys* (“many”) and *lepis* (“scale”), referring to the abundant scale-like (lepidote) indument that densely covers the leaves.

Note: When describing *Pera polylepis*, Urban (1924) only stated that the type material of the species is from the collection *E.L. Ekman 5948*. He did not mention in which herbarium the specimens consulted by him were deposited, so all duplicates must be considered syntypes (Turland & al. 2025: Art. 40, Note 3). The specimen in S (*S-R-10658*) has on its label the species name and the Latin term “typus”

written by I. Urban himself (Burdet 1979). Hence, we chose this specimen as the lectotype. Urban (1924) also mentions the collections *E.L. Ekman 9591* and *C. Wright 3710* as samples consulted. Therefore, all duplicates of these should be considered as paratypes (Turland & al. 2025, Art. 9.7), from which we were only able to locate the latter with the specimens NY #01431938!, NY #01431875!, GH #02410060!.

Distribution: Endemic to Cuba.

10b. *Pera polylepis* subsp. *moaensis* Borhidi, in *Acta Bot. Acad. Sci. Hung.* 25(12): 44. 1979. Holotype: Cuba, Holguín, Moa: “Prov. Oriente. Charrascos: Río Yagrumaje, Moa”, 18.VII.1944. *Bro. Clemente 3885* (HAC [ex LS]!).

Etymology: The subspecific epithet derives from the type locality, Moa, combined with the Latin suffix *-ensis* (“belonging to a place”), meaning “from Moa,” referring to the region in Holguín, northeastern Cuba, where the type specimen was collected.

Note: When describing the new subspecies, Borhidi & Muñiz (1979) specifically stated that the holotype of the new taxon is the specimen *Bro. Clemente 3885*, housed in HAC. In this study no other specimen of this collection was found.

Distribution: Endemic to Cuba.

CONCLUSIONS

This study provides the first comprehensive nomenclatural revision of West Indian *Pera*, establishing a stable typification framework for all 13 validly published names. The resulting species list and clarified typifications constitute a robust foundation for future integrative taxonomic studies that will combine morphology, molecular data, and biogeography to refine species limits and assess conservation status. This is particularly evident in the case of *Pera bumeliifolia* and its allies, where species boundaries remain ambiguous and require rigorous testing. Detailed morphometric analyses of highly variable vegetative traits, coupled with careful documentation of reproductive characters and molecular phylogenetic data, are needed to determine whether this complex represents a single widespread species or an assemblage of geographically restricted lineages. Such an approach will enable either the re-validation of historical names or the description of new species.

Most *Pera* species recorded from the West Indies are concentrated in Cuba, a pattern that mirrors several other plant groups. Comparative studies have demonstrated that multiple Caribbean lineages, including *Buxus* (González & al. 2023), Caribbean subclades of *Casearia* (de Mestier & al. 2022), *Phyllanthus* sect. *Orbicularia* (Falcón & al. 2020), and several *Euphorbiaceae* lineages (Cervantes & al. 2016), exhibit elevated speciation rates originating on Cuba prior to dispersing to neighboring islands. This recurring biogeographic pattern suggests that *Pera* may likewise possess a distinct Caribbean clade with Cuban origins. To evaluate this

hypothesis, a dense taxon sampling across the archipelago is required, and the integration of this nomenclatural baseline with molecular phylogenetic and biogeographic studies will ultimately clarify species limits and elucidate evolutionary patterns in this poorly known Neotropical genus.

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AUTHOR'S CONTRIBUTION

L.M. Leyva conceived the original idea, examined the herbarium specimens, reviewed the digital catalogs from different herbaria in the search for type materials, and wrote the first version of the manuscript. T. Borsch and B. Falcón-Hidalgo supervised the designation of the types and carried out critical revisions of the first draft. All authors reviewed and approved the final version and addressed the reviewer's comments.

COMPLIANCE WITH ETHICAL STANDARDS

Conflict of interest: The authors declare that they have no conflict of interest.

Ethics approval: All authors have carried out fieldwork and data generation ethically, including obtaining appropriate permitting.

Consent for publication: All authors have consented to publishing this work.

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