

First Record of *Leea guineensis* (Vitaceae) in Cuban Scientific Literature

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ABSTRACT

The presence of *Leea guineensis* G. Don. was confirmed in Cuba. It is a widely cultivated alochtonous species used in Cuba as ornamental plants, which had not been previously registered in the scientific literature of the country. Several botanical procedures (collections, specialized catalogs, descriptions, and scientific illustrations) were applied. It is a new taxon of the genus in the country. A key is suggested as a way to distinguish it from other genera of the Vitaceae family.


KEY WORDS/: *Leea guineensis*, Vitaceae, flora of Cuba, ornamental plants.


INTRODUCTION

There is little knowledge about several ornamental Cuban species; the literature contains insufficient data about the flora of the country, or else, these species have not been recorded so far. Often visitors to the Julian Acuña Gale herbarium of the University of Camagüey (HIPC) request information about the identity of many of them for utilization in different management actions. Meanwhile, this specialized service involves the review of multiple sources, and the application of specific botanical research methods as a scientific discipline. The publication of results prevents future reiteration of this process.

A particular case is closely related to a shrub frequently used in gardening, which has very dark leaves, colorful erect inflorescences with red flowers and small yellow-orange fruits (Fig. 1). Accordingly, the aim of this paper was to disclose the identity of this plant, define its taxonomic position, and provide tools to distinguish it from other genera of the family reported in Cuba.

This result was accomplished thanks to two research projects. One of them is called *Installing a Center of Excellence in Mid-Eastern Cuba to Enhance Production and Research on Bioactive Plants*, which is implemented by several Cuban institutions (under the leadership of the University of Camagüey), and the University of Antwerp, financed by the government of Belgium through the VLIR-UOS Program. The other project is called *Contribution to Knowledge and Sustainable Management of Selected Biodiversity Groups in the Province of Camagüey*. It is

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an institutional project developed by the Center for Environmental Management Studies at the University of Camagüey.

MATERIALS AND METHODS

A collection of samples and pictures of the species was made in some Camagüey city gardens. The specimens were deposited at the Julian Acuña Gale herbarium of the Ignacio Agramonte Loynaz University (HIPC), according to permanently updated Thiers (2012). The identity of the taxon was established, first, by contrasting the specimens to images available on the Internet (<http://www.tropicos.org/Image>, 12474, 12475, and 100383928).

Then they were compared to descriptions and keys according to Ridsdal (1974), Chen & Wen (1998), and Lok, Ang & Suen (2011). Additionally, other digital materials were consulted in these herbaria: BNRH, BR, COI, K, MO, and P, thanks to the support given by the Journal Storage (JSTOR) (<http://plants.jstor.org>).

Gender and species protologue were located in the following free access portals: Botanicus (www.botanicus.org/) and Biodiversity Heritage Library (<https://www.biodiversitylibrary.org/>). The possible existence of types was mined in the database of JSTOR Global Plant (<http://plants.jstor.org>). Throughout history, the taxon nomenclature was assessed in light of the International Code of Nomenclature for algae, fungi, and plants (McNeill, Barrie, Buck *et al.*, 2012). The Font Quer (1975) terminology was used to describe the species.

The search for possible documentary evidence of the existence of the species in Cuba included a review of materials already deposited in these herbaria: HAC, HAJB, HIPC, and ULV Thiers (2012). Besides, the related literature was reviewed, such as, Acevedo & Strong (2012); Alain (1974); Esquivel, Hammer & Knüpffer (1992); Gómez de la Maza (1889 and 1897); Gómez de la Maza & Roig (1916); Greuter & Rankin (2017); Grisebach (1860, 1864 and 1866); Herrera (1993); León & Alain (1953); Oviedo (1994); Richard (1850); Sauvalle (1873); Seifriz (1943).

The morphological traits of the species growing in Camagüey gardens were evaluated on site or through high resolution photos, which made possible more accurate and detailed observations of the plant. The herbarium specimens were also studied, using a stereoscopic microscope and Internet images.

The analytical key to distinguish the genera of family Vitaceae, first required the evaluation of species, traits with renowned diagnostic value within the family of Cuban representative species; then, the species whose status were manifested as mutually excluding alternatives were selected; and finally, they were concatenated consecutively to help users gather evidence to identify each gender with a representation in Cuba.

The distribution and ecology data were collected according to Ridsdal (1974) and Acevedo & Strong, (2012).

The information related to ethnobotany of the species was accessed from the literature, specifically Ajiboye, Salawu, Okezie *et al* (2014), Asif (2015), Falodun, Okunrobo & Agbo (2007), Neji,

Neji & Ushie (2016), Pieme, Penlap & Nkegoum (2008) and Woode, Abasiwani, & Mensah (2011).

RESULTS AND DISCUSSION

The species was taxonomically identified as *Leea guineensis* G. Don, from the Vitaceae family. Hence, it is a new finding for the Cuban flora, specifically. The most significant details regarding the nomenclature, morphology, distribution, ethnobotany, and ecology of the species are presented below:

Leea D. Royen ex L. Syst. Nat. 12 (2): 608, 627. 1767 (*nom. cons.*).

Type: *L. aequata* L. Syst. Nat. 12 (2): 124. 1767 (*typ. cons.*).

Erect shrubs or small trees. Alternate, 1-4 pinnate, rarely simple or 3-foliolate leaves, usually imparapinnates; large obovate, caduceous or persistent stipules; expanded petiole at the base forming a stipular structure surrounding the stem apex, and serrulate-crenate leaflets on the edge. Dichasial or umbelliform inflorescence. Bisexual, 4-5 merous, bisexual flowers. Gamosepalous campanulate calyx, with triangular glandular lobules in the apex. Corolla with petals adnate to a staminodal tube on the inner side. The androceum is made of staminodes and fertile stamens in a cone-like structure, forming a 5-lobulated tube, retuse or 2-lobulated apex, apically reticulated or bifid; 5-free fertile stamens, flattened filaments, alternating with the staminodial lobes, curved to the inside, inverted anthers packed in the staminodal tube; the filaments are straight and the anthers are exerted along the open flower. Heavily cupulate disc. Gynoecium with discoid ovary, 4-6(-10) locular, 1 lobule per locule; short style, slightly thickened stigma. Drupe fruits, usually depressed or subglobose, with 4-6 (-10) seeds. Seeds with ruminated endosperm.

It includes around 34 species, of which 32 are in the Indian/Malaysian region, and other 2 are confined to the African/Madagascar region (Risda, 1974).

Only one species is found in Cuba:

Leea guineensis G. Don G. Hist. 1: 712. 1831. Type: Unassigned

= *Leea coccinea* Planch Hortus Donatensis 6. 1854. Type: Unassigned

One to five meter high tree or shrub. Lateral shoots in zigzag, from stipule-protected buds at the axils of old leaves. 3-4 imparapinnate leaves, 5-10(15) x 2.5-5(8) cm oval-elliptical or broadly lanceolate leaflets, crenate and slightly pandurate on the edge, and apiculate on the apex. The stipules form a pod that leaves a deep scar in the petioles when the pod falls. Compact or lax (3-)10-25(-40) cm long inflorescence, sometimes glabrous or hairy, rarely furry. Red flowers in Cuban representatives. Gamosepalous tubular calyx, triangular sepals, acute in the apex. Gamopetalous corolla, attached to the staminodal tube, elliptical petals. *Androceum with a red or white* staminodal tube, adnate to the corolla in the central part, yellow anthers. *Gynoecium with a* 1-2 mm round ovate ovary, red style, slightly expanded stigma. Yellow-orange berries at maturation, with 4-6 seeds. Cuneate seeds (Fig. 1).



Fig. 1. *Leea guineensis* G. Don G. (Vitaceae) A) Branch with stipule and shoot. B) Leaf C) Leaflet D) Inflorescence F) Stem base. Garden of the Ignacio Agramonte Loynaz University of Camagüey.

Originally from Africa, Asia, and the Pacific (Ridsdal, 1974). Africa: it grows in the Gulf of Guinea Sao Tome Islands, Madagascar, Bourbon, and Mauricius. Asia: India, Burma, Thailand, Cambodia, Laos, Thailand Malaysia, Sumatra, and Java. The Pacific: The Philippines, Taiwan, Micronesia, and New Guinea. It is widely cultivated in several parts of the world, including La Española and Puerto Rico (Acevedo-Rodríguez, P. & Strong, 2012). Information about the time it

was introduced in Cuba is not available, but according to interviews made to professionals with broad experience in gardening, this must have happened a long time ago, so its presence has been widespread throughout the country. No evidence of invading other cultivation areas have been found.

Specimens identified In Camagüey: Campus of Ignacio Agramonte Loynaz University of Camagüey, A. Martínez Proenza, HPC-12044, 20-XII-2017 (HIPC).

It is used for ornamental purposes in Cuba. Usually, it is cultivated to make hedges near buildings. It can adapt well in the shade, so it can be planted in pots indoors.

In other parts of the world, it is known for various properties: antimicrobial against *Escherichia coli*, *Staphylococcus aureus*, *Bacillus substillus*, *Streptococcus pneumonia*, *Pseudomonas aeruginosa*, and *Candida albican* (Neji, 2016); antioxidant (Asif, 2015); anti-tumor (Pieme, Penlap & Nkegoum, 2008); contraceptive, anti-seizure, and anxiolytic, similar to diazepam (Woode, Abasiwani & Mensah, 2011); and to counter-attack the effect of organic-phosphate (dichlorofoes) used as insecticides in animals (Ajiboye, Salawu, and Okezie *et al*, 2014). This species also contains alkaloids, flavonoids, tannins, saponins, and cardiac glucosides (Neji, Neji & Ushie, 2016); vitamins A, C, D, and E; and selenium, sodium, calcium, manganese, and zinc (Ajiboye, Salawu, Okezie *et al* 2014).

For other species of this genus (*Leea indica* (Burm. f.) Merr.), anti-edematogenic properties have been found, along with saponins (Falodun, Okunrobo & Agbo, 2007), which will deserve further study in *L. guineensis* G. Don.

Common names: Lia (Dominican Republic); lía (Puerto Rico); cafetillo (Camagüey, Cuba).

Genus *Leea* has been regarded as an independent family (Leeaceae) by authors like, Acevedo & Strong (2012); Chen & Wen (1998); Gilman (1999); Herrmann (2012); Humbert (1967); Molina (2009), y Ridsdal (1974), and others. Nevertheless, it is traditionally classified within the Vitaceae family by some authors: Lok, Ang, & Suen (2011); Ingrouille, Chase, Fay, *et al.* (2002); Molina, Wen & Struwe (2013); Wen, Lu, & Boggan (2014); Trias-Blasi, Parnell, & Hodkinson (2012), recently ratified by (APG IV) Byng, Chase, Christenhusz *et al.* (2016), the criterion assumed for this research.

The only reference of the presence of the species in the Antilles (Acevedo and Strong, 2012) was under the name *Leea coccinea* Planch. In this study, the criterion of Ridsdal (1974) was assumed, since in his world monograph of the genus, he considered the above name a synonym of *Leea guineensis* G. Don

The thorough bibliographic review demonstrated that *Leea coccinea* is not recorded for Cuba in the works of Acevedo-Rodríguez, Alain (1974); Esquivel, Hammer & Knüpffer (1992); Greuter & Rankin (2017); Herrera (1993); León & Alain (1953); Oviedo (1994); P. & Strong M. (2012). Neither it was in the Cuban Data Network of Biodiversity, or in herbaria HAC, HAJB, HIPC, and ULV (Thiers 2017).

According to Greuter & Rankin (2017), this is the sixth genus of Vitaceae found in Cuba, which may be identified using the analytical key below:

- 1 Simple leaves.....2
- 1* Complex leaves..... 3
- 2. Petals with a cone-like structure in the apex, forming a hood behind the anthesis..... *Vitis*
- 2* Free, sort of persistent petals..... *Ampelocissus*
- 3 Pinnate leaves (at least in the Cuban species)..... 4
- 3* Digitate leaves..... 5
- 4 Conspicuous staminodal tube in the flower..... *Leea*
- 4* Free stamens not making a staminodal tube..... *Ampelopsis*
- 5 5-7 leaflet leaves..... *Parthenocissus*
- 5* 3-5 leaflet leaves..... *Cissus*

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