

Phyllanthus phialanthoides (Phyllanthaceae), a new species from northeastern Cuba

Phyllanthus phialanthoides (Phyllanthaceae), una nueva especie del noreste de Cuba

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ABSTRACT

A new species, *Phyllanthus phialanthoides*, endemic to serpentine lowlands of the northeastern Cuba is described, and its known distribution is given. Diagnostic features of the new species are discussed and compared to the closely allied species *P. comosus*. This species belongs to *Phyllanthus* subg. *Xylophylla* sect. *Orbicularia*. Based on fieldwork studies we propose *P. phialanthoides* as a Critically Endangered species according with the IUCN criteria.

Keywords: *Phyllanthus comosus*, *Phyllanthus* subg. *Xylophylla* sect. *Orbicularia*, Critically Endangered species

RESUMEN

En este trabajo se describe a *Phyllanthus phialanthoides*, una nueva especie endémica de las serpentinas bajas del noreste de Cuba y se presenta su mapa de distribución conocida. Los caracteres diagnósticos de la nueva especie se comparan con los de *P. comosus*, que es la especie más cercana dentro del género. *Phyllanthus phialanthoides* pertenece a *Phyllanthus* subg. *Xylophylla* sect. *Orbicularia*. Basado en estudios de campo se propone a *P. phialanthoides* como una especie En Peligro Crítico de acuerdo con los criterios de la UICN.

Palabras clave: *Phyllanthus comosus*, *Phyllanthus* subg. *Xylophylla* sect. *Orbicularia*, especie en Peligro Crítico

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INTRODUCTION

Phyllanthaceae form a recently recognized family of flowering plants that has segregated from *Euphorbiaceae* s.l., based on molecular phylogenetic data (Savolainen & al., 2000, APG II 2003). This taxon comprises a morphologically diverse pantropical group of about 2000 species in ca. 60 genera (Samuel & al. 2005). *Phyllanthus* is the largest genus of this family, and it includes 833 species (*sensu* Govaerts & al. 2000), 220 of them found in the Neotropical region, with 83 of them occurring in the Caribbean Islands (Acevedo-Rodríguez & Strong 2012). In Cuba grow 49 species of this genus, 77% of which are endemic to this island (Greuter & Rankin 2016). The latest taxonomic revision for the Caribbean Island species was published by Webster (1956-1958) 60 years ago. This author recognized the necessity to undertake additional studies pertinent to the Cuban species because several groups from this island are poorly understood and exhibit unclear taxonomic boundaries. Webster (*op. cit.*) also indicated that it is likely that, within this genus, new taxa needed to be described for Cuba.

Phyllanthus subg. *Xylophylla* is restricted to the New World, and its center of taxonomic diversification is located in the West Indies [42 species of ca. 80 species (Webster 1956-1958)]. The majority of these species occurs in the Greater Antilles. They are arranged in 10 sections, with seven of them endemic to these islands (*op. cit.*), such as *Phyllanthus* section *Orbicularia*, that is composed of eight endemic shrubby species. Seven of them are restricted to Cuba, and generally occur in pinelands and microphyllous scrubs on serpentine soils (*op. cit.*). The other species (*P. nummularioides* Müll. Arg.) only occurs on the Hispaniola island. Species of this section form a taxonomically challenging group, they have: phyllanthoid branching, axes smooth and glabrous; leaves with mesophyllar sclereids, mostly coriaceous; stipules mostly persistent, that mostly species differ between them in the shape of leaf blades, the size of flower pedicels, and calyx color.

Additionally, during the study of herbarium material for a taxonomic revision of *Phyllanthus* for Cuba, we came across eight different collections from North-Western Cuba that have leaf and flower traits not known in any other Cuban taxa of this genus. On July 2015, we visited the Yamanigüey region where we located one population (with approximately 50 individuals) of this new taxon. We consider these specimens to belong a new species that is described in this contribution.

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MATERIALS AND METHODS

For this investigation, 33 herbarium sheets housed in B, HAJB, HAJU, and JE were examined [herbarium codes according to Index Herbariorum (Thiers 2016)]. From each herbarium sheet, we studied ten branches, ten adult leaves, 10 male and female flowers, and five fruits, whenever it was possible. The flowers structures were hydrated into a solution of water and liquid detergent in a proportion 1/1 (Peña & Saralegui 1982).

To define the plant community type where the new species grows we follow the vegetation classification system of Capote & Berazaín (1984). The conservation status of this species was made according to the UICN (2001) guidelines.

RESULTS AND DISCUSSION

Phyllanthus phialanthoides Falcón & J. L. Gómez, **sp. nov.** (Figure 1)

Holotype [specimen]: Cuba, Holguín, Moa, Yamanigüey, charrascos al oeste de Yamanigüey, serpentina rocosa, 07-V-1980, A. Álvarez de Zayas, J. Bisse, J. Gutiérrez & F. K. Meyer HFC 42930 (HAJB #G001016; isotypes: B #10 0363193, JE, HAJB: #G001017, #G001018, #G001019, #G001020, #G001021).

Diagnosis: The new species is similar to *Phyllanthus comosus* Urb., but differs by its revolute leaves blade of 2-4 mm of long with a bright green color above (vs. plane leaves blade of 9-16 mm of long with a pallid green color in both surfaces in *P. comosus*); pedicel of female flower three or four times shorter than pedicel of male flower (vs. pedicel of both flower types of similar size); calyx greenish or yellowish less than 2 mm long in both sexes (vs. pinkish more than 15 mm long in both sexes); stamens 3 (vs. 5-6 stamens), and a fruit of 2.4-3 mm long (vs. 4-4.5 mm long).

Description: Monoecious small shrub ca. 0.5m high, branches glabrous of 1-3 mm thick, with short leafy branchlets often clustered at branch tips with wax, the old becoming terete, and fissured bark (Figure 2). Leaves of branches reduced to cataphylls blackish, indurate and persistent, stipules triangular to lanceolate, 0.3-0.6 × 0.1-0.2 mm broad, blade acicular-ovate, 0.2-0.4 cm long deciduous branchlets of 0.5-1.2 cm long and 0.3 mm thick, terete, yellow, with (5)-11-12 leaves (Figure 2A). First internode, 0.5-1 mm long, median internode 1mm long Leaves with persistent stipules triangular to lanceolate, 0.5-1 mm × 1.1-0.2, brownish, with a dark apicule. Petiole cylindrical, 0.1-0.2 mm long Leaf blade coriaceous, obovate to narrowly spatulate, 0.3-0.6 × 0.1-0.2 mm, apex obtuse to rounded, with an inconspicuous apiculum, narrowly acute at the base; adaxial surface bright green (with a subhexagonal reticulum of raised

cell walls); veins not prominent, abaxial surface paler whitish with principal central and lateral veins obscure due to the presence of abundant wax, margin revolute (Figure 2). Plants with solitary flowers. Male flower (Figure 3A): pedicel capillary, 3-4 mm long; calyx-lobes 6 (3+3), elliptic-oblong, 2×1.2 mm, margin sub-entire, midrib unbranched; disk 3 roundish segments, 0.5 mm broad; stamens 3, filaments completely connate into a slender column ca. 0.4 mm high; anthers sessile, ovate ca. 0.25-0.4 mm broad; anther sacs divergent, dehiscing obliquely or horizontally. Female flower (Figure 3B): pedicel capillary, 0.8-1 mm long, slightly thickened above; calyx-lobes 6 (3+3), greenish or yellowish, subequal, ovate-oblong, 1.7-2×1-1.4, margin sub-entire, midrib unbranched or nearly so; disk obtusely 6-lobed, somewhat thickened; ovary nearly sessile, 3-sulcate; styles erect, connate at the base into a column ca. 0.2 mm high, the branches ca. 0.2-0.4 mm long, divergent, the narrowed tips recurved. Capsule oblate, ca. 2.4-3.0 mm in diameter, smooth, stramineous, not venous (Figure 2B, 3C). Seeds trigonous, symmetric 1-1.3 mm long, 0.6-0.7 mm tangentially, 0.8-1 mm radially, brown when mature, with rows of slightly raised reddish-brown dots; hilum subterminal, elliptic, ca. 0.2 mm long.

Phenology: Flowering specimens were collected from December to May, and fruiting specimens were collected in March and July.

Distribution and habitat: *Phyllanthus phialanthoides* is endemic to coastal ecosystems located between Moa and Baracoa. It grows at low elevation (0-10 m), on dry rocky soils with serpentine substrates that are located west to the town of Yamanigüey (municipality of Moa, Holguín) and in the Valley of Maraví River (municipality of Baracoa, Guantánamo) (Figure 4). Associated species include *Phyllanthus* aff. *orbicularis* Kunth, *Byrsonima parvifolia* Alain (*Malpighiaceae*), *Dracaena cubensis* Vict. (*Asparagaceae*), *Erythroxylum pedicellare* O.E.Schulz (*Erythroxylaceae*), *Leucocroton linearifolius* Britton (*Euphorbiaceae*), *Poitea gracilis* (Griseb.) Lavin (*Fabaceae*) and *Jacaranda arborea* Urb. (*Bignoniaceae*).

Etymology: The epithet makes references to the HAJB herbarium material, as these sheets were mistakenly identified as *Phialanthus linearis* Alain (*Rubiaceae*).

Taxonomic remarks: *Phyllanthus phialanthoides* belongs to the plants of *Phyllanthus* subg. *Xylophylla*, sect. *Orbicularia* due to the presence of axes smooth and glabrous, leaves with mesophyllar sclereids, male flower with stamens 3-7, female flower with ovary sessile or slightly stipitate, capsule oblate, and seeds verruculose. This species is many times smaller than



Fig. 1. Holotype of *Phyllanthus phialanthoides*, housed in the Herbarium Johannes Bisse (HAJB) of the National Botanical Garden.
Fig. 1. Holotipo de *Phyllanthus phialanthoides*, depositado en el Herbario Johannes Bisse (HAJB) del Jardín Botánico Nacional.



Fig. 2. *Phyllanthus phialanthoides*. **A.** Branch. **B.** Branch with a mature fruit. Scale bars: ca. 0.4 cm. Photos: José L. Gómez.

Fig. 2. *Phyllanthus phialanthoides*. **A.** Rama. **B.** Rama con fruto. Barras de escala: ca. 0,4 cm. Fotos: José L. Gómez.

any other species in this group. On the other hand, *P. phialanthoides* presents three stamens with filaments completely connate into a slender column, similar to *P. phlebocarpus* Urb., which until now was the only species with such an androecium in this section of the genus.

Conservation status: The population of Yamanigüey region occurs close to Moa-Baracoa road, near of Yamanigüey village that is located inside the National Park Alejandro de Humboldt; however, it is surround by a tip. We could not visit the population from the Valley of Maraví River; however, this locality is not part of any protected area. Based on our field observation we predict a continuous decline in the habitat quality of the site that is located outside the National Park Alejandro de Humboldt, due to habitat fragmentation and loss. The conservation status of the new species is thus assessed as Critically Endangered (CR) under criteria B1ab(ii,iii) + 2ab (ii,iii) (UICN 2001).

Additional specimens seen (paratypes): CUBA, Holguín, Moa: charrascos en el valle del río Maraví, II-1968, *Bisse J., Köhler E. HFC 5566* (B, JE, HAJB); charrascales al este de Yamanigüey, III-1968, *Bisse J., Köhler E. HFC 6705* (JE, HAJB); charrascales al este de Yamanigüey, 06-I-1969, *Bisse J., Lippold J. H. HFC 12022* (JE, HAJB); charrascales cerca de Yamanigüey, XII-1969, *Bisse J. HFC 15247* (JE, HAJB); charrascos al oeste de Yamanigüey, 16-IV-1981, *Bisse J., Dietrich H., Lepper L., Sánchez C., Díaz M. A., Leiva Á., Mory B. HFC 44244* (HAJB, B, JE); pinares al oeste de Yamanigüey, lateritas, 13-IV-1985, *Álvarez de Zayas A., Berazaín R., Beurton C., Dietrich H., Lepper L., Gutiérrez J., Oviedo R., Panfet C., Rankin R., Urquiola Cruz A. HFC 55812*(HAJB); charrascales de Yamanigüey, 31-III-1990, *2da Expedición Botánica Nacional "Johannes Bisse" HPR 6435* (HAJU); Al oeste de Yamanigüey, 27-VII-2015, *Falcón B., Gómez Hechavarría J. L., de Vales D., Figueroa N. HFC 88402* (HAJB, Pal-Gr).

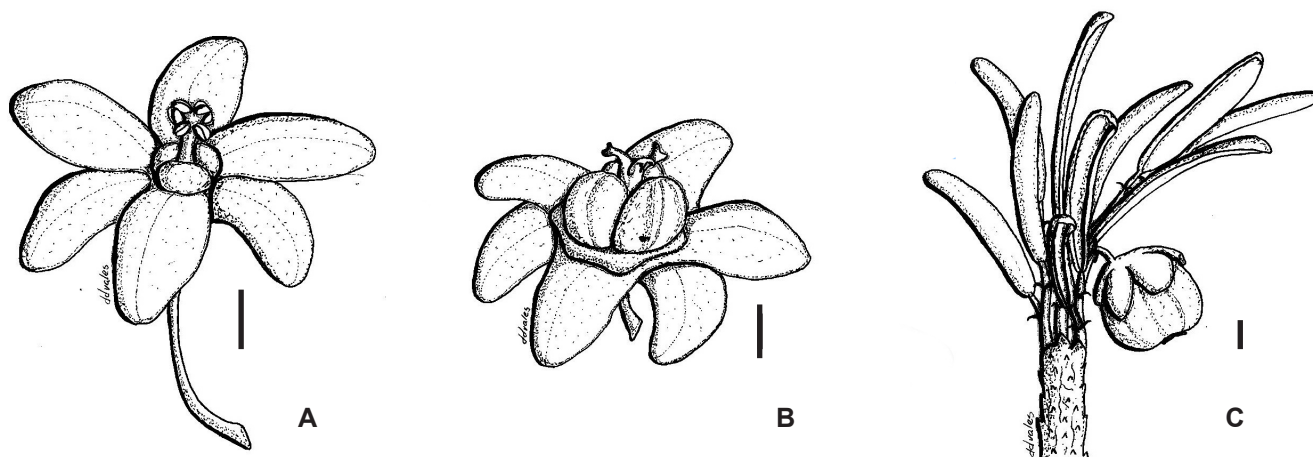


Fig. 3. *Phyllanthus phialanthoides*. **A.** Male flower branch. **B.** Female flower. **C.** Branch with a mature fruit. Scale bars: 1 mm. A and B from the specimen HFC 42930 (HAJB). Draws: Dennys de Vales.

Fig. 3. *Phyllanthus phialanthoides*. **A.** Flor masculina. **B.** Flor femenina. **C.** Rama con fruto; las barras de escala: 1 mm. A y B del espécimen HFC 42930 (HAJB). Dibujos: Dennys de Vales.



Fig. 4. Distribution of *Phyllanthus phialanthoides*.
Fig. 4. Distribución de *Phyllanthus phialanthoides*.

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