A new species of *Protium* (Burseraceae) from northwestern Ecuador

Una nueva especie de *Protium* (Burseraceae) del noroeste de Ecuador

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ABSTRACT

A new species of *Protium* (Burseraceae) from the base of the Andes of northwestern Ecuador is described and illustrated. The new species is distinguished by its leaves, with 1 or 3 rough leaflets with dense, strigulose and granular indumentum on the lower surface, the 8-lobed disc of the flower and the closely ovate-elliptic and bivalved fruits. The species has only been found in the northwestern part of Ecuador, between 600 and 900 m elevation. Trees with flowers have been found between May and June, and fruits between November and December.

Key words: rugosum, strigulose, papillose, asymmetric fruits.

RESUMEN

Se describe e ilustra una nueva especie de *Protium* (Burseraceae) de la base de los Andes del noroeste de Ecuador. La nueva especie se distingue por sus hojas, con 1 o 3 folíolos rugosos con indumento denso, estriguloso y granular por el envés, las flores con un disco 8-lobado y los frutos estrechamente ovado-elípticos y bivalvos. La especie solo se ha encontrada en la parte noroeste de Ecuador, entre 600 y 900 m de altitud. Se han encontrado árboles con flores entre mayo y junio y, frutos entre noviembre y diciembre.

Palabras clave: rugosum, estrigulosa, papilosa, frutos asimétricos.

INTRODUCTION

The genus *Protium* Burm. F., with approximately 160 species, has pantropical distribution, though absent from Africa (Santamaría-A & Lagomarsino 2017). The genus is characterized by the pinnate, trifoliolate, or rarely unifoliolate leaves, pulvinate petiolules, flowers with 3–5 petals, capsular fruits with 2–5 -¡valves and 1–5 pyrenes and resin that is usually aromatic (Lagomarsino-A 3017, Gentry 1993, Pennington et al 2004).

In Ecuador, 26 species have been recorded (Daly 1999, Ulloa & Neill 2005, Ulloa et al in press, Neill & Ulloa 2011. Palacios 2016], although there are at least 10 other species that have not been correctly identified. This time, a new species from northwestern Ecuador is described.

MATERIALS AND METHODS

In this study, the herbarium specimens deposited in QCA, QAP and QCNE were examined. The Tropicos® (http://www.tropicos.org 2020) and JSTOR (http://plants.jstor.org, 2021) databases were consulted for publications on new species from the Neotropics in recent years, nomenclature of species, and images of types.

RESULTS

Protium rugosum W. Palacios, sp. nov. (Figure 1, 2)

TYPE: ECUADOR. Imbabura: Cantón Ibarra, Parroquia Lita, sector Río Verde, bosque muy húmedo, 0°46'59''N, 78°26'38''W, 900 m, June 2014, *W. Palacios 17482* (holotype 243160 QCNE!).

Diagnosis

Leaves with 1 or 3 leaflets, laminas with rough aspect due to the nerves furrowed by the adaxial side, apex slightly conduplicate; petioles 2.5–3.3 cm long; buds and abaxial side of leaflets strigulose and granulose; female flowers 4-mera with a well-defined 8-lobed disk; capsule bivalve, closely ovoid-elliptical, 2–2.6 cm long × 1.1–1.3 cm wide, with 1(–2) pyrenes.

Tree, up to 15 m high. Branchlets cylindrical and glabrous, and with circular or elliptic lenticels split in half. Buds densely strigulose, papillose. Leaves with 1 or 3 leaflets; petioles 2.5–3.3 cm long, semiterete or flattened; lateral petiolules 0.7–1.2 mm long, strongly thickened and flexed at apex; terminal petiolules 2–2.7 mm long, semiterete to broadly channeled, slightly curved on apex. Leaflets 10–15 cm long × 7–11 cm wide, elliptic or less frequently oblong; upper surface glabrous; under surface densely strigulose and granulose (becoming subglabrous in adult age); base rounded; apex short-acuminate; middle vein with apical part recurved (apex of the lamina ruptured by default in dry herbarium specimens); secondary veins 13–15 pairs, slightly divergent, bifurcated towards the edge to form a double arch, ± broquidodromous towards apex lamina, prominent on the underside, sulcate on the upper side (determined a rough aspect of the lamina); inter secondary veins present only between a few pairs of secondary veins, slightly diagonal to secondary ones; tertiary veins prominent, perpendicular to the secondaries, oblique, forming a broad net. Inflorescence axillary, 1(–2) panicle per axes, 4–9 cm long; peduncle 0.5–2 cm long (or 2–4 ramifications from the base); lateral branches 2–3.5 cm long; bracts and bracteole 2 mm long, ovate-lanceolate. Flowers unisexual (female seen); pedicels 1–1.1 mm long, sparsely granular, strigulose; calyx deeply 4-lobed (or sepals only united at base), 0.9–1.1 mm long, lobes broadly ovate, sparsely granulose and strigulose outside; petals 4, 2.6–2.9 mm

long, oblong-lanceolate or lanceolate, reflexed at apex, sparsely granulose and strigulose outside, glabrous inside; disk 8-lobed, glabrous; staminodes 8, alternating with disk lobes, glabrous; filaments 1 mm long, glabrous; antherodes 0.5 mm long, cordiform at base, glabrous; pistil 2.7–2.9 mm long, densely strigulose and granulose except the 4-lobed stigma; ovary broadly ovoid. Fruit (immature seen) 2–2.6 × 1.1–1.3 cm, closely ovoid-elliptical, bivalve, acuminate, with minute lenticels; floral whorls persistent in immature fruits; a pyrene. Very odorous resin, this farinose in herbarium collects on the fruits, flowers, or old cuts. Common name: *copal*, according to *Pennington* et al. *15910* (QCNE).

Additional specimens examined (paratypes): ECUADOR. **Imbabura**: Ibarra, parroquia Lita, sector Río Verde, December 2012, fl., *G. Quemá 8* (Herbario de la Universidad Técnica del Norte!), December 2012, fl., fr., *F. España 9* (Herbario Universidad Técnica del Norte!); *J. Cuasquer 8* (Herbario de la Universidad Técnica del Norte!). Pichincha. Pedro Vicente Maldonado, Reserva Río Silanche, 0º05'N, 79º03'W, premontane wet forest, 600–700 m, 4000–5000 mm annual rainfall, Nov 1996, *T. Pennington et al. 15910* (QCNE!).

Taxonomic relationship: There are seven sections recognized to *Protium* (Daly 2007, Daly & Fine 2011). The new species is partially located in the *Icica* section (Aublet) Swart (published as section by Swart (1942)), characterized by: distal pulvinulus on the petiolules, thyrsoid inflorescences, pedicellate flowers and glabrous disk in staminate flowers (Daly 2007); however, the indumentum is more related to the section *Papilloprotium* (Daly & Fine 2011). On the other hand, only female flowers were observed, which hinders a better location in the respective section.

In the Neotropics, at the specific level, there are no known species with the combination of characters (leaves 1–3 leaflets, elliptic leaflets with strigulose and granulose indumentum, tetramer female flowers with a well-defined 8-lobed glabrous disk, and asymmetric fruit with one pyrene) described for this new taxon. The leaves with 1 or 3 leaflets with deep secondary veins by the upper surface that give a rough aspect are very distinctive characteristics of the new species. Few species of the genus have leaves with this number of leaflets. For example, *Protium unifliolatum* Engl. has unifoliolate leaves and inflorescences 2–3 cm long; *P. icicariba* March. from eastern Brazil, has the same foliar structure as *P. rugosum*, but the leaflets are closely obovate, smooth, and petioles significantly longer, 8–10 cm. Also, *P. pullei* Swart of Surinam has leaves with 1–3 leaflets, but these are closely ovate and acuminate, and inflorescences are less than 3 cm long. The fruits of *P. rugosum* are like *P. veneralense* Cuatrec., but this species differs from 3–5 pinnate leaves, and oblong leaflets.

Distribution: The species have been registered in two localities of northwestern Ecuador at elevations between 400 and 900 m: Lita, in Imbabura, and Pedro Vicente Maldonado, in Pichincha. This area is part of the Choco region, one of

the wettest areas with the greatest biodiversity on the planet.

Phenology: Specimens with flowers have been collected in June and July, with fruits in July and November.

State of conservation: The species has only been found in areas where forests are cleared to establish agricultural systems; it should be noted that the species is threatened, however, it is expected to be located inside of the Cotacachi-Cayapas National Park, which maintains ecosystems like those of the collection site and is located between the two localities of records.

Etymology: The specific name of the species refers to the rough aspect of its leaflets due to the prominent secondary veins.

A C K N O W L E D G M E N T S
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Conflict of interest

The author declares that he has no conflicts of interest in relation to this publication.

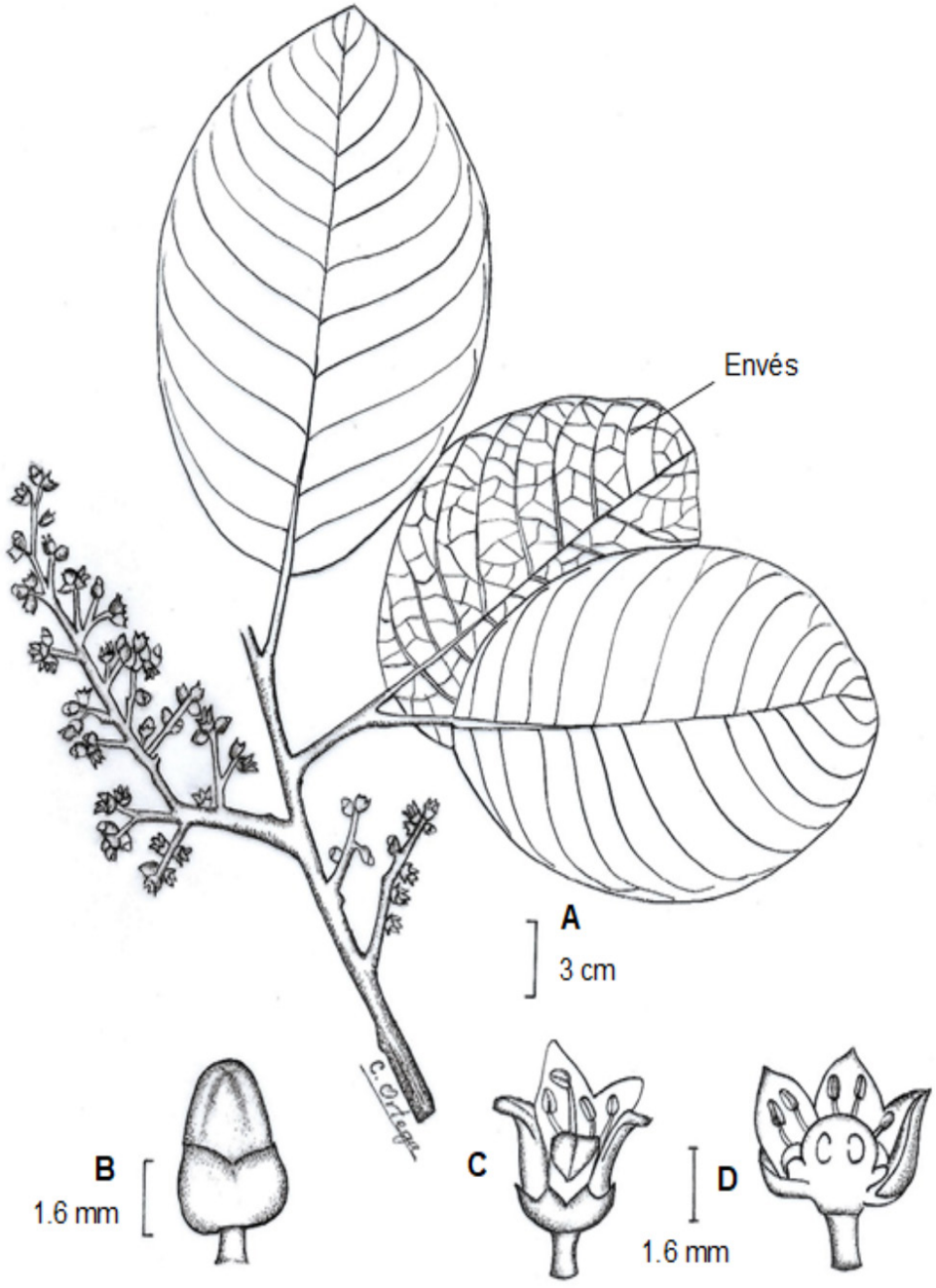

Figure 1. *Protium rugosum* W. Palacios. Illustration of a twig and flower details based on the type collection.

Figure 2. *Protium rugosum* W. Palacios. Image of the holotype, *Palacios 17482* (holotype 243160 QCNE)