



# A new Philippine species of *Ridsdalea* (Rubiaceae, Ixoroideae) from karst vegetation in Palawan

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## Key words

El Nido-Taytay Managed  
Resource Protected Area  
*Gardenieae*  
Malaysia  
Philippines  
*Ridsdalea*  
*Rubiaceae*

**Abstract** *Ridsdalea philippinensis* (Rubiaceae), a new species from the karst forest in El Nido (Palawan, Philippines), is described and illustrated. It is unique among Malesian *Ridsdalea* species in having a corolla tube that is distinctly inflated at the apex, a character state also displayed by *R. sootepensis* and *R. thailandica* from Laos and Thailand. Amongst others, *R. philippinensis*, however, differs from both of these species in having smaller flowers and anthers that do not emerge from the corolla tube. An updated key for Philippine *Ridsdalea* is also presented.

**Citation:** Bustamante RAA, Pelser PB. 2022. A new Philippine species of *Ridsdalea* (Rubiaceae, Ixoroideae) from karst vegetation in Palawan. *Blumea* 67 (1): 15–19. <https://doi.org/10.3767/blumea.2022.67.01.04>. Effectively published online: 17 January 2022.

## INTRODUCTION

Karst is a landscape formed from the weathering of calcium-rich rocks including limestone, dolomite, and gypsum. In the Philippines, karst formations account for c. 12 % of the total land area (Restificar et al. 2006) and have a high level of plant endemism (Fernando et al. 2008). Species diversity in karst areas is likely to be underestimated, because the inaccessible nature of karst terrain complicates field work (Clements et al. 2006, Tang et al. 2011). Some notable forest over limestone areas in the Philippines are located in the Caramoan Natural Park Protected Area (CNPPA) in Camarines Sur Province, Puerto Princesa Subterranean River National Park (PPSRNP) and Saint Paul Mountain Range, both in Palawan, and in the Chocolate Hills Natural Monument in Bohol (Restificar et al. 2006). In El Nido, Palawan, karst terrain is largely composed of exposed, vertical limestone prominence (tower karst). The vegetation in this area is dominated by, amongst others *Adonidia merrillii* (Becc.) Becc. (Arecaceae), *Dracaena multiflora* Warb. ex P.Sarasin & Sarasin (Asparagaceae) and *Euphorbia lacei* Craib (Euphorbiaceae), and contains many noteworthy species, including micro-endemics such as *Amorphophallus salmoneus* Hett., *A. natolii* Hett., Wistuba, V.B. Amoroso, Medecilo & Claudel (Araceae), *Begonia elnidoensis* C.I. Peng, Rubite & C.W. Lin (Begoniaceae) and *Hoya golamcoana* Kloppenb. (Apocynaceae). In 2016, during an ongoing study of the botanical biodiversity of El Nido, an undescribed species of *Ridsdalea* J.T. Pereira & K.M. Wong was documented by the first author at the summit of the Taraw Cliff in Barangay Buena Suerte.

*Ridsdalea* is a segregate genus of a previously more broadly circumscribed *Rothmannia* Thunb. (Wong & Pereira 2016).

It is composed of 31 subtropical and tropical Asian species distributed from Myanmar, Thailand, Cambodia, Laos, Vietnam and Southern China (Yunnan) in the west, across Malaysia, Indonesia and the Philippines, and to New Guinea in the east (Pereira 2016, Khammongkol et al. 2018, Chavez et al. 2020). The genus is characterised by flowers with a hypocrateriform (salver-shaped) or campanulate (bell-shaped) corolla and trifoliate leaf clusters formed through the reduction of one leaf of the distal leaf pair of 2-node branch segments (Wong & Pereira 2016; Fig. 1c, 2a).

In this paper, we describe the new *Ridsdalea* species from Palawan as *R. philippinensis* R. Bustam. & Pelser. It represents the seventh species of *Ridsdalea* in the Philippines and the third observed on the island of Palawan (Pelser et al. 2011 onwards). An updated key to the *Ridsdalea* species of the Philippines is also provided.

## MATERIALS AND METHODS

One plant of *R. philippinensis* from the El Nido-Taytay Managed Resource Protected Area (ENTMRPA) was examined and collected. Descriptions and measurements were made from the dried specimens (holotype and isotypes) and samples preserved in 70 % denatured alcohol with 2 % glycerol (Copenhagen solution). Specimens were collected under Wildlife Gratuitous Permit GP. No. 2019-21 and Wildlife Transport Permit No. PPC-LTP-AO12-2020-241 issued by the Palawan Council for Sustainable Development (PCSD). These specimens were deposited at FEUH, PNH, PSU and USTH (herbarium acronyms follow Thiers, continuously updated). Photos of type specimens of *R. sootepensis* (Craib) J.T. Pereira, and *R. thailandica* (Tirveng.) J.T. Pereira at BM, K, L and TCD were also studied. An identification key for Philippine *Ridsdalea* species was prepared from our observations of *R. philippinensis* and data from Elmer (1906), Pereira (2008) and Chavez et al. (2017).

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**Fig. 1** a–c, e. *Ridsdalea philippinensis* R.Bustam. & Pelsner. a. Flower; b. longitudinal section of flower; c. branching of twig; e. flower showing inflated apex of corolla tube. — d, f. *Ridsdalea merrillii* (Elmer) J.T.Pereira. d. Flowering twig; f. flower showing the lack of an inflated apex of the corolla tube. — Photos by: a–c, e: W. Cabanillas & L.M. Camangeg; d, f: P.B. Pelsner & J.F. Barcelona.



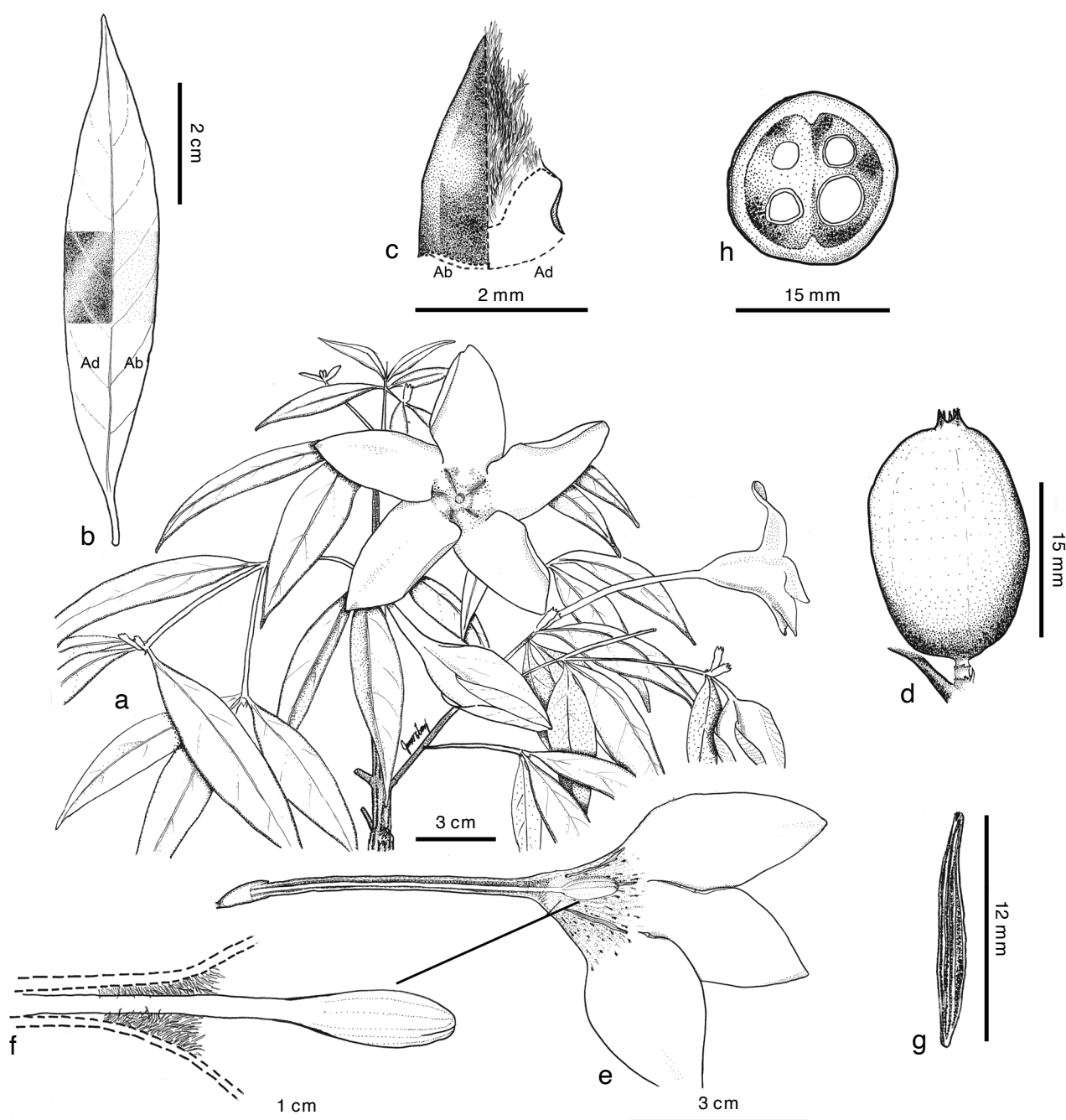
## TAXONOMIC TREATMENT

***Ridsdalea philippinensis*** R.Bustam. & Pelser, *sp. nov.* — Fig. 1, 2

A species that is unique among all currently described species of *Ridsdalea* in displaying a combination of flowers with a corolla tube that is distinctly inflated at its apex and anthers that do not emerge from it. — Type: *PTI 4* with William Cabanillas & Lea Magarce-Camangeg (holo PNH; iso FEUH, PSU, USTH), Philippines, Palawan, El Nido-Taytay Managed Resource Protected Area (ENTMRPA), Municipality of El Nido, N11°10'44.4" E119°23'19.7", c. 150 m, 6 June 2020.

Small tree, to 3 m high. *Bark* of stem and branches fissured, blackish grey to light brown. Young twigs smooth, glabrous, green when fresh. *Leaves* usually placed in branch segments consisting of two nodes with the proximal leaf pair subtended by a relatively long internode, but the distal node bearing only one normally developed leaf (the other vestigial, acicular, c. 1–1.5 mm long) and subtended by a very short internode, resulting in a

pseudo-ternate phyllotaxy. *Stipules* caducous, triangular to ovate, 2–3 by 1.5–3 mm, apex narrowly acute, adaxial surface with colleters at the central portion and densely pubescent, abaxial surface glabrous. *Petioles* 2–7 mm long, adaxially canaliculate, abaxially rounded, glabrous. *Leaf laminae* narrowly elliptic, 5.6–9.4 by 0.9–2.3 cm, (2.9–)3.7–6(–6.7) times longer than wide, base attenuate, apex acute or acuminate, chartaceous, abaxially pubescent when young, glabrescent; midrib on adaxial side slightly depressed, slightly raised abaxially; secondary veins 6 or 7 pairs, adaxially flat, raised below. *Inflorescence* terminal, but seemingly axillary following branching, compact simple cyme, glabrous; peduncle 2–3 by 1.5–2 mm. *Flowers* 2 or 3 per cyme; pedicels c. 1.5–2 mm long. *Calyx* tube (including ovary) urceolate to tubular, 9–11.6 by 2.7–3.2 mm, indumentum only visible at 10× magnification, basal part sparsely pubescent becoming denser towards the apex; calyx lobes 5, triangular, 1–2 mm long, apex narrowly acute, margin pubescent. *Corolla* 7.3–8.5 cm long, white;



**Fig. 2** *Ridsdalea philippinensis* R.Bustam. & Pelser. a. Flowering twig; b. leaf, showing appearance of the adaxial (Ad) and abaxial (Ab) surface; c. stipule, showing appearance of the adaxial (Ad) and abaxial (Ab) surface; d. fruit; e. cross section of flower; f. indumentum at the apical part of the basal section (i.e., non-inflated part) of the corolla tube; g. anther; h. cross section of fruit. — Drawing by J. Mansibang.

corolla tube 66–68 mm long, abruptly inflated at apex; basal part of tube 45–50 by c. 1.55 mm, outer surface glabrous, inner surface villous; apical part of tube 12–20 by 9–12 mm, outer and inner surface glabrous, speckled with bright-clear red to dark red spots; corolla lobes sinistrorse, 5, ovate, 21–30 by 12.8–14.9 mm, c. 0.22 mm thick, base slightly cordate and with a few bright-clear red to dark red spots, apex obtuse to slightly acute, glabrous. *Stamens* 5, not emerging from the corolla tube; anthers linear with 4 parallel grooves, 12–13 by c. 1.75 mm. *Style* and *stigma* not emerging from the corolla tube, 63–66 mm long; style terete, 54–58 by c. 1 mm, smooth, glabrous; stigma clavate, 8–9 mm long. Immature *fruits* obovoid and crowned with a persistent calyx, c. 24 by 17 mm, locules 2, placentation axile; mature seeds not observed.

**Distribution** — *Ridsdalea philippinensis* is endemic to El Nido, Palawan (Philippines).

**Habitat & Ecology** — Tower karst formation. Altitude: c. 150 m. Flowering: June.

**Conservation status** — The first author has continually explored the El Nido-Taytay Managed Resource Protected Area since 2014, but the new species has thus far only been documented on one tower karst formation of approximately 250 hectares situated directly beside highly urbanized areas, where it grows on the exposed limestone tower karst summit and the upper sides of the sheer cliff face. Due to the inaccessibility of most of the other tower karst formations in El Nido, these areas have not yet been fully explored. It is therefore possible that *R. philippinensis* also exists at other sites. We thus propose this species to be Data Deficient (IUCN 2001).

**Notes** — *Ridsdalea philippinensis* is unique among Malaysian *Ridsdalea* species in having a corolla with a distinctly inflated apex. However, it is perhaps most similar to *R. merrillii* (Elmer) J.T.Pereira from Borneo (Fig. 1) and the Philippines and *R. puffiana* J.T.Pereira from Borneo. Amongst others, these three species have leaves that always show at least some pubescence when young, stipules that are shorter than 10 mm, a calyx that is glabrous or at most with pubescence that is only visible at 10× magnification, and that have relatively few flowers per cyme (Pereira 2008, 2016). However, the corolla throat of *R. philippinensis* is speckled and glabrous inside, whereas both *R. merrillii* and *R. puffiana* have a pubescent corolla throat that is not speckled (Pereira 2016). In addition, the leaves of *R. philippinensis* are typically narrower (0.9–2.3 cm wide) than those of *R. merrillii* ((1.5–)4–8(–10) cm; Pereira 2008). Further, *R. philippinensis* has a much shorter corolla tube (66–68 mm) than *R. puffiana* ((80–)105–145 mm), as well as longer anthers (12–13 mm vs 6–12 mm) (Pereira 2016).

*Ridsdalea philippinensis* also bears some resemblance to *R. sootepensis* and *R. thailandica* from Thailand and Laos. For example, all three species have a corolla tube that is inflated near the apex and a speckled corolla throat (Craib 1911, Tirvengadam 1983). However, the anthers of *R. sootepensis* and *R. thailandica* clearly extend beyond the corolla tube (Tirvengadam 1983), whereas those of *R. philippinensis* are contained within its apical portion. Both species also have smaller flowers than *R. philippinensis* (e.g., corolla tube less than 55 vs 66–68 mm long; corolla lobes up to 20 vs 21–30 mm long) (Craib 1911, Tirvengadam 1983). In addition, the calyx of *R. sootepensis* is distinctly pubescent (vs with indumentum that is only visible at 10× magnification) and has longer calyx lobes (i.e., 2.3–4.2 vs 1–2 mm long) (Craib 1911). Furthermore, the leaves of *R. sootepensis* are generally narrower than those of *R. philippinensis* (length/width ratio 2.6–4 vs (2.9–)3.7–6(–6.7)). *Ridsdalea thailandica* most conspicuously differs from *R. philippinensis* in having corolla lobes that are of about the same length (vs less than half as long) as the corolla

tube (Tirvengadam 1983). The apex of its corolla tube is also much less distinctly inflated and c. 5 mm instead of 9–12 mm wide at the throat (Tirvengadam 1983).

## IDENTIFICATION KEY TO PHILIPPINE SPECIES OF RIDSDALEA

1. Inflorescence axes and calyx glabrous or scantily pubescent (visible only at 10× magnification). Stipules not longer than 3 mm. Leaves 5–20 cm long . . . . . 2
1. Inflorescence axes and calyx obviously pubescent (visible unaided). Stipules 2–8 mm. Leaves not shorter than 10 cm . . . . . 4
2. Corolla tube distinctly inflated at the apex, throat speckled. Leaves 5.6–9.4 by 0.9–2.3 cm . . . . . *R. philippinensis*
2. Corolla tube not distinctly inflated at the apex, throat not speckled. Leaves potentially larger, up to 20 by 10 cm . . 3
3. Corolla lobes 1–1.5 by 0.25–0.3 cm. Corolla tube glabrous inside, apical half of tube pubescent outside. Youngest twigs pubescent, becoming glabrous with age. Leaf apex acuminate, acumen to 1 cm long . . . . . *R. lagunensis*
3. Corolla lobes 2–4.5 by 0.5–1(–1.5) cm. Corolla tube pubescent inside, glabrous outside. Youngest twigs glabrous. Leaf apex acute to obtuse, acumen to 0.3 cm long . . *R. merrillii*
4. Corolla tube shorter than 6 cm and corolla lobes 0.4–0.9 cm long . . . . . 5
4. Corolla tube 6 cm or longer, corolla lobes 1.2–4.5 cm long . . . . . 6
5. Corolla lobes 6–9 mm long. Stipules sparsely pubescent. Petioles 1–4 mm. Anthers 6–7 mm long, margins not ciliate . . . . . *R. graciliflora*
5. Corolla lobes c. 4 mm long. Stipules densely pubescent. Leaves subsessile. Anthers c. 3 mm long, margins ciliate . . . . . *R. quadrasii*
6. Flowers 4–9 per cyme. Corolla lobes 1.2–2.5 by 0.4–0.9 cm, tube glabrous inside. Petioles 1–6 mm long. Stipules 5–7 mm long . . . . . *R. leytenensis*
6. Flowers 2–3 per cyme. Corolla lobes 2.7–4.5 by (1.5–)1.8–2.5 cm, tube pubescent inside. Petioles 5–13 mm long. Stipules 2–4 mm long . . . . . *R. negrosensis*

**Acknowledgements** We wish to thank the following persons: Mildred A. Suza (PASu-ENTMRPA), Jenuel P. Casel (aPASu-ENTMRPA), Edna Gacot-Lim (Municipal Mayor of El Nido), Teodoro Jose Matta (Executive Director PCSD) for providing permission to conduct research and for issuing the Gratuitous Wildlife Collection Permit and Local Transport Permit. Raul B. Maximo (City Administrator El Nido), Ivy Mae Hechanova (Clerk-ENTMRPA), and Reina Rose C. Abordo (Clerk-ENTMRPA) assisted the first author during his research. Lea Magarce-Camangeg and William Cabanillas helped with data gathering and provided photos. Mc Andrew Pranada also assisted with collecting data. Jayson Mansibang illustrated *Ridsdalea philippinensis* and Dr. Joan Pereira provided electronic copies of her *Ridsdalea* and *Singaporandia* publications to the first author. Dr. Pereira and Dr. Wong Khoon Meng provided valuable feedback on an earlier version of this paper.

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