



## *Psychotria phuquocensis* Bao, Vuong & V.S.Dang, a new species of Rubiaceae from Phu Quoc National Park, southern Vietnam

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**ABSTRACT:** *Psychotria phuquocensis*, a new species is described and illustrated from Phu Quoc National Park, Phu Quoc Island in southern Vietnam. It can be distinguished from other *Psychotria* species previously known in the region by its glabrous stems, triangular, ovate-triangular to ovate stipules, elliptic, lanceolate elliptic or narrowly elliptic oblong leaf blade with small domatia between midrib and basal secondary veins, cymose inflorescence, green flower, and ellipsoid fruits. The color photographs, phenology, distribution, habitat, and preliminary conservation assessment are provided for *P. phuquocensis*.

**KEY WORDS:** Indochina, plant diversity, *Psychotria aganosmifolia*, *Psychotria asiatica*, *Psychotria fluviatilis*, Psychotriaceae.

### INTRODUCTION

The genus *Psychotria*, described in 1759 by Linnaeus, is one of the largest angiosperm genera, with an estimated 1645 to 2000 species in the world (Linnaeus, 1759; Frodin, 2004; Taylor *et al.*, 2007; Sohmer and Davis, 2007; Davis *et al.*, 2009; POWO, 2024). This genus mainly occurs in tropical regions, thriving in wet to seasonal forests, with only a few species inhabiting drier environments (Paul, 2009). Most species within this genus are typically characterized as shrubs, small trees, or climbing vines, possessing opposite leaves (rarely whorled) and caducous stipules, cymose inflorescence, small white or yellow flowers, drupaceous fruits, two plano-convex pyrenes which possess a preformed germination slit, and seeds with a ruminant endosperm and seed coat pigments that dissolve in ethanol (Nepokroeff *et al.*, 1999; Andersson, 2002; Chen and Taylor, 2011; Wong, 2019; Mary *et al.*, 2024). Pitard (1924) documented 26 species of *Psychotria* from the Indo-China region, of which 17 species were found in Vietnam. Pham (2000) illustrated 30 species and one variety found in Vietnam, and later on Tran (2005) estimated 26 species and one variety of *Psychotria* in Vietnam. Recently, *Psychotria ngotphamii* Bao, Tagane, Yahara & V.S.Dang was described as a new species in 2023, increasing the total number of *Psychotria* species in Vietnam to 27 species and one variety (Nguyen *et al.*, 2023).

During our botanical survey in Phu Quoc National Park, Kien Giang Province, Vietnam in November 2023 and July 2024, we found four common species i.e., *Psychotria asiatica* L., *P. adenophylla* Wall., *P. serpens*

L., and *P. sarmentosa* var. *membranacea* (Pit.) P.H.Hô. In addition, an unknown species was collected. After a careful examination using relevant taxonomic literature related to *Psychotria* (Pitard, 1924; Craib, 1932; Petit, 1964, 1966; Chen, 1992; Pham, 2000; Tran, 2005; Mark *et al.*, 2007; Sohmer and Davis, 2007; Chen and Taylor, 2011), available herbaria materials of *Psychotria* specimens at HN, VNM, as well as digitized specimen images on the websites of various herbaria including P, K, KAG, LE, MW, and JSTOR Global Plants, we concluded it is an undescribed species and thus we here describe it as a species new to science, *P. phuquocensis*.

### MATERIAL AND METHODS

The studied materials were collected from Phu Quoc National Park, Kien Giang Province, Vietnam. All photographs were taken with a Canon 750D mounted with Canon EF-S 60 mm f/2.8 Macro USM lens. Description of all morphological characters of the species is based on Beentje (2012). Nomenclature was carried out using the provisions of the Shenzhen Code, otherwise known as the International Code of Nomenclature for Algae, Fungi, and Plants (Turland *et al.*, 2018). The conservation evaluation was conducted according to the criteria set by the International Union for Conservation of Nature (IUCN, 2019).

### TAXONOMIC TREATMENT

*Psychotria phuquocensis* Bao, Vuong & V.S.Dang, *sp.nov.*

Fig 1



**Type:** VIETNAM. Kien Giang Province, Phu Quoc National Park, evergreen forest, alt. 50–100 m, 10°19'53.0"N 103°59'17.9"E, Nov 2<sup>nd</sup>, 2023, *Nguyen Q.B., Truong B.V., Nguyen N.M.T., Dang V.S. QB114* (Holotype, VNM00071170!).

**Diagnosis:** Similar to *Psychotria fluviatilis* Chun ex W.C.Chen distributed in Chinain having lanceolate leaf blades, cymose inflorescence, and similar peduncle length, but this new species is distinguished by having larger leaf blades (10.5–23.0 × 3–4.7 cm vs. 5–11 × 1–3.7 cm), more numerous secondary veins (10–16 pairs vs. 4–8 pairs), domatia (present vs. absent), larger stipules (9–11 mm long vs. 4–7 mm long), and fruit length (7–9 mm vs. 6–7 mm).

**Treelet**, 1–2.5 m tall. **Twigs** glabrous, dark green *in vivo*, dark brown *in sicco*, cylindrical; internodes 0.9–3.5 cm long. **Stipules** triangular, ovate-triangular to ovate, 9–11 mm long, green to yellowish-green *in vivo*, dark brown *in sicco*, caducous and leaving a ring of reddish-brown hairs present at the nodes and adjacent leaf axils, outer surface glabrous, inner surface villous to tomentose at the base, apex acute to strongly caudate, margin ciliate or entire. **Leaves** simple, opposite-decussate, petiolate; leaf blades elliptic, lanceolate elliptic or narrowly elliptic oblong, 10.5–24.5 × 3–4.7 cm, glabrous on both surfaces, adaxial surface dark green *in vivo*, abaxial surface light green *in vivo*, blackish-brown *in sicco*, apex attenuate, base attenuate to cuneate, margin entire, venation mixed camptodromous to brochidodromous, midrib prominent on both surfaces, lateral veins 10–16 pairs, prominent on abaxial surface with small domatia present; petioles 0.7–.5 cm long, glabrous. **Inflorescence** terminal or rarely axillary, cymose, trichotomous, pedunculate, peduncle 0.6–1.5 cm long, puberulent, green *in vivo*, puberulent; bracts caducous, narrow triangular, 2 mm long, green *in vivo*, brown *in sicco*, glabrous, apex acute, margin entire. **Flowers** small; 5-merous, pedicellate; pedicel ca. 1.5 mm long, puberulent; bracteoles not seen. **Calyx** green, cupuliform, puberulent outside, tube 2–2.5 mm long, lobes 5, triangular, 1 mm long, apex acute, margin ciliate to entire. **Corolla** green to greenish, tube lighter in color, lobes darker in color, tube 2.5–3 mm long, glabrous on both surfaces, lobes 5, triangular, narrowly triangular to ovate-triangular, ca. 3 mm long, glabrous on both sides, villous at throat inside; apex acute, incurved. **Stamens** 5, exerted, filaments 1.5–1.6 mm long, glabrous, erect; anthers ovate, 1.3–1.5 mm long, apex rounded, dorsifixed. **Ovary** 2-locular, with 1 ovule in each locule; style 3–3.5 mm long, equaling stamens, glabrous; stigma 2-lobed. **Infructescence** larger than inflorescence, axes becoming dark green. **Fruits** drupeaceous, green when young, red when ripe, ellipsoid, 7–9 mm long, 3.5–4 mm in diam., shiny, glabrous, calyx lobes on apex 5, persistent or absent; triangular, ca. 1 mm long, glabrous on both surface, apex acute, margin entire;

fruting pedicels 2–3 mm long; pyrenes 2, plan ventral with one longitudinal groove, convex dorsal with 5 longitudinal ridges and 4 longitudinal grooves. **Seeds** 2, hemi-ellipsoid, 7–8 mm long, 2.5–3 mm wide, ca. 1.5 mm thick, blackish brown when dry, albumen ruminant.

**Phenology:**—Flowering in May to July, fruiting in August to November.

**Distribution and habitat:**—*Psychotria phuquocensis* is so far known only from Phu Quoc Nation Park, situated within the Gulf of Thailand, approximately 120 km by sea from Kien Giang Province, Vietnam. It grows in evergreen forests at an elevation of 50–100 m. The plants usually grow among each other, making it very difficult to distinguish them in the habitat unless flowers or fruits are present (Fig 2.)

**Etymology:** The specific epithet refers to Phu Quoc National Park where it was discovered.

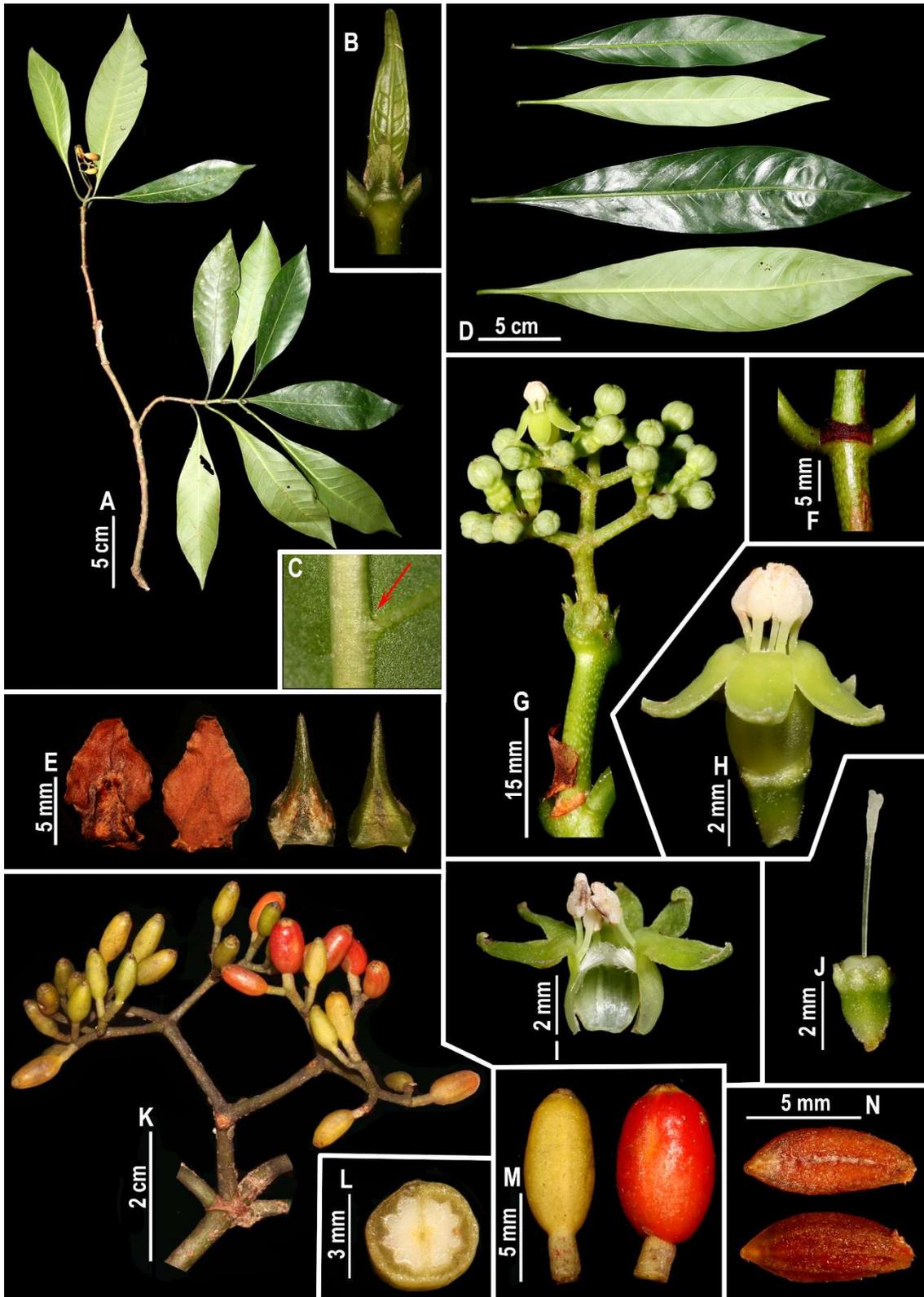
**Vernacular name:** Lâu phú quốc

**Examined specimens:** VIETNAM: Kien Giang province, Phu Quoc National Park, evergreen forest, alt. 50–100 m, 10°19'53.0"N 103°59'17.9"E, Jul 13<sup>th</sup>, 2024, *Nguyen Quoc Bao QB126* (VNM!); Kien Giang province, Phu Quoc National Park, evergreen forest, alt. 50–100 m, 10°19'53.0"N 103°59'17.9"E, Nov 2<sup>nd</sup>, 2023, *Dang Van Son et al. N162*, (VNM!, FOF!, KAG!).

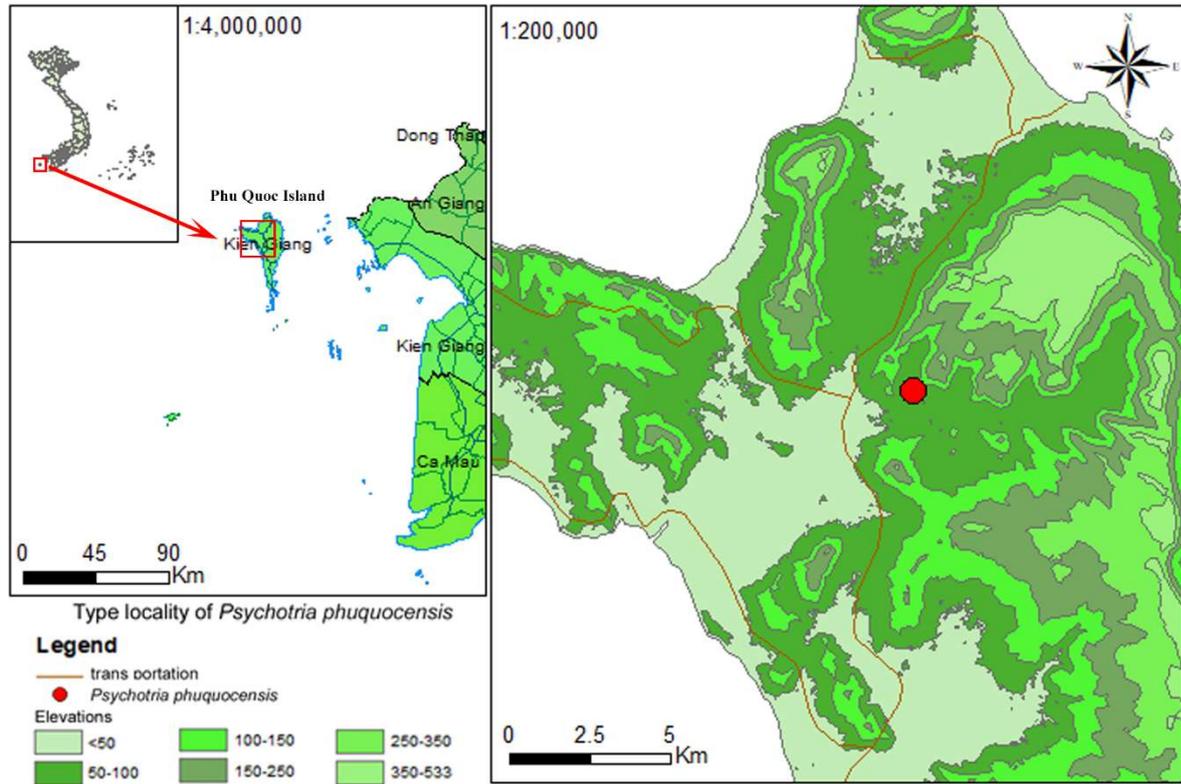
**Preliminary conservation assessment: Data Deficient (DD).** A field survey recorded a small population comprising an estimated 50 mature individuals. Nevertheless, the national park is ensconced within extensive tracts of evergreen forests with a total land area of approximately 314.2 km<sup>2</sup>. It is conceivable that additional groups of mature individuals may inhabit the park and its environs. Therefore, a comprehensive survey is needed to investigate the distribution of this species in the area and to reassess its status according to IUCN criteria.

**Notes:** The newly described species is characterized by its habit up to 2.5 m tall, glabrous, triangular, ovate-triangular to ovate stipules up to 11 mm long, leaves with 10–16 pairs of secondary veins, small domatia present, cymose inflorescence, green flowers, fruits ellipsoid, glabrous; seeds with ruminant endosperm; performed germination slits present. By this combination of characters, it is unique from the known species within the genus. The characterization of *Psychotria phuquocensis* matches *Psychotria* in its present circumscription, with the most obvious features being the dark reddish-brown color of dried specimens, deciduous stipules that expose a ring of reddish-brown hairs at the nodes and adjacent leaf axils, and seeds with a ruminant endosperm. Additionally, the performed germination slits (PGSs) were found in pyrenes, which is an important characteristic of the genus *Psychotria*. The PGSs are located at the bottom of the pyrenes and align with the direction of the pedicel.

The morphological characteristics of *P. phuquocensis* are similar to *Psychotria aganosmifolia* Craib and *Psychotria asiatica* L. in leaf blade shape, apex of stipules



**Fig. 1.** *Psychotria phuquocensis* Bao, Vuong & V.S.Dang. **A.** Fruiting branch. **B.** Shoot apex showing young leaves and stipule. **C.** Domatia between midrib and base of the secondary vein. **D.** Leaves (adaxial surface and abaxial surface). **E.** Stipules. **F.** The ring of reddish-brown hairs at the nodes and adjacent leaf axils. **G.** Inflorescence. **H.** Flower. **I.** The longitudinal cross section of corolla shows filaments and anthers. **J.** Calyx, style and stigma. **K.** Infructescence. **L.** The cross section of fruit show pyrenes and albumen. **M.** Fruit when ripe. **N.** Pyrenes. (All photo by Nguyen Quoc Bao)



**Fig. 2.** The type locality of *Psychotria phuquocensis* and habit of species in study region. Red arrow: *P. phuquocensis*; Blue arrow: *P. asiatica*.

**Table 1.** Morphological comparisons between *P. phuquocensis*, *P. fluviatilis*, and *P. asiatica*.

Characters	<i>P. phuquocensis</i>	<i>P. aganosmifolia</i>	<i>P. fluviatilis</i>	<i>P. asiatica</i>
Stem	1–2.5 m tall	2 m tall	0.4–3 m tall	0.5–5 m tall
Leaf blade size	10.5–24.5 × 3–4.7 cm	9–17 × 1.5–4.5 cm	5–11 cm × 1–3.7 cm	5–23.5 cm × 2–9 cm
Leaf blades	elliptic, lanceolate elliptic or narrowly elliptic oblong	lanceolate to oblanceolate	oblanceolate to elliptic	ellipticoblong, lanceolate-oblong, or rarely oblong-ovate
Domatia	present	-	absent	present
Secondary veins	10–16 pairs	9–10 pairs	4–8 pairs	5–11 pairs
Petioles length	0.7–3.5 cm	0.8–3 cm	0.5–1.8 cm	0.7–5 cm
Stipules	triangular, ovate-triangular to ovate, 9–11 mm long, apex acute to strongly caudate	subulate-acuminate or sparsely fringed, margins irregularly toothed, 7 mm	lanceolate to deltoid, 4–7 mm long, apex acuminate, sometime bilobed	triangular to broadly triangular or broadly ligulate, 3–8 mm long, apex acute to obtuse
Peduncles lengths	0.6–1.5 cm	7 mm	0.2–2 cm	2.5 mm
Calyx lobes length	5, ca. 1 mm	4, 1.5 mm	4–5, 0.5 mm	(4)–5–(6), 0.8–1 mm
Calyx tubes	2–2.5 mm	0.5 mm	1–1.5 mm	0.8–1.2 mm
Corolla lobes	green, 5, ca. 3 mm	white, 4, 2 mm	white, 4–5, 1–1.7 mm	white, (4)–5–(6), 2–2.5 mm
Corolla tubes	5, 2.5–3 mm	4.75 mm	3–3.5 mm	2–3 mm
Filament	1.5–1.6 mm	1 mm	-	-
Fruits	ellipsoid, 7–9 mm × 3.5–4 mm, glabrous	-	oblong to subglobose, 6–7 mm × 3–6 mm, glabrous	subglobose to broadly ellipsoid, 5–8 mm × 4–7 mm, puberulent
Seeds	2, elliptic in outline view, 7–8 × 2.5–3 mm	-	2, convex dorsal, ribbed, plan ventral	2, broadly elliptic in outline view, 4.6–4.9 × 4.4–4.8 mm

The morphological details based on Craib (1932), Chen (1992), Chen and Taylor (2011).

undivided, cymose inflorescence, but the new species has larger stipules differing in shape and size, more numerous secondary veins, a longer peduncle, different color corolla, larger anthers, and different fruit shape. The morphological comparison with similar species is presented in Table 1.

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