

*Ceropegia vietnamensis* (Asclepiadoideae, Apocynaceae),  
A NEW SPECIES FROM VIETNAM

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**ABSTRACT**

*Ceropegia vietnamensis* is described as a new species from Binh Chau - Phuoc Buu Nature Reserve in the Xuyen Moc district of Ba Ria- Vung Tau province. It is morphologically close to *Ceropegia laotica* in general appearance and coloration of flowers but differs in many vegetative and reproductive characteristics and grows in a different habitat. The new taxon is described, illustrated with field photographs of detailed botanical characteristics and compared to related species.

**Keywords:** Asclepiadoideae, Apocynaceae, *Ceropegia vietnamensis*, new species, Vietnam.

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## INTRODUCTION

During a botanical survey in October 2020, the authors of this paper encountered a lantern flower in Binh Chau - Phuoc Buu Nature Reserve, Ba Ria - Vung Tau province, Vietnam. It was initially assigned to be *Ceropegia candelabrum* L. (Asclepiadaceae: Asclepiadoideae) according to Pham-Hoang (2003) and Tran (2017). Our recent examination of its morphological characteristics and consultation of literature indicates that it is indeed a new species that we describe here.

## MATERIALS AND METHODS

The studied material was collected from Binh Chau - Phuoc Buu Nature Reserve, Xuyen Moc district, Ba Ria - Vung Tau province, Vietnam. Specimens were sampled and processed following conventional methods (Bridson & Forman, 1998). Detailed photographs and descriptions of taxonomically important characters were taken of fresh materials in the field using a digital camera.

## RESULTS

### *Ceropegia vietnamensis* Nguyen-Phi & Luu, sp. nov. (Figs. 1 & 2)

*Ceropegia vietnamensis* is morphologically close to *Ceropegia laotica* Rodda & Meve in general appearance and coloration of flowers but differs in having longer petioles (5–14 vs. 5–7 mm), lanceolate to linear-lanceolate (vs. linear-lanceolate) leaf lamina, longer bracts (3–3.5 vs. 1–2 mm), 3–30 (vs. 1–2)-flowered inflorescences, longer (45–57 vs. 35–45 mm) corolla with shorter (vs. longer) tube than lobes, narrowly triangular (vs. triangular) outer corona lobules, longer inner corona lobes (3–4 vs. 1–1.2 mm long) and ovate (vs. broadly ovoid) pollinaria.

Perennial, twining herb up to 2.5 m long, with 1(–2) stems from the base, terete, glabrous, slender, 5.5–4.0 mm in diameter, greenish brown to light brown; internodes (4–)6–10(–16) cm long. **Tubers** subglobose, slightly apically compressed, smooth, pale

brown outside, lemon yellow inside, 1.5–4.5 cm in diameter, with many fleshy roots c. 2.5 mm in diameter. **Leaves** simple, opposite, petiolate, **petiole** terete, 5–14 × 1.5–2.5 mm, channelled above, pubescent; **lamina** lanceolate, linear-lanceolate, (4–)8–10(–12) × 0.6–4.5 cm, base attenuate, apex acute, entire at margins, adaxially dark green, puberulent above and along the margins, abaxially paler, puberulent along main vein only; venation pinnate, lateral veins obscure; **colleters** one at base of lamina, globose, c. 0.3 mm. **Inflorescences** extra-axillary umbellate cymes, 3–9(–30) flowered, with 1(–2) flower open at a time, **peduncles** extra-axillary, one per node, 0.5–2 mm long, 1.5–2 mm in diameter, greenish-pinkish, glabrous; pedicels erect, 6–11(–13 when fruiting) × c. 1.5 mm (–2.5 when fruiting) in diameter, pale green to pinkish green, glabrous; bracts 1 or 2 at base of pedicel, lanceolate, 2.5–3.5 mm long, pinkish green, apex acute, reddish, glabrous. **Calyx** 5-partite, greenish at base, reddish or blotched reddish towards apex; lobes linear-lanceolate, 6–8 × 0.8–1.1 mm, apex acuminate, reddish, glabrous. **Corolla** straight or slightly curved, 45–57 mm in total length, glabrous outside at base, sparsely minutely hairy towards apex; **tube** upright, straight or slightly curved, glabrous, 24.5–26.5 mm long, with an inflated base 6.5–7 mm in diameter, cylindrical part 2.2–2.7 mm in diameter; base pinkish white, streaked and blotched reddish maroon at apex on outer surface, pinkish white and striped reddish maroon inner surface; cylindrical part red with paler dots outside, dark red and striped maroon inside; apex red and spotted green outside, cream and striped pink inside; **corolla lobes** broadly ovate, folded, 24–30.5 × 7–11 mm, lower-half lemon yellow, ciliate inside with hairs c. 1.2 mm, upper-half greenish-brown or reddish-brown, ciliate outside with hairs c. 1.2 mm, inside pubescent, apex acute, connate at tips. **Gynostegium** stipitate, stipe 1.0–1.1 long × 0.9–1.1 mm in diameter, pinkish white, glabrous. **Corona** biseriate,

2.5–3.0 mm in diameter, blotched reddish maroon with a cream base; outer series of 5 deeply bifid lobes, lobules narrowly triangular, c. 1.5 mm long  $\times$  0.3 mm wide at base, reddish maroon, ciliate along margins and within, hairs c. 0.6 mm long; inner series of 5 flattened lobes, erect, linear, lobes 3–4 mm long  $\times$  0.3–0.4 mm wide, pinkish white to reddish maroon, glabrous. **Pollinaria:** pollinia 2 per pollinarium, erect, ovoid, yellow, inner angle with a prominent translucent margin, 350–400  $\times$  200–250  $\mu\text{m}$ , caudicles 80–90  $\mu\text{m}$  long; corpusculum clavate, reddish brown, 200–250  $\times$  90–110  $\mu\text{m}$ . **Ovary** conical, 2.5–2.8  $\times$  0.5–0.7 mm wide at the base, apex truncate, glabrous. **Follicles** in pairs, linear, slightly curved, up to 150  $\times$  3 mm, equal, reddish green, tapering at both ends, glabrous. **Seeds** many, flattened, up to 7.5  $\times$  2.5 mm, 1.5 mm thick, pale greenish (immature) and brownish (mature), comose; coma up to 30.5 mm long, silky white.

**Types:** Vietnam, Ba Ria - Vung Tau province, Xuyen Moc district, Binh Chau - Phuoc Buu Nature Reserve, 19 October 2020, approximate coordinates 10°36'27.28"N, 107°33'20.56"E, 20 m asl, *Nguyen Phi Nga & Le Van Son* 829 (holotype SGN!, isotypes SGN!, PHH!).

**Ecology:** This new species was found growing under the canopy of a periodically flooded sparse forest dominated by *Melaleuca cajuputi* L., *Dipterocarpus intricatus* Dyer, and *Dipterocarpus obtusifolius* Teijsm. ex Miq. It grows mixed with other lianas such as *Dioscorea* sp., *Streptocaulon kleinii* Wright & Arn., *Tetracera scandens* (L.) Merr., *Stemona pierrei* Gagnep., etc.

**Etymology:** The species is named after the country where the new taxon was discovered.

**Proposed Vietnamese name:** Long den Viet Nam.

**Conservation status:** The new species is known only from one population of more or less 1,000 individuals at the type location. The extent of its occurrence is estimated to be less

than 15 km<sup>2</sup>, which is divided by a newly built road and converted to agricultural and residential land. Its occupancy is much less than 10 km<sup>2</sup>. Given this situation, we assess this species as CR B1+B2ab (i, ii, iii) (IUCN Standards and Petitions Subcommittee, 2022).

**Taxonomic notes:** *Ceropegia* L. *sensu stricto* includes more than 200 species in Southeast Asia, China, India, Madagascar, tropical Arabia, the Canary Islands, Africa, Papua New Guinea and Northern Australia (Huber, 1957; Gilbert, 2002; Kambale, 2015; Bruyns et al., 2017; Bruyns et al., 2018; Pullaiah et al., 2019; Alharbi & Al-Qthanin, 2021; Phonepaseuth & Rodda, 2021). A recent phylogenetic study included *Brachystelma* and the stapeliads making the genus (*sensu lato*) have more than 700 species (Bruyns et al., 2017). In the last few years, many new species have been described for the genus (e.g. Karuppusamy & Ravichandran, 2017; Kidyoo & Paliyavuth, 2017a, b; Bruyns, 2018; Hanáček & Bruyns, 2018; Kidyoo, 2018; Kidyoo & Kidyoo, 2019; Murugesan et al., 2019; Wu et al., 2019; Kidyoo, 2021; Murugesan & Mao, 2021; Phonepaseuth & Rodda, 2021; Styles & Meve, 2021; Thulin et al., 2021; Ma et al., 2022a; Ma et al., 2022b). In Vietnam, *Ceropegia* L. was first reported with three species by (Loureiro, 1790): *Ceropegia candelabrum* L. as a new record and two new species *Ceropegia obtusa* Lour. and *Ceropegia cordata* Lour. Costantin (1912) accepted the two later and doubted about the existence of *C. candelabrum* in Vietnam. Pham-Hoang (2003) in his well-known Illustrated Flora of Vietnam, Volume 2 accepted only *C. cordata* and uncertainly identified another species as *C. cf. candelabrum*. A few years later, Tran (2005) reported only *C. cf. candelabrum* and *Ceropegia driophila* C.K.Schneid. for Vietnam. However, in his most recent revision of Asclepiadaceae for Vietnam (Tran, 2017), he listed four species (*C. candelabrum*, *C. driophila*, *C. obtusa* and *C. cordata*) but the two species later were noted with “lack of information”.

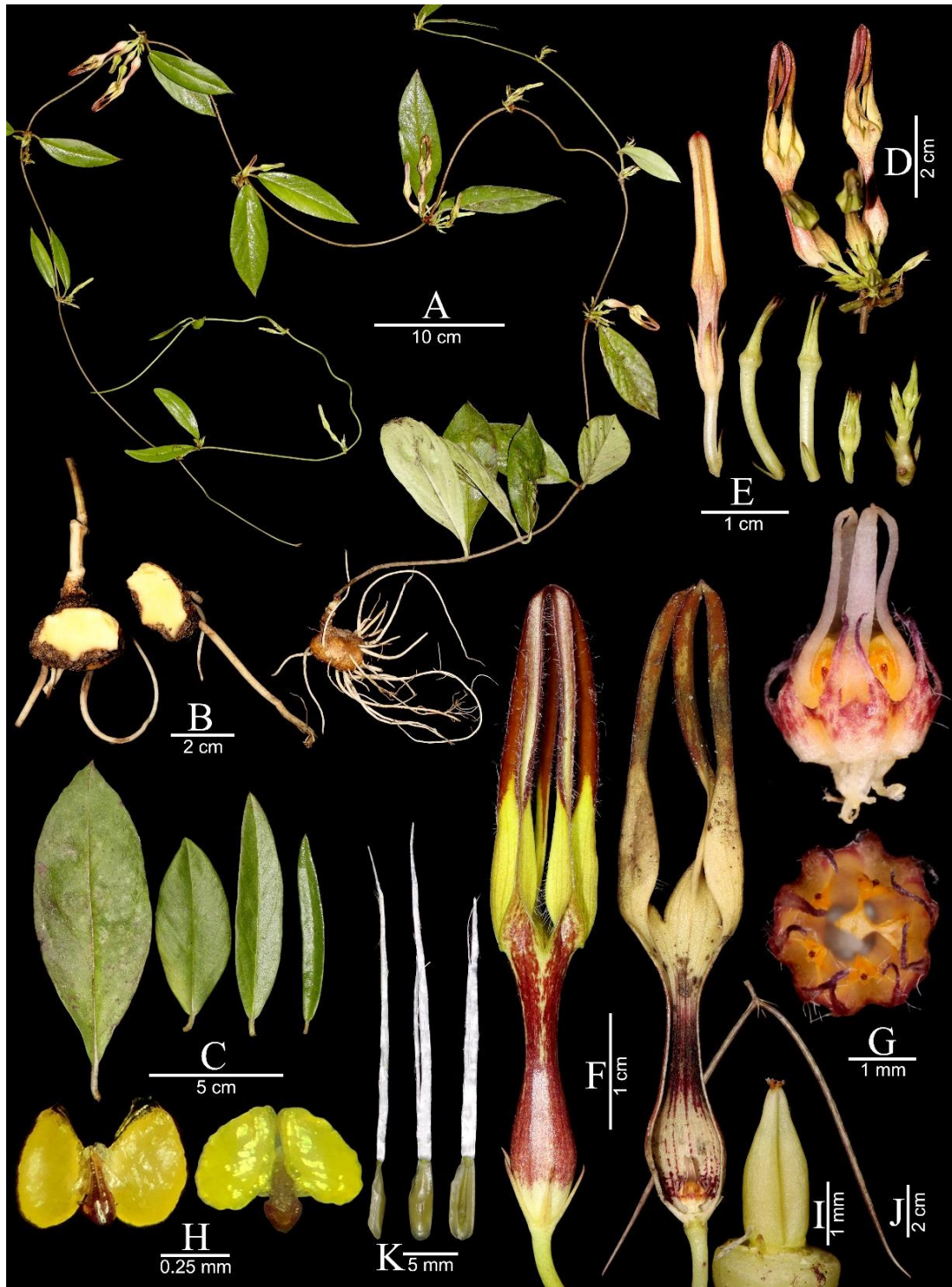


Figure 1. *Ceropegia vietnamensis* Nguyen-Phi & Luu, sp. nov. A. Whole plant. B. Tuber yellowish inside and with fleshy roots. C. Leaf shapes. D. Inflorescence. E. Details of one inflorescence. F. Flowers and longitudinal section showing inside structure. G. Corona, side view and top view. H. Pollinarium. I. Ovary. J. Follicles. K. Seeds with coma



Figure 2. *Ceropogia vietnamensis* Nguyen-Phi & Luu, sp. nov.. A. Habitat.  
B. Flowering and fruiting plant climbing on *Melaleuca cajuputi*

*Ceropogia vietnamensis* appears morphologically closest to *C. laotica* Rodda & Meve recently described from Laos (Rodda & Meve, 2017) in general appearance and coloration of flowers but the new plant differs from the latter in many characters: larger petioles (5–14 × 1.5–2.5 vs. 5–7 × 1–1.5 mm in diam.), lanceolate to linear-lanceolate (vs. linear-lanceolate) leaf lamina, longer bracts (3–3.5 vs. 1–2 mm), 3–30 (vs. 1–2)-flowered inflorescence, longer (45–57 vs. 35–45 mm) corolla, shorter (vs. longer) tube than corolla lobes, narrowly triangular (vs. triangular) outer corona lobules, longer inner corona lobes (3–4 vs. 1–1.2 mm long), ovate (vs. broadly ovoid) pollinia, shorter caudicles (80–90 vs. 200 μm) and longer ovary (2.5–2.8 × 0.5–0.7 vs. 2.1–2.3 mm). In addition, the Vietnamese plant grows under a sparse forest on seasonally flooded deep sandy soils while the Laotian does among grasses on very thin soils (3–6 cm thick) over large sandstone boulders partially exposed.

The shape and coloration of corollas in *C. vietnamensis* recall those in *Ceropogia murlensis* Ram. Kumar & S. Sharma from India (Kumar et al., 2018) but the Indian plant

differs in having no tuber, narrowly winged petioles, glaucous and narrow (6–9 mm wide) leaf lamina, longer peduncles (15–22 mm), smaller corollas (35–45 mm long), greenish corolla tubes, as all have a sparsely pilose and purplish stem and corolla tube with a ring of hairs at the neck of basal inflation and much longer than lobes.

We cannot assign our new species properly to any of the total 63 sections recognized by Bruyns et al. (2017) as it has a fleshy discoid tuber with fleshy roots, the annual twinning stem that dye off into subterranean tuber in the dry season, leathery leaves and corollas with tube almost as long as lobes. It is most possible that it belongs to the section *Esculentae* Bruyns with five species distributed from Africa to South Asia; in this section, it is most morphologically similar to *Ceropogia bulbosa* Roxb. - the type of the section but the latter is easily distinguishable by its fibrous roots, short (0.4–1.0 cm long) petioles slightly hairy at apex, smaller (1.2–4.6 × 1.1–4.5 cm) and orbicular, elliptic-oblong or ovate-cordate leaf lamina and much smaller corolla (1.4–2.3 cm long) (Kambale & Yadav, 2019).

Table 1. Morphological differences among *Ceropegia vietnamensis* and closest congeners

Characters	<i>Ceropegia vietnamensis</i>	<i>Ceropegia bulbosa</i>	<i>Ceropegia laotica</i>	<i>Ceropegia murlensis</i>
Tuber	1.5–4.5 cm in diam	c. 5 in diam	2–3 cm in diam	absent
Roots	fleshy	fibrous	fleshy	fusiform
Stem	up to 2.5 m long, 2.5–4 mm in diam	c. 1.5 m long, diameter unknown	up to 2 m long, 1.5–2.5 mm in diam	2–3.5 m long, 2 mm in diam
Petiole length	5–14 mm	4–10 mm	5–7 mm	10–12 mm
Leaf lamina	lanceolate to linear-lanceolate, (–4) 8–10 (–12) × 0.6–4.5 cm	orbicular, elliptic-oblong or ovate-cordate, 1.2–4.6 × 1.1–4.5 cm	linear(–lanceolate), (4–)5–10(–12) × 0.5–1.2 cm	linear to linear-lanceolate 7–14 × 0.6–0.9 mm
Inflorescences	3–9(–30)-flowered	4–13-flowered	1–2-flowered	6–12-flowered
Bract length	3–3.5 mm	1.2–3 mm	1–2 mm	unknown
Peduncle length	0.5–2 mm	12–20 mm	0.5–2 mm	15–22 mm
Corolla length	45–57 mm	14–23 mm	35–45 mm	35–45 mm
Corolla tube	24.5–26.5 mm long, glabrous within	10–15 mm, hairy within except for dilation part	(20)23–27 mm long, glabrous within	18–22 × 4–5 mm with a ring of hairs at neck of basal inflation within
Corolla lobes	24–30.5 × 7–11 mm	4–8 × ?? mm	(12–)15–17 × 7–8.5 mm	20–22 × 3–4 mm
Corona	outer lobes bifid, lobules narrowly triangular, 1.5 mm long, hairy; inner lobes 3–4 mm long	outer lobes rounded to shortly pointed, c. 3 mm long, glabrous; inner lobes 2 mm long	Outer lobes bifid, lobules triangular, 1.5 mm long, hairy; inner lobes 1–1.2 mm long	unknown
Pollinium shape	ovoid	unknown	broadly ovoid	ovoid
Caudicles	80–90 µm long	unknown	c. 200 µm long	150 µm long
Ovary	2.5–2.8 × 0.5–0.7 mm	unknown	2.1–2.3 × 0.5–0.7 mm	unknown
Follicles	up to 150 × 3.5 mm	68–120 mm	c. 115 × 3 mm (immature)	unknown

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