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Didymocarpus albiflorus (Gesneriaceae), a new species from Vientiane capital, Lao PDR

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ABSTRACT: *Didymocarpus albiflorus*, a new species from central Lao PDR, is described and illustrated with photographs. The new species is similar to *D. middletonii* and *D. brevipedunculatus*, but can be distinguished by a combination of characters (see diagnosis and note). A detailed description, illustration, photographs, distribution, ecology and provisional conservation assessment and key to the species of *Didymocarpus* in the flora of Lao PDR are provided.

KEY WORDS: *Chayamaritia*, *Didymocarpus middletonii*, Didymocarpoideae, Gesneriaceae, Plant taxonomy, Flora of Lao PDR.

INTRODUCTION

The genus *Didymocarpus* Wallich (1819) belongs to the family Gesneriaceae, subfamily Didymocarpoideae, that includes 95 species are accepted naming (POWO, 2020), ranging distribution from India to the Indo-Burma region (Nanggam and Middleton, 2014; Hong *et al.*, 2018; Souvannakhoumane *et al.*, 2018; Yang *et al.*, 2019). Only one species of this genus, *Didymocarpus middletonii* Souvann., Soulad. & Tagane, has been found in Lao PDR (Souvannakhoumane *et al.*, 2018). This number is significantly less than the numbers of Lao PDR's neighboring countries, such as China, where 34 species have been recorded (Cai *et al.*, 2016; Yang *et al.*, 2019), Thailand, 22 species (Nanggam and Middleton, 2014), and Vietnam, 5 species (Hong *et al.*, 2018). In *A Checklist of Vascular Plants of Lao PDR*, 11 genera and 28 species of Gesneriaceae are listed (Newman *et al.*, 2007). Subsequently, *Chayamaritia* D.J.Middleton & Mich.Möller was confirmed to be a new genus distributed in Lao PDR and Thailand, it appear placed in a subfamily Didymocarpoideae with genus *Didymocarpus*, which *Chayamaritia banksiae* D.J.Middleton endemic to Lao PDR (Middleton *et al.*, 2015).

During a botanical field survey in Naxaythong district, Vientiane capital, central Lao PDR from May to August 2019, a possible new species of *Didymocarpus* was found on shaded rocks covered with moss in mixed deciduous forest. After examination of the taxonomic literature (Wang *et al.*, 1998; Nanggam and Maxwell, 2013; Weber *et al.*, 2013; Nanggam and Middleton, 2014; Phuong *et al.*, 2014; Hong *et al.*, 2018; Yang *et al.*, 2019) and documents available online at the Biodiversity Heritage Library, the morphology was compared with dry specimens at FOF and HNL and the digital herbarium at AAU, BKF, BM, E, K, NY, P, PE, and SING. This species is described and illustrated with photographs.

TAXONOMIC TREATMENT

Didymocarpus albiflorus Souvann. & Phonepaseuth, *sp. nov.*, **Figs. 1–3**

Diagnosis. The new species is similar to *D. middletonii*, but differs in having longer stem, calyx tube funnellform, pale green with reddish blotches, glabrous, corolla white with 9 grayish stripes inside.

Type. Lao PDR, Vientiane capital, Naxaythong district, Darn Sinxay temple area, 18°02'24.71"N, 102°27'51.8"E, alt. 210 m, 11 August 2019, *Souvannakhoumane, Phonepaseuth & Phothilart, KS-Bio 00140* (holotype HNL! [HNL009922], isotypes FOF, E).

Description. Deciduous, perennial, lithophytic herb, up to 25 cm tall. **Stem** erect to ascending, ca. 17 cm long, single, densely covered with multicellular glandular hairs. **Leaves** sub-opposite to alternate, whorled at apex, anisophyllous; petioles terete, 0.5–6 cm long, light green, covered with multicellular eglandular hairs; lower blade asymmetrical, elliptic-ovate, ca. 10 × 8 cm, upper blade symmetric, obovate-elliptic, 2–5 × 1.5–5 cm, membranous, base slightly oblique, obtuse-cuneate or sometimes truncate, apex acute to rounded, margins serrate, dark green adaxially, light green abaxially, densely covered with white multicellular eglandular hairs on both surfaces, venation pinnate, midrib prominent beneath, secondary veins 5–9 on each side of midrib, sub-opposite, sometime alternate, obscure above, prominent beneath. **Inflorescences** terminal, cymose, up to 10 cm long, 3–4-flowered; peduncles slender, up to 4 cm long, green, covered with multicellular glandular and eglandular hairs; pedicels 2.5–6 mm long, green, with indumentum as on the peduncle. **Bracts** unknown. **Calyx** shallowly 5-lobed, zygomorphic, 7.5–12 mm long, 3–5 mm in diameter, pale green with reddish blotches, glabrous, tube funnellform, 5–7 mm long, lobes triangular to semi-orbiculate, ca. 1.5 × 2 mm, apex acute

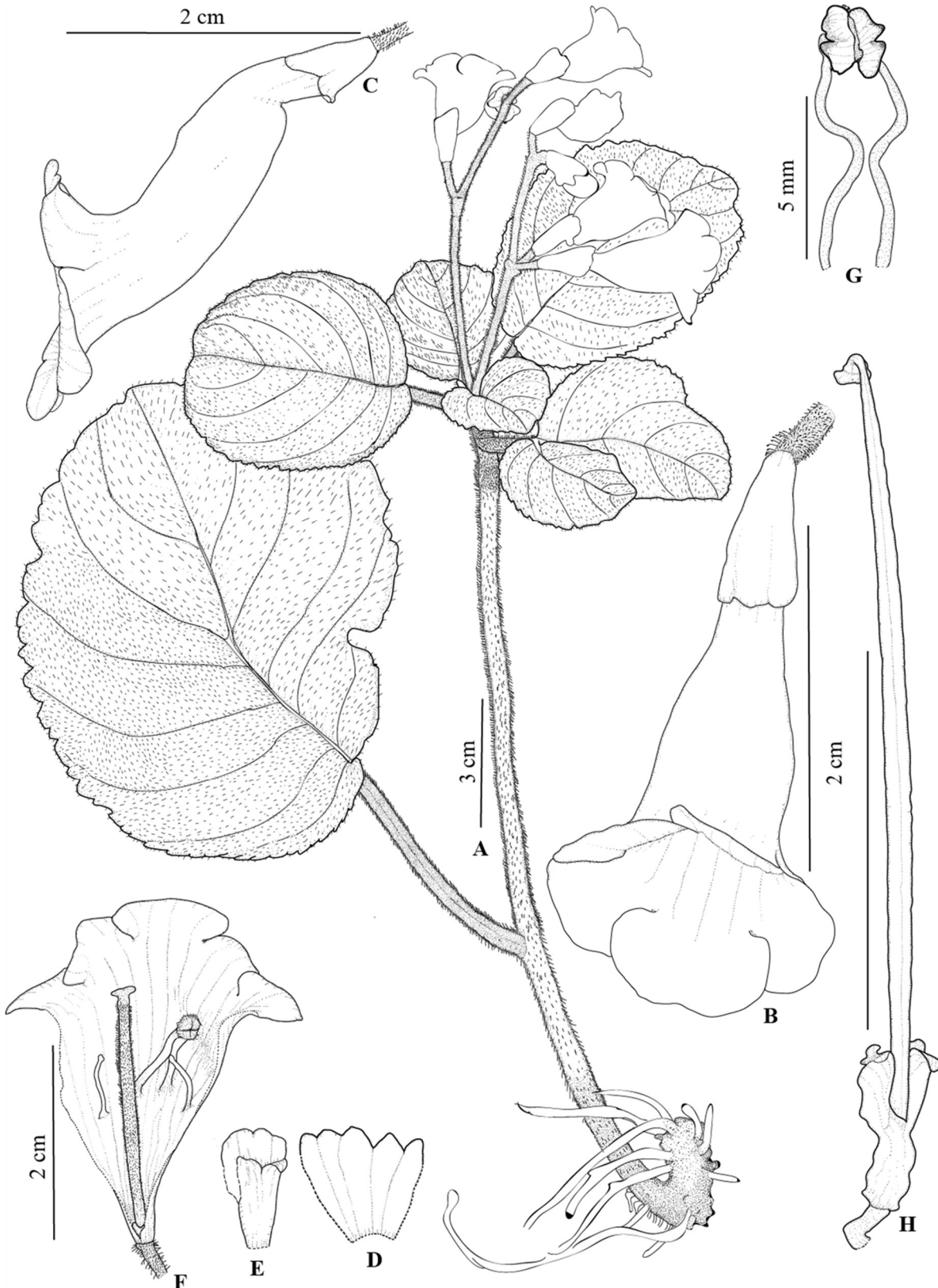


Fig. 1. *Didymocarpus albiflorus* Souvann. & Phonepaseuth, **A**, habit; **B**, flower top view; **C**, flower lateral view; **D**, opened calyx; **E**, calyx tube; **F**, opened corolla, showing pistil, stamens and staminodes; **G**, fertile stamens; **H**, fruits. Line drawing by K. Souvannakhoummane from *KS-Bio140* (HNL).

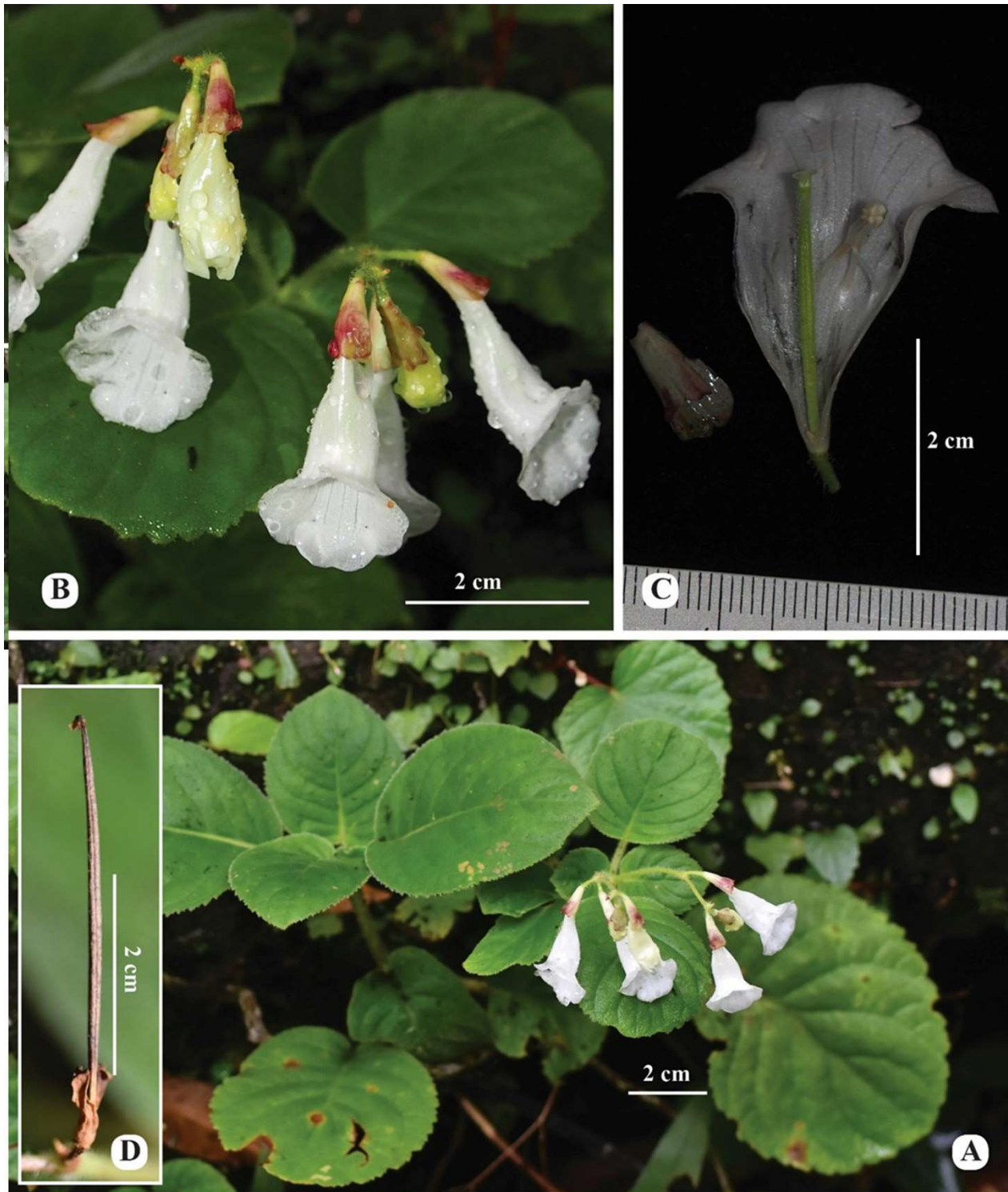


Fig. 2. *Didymocarpus albiflorus* Souvann. & Phonepaseuth, **A**, habit; **B**, inflorescences and flowers; **C**, opened corolla, showing pistil, stamens and staminodes; **D**, fruit. A & D, photos by P. Phonepaseuth and B–C by K. Souvannakhoumane from *KS-Bio140* (HNL).



to rounded. **Corolla** funnellform, zygomorphic, 3–3.5 cm long, white, 9 grayish stripes inside, glabrous; tube ca. 3 cm long, base narrow, 5–7 mm in diameter, dilated and slightly ventricose towards the throat, widest at throat, 7–12 mm in diameter; corolla lobes suborbicular or semi-orbicular, lower lip 3-lobed, lobes orbiculate, more or less equal, 7–9 × ca. 8 mm, upper lip 2-lobed, lobes semi-orbicular, 4–8 × ca. 6 mm long, apex rounded. **Fertile stamens** 2, inserted ca. 1.5 cm from the base of the corolla; filaments ca. 8 mm long, glabrous; anthers connected, ellipsoidal, ca. 2 mm long, ca. 1 mm in diameter, tips and bases rounded, silky hairs. **Staminodes** 3, adnate to corolla ca. 1.4 cm from base, reduced to thin filaments, lateral ones ca. 2 mm long, glabrous, middle one very smaller up to 1 mm long. **Disc** cylindrical, ca. 2 mm long, margin regular. **Pistil** ca. 2.5 cm long, sparsely glandular puberulent; ovary narrowly linear, ca. 2 cm long, sparsely glandular puberulent; stigma capitate, concave, papillose. **Capsule** cylindric, slightly stipitate, erect, straight, light green, when mature light brown, 3.5–4.5 cm long and 1–1.5 mm diameter. **Seeds** numerous, brown.

Distribution. Currently known from type locality at Darn Sinxay temple area, about 20 km from central Vientiane.

Ecology and habitat. The species grows on shaded rocks covered with moss in mixed deciduous forest with sufficient seasonal run-off water, at an elevation of 210 m a.s.l. It grows with *Begonia martabanica* A.DC. (Begoniaceae) and *Monolophus bracteatus* (K.Larsen & S.S.Larsen) Veldk. & Mood (Zingiberaceae). The massive flowering and fruiting were observed in August and September.

Vernacular name. סופת־יהלום 'Dok Kea Yok Khao' [funnel white jade flower] (suggested here).

Etymology. The specific epithet is derived from the white flowers.

Provisional conservation assessment. Because the population information of *Didymocarpus albiflorus* is still unclear, it is not appropriate to make an assessment of the extinction risk faced by this new taxon. Thus, the category of Data Deficient (DD) is appropriate, according to IUCN (2019) criteria. Fortunately, the known habitat of the species is protected as part of a temple, but some illegal logging in the area has occurred. There are other potential risks to the persistence of this new species such as forest fire, prolonged droughts etc.

Notes. The new species is similar to *D. middletonii*, but differs in having longer stem (ca. 17 cm long versus 0.3–0.7 cm long), calyx tube funnellform, pale green with reddish blotches, glabrous (vs. tube urceolate, dark red, multicellular eglandular hairs), corolla white with 9 grayish stripes inside (vs. light red at base, reddish to blackish purple with 9 dark stripes inside). This species is also similar to *D. brevipedunculatus* Y.H.Tan & Bin

Yang, but differs in that the leaves ovate-elliptic (vs. ovate), inflorescences occur on axil near the top of stem with 3–4 flowers (vs. one per axil with numerous flowers), peduncles ascending to erect (vs. pendulous), calyx pale green with reddish blotches (vs. pale green to white), corolla inside with 9 white-grayish longitudinal (vs. inside with 9 purplish to deep red longitudinal stripes), ovary multicellular eglandular hairs (vs. glabrous).

Key to the species of *Didymocarpus* in the flora of Lao PDR

- 1a. Stems up to 17 cm long, calyx tube funnellform, pale green with reddish blotches, glabrous, corolla white with 9 grayish stripes inside *D. albiflorus*
 1b. Stems 0.3–0.7 cm long, calyx tube urceolate, dark red, multicellular eglandular hairs, light red at base, reddish to blackish purple with 9 dark stripes inside *D. middletonii*

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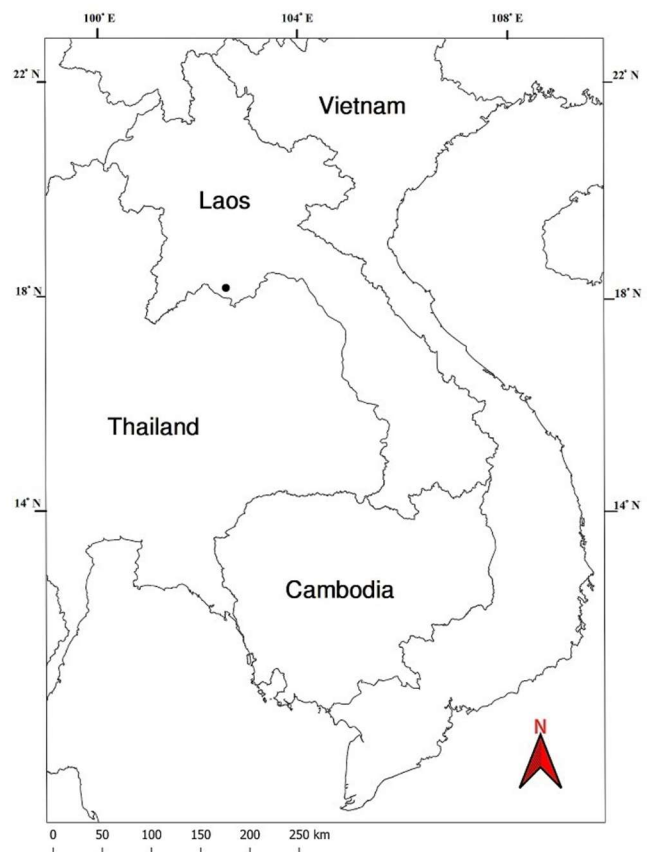


Fig. 3. Type locality of *Didymocarpus albiflorus* Souvann. & Phonepaseuth (●) in Lao PDR.



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