Research article

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# FLORA OF NAM KADING NATIONAL PROTECTED AREA VIII: ADDITIONAL NEW RECORDS OF FLOWERING PLANTS

*Deuanta Kongxaisavath[1*], Shuichiro Tagane[2], Takenori Yamamoto[2], Thyraphon Vongthavone[3], Phongphayboun Phonepaseuth[4], Truong Ba Vuong[5], Pham Quoc Trong[5] and Phetlasy Souladeth[1]*

ABSTRACT

We report six native taxa of flowering plants from Nam Kading National Protected Area, which are poorly known or have not been previously documented in Laos: *Thunbergia amphaii* (Acanthaceae), *Aetheolirion stenolobium* (Commelinaceae), *Elaeocarpus balansae* (Elaeocarpaceae), *Lepionurus sylvestris* (Opiliaceae), *Adina pilulifera* (Rubiaceae), and *Causonis timoriensis* var. *mekongensis* (Vitaceae). For each taxon, voucher specimens, photographs and notes are provided based on Lao materials.

Keywords: angiosperm, Bolikhamxai Province, diversity, flora, Indochina, taxonomy

## INTRODUCTION

The Indo-Burma region is one of the biodiversity hotspots with more than 7,000 endemic plants (MITTERMEIER *ET AL.*, 2004). The forest types of Laos are various according to the geographical area: a tropical montane forest of broad-leaved evergreens in the north and monsoon forests of mixed evergreens and deciduous trees in the central to south regions. Trees are mostly secondary growth with an abundance of bamboo and wild banana. Supported by these various vegetations, the flora has rich diversity and the country is estimated to contain 5,000–6,000 species (NEWMAN *ET AL.*, 2007, 2017 onwards; JIN *ET AL.*, 2016; ZHU, 2017). Due to the relatively low accumulation of herbarium specimens and few taxonomic investigations conducted to date, many species remain to be recorded (MIDDLETON *ET AL.*, 2019).

Nam Kading National Protected Area, located in central Laos, is one of the most globally significant ecosystems of Laos (HALLAM & HEDEMARK, 2013). Recent field excursions in this area led us to discover many interesting findings for the flora of Laos. For example, among the 188 plant taxa obtained from two field surveys, eight species were new to science (SOULADETH *ET AL.*, 2017, 2019; TAGANE *ET AL.*, 2018a; YANG *ET AL.*, 2018;

[1] Faculty of Forest Science, National University of Laos, Dongdok Campus, Xaythany District, Vientiane Capital, Laos.
[2] The Kagoshima University Museum, Kagoshima University, 1-21-30 Korimoto, Kagoshima 890-0065, Japan.
[3] Association for Community Development (ACD), Salavan Province, Laos.
[4] Faculty of Environmental Science, National University of Laos, Dongdok Campus, Xaythany District, Vientiane Capital, Laos.
[5] Institute of Tropical Biology, Ho Chi Minh, Vietnam.
* Corresponding author. E-mail: deuantar66789@gmail.com
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SOUVANNAKHOUMMANE *ET AL.*, 2019) and 31 species were newly recorded in Laos (TAGANE *ET AL.*, 2018b; PHONEPASEUTH *ET AL.*, 2021).

In this paper, to contribute to a better understanding of the flora of Laos, we report additional six species which were previously not known, or were poorly documented, in the flora of Laos. The identification and confirmation of distribution records in Laos were based on literature review, specimen records in herbaria BKF, FOF, FU, KAG and VNM, as well as digitized images on the web (for details see TAGANE *ET AL.*, 2020).

## SPECIES RECORDED IN LAOS

***Thunbergia amphaii*** Suwanph., K.Khamm., D.J.Middleton & Suddee [Acanthaceae]—Fig. 1.

Thai Forest Bull., Bot. 49(1): 58 (2021).

This beautiful flowered *Thunbergia*, *T. amphaii*, was recently described based on the specimens from Phu Langka National Park, Nakhon Phanom Province, Northeastern Thailand, and had been known as endemic to this area (SUWANPHAKDEE *ET AL.*, 2021). In Laos, a few populations of *T. amphaii* were found in seasonal broad-leaved evergreen forest, at alt. 268–550 m, in Nam Kading National Protected Area, Bolikhamxai Province during our field surveys in 2016 and 2023. As it is locally common in the area, it might occur in its neighboring areas in Laos.

Specimens examined: LAOS. Bolikhamxai Province: Pak Kading District, Nam Aan River, Nam Kading National Protected Area, 18.334587°N, 104.28142°E, 315 m a.s.l., 2 September 2023, fl., *Tagane et al. Z11* (FOF, KAG, VNM); Pak Kading District, 18°12′06.8″N, 104°23′18.7″E, 268 m a.s.l., 25 December 2016, fr., *Souladeth et al. L299* (FOF, FU); same locality, 18°10′27.5″N, 104°28′21.2″E, 282 m a.s.l., 26 December 2016, fr., *Souladeth et al. L415* (FOF, FU); Ban Naphong, 18.216958°N, 104.382452°E, 550 m a.s.l., 6 November 2023, fl. and fr., *Souladeth et al. Z722* (FOF, KAG, VNM).

Distribution: Thailand (Northeastern: Nakhon Phanom), Laos (Bolikhamxai).

***Aetheolirion stenolobium*** Forman [Commelinaceae]—Fig. 2.

Kew Bull. 16(2): 209 (1962).

This is a twining herb, characterized by inflorescence leaf-opposed thyrse, 5 stamens dimorphic consisting of 2 fertile and 3 sterile, and filaments of 3 sterile stamens bearded (FORMAN, 1962; BOONSUK *ET AL.*, 2023). It had been known to be endemic to Thailand (FORMAN, 1962; NEWMAN *ET AL.*, 2017 onwards; BOONSUK *ET AL.*, 2023). In Laos, though we have not seen its voucher specimens, MAKNOI (2019) introduced photographs of this species in his book *"Plants Diversity in Luang Prabang Province"*, which could be the first record of occurrence in the country. Our collection is the second record based on firm evidence, i.e., voucher specimens, and represents a new locality in central Laos. As previously known, the species grows in limestone forests in Laos.

Specimen examined: LAOS. Bolikhamxai Province, Viengthong District, Hin Ngon Village, in limestone forest, 18.371345°N, 104.460451°E, 406 m a.s.l., 3 September 2023, fl., *Tagane et al. Z188* (FOF, KAG, VNM).

Distribution: Thailand (Northern, Northeastern, Central, Southeastern), Laos (Bolikhamxai, Luang Prabang).

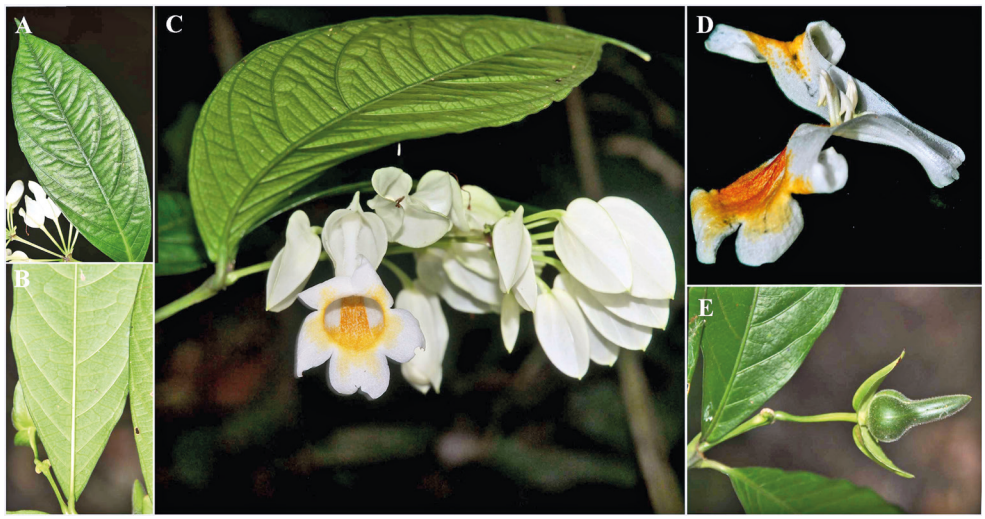


Figure 1. *Thunbergia amphaii* Suwanph., K.Khamm., D.J.Middleton & Suddee — A, upper leaf surface. B, lower leaf surface. C, flowering twig. D, flower, dissected to show anthers. E, fruit. Photographs by Shuichiro Tagane.


Figure 2. *Aetheolirion stenolobium* Forman — A, lower leaf surface. B, general morphological characters of leaves and inflorescence. C, flower. D, inflorescence. Photographs by Shuichiro Tagane.

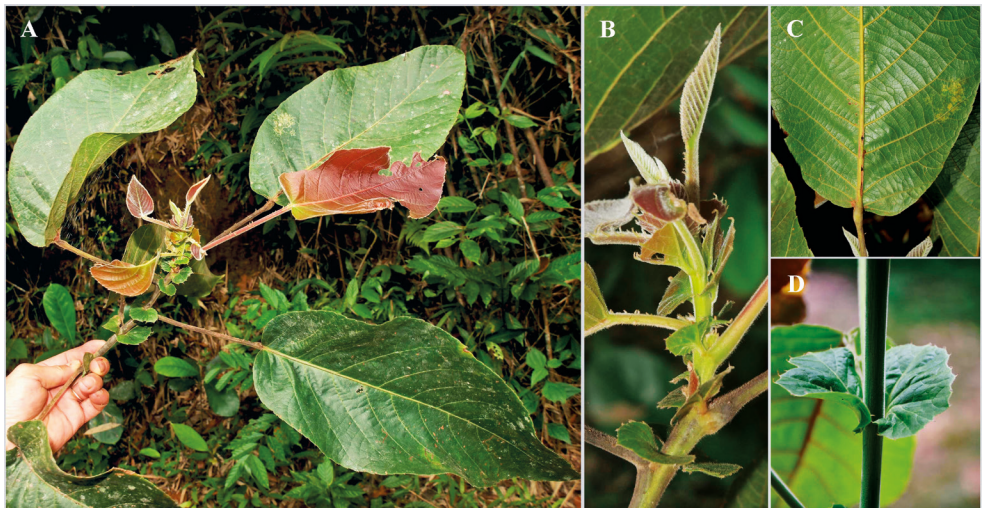


Figure 3. *Elaeocarpus balansae* DC.—A, leafy twig. B, shoot apex. C, a portion of the lower leaf surface. D, stipules. Photographs by Shuichiro Tagane (A–C) and Deuanta Kongxaisavath (D).

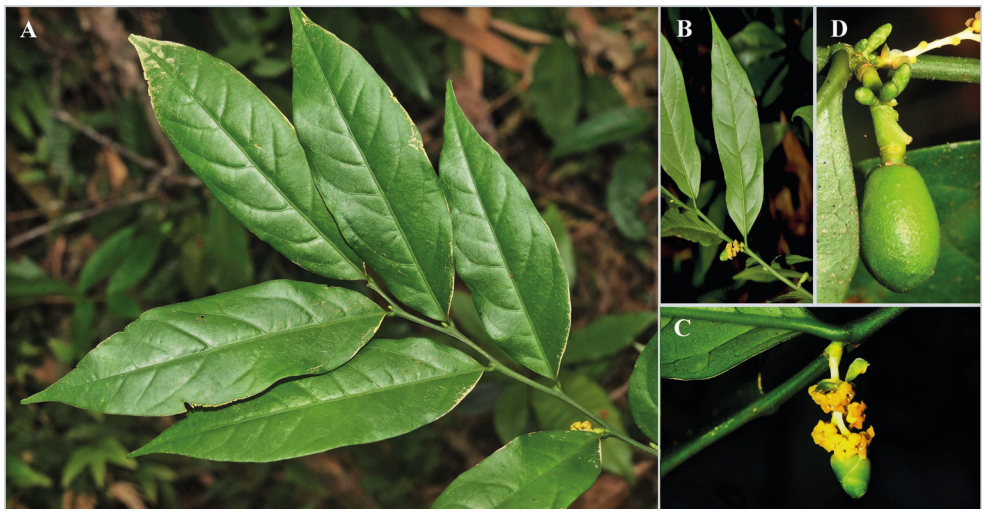


Figure 4. *Lepionurus sylvestris* Blume—A, flowering twig. B, lower leaf surface. C, inflorescence. D, fruiting twig. Photographs by Shuichiro Tagane.

***Elaeocarpus balansae*** DC. [Elaeocarpaceae]—Fig. 3.

Bull. Herb. Boissier, sér. 2, 3: 366 (1903).

This species, though our collection is in a vegetative state, is easily distinguishable from the other species of *Elaeocarpus* in Indochina by its conspicuous, sessile and leaf-like stipules, large leaves (petiole to 12 cm long, leaf blades 18–32 cm long), rust-brown tomentose petioles and lower leaf surface, and cordate leaf base (Tang & Pengklai, 2007). We found this species common at the edge of seasonal broad-leaved evergreen forest at alt. 400–550 m in the Nam Kading National Protected Area.

Specimen examined: LAOS. Bolikhamxai Province: Viengthong District, Hin Ngon Village, Nam Kading National Protected Area, 18.381867°N, 104.433464°E, 439 m a.s.l., 2 September 2023, ster., *Tagane et al. Z177* (FOF, KAG, VNM).

Distribution: China (South–Central), Myanmar, Thailand (Northeastern, Peninsular), Laos (Bolikhamxai), Cambodia, Vietnam, Malaysia (Peninsular).

***Lepionurus sylvestris*** Blume [Opiliaceae]—Fig. 4.

Bijdr. Fl. Ned. Ind. (17): 1148 (Oct 1826–Nov 1827).

*Lepionurus* Blume is a monotypic genus, containing only one species *Lepionurus sylvestris*. The species is a shrub, ca. 1.5 m tall, widely distributed in Southeast Asia, from Nepal in the west to Indonesia in the south, and China in the north and east (Hiepko, 1984; POWO, 2023), but its occurrence with firm evidence in Laos has not been known. Accordingly, we here report this to the flora of Laos for the first time. It is known to be extremely variable in leaf shape and size, number of inflorescences per axil, and size of flowers (Hiepko, 1984). Our collections showed ovate-elliptic, oblong-elliptic leaf blades 1.7–4.5 × 5.5–15.9 cm, 1(–3) inflorescence per axil, and the flower size 0.1–0.3 cm in diameter.

Specimens examined: LAOS. Bolikhamxai Province: Pak Kading District, along Nam Aan River, Nam Kading National Protected Area, 18.3453°N, 104.27826°E, 375 ma.s.l., 2 September 2023, fl. & fr., *Tagane et al. Z77* (FOF, KAG, VNM); Ban Naphong, 18.216958°N, 104.382452°E, 550 m a.s.l., 6 November 2023, fl., *Souladeth et al. Z701*, fl. and fr. *Souladeth et al. Z726* (FOF, KAG, VNM).

Distribution: Nepal, India, Bangladesh, China (South–Central), Myanmar, Thailand (Northern, Southeastern, Eastern, Southwestern, Peninsular), Laos (Bolikhamxai), Vietnam, Malaysia, Indonesia (Sumatra, Java, Kalimantan).

***Adina pilulifera*** (Lam.) Franch. ex Drake [Rubiaceae]—Fig. 5.

J. Bot. (Morot) 9: 207 (1895).

We found this species at the streamside of a branch of the Nam Aan River. Previously, its distribution range had been known from Japan, China and Vietnam, and our finding extends its distribution to the southwest. *Adina pilulifera* is characterized by its inflorescences terminal and in axils of uppermost leaves, capitate with globose heads, and leaf blades narrowly elliptic-oblong to oblanceolate to 12 cm long (Chen & Taylor, 2011).

Specimen examined: LAOS. Bolikhamxai Province: Pak Kading District, along Nam Aan River, Nam Kading National Protected Area, 18.34381°N, 104.28015°E, 329 m a.s.l., 2 September 2023, fr., *Tagane et al. Z64* (FOF, KAG, VNM).

Distribution: China (South–Central to Southeast; Hainan), Japan, Laos (Bolikhamxai), Vietnam.

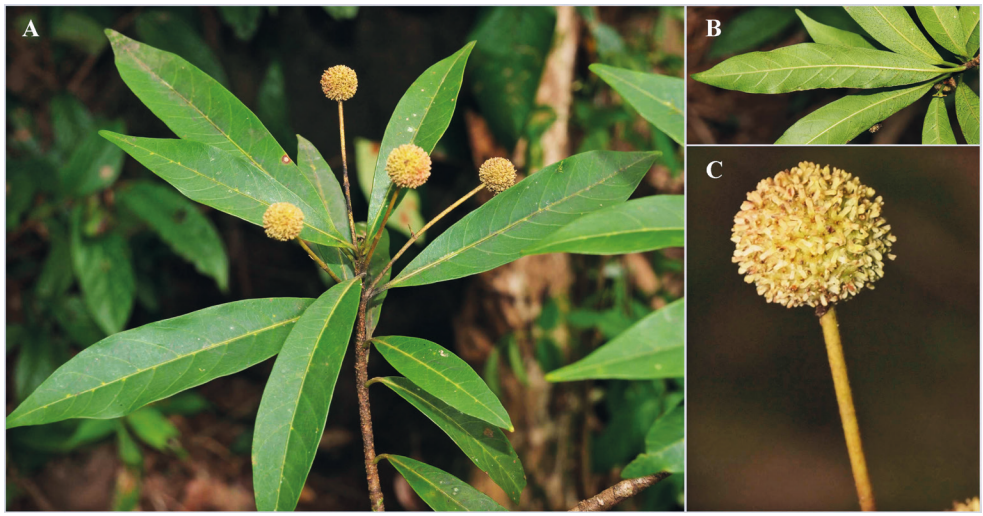


Figure 5. *Adina pilulifera* (Lam.) Franch. ex Drake—A, flowering twig. B, lower leaf surface. C, portion of inflorescence. Photographs by Shuichiro Tagane.

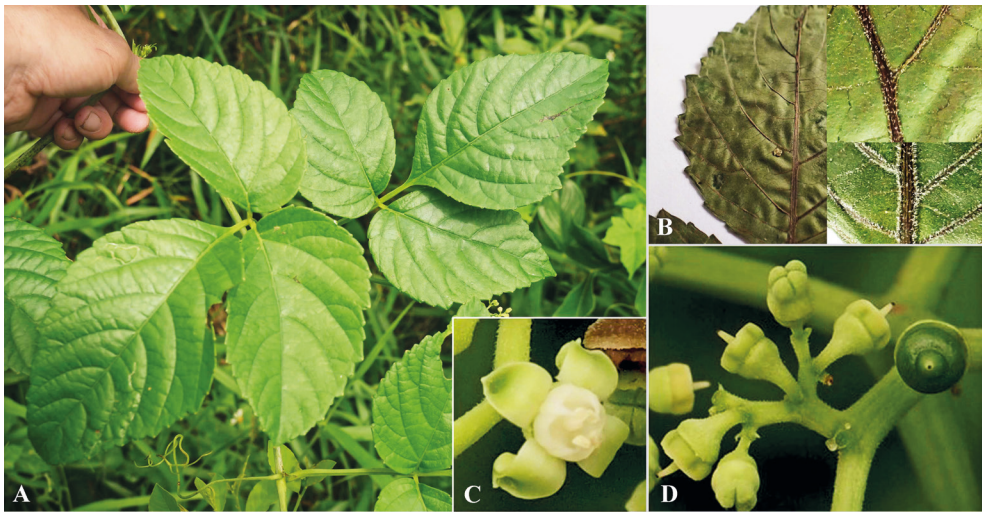


Figure 6. *Causonis timoriensis* (DC.) L.M.Lu & V.C.Dang var. *mekongensis* (C.Y.Wu ex W.T.Wang) G.Parmar & L.M.Lu—A, leafy twig. B, a portion of the lower leaf surface with magnified images at the upper and lower right corners. C, flower. D, young fruit. Photographs by Shuichiro Tagane.

***Causonis timoriensis*** (DC.) L.M.Lu & V.C.Dang var. ***mekongensis*** (C.Y.Wu ex W.T.Wang) G.Parmar & L.M.Lu [Vitaceae]—Fig. 6.

Taxon 70(6): 1213 (2021).

This is a climbing herb, scattered in roadside thickets or secondary forest margins. Morphological appearance is similar to *Causonis trifolia* (L.) Mabb. & J.Wen, a widely distributed species from South to Southeast Asia, extending to Australia, and more or less common in Laos, in having 3-foliate leaves, but distinguished from it by its tendril 2(–3)-furcate and lacking an adhesive discus at the tip (vs. 3–5-furcate, usually forming adhesive discus) and, leaflets oblong, ovate or ovate-rhombic with obtuse teeth (vs. oval or nearly orbicular with rounded teeth) (Ren & Wen, 2007; Parmar *et al*., 2021; Trias-Blasi *et al*., 2022). *Causonis timoriensis* has two varieties, var. *timoriensis* and var. *mekongensis*, and our collection is determined as var. *mekongensis* due to leaflets being abaxially pilose on veins (Fig. 6B) (Ren & Wen, 2007; Parmar *et al*., 2021).

Specimen examined: LAOS. Bolikhamxai Province: Viengthong District, Tha Phae Village, 18.51648°N, 104.43714°E, 321 m a.s.l., 6 September 2023, fl. & young fr., *Tagane et al. Z507* (FOF, KAG, VNM).

Distribution: China (South-Central), Thailand, Laos (Bolikhamxai), Malaysia (Peninsular).

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