

Three new records of Annonaceae for the flora of Laos

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ABSTRACT

Three species of Annonaceae, *Dasymaschalon acuminatum*, *Fissistigma maclurei* and *Monoon jucundum*, from Bolaven Plateau in southern Laos, are reported as new additions to the flora of Laos. Voucher specimens, photographs, geographical distribution, ecology and taxonomic notes are provided for each species.

KEYWORDS: Bolaven Plateau, *Dasymaschalon*, Dong Hua Sao National Park, *Fissistigma*, Indochina, *Monoon*, taxonomy.

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INTRODUCTION

The Annonaceae family consist of trees, shrubs, or woody climbers that are prevalent in tropical regions, especially in tropical rainforest ecosystems (Chatrou *et al.*, 2012; Couvreur *et al.*, 2012). To date, 111 genera and ca 2,490 species of Annonaceae are known throughout the tropics (WCVP, 2022). In Laos, 28 genera and 90 species have been reported (Newman *et al.*, 2017 onwards; <https://padme.rbge.org.uk/laos/list/>). Recently, the following six species were added to this list: *Goniothalamus calvicarpus* Craib, *G. cheliensis* Hu, *Goniothalamus saccopetaloides* Y.H.Tan & Bin Yang (Yang *et al.*, 2020), *Monoon namkadingense* Soulad. & Tagane and *Neo-uvaria laosensis* Tagane & Soulad. (Tagane *et al.*, 2018), and *Polyalthia chantaranothaii* Bunchalee & Chalermglin (Bunchalee *et al.*, 2021).

Due to the limited collection density of plant specimens in Laos (Middleton *et al.*, 2019), further efforts to collect plant specimens and conduct subsequent taxonomic studies are required to fully explore the flora of Laos (Newman *et al.*, 2007;

Middleton *et al.*, 2019). In this paper, we report three species of Annonaceae new to Laos, which were identified through our taxonomic study of collections obtained from field surveys conducted in Bolaven Plateau (Fig. 1), where is one of the biodiversity hotspots in Indochina (Profile, 2012) and is partially protected as Dong Hua Sao National Park, in southern Laos during 2018–2019 (Tagane *et al.*, 2021).

MATERIAL AND METHODS

The specimens examined in this study were collected during the field studies in the Bolaven Plateau, located mostly in Champasak Province, and partly in Saravan, Sekong and Attapeu (Attapu) Provinces in southern Laos in 2018–2019 (Fig. 1). The Plateau covers an area of approximately 4,400–4,800 km² (Profile, 2012; Tagane *et al.*, 2021), most of which ranges from 900–1,400 m in elevation, and is partly protected within Dong Hua Sao National Park. Forest types are diverse along the elevation gradient, from dry evergreen forest at lowland to hill evergreen forest at high elevation, with open grassland and sparse pine forest (Tagane *et al.*, 2021).

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To identify the plant species, we consulted relevant literature (e.g. Bân, 2000; Li & Gilbert, 2011; Wang *et al.*, 2009; Xue *et al.*, 2012; Lý, 2017; Turner, 2019; Johnson *et al.*, 2021; Bunchalee *et al.*, 2022; Johnson & Murray, 2022) and examined type specimens and representative vouchers kept in the FOF, HN, KAG, and TNS herbaria as well as digital specimen images from A, BKF, BM, C, E, K, HK, HN, L, P, US, and JSTOR Global Plants (<https://plants.jstor.org/>); herbarium acronyms follows Thiers (2016 onwards). The descriptions below were made based on our Lao collections.

SPECIES NEWLY RECORDED IN LAOS

Dasymaschalon acuminatum Jing Wang & R.M.K.Saunders, Syst. Bot. 34(2): 254. 2009. Type: Thailand, Buri Ram [18 Nov. 1976, *C. Phengklai* 3272 (holotype **BKF** [SN003209-image!], isotypes **BKF** [SN215656-image!, SN229093-image!], **IBSC**)]. Fig. 2A–C.

Distribution.— Thailand, Laos, Vietnam, Cambodia.

Ecology.— In hill evergreen forest; alt. ca 1,000 m. Not seen in flower. A fruiting specimen was collected in July.

Vernacular.— Mak tidtor bai raem (ໝາກຕິດຕໍ່ໄປແຫຼມ)(Proposed here).

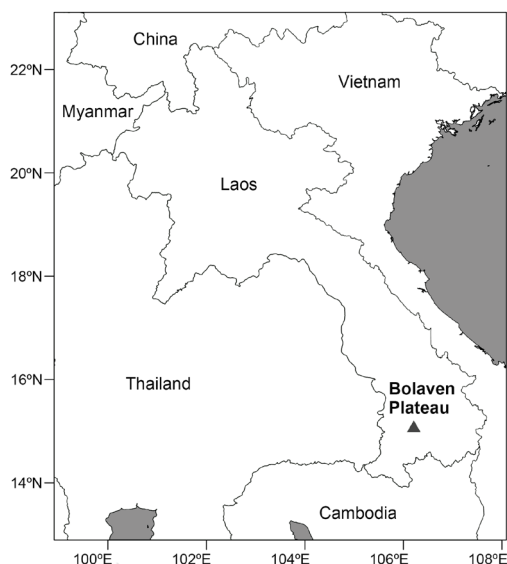


Figure 1. The location of the Bolaven Plateau in Laos.

Notes.— Four species of *Dasymaschalon* Dalla Torre & Harms are known to occur in Laos: *D. glaucum* Merr. & Chun, *D. lomentaceum* Finet & Gagnep., *D. macrocalyx* Finet & Gagnep., and *D. sootepense* Craib (Newman *et al.*, 2017 onwards; <https://padme.rbge.org.uk/laos/list/>). Among them, *D. acuminatum* is similar to *D. sootepense* in its lamina abaxially sparsely hairy, and with acuminate at apex and ellipsoid seeds, but it can be distinguished by leaf base (slightly attenuate-cordate or rounded in *D. acuminatum*, slightly attenuate in *D. sootepense*), shape of the petal apex (acuminate in *D. acuminatum*, acute in *D. sootepense*), petal thickness (0.9–1 mm in *D. acuminatum*, 0.3–0.7 mm in *D. sootepense*), seed length and length/width ratio (9–14 mm long, length/width ratio 2.2–3.3 vs 17.5–24 mm long, length/width ratio 3.5–6) (Wang *et al.*, 2009; Johnson & Murray, 2022). Though *D. acuminatum* in Thailand has yellow fruits according to Wang *et al.* (2009) and Johnson & Murray (2022), we identified this specimen with red fruits as *D. acuminatum* based on the other characteristics mentioned above.

Specimen examined.— LAOS: Champasak [Paksong District, 15°10'27.38"N, 106°08'54.84"E, alt. 984 m, 5 July 2019, *Souladeth et al.* L2972 [fr.] (**FOF** [FOF0006303], **KAG** [KAG129245])].

Fissistigma maclurei Merr., Philipp. J. Sci. 21: 342. 1922. Type: China, Hainan [Yik Tsok Mau, 24 Dec. 1921, *F.A. McClure* 8460 (lectotype US [US00098810-image!], designated by Turner (2018: 481), isolectotypes **BM** [BM000547055-image!], **C** [C10005588-image!], **IBSC**, **HK** [HK1040-image!])]. Fig. 2D–H, J.

Distribution.— China, Laos, Vietnam.

Ecology.— At edge of wet evergreen forest; alt. 1,200–1,250 m. A specimen with flower buds was collected in December. A fruiting specimen was collected in July.

Vernacular.— Nom khouay thamin (ນົມຄວາຍທະມິນ)(Proposed here).

Notes.— Four species of *Fissistigma* Griff. are known to occur in Laos: *F. chrysosericeum* (Finet & Gagnep.) Merr., *F. glaucescens* (Hance) Merr., *F. polyanthoides* (Aug.DC.) Merr., and *F. thorelii* (Pierre ex Finet & Gagnep.) Merr. (Newman *et al.*, 2017 onwards; <https://padme.rbge.org.uk/laos/list/>). Among them, *F. maclurei* is similar to *F. polyanthoides*

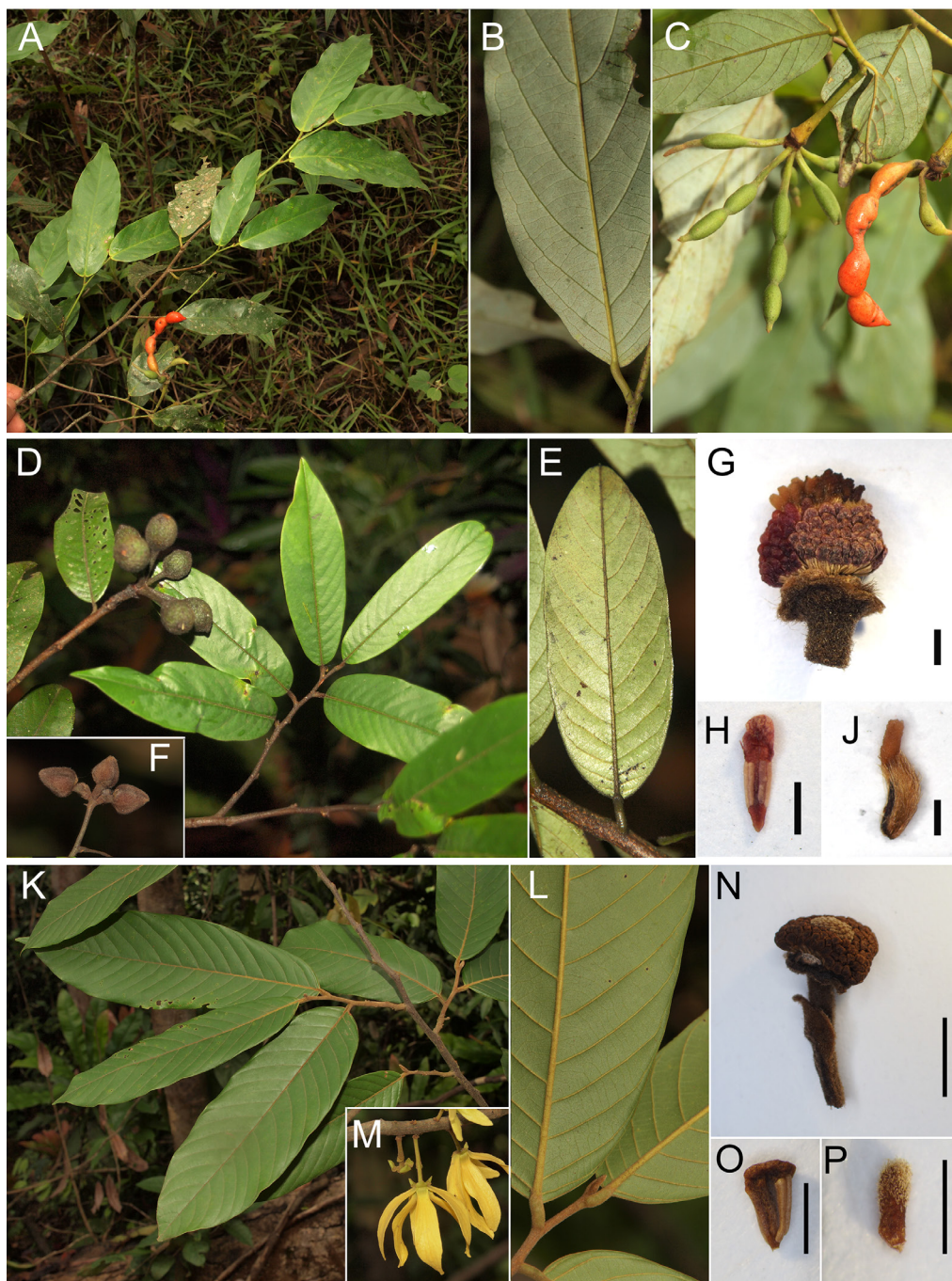


Figure 2. A–C: *Dasyaschalon acuminatum* Jing Wang & R.M.K.Saunders: A. fruiting branch, B. portion of lower leaf surface, C. fruits. D–H & J *Fissistigma maclurei* Merr.: D. fruiting branch, E. lower leaf surface, F. flower buds, G. immature flower (in bud), sepals and petals removed, H. stamen, J. pistil. Scale bars: G = 2 mm, H & J = 1 mm. K–P: *Monoon jucundum* (Pierre) B.Xue & R.M.K.Saunders: K. leafy branch, L. portion of lower leaf surface, M. flowers, N. flower, sepals and petals removed, O. stamen, P. pistil. Scale bars: N = 5 mm, O & P = 1 mm. A–C: *Souladeth et al.* L2972. D & E: *Souladeth et al.* L2899, F–H & J: *Tagane et al.* L2057. K–P: *Souladeth et al.* L3100. Field photos (A–F, K–M) were taken by S. Tagane and enlarged flower photos from specimens (G, H & J, N–P) were taken by A. Nagahama.

distributed in China, Laos, Myanmar, Thailand, and Vietnam, in its globose monocarps, but distinguished by its relatively smaller and lanceolate leaf blade with acute apex (8–13.6 × 2.7–4.6 cm in *F. machurei* vs 10–23 × 4–10 cm, oblong, oblong-lanceolate, or sometimes obovate-oblong leaf blade with acute to shortly acuminate at apex in *F. polyanthoides*) and the sepals and outer petals are woolly, with dark brown hairs on (vs tomentose, with pale brown hairs) (Li & Gilbert, 2011).

Based on the above morphological characteristics, we identified our collection as *Fissistigma machurei*. However, our specimens show longer petioles (8–12 mm long) than those in the previously known specimens (5–8 mm long: type specimens and Li & Gilbert, 2011; 5–7 mm long: Bân, 2000).

Specimens examined.— LAOS. Champasak [Paksong District, 15°04'36.61"N, 106°12'31.69"E, alt. 1,221 m, 11 Dec. 2018, *Tagane et al. L2057* [fl. bud] (**FOF** [FOF0005389], **KAG** [KAG128158]); same locality, 15°04'19.26"N, 106°12'38.67"E, alt. 1,248 m, 4 July 2019, *Souladeth et al. L2899* [fr.] (**FOF** [FOF0006230], **KAG** [KAG129178], **TNS** [TNS01316584]).

Monoon jucundum (Pierre) B.Xue & R.M.K. Saunders, *Taxon* 61(5): 1032. 2012.— *Unona jucunda* Pierre, *Fl. Forest. Cochinch.*: t. 25. 1881. Type: Vietnam, Bien Hoa [Bao Chan, July 1877, *Pierre 1795* (lectotype **P** [P00432353-image!], designated by Turner (2018: 601), isolectotypes **A** [A00415897-image!], **BM**, **K** [K000691540-image!], **L** [L0038118-image!], **P** [P00432351, P00432352-images!]]. Fig. 2K–P.

Distribution.— Thailand, Laos, Vietnam, Cambodia.

Ecology.— At the edge of evergreen forest; alt. 150–250 m. A flowering specimen was collected in July. Fruiting specimen was not collected.

Vernacular.— Phiphouan lasy (ພິພວນລາສີ) (Proposed here).

Notes.— In the vascular plant checklist of Lao PDR (Newman *et al.*, 2017 onwards), *Monoon jucundum* had already been listed though no voucher specimen was cited; the species is listed here again to confirm the distribution of *M. jucundum* in Laos.

In addition to *Monoon jucundum*, three species of *Monoon* Miq. are known to occur in Laos: *M. namkadingense*, *M. simiarum* (Buch.-Ham. ex Hook.f. & Thomson) B.Xue & R.M.K.Saunders, and *M. viride* (Craib) B.Xue & R.M.K.Saunders (Newman *et al.*, 2017 onwards; <https://padme.rbge.org.uk/laos/list/>). Among them, *M. jucundum* is similar to *M. simiarum* in having ovate or oblong-elliptic leaves longer than 10 cm, but differs in having tomentose petioles (vs glabrous in *M. simiarum*), and lamina with acute, acuminate or cuspidate apex (vs obtuse) (Lý, 2017).

Specimens examined.— LAOS: Attapeu [Sanamxai District, 14°48'25.28"N, 106°26'49.68"E, alt. 232 m, 6 July 2019, *Souladeth et al. L3100* [fl.] (**FOF** [FOF0006431], **KAG** [KAG129368], **TNS** [TNS01316741]); Champasak [Pathoumphone District, 14°53'44.73"N, 106°01'02.36"E, alt. 158 m, 14 Dec. 2018, *Tagane et al. L2350* [ster.] (**FOF** [FOF0005682], **KAG** [KAG128450])].

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