



Saraca laotica (Fabaceae), a new species from Laos

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Abstract

A new species of *Saraca* (Fabaceae-Detarioideae), *S. laotica*, is described and illustrated from Laos. It is characterized by leaflets with (9–)11–20 pairs of secondary veins, relatively larger, persistent and showy bracts of 1.4–3.3 × 0.6–0.9 cm, calyx tube of 27–36 mm, 4 stamens, anthers 1.9 mm long, by which combination, it is clearly distinguished from previously known species in the genus. Information on its habitat, phenology, vernacular name, and preliminary conservation assessment are also provided.

Key words: Detarioideae, endemic, Fabales, Leguminosae, limestones, plant taxonomy

Introduction

Saraca Linnaeus (1767: 13) is a small genus of shrubs and medium-sized trees, usually 3–10 m tall, rarely reaching 25 m in height. The genus comprises 12 species, distributed from India to New Guinea (Zuijderhoudt 1967, Hou 1996, Pongamornkul *et al.* 2021, POWO 2025), among which four species have been recorded in Laos, namely *Saraca declinata* (Jack 1822: 74) Miquel (1855: 84), *S. dives* Pierre (1898: 386B), *S. griffithiana* Prain (1897: 491), and *S. indica* Linnaeus (1767: 98) (Larsen *et al.* 1980, Newman *et al.* 2017-present).

During our botanical surveys in limestone areas of Phou Hin Poun National Park in Khammouane Province and Vang Vieng District in Vientiane Province, central Laos in 2024 and 2025, we collected interesting specimens of *Saraca*. After a careful examination with preserved specimens in various herbaria, including online images available on the web, and consultation of relevant literature, it was revealed to morphologically differ from any other previously known taxon of the genus. Therefore, we describe and illustrate it as a new species, *Saraca laotica* Tagane & Soulad.

Materials and methods

Morphological observations

To assess the novelty of the new species, we consulted the taxonomic literature (Gagnepain 1913, Zuijderhoudt 1967, Larsen *et al.* 1980, 1984, de Wilde 1981, 1985, Hou 1996, Pham 1999, Chen *et al.* 2008, Pongamornkul *et al.* 2021) and herbarium specimens housed in FOF, KAG, and VNM (Thiers, 2025) as well as digitized images on online sources (e.g. JSTOR Global Plants <https://plants.jstor.org/>, Naturalis Bioportal <https://bioportal.naturalis.nl/nl>, Chinese Virtual Herbarium <https://www.cvh.ac.cn/>). The preliminary conservation assessment is based on the guidelines of the IUCN (2024).

DNA extraction and sequencing

The total DNA was extracted from silica dried leaves samples by using a 2× CTAB protocol modified from Doyle & Doyle (1987). For DNA barcoding, maturase K (*matK*), primers matK413f-1 (TAATTTACRATCAATTCATTCAATATTTCC) and matK1227r-1 (GARGAYCCRCRTRATAATGAGAAAGATTT) were selected according to Heckenhauer *et al.* (2016) and thermal cycling conditions followed Yu *et al.* (2011) as follows: 94 °C for 3 min, followed by 40 cycles of 94 °C for 30 s, 48 °C for 40 s, 72 °C for 1 min, and a final extension at 72 °C for 10 min. Purification, labeling and sequencing followed Souvannakhoumane *et al.* (2025). The voucher specimens were deposited in the herbaria FOF, KAG and VNM.

Results

Taxonomic treatment

Saraca laotica Tagane & Soulad., *sp. nov.* Figs. 1–3.

TYPE:—LAOS. Vientiane Province, Vang Vieng District, Ban Phon Nguen, along trail to the Pha Nguen Silver Cliff View Point, on foot of limestone hill, 18.91629°N, 102.413°E, 475 m elev., 20 September 2025, *S. Tagane, P. Souladeth, V.S. Dang, T. Vongthavone, A. Sengthong, D. Kongxaisavath, K. Phengmala, Q.T. Pham, K. Takahashi, K. Yamazaki, A. Takeguchi Z3281* (holotype FOF [FOF0008012!], isotypes KAG [KAG202801!, KAG202865!], VNM [VNM00072313!]).

Diagnosis:—Similar to *Saraca griffithiana* and *S. declinata* in having persistent bracts and 4 stamens, but distinguished from the former by its midrib sunken adaxially (vs. prominent in *S. griffithiana*), longer bracts (1.4–3.3 cm long vs. shorter than 0.5 cm), and longer calyx tube (27–36 mm vs. 12–18 mm), and from the latter by more leaflets [5–9 pairs vs. 3–5(–7) pairs in *S. declinata*], more secondary veins [(9–)11–20 pairs vs. (6–)8–10(–12) pairs], larger bracts (1.4–3.3 × 0.6–0.9 cm vs. 0.3–1.2 × 0.1–0.7 cm), and longer anthers (1.9–2.2 mm vs. 0.75 mm long).

Description:—Trees, evergreen, to 12 m tall. Twigs grayish brown to reddish brown, puberulent, lenticellate, often hollowed and inhabited by ants. Stipules caducous, not seen. Leaves paripinnate, to 60 cm long; petioles 1.5–2.2 cm long, swollen at lower part, 0.4–0.6 mm in diam., puberulent; rachis 21.6–43.5 cm long, glabrous. Leaflets 5–9 pairs; petiolules 5.5–9.5 mm long; blades ovate, ovate-oblong, narrowly ovate-oblong, lowest pairs smallest, 5.5–10.1 × 2.6–5.5 cm, other pairs 8.8–36.4 × 3.4–8.8 cm, subcoriaceous, adaxial surface dark yellow green to grayish green, glabrescent, abaxial surface dull brownish yellow, sparsely to densely puberulent on veinlets, apex acuminate, acumen up to 2.2 cm long, base rounded to cuneate, margin entire, midrib sunken adaxially, prominent abaxially, secondary veins (9–)11–20 pairs, prominent abaxially, tertiary veins reticulate, faintly visible abaxially. Inflorescences terminal or on old branches behind leaves, not cauliflorous, corymbose, 14.4–27 × 11.3–28 cm; peduncle 2.6–6 cm long, 3.5–5 mm in diam., puberulent; bracts persistent, much longer than bracteoles, enclosing tuft of immature flowers, ovate-oblong to obovate-oblong or linear, 1.4–3.3 × 0.6–0.9 cm, the color turned from yellowish-orange, bright red to reddish-brown at anthesis *in vivo*, dull orangish red to blue-gray *in sicco*, almost glabrous adaxially, puberulent abaxially, apex short-acuminate, margin ciliolate. Flowers yellowish-orange *in vivo*; pedicels 4–16 mm long, sparsely puberulent; bracteoles 2, (sub)opposite, inserted at the top of pedicels, persistent, linear to narrowly ovate-oblong, 8–17 × 1.2–2.8 mm, glabrous adaxially, sparsely puberulent abaxially, apex acute to short acuminate, margin ciliolate. Calyx tubular,

yellowish orange *in vivo*, tube 27–36 × 1.2–1.4 mm, lobes 4, obovate-oblong, 8–13 × 4–5.6 mm, apex rounded, ciliate, margin ciliolate. Petals absent. Stamens 4, inserted on staminal disc in the throat, anthers ovate-elliptic, 1.9–2.2 × 1 mm, black, with bundle of hairs at both apices, apical hood-like structure absent, filaments 2.7–2.9 cm long, glabrous, staminal disc tubular, up to 1.4 mm high, orange-red *in vivo*. Pistil 2.1–2.3 cm long; stipe of ovary (free part) 3.5 mm long, sparsely appressed pubescent; ovary 5–7 mm long, glabrous except pubescent suture, with 7 ovules, style 1.6 cm long, glabrous, stigma capitate, ca. 0.6 mm in diam. Pods 1–1.1 cm stipitate, compressed, obovate-oblong, 11–17.5 × 4.7 cm, ca. 0.8 cm thick, apex curved shortly, acute, up to 0.8 cm long beaked, base cuneate to attenuate, woody, coiled when dry; stalk 3.4–4 cm long, woody, glabrous. Seeds 4 per pod, semi-circular, ellipsoid, 2.5–3.5 × 1.3–2.4 cm compressed, 0.8–0.9 mm thick, reddish brown to dark grayish brown, glabrous.

Additional specimens examined (paratypes):—LAOS. Xayabouly Province: Xayabouly District, Huay At (stream), tributary of Nam Pouy which flows into the Mekong River, at Pak Pouy Village, ca. 1 km down river from Pah Turp limestone cliffs, 275 m elev., 26 April 2012, fl., *J.F. Maxwell 12-129* (L [L2078864]). Luang Prabang Province, 4 May 2013, fl., *H. Sun et al. sunhang16416* (KUN [KUN1256521]). Vientiane Province: west of Vang Vieng, in limestone valley, 18°55'17.95"N, 105°10'52.73"E (possibly an error in longitude value), 270 m elev., 26 November 2012, fl., *H. Sun et al. Sun Hang 13633* (KUN [KUN1258891]); *ibid.*, Vang Vieng, under forest in limestone valley, 18°52'28.17"N, 102°24'20.60"E, 260 m elev., 27 November 2012, fl., *H. Sun et al. Sun Hang 13684* (KUN [KUN1260033]). Khammouane Province: Hinboun District, Ban Huana, 17.87093°N, 104.67622°E, 192 m elev., 7 September 2024, fr., *S. Tagane et al. Z1921* (FOF [FOF0006990], KAG [KAG188573], VNM [VNM00072131]); *ibid.*, Ban Bouamlou, Phou Hin Poun National Park, 17.76432°N, 104.72605°E, 192 m elev., 29 June 2025, fr., *S. Tagane et al. Z2639* (FOF [FOF0008007], KAG [KAG202216], VNM [VNM00072262]); Gnommalat District, near Ban Tat, 17.543°N, 105.05786°E, 259 m elev., 5 September 2024, fl., *S. Tagane et al. Z1615* (FOF [FOF0006702], KAG [KAG188282], VNM [VNM00072102]).

Distribution:—Laos (Luang Prabang, Xayabouly, Vientiane, and Khammouane Provinces) (Fig. 4).

Habitat:—In evergreen broad-leaved forests, on foot and valley of limestone mountains, at elevations of 190–480 m.

Phenology:—Flowering specimens were collected in April and September, and fruiting specimens in June (dried, after seed dispersal) and September (fresh).

Etymology:—The specific epithet “*laotica*” refers to the country Laos, where the new species was discovered.

Vernacular name:—ຄຳລາວ (Kham Lao) (proposed here). In Lao, “Kham” means golden, referring to the color of the flowers, and “Lao” is the country name, indicating the locality where this species is found.

GenBank accession no.:—LC906537 (*matK*, sequenced for *Tagane et al. Z3281*).

Preliminary conservation assessment:—Vulnerable (VU). So far, *Saraca laotica* is known from four provinces located in north and central Laos (Fig. 4). Based on the collection records, the extent of occurrence (EOO) for this species is calculated as 18,928 km² and the area of occupancy (AOO) is 24 km² using GeoCAT (Bachman *et al.* 2011), with more than 5 and less than 10 locations (*sensu* IUCN). In our field observation in Khammouane and Vientiane Provinces, it is locally common in evergreen broad-leaved forests on foot and along streams of limestone mountains, and the number of individuals is abundant in such areas. However, the forests on limestone and its vicinities can be easily affected by human disturbance, such as through limestone mining, tourism development, and conversion to farmland. Thus, given this situation, we assessed this species as Vulnerable according to IUCN criterion B: 1a, b (i, iii), 2a, b (i, iii) (IUCN 2024).

Discussion and conclusion

In addition to the two species, *Saraca griffithiana* and *S. declinata*, in the diagnosis above, *S. laotica* may resemble *S. dives* in the shape and texture of leaflets. However, it can be readily distinguished by its number of leaflets (5–9 pairs in *S. laotica* vs. 5–6 pairs in *S. dives*), number of secondary veins [(9–)11–20 vs. 8–11], and number of stamens (4 vs. 8–10), among which the number of stamens is one of the critical characteristics in the species classification within the genus and commonly used in the keys for identification (e.g. Zuijderhoudt 1967, Larsen *et al.* 1980, 1984, Chen *et al.* 2008). The BLAST similarity search based on the *matK* sequence of *S. laotica* resulted in homology as high as 771/779, 770/779, and 756/761 bp with the sequence of *S. dives* (GenBank accession no. KX162282, NC_071827, and HM049553, respectively) in the DNA database, supporting the new species is genetically distinct from *S. dives*.



FIGURE 1. Holotype of *Saraca laotica* Tagane & Soulad. (Tagane et al. Z3281, FOF [FOF0008012]).

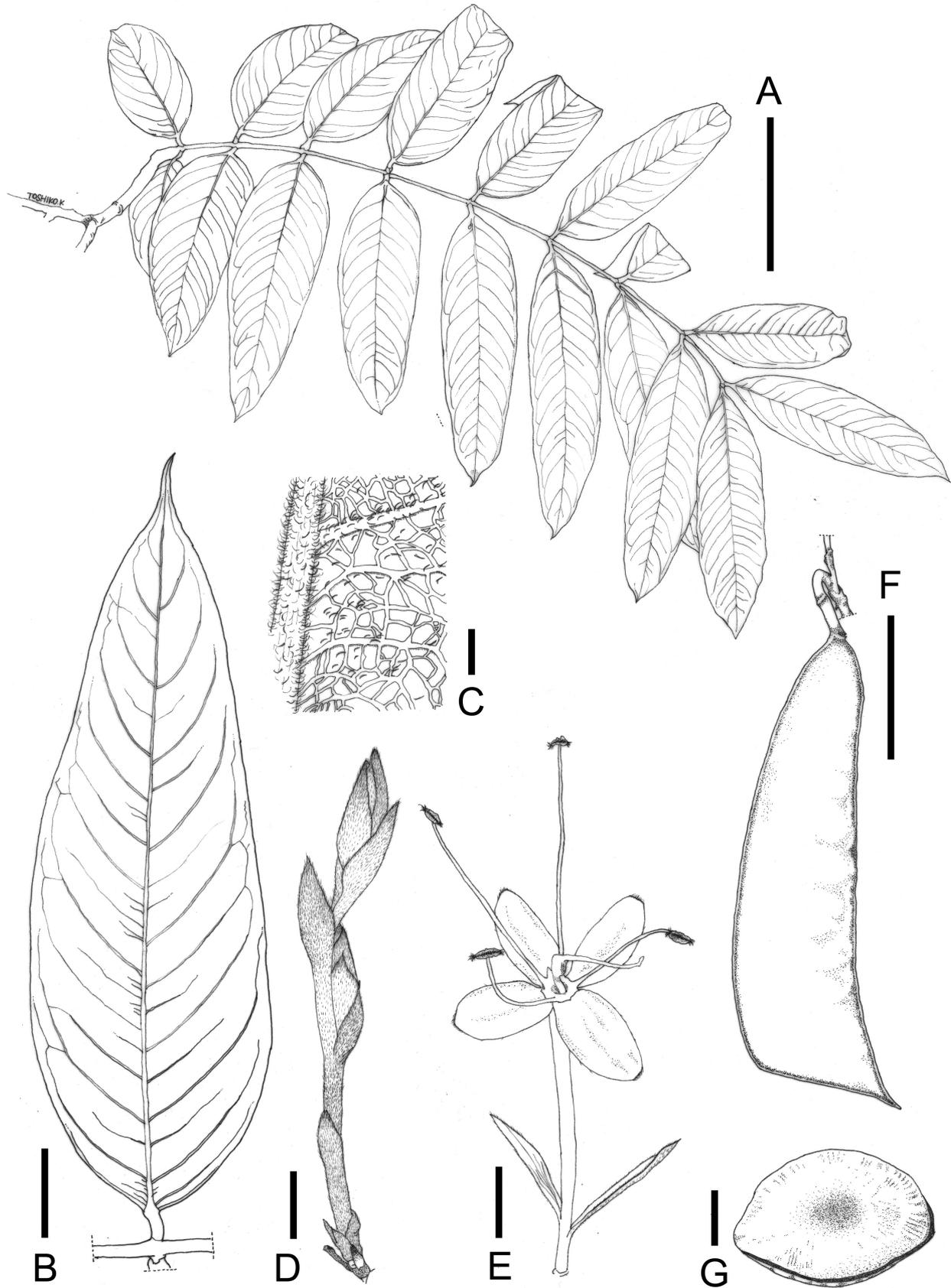


FIGURE 2. *Saraca laotica* Tagane & Soulad. A. Leaf; B. Abaxial leaflet surface; C. Portion of abaxial leaf surface showing puberulent veinlets; D. Young inflorescence; E. Flower; F. Fruit; G. Seed. Scale bars A = 10 cm, B = 2 cm, C = 1 mm, D, E, G = 1 cm, F = 5 cm. Materials A, B, F, G from Tagane *et al.* Z2639, C from Tagane *et al.* Z3281, D & E from Tagane *et al.* Z1615. Drawn by Toshiko Kawabata.

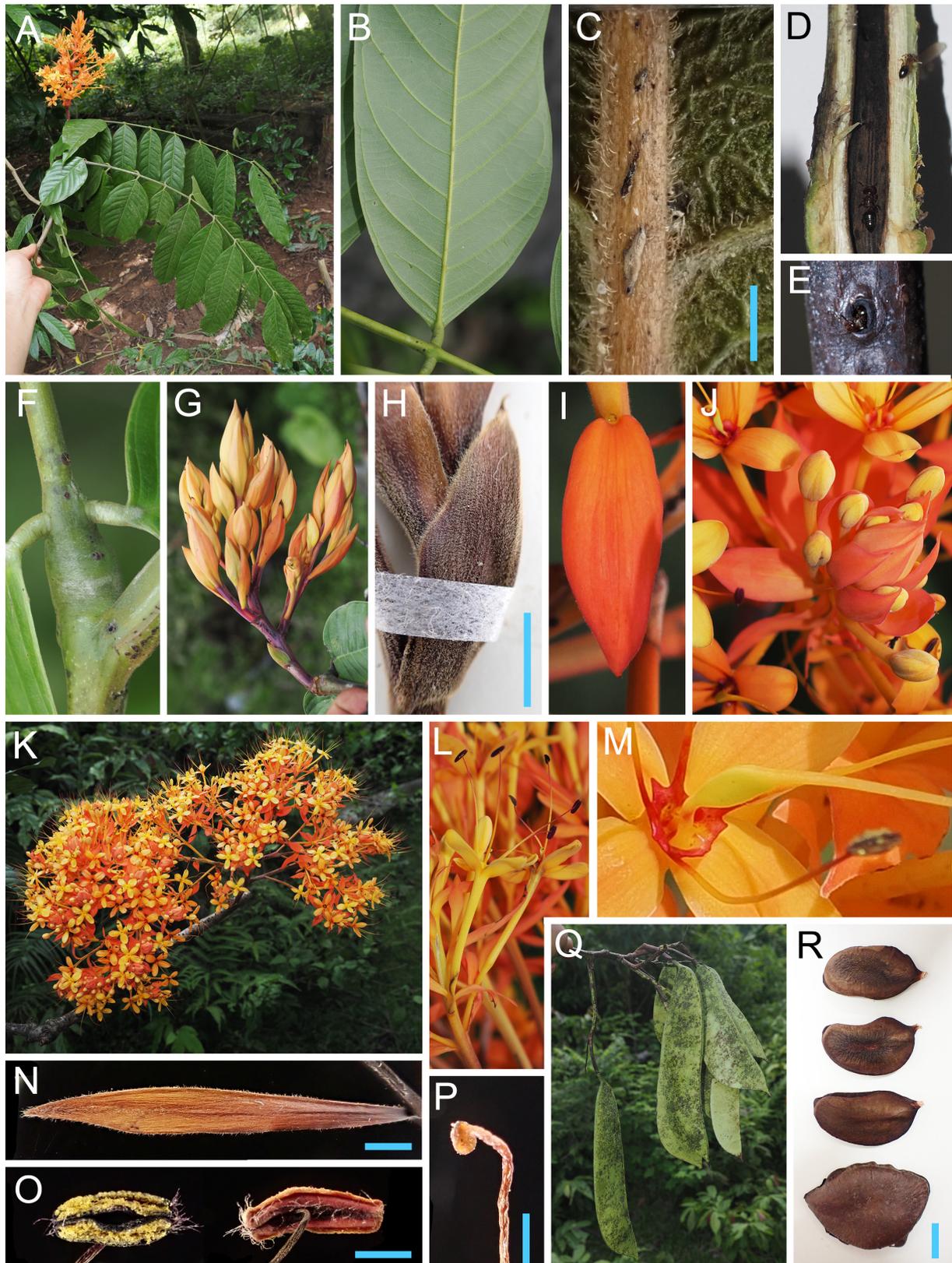


FIGURE 3. *Saraca laotica* Tagane & Soulad. A. Flowering branch; B & C. Portion of abaxial leaf surface; D. Hollowed twig inhabited by ants. E. Nest entrance on twig; F. Base of leaf showing petiole and petiolules; G. Young inflorescence; H & I. Bracts; J. portion of inflorescence, showing bracts and flower buds; K. Full-blooming inflorescence; L. Flowers, lateral view; M. Mouth of calyx tube showing ovary and filaments base; N. Bracteole (adaxial side); O. Anthers, adaxial (left) and abaxial (right) sides; P. Stigma; Q. Infructescence; R. Seeds. Scale bars C, O & P = 1 mm, H = 5 mm, N = 2 mm, R = 1 cm. Photographed A & H from *Tagane et al.* Z1615, B, C, F, G, I–Q from *Tagane et al.* Z3281, D & E from *Tagane et al.* Z2639, R from *Tagane et al.* Z3281 (above three) and Z2639 (bottom), taken by S. Tagane.

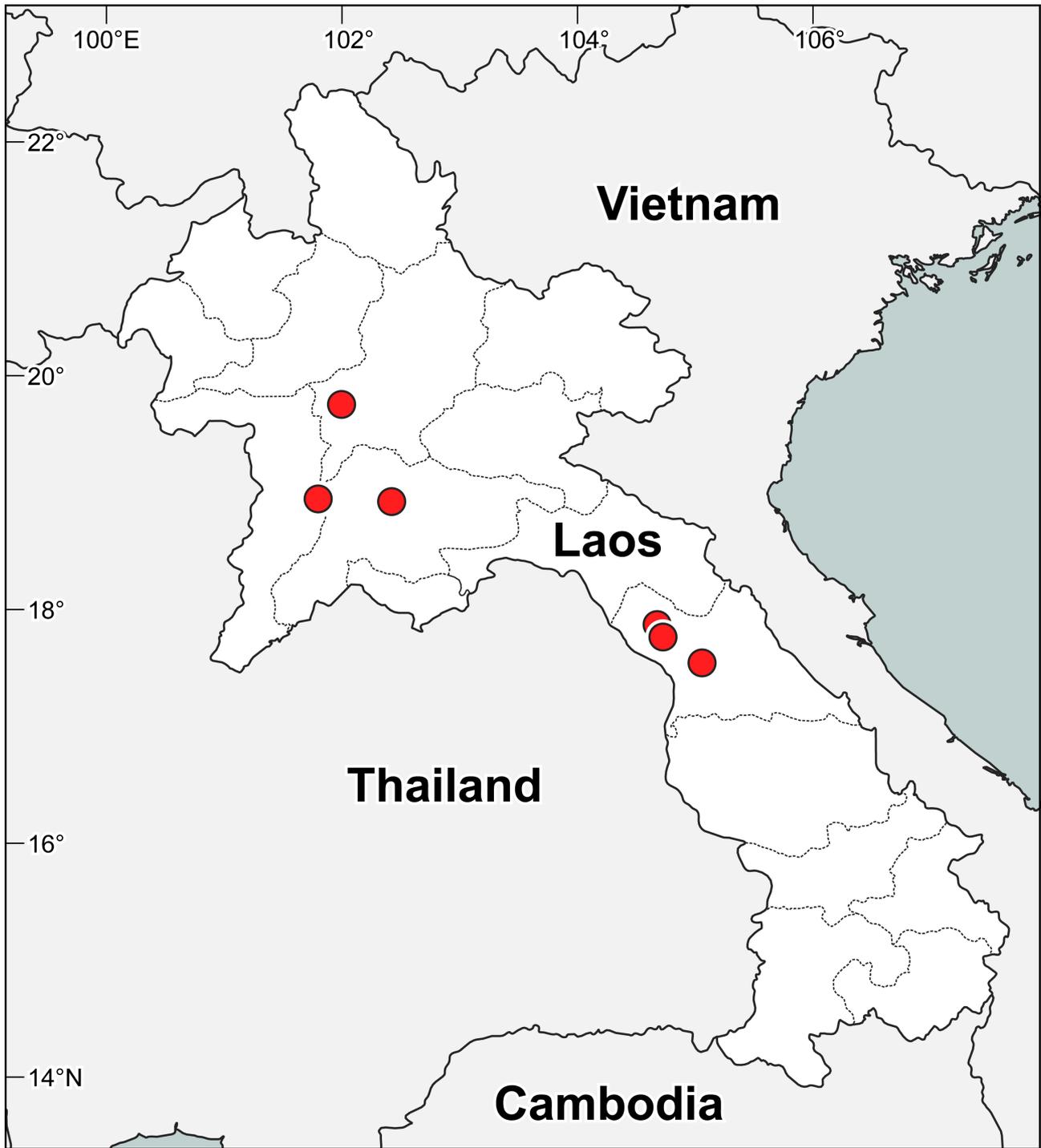


FIGURE 4. Geographical distribution of *Saraca laotica* Tagane & Soulad.

It is notable that the new species, *Saraca laotica*, has hollowed twigs that are inhabited by *Cladomyrma* ants (Figure 3D & E). Precise identification of the ant species at the species level requires careful examination using an integrative approach that combines morphological analysis and DNA barcoding of the ants (Eguchi, pers. comm.). So far, two species of *Saraca* have been reported to be myrmecophytic: *Saraca dives* from Vietnam (Eguchi & Bui, 2007) and *Saraca thaipingensis* Cantley ex Prain (1897: 211) from Malay Peninsula (Maschwitz *et al.* 1991), both of which are inhabited by specific ants, *Cladomyrma scopulosa* Eguchi & Bui (2006) and *C. petalae* Agosti (1991), respectively. Knowledge of ant-plants in Laos is still limited, and further research is expected to yield fascinating insights into ant taxonomy, biogeography, and coevolution.

Our study confirms the importance, also in modern plant taxonomy, of field work and of in-depth floristic knowledge of a territory (Lamxay *et al.* 2021, Perrino *et al.* 2022, Wagensommer 2023, Ben Mahmoud *et al.* 2024). Furthermore,

it highlights the importance of an integrated approach (morphological-molecular) for a consistent description of new taxa, even if the description of species new to science based on morphological features only is still common in plant taxonomic research (e.g., Brullo *et al.* 2015, Sefi *et al.* 2020), well as its synecology (Perrino *et al.* 2024).

Acknowledgments

The authors are grateful to the manager and staff of Phou Hin Poun National Park, Khammouane Province and Forest sector of Provincial Office of Agriculture and Environment, Vientiane Province for permitting and supporting our botanical inventories in the protected areas. We also thank the curators of the herbaria FOF, KAG, and VNM for making their specimens accessible, Ms. Toshiko Kawabata for beautiful drawing, and Dr. Katsuyuki Eguchi for valuable comments on identification and interaction of ants. This study was supported by the Nagao Natural Environment Foundation, Japan, and field survey in Phou Hin Poun National Park was partially support by the Lao Landscapes and Livelihoods Project under the Department of Forestry, Ministry of Agriculture and Environment of Laos.

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