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Driessenia phasmolacuna (Sonerileae, Melastomataceae), a new species from Batang Ai, Sarawak, Borneo

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ABSTRACT: A new species, *Driessenia phasmolacuna* C.W. Lin, from Batang Ai, southwestern Sarawak, is described and illustrated. It belongs to a distinct group of *Driessenia* that have subequal or unequal leaves in each pair, often congested cymose inflorescence with many tiny flowers. Morphologically, it is similar to *D. sessiliflora*, but differing in its stem being 4-winged (vs. wing absent), larger laminas 18–22 × 5–7 (vs. 13–14.5 × 3.7–5) cm, much longer pedicel 3–5 (vs. 0.1–0.5) mm long, shorter bracts *ca*. 0.3 (vs. 1–1.5) mm long, pedicel 3–5 (vs. 0.1–0.5) mm, petal white (vs. yellowish) and ovary subequal in length to hypanthium (vs. exceeding hypanthium by one fourth) in fruit. Detailed comparison of the new species with five phenetically similar species are also presented.

KEY WORDS: Borneo; *Driessenia*; Melastomataceae; New species; Sarawak; Sonerileae.

INTRODUCTION

The first thorough taxonomic revisionary study of the Asiatic genus *Driessenia* Korth. (Hansen 1985) listed 14 species and 2 varieties, 11 species of which are endemic to Borneo. *Driessenia* are characterised by the dimorphic leaves in each pair, often congested cymose inflorescence with many tiny flowers, sepals shortly connate, sepals usually thickened, anthers with three appendages. The two ventral appendages are more conspicuous being at least about half as long as the anthers, and longer than the deflexed dorsal appendage (Hansen, 1985). A distinct group of *Driessenia* that includes 5 species (*D. attenuata* C. Hansen, *D. microthrix* Stapf, *D. minutiflora* Schwartz, *D. planopetiolata* C. Hansen and *D. sessiliflora* C. Hansen) can be easily distinguished from other *Driessenia* by their very tiny flowers (hypanthium 1.1–2 × 1.3–2 mm, petals 1–3 mm long), with a connective that is shortly prolonged below the anther, two ventral appendages that are lanceolate or linear, and a triangular or very shortly spurred dorsal appendage. Among this group of species, *D. sessiliflora* is currently known only from two collections from montane tropical rainforest in Lanjak Entimau. The distinguishing characters of *D. sessiliflora* are its strongly dimorphic leaves in each pair and shorter (less than 0.5 mm) subsessile pedicels. In this paper, a new species is proposed which originated from Batang Ai, a range neighboring Lanjak Entimau with rich biodiversity and endemism. Measurements made in the description below were based on cultivated plants and field work, although the size of leaf in cultivated plants is smaller than the original habitats, but the characters of the flower are consistent. In recent years, many new species of Melastomataceae from this area have been published (Lin 2018; Lin & Lee 2018; Lin *et al.*, 2015, 2017). Based on a careful study of relevant literature and type collections, the collection from Batang Ai is confirmed as a new species of *Driessenia*. This new species is described here together with a color plate, line drawings of diagnostic characters, a distribution map, and a table comparing it with a phenetically similar species.

TAXONOMIC TREATMENT

Driessenia phasmolacuna C.W. Lin, ***sp. nov.***
幽靈池德里森木 Figs. 1 & 2; Table 1

Type: MALAYSIA. Borneo, Sarawak, Sri Aman Division, Lubok Antu, Batang Ai, *ca*. 150 m elev. Type specimens pressed from plants cultivated in a nursery in Taiwan, 8 July 2018, *C. W. Lin 659* (holotype: TAIF; isotype: K).

Diagnosis: *Driessenia phasmolacuna* resembles *D. sessiliflora* C. Hansen (1985: 340), differing in its 4-winged internodes (vs. wing absent), larger laminas 18–22 × 5–7 (vs. 13–14.5 × 3.7–5) cm, much longer pedicel 3–5 (vs. 0.1–0.5) mm, shorter bracts *ca*. 0.3 (vs. 1–1.5) mm and ovary subequal in length to hypanthium (vs. exceeding hypanthium by one fourth) in fruit.

Erect, little-branched herbs. ***Stems*** 40–100 cm or longer, 3.5–5.5 mm thick, subcylindric, 4-winged, woody at base, sparsely to densely and minutely tomentose; internodes 1–4(–6) cm long; old stem less markedly angular and 4-ribbed; bark usually pale brown. ***Leaves*** opposite, strongly dimorphic in each pair and held nearly horizontally. *Larger leaf* petiole 0.5–1 cm long, densely and minutely tomentose; lamina glossy, thick chartaceous, slightly asymmetrical, narrowly ovate to lanceolate, 18–22 cm long, 5–7 cm wide, apex attenuate, base oblique, rounded to subcordate on wider side and obtuse or rounded on narrower side, margin

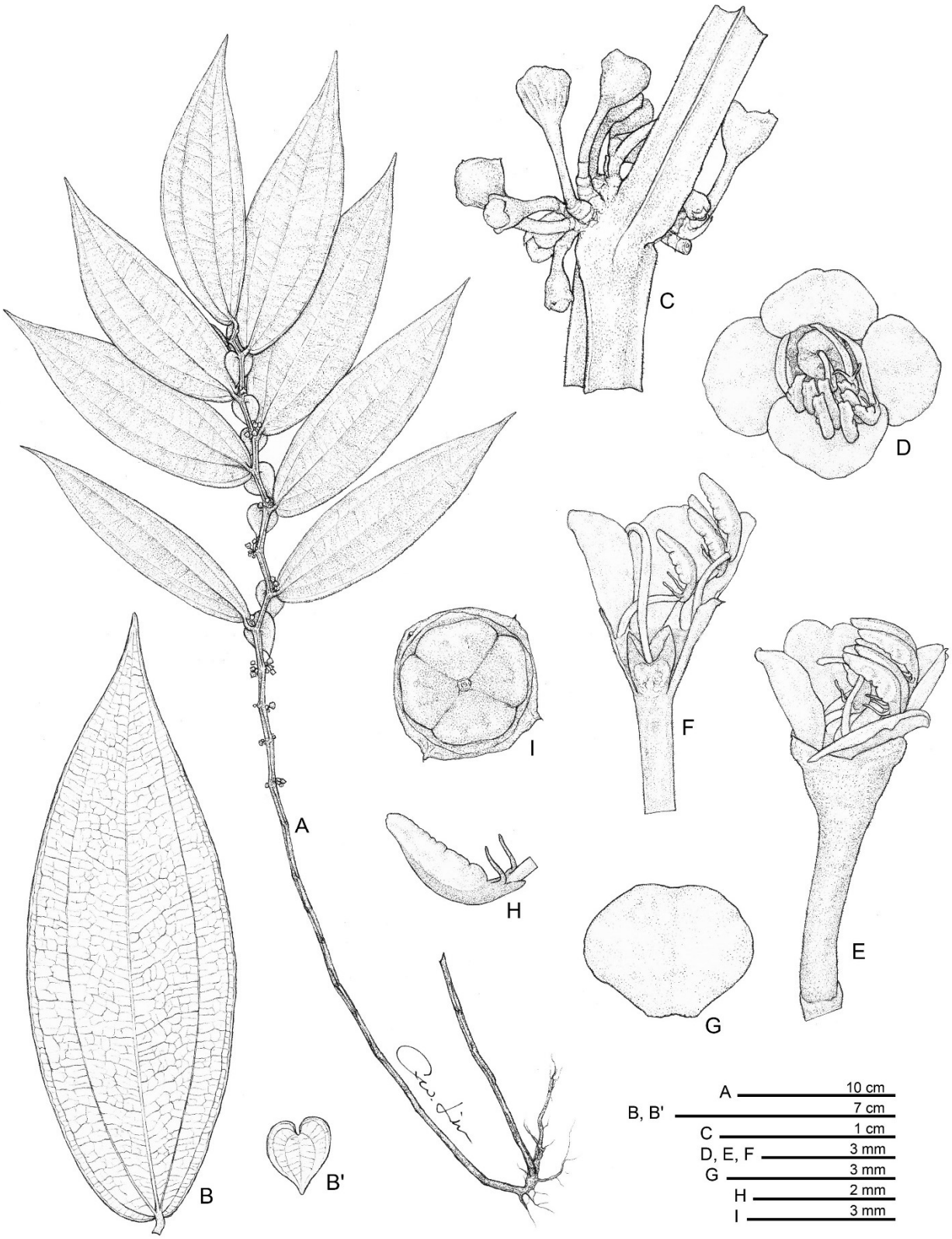

Fig. 1. ***Driessenia phasmolacuna*** C.W. Lin. **A**. Habit; **B**, **B'**. Dimorphic leaves, showing extremely unequal in size and shape; **C**. Inflorescence on stem; **D**, **E**. Flower, face and side views; **F**. Longitudinal section of flower; **G**. Petal; **H**. Stamen, side view; **I**. Immature fruit, face view.

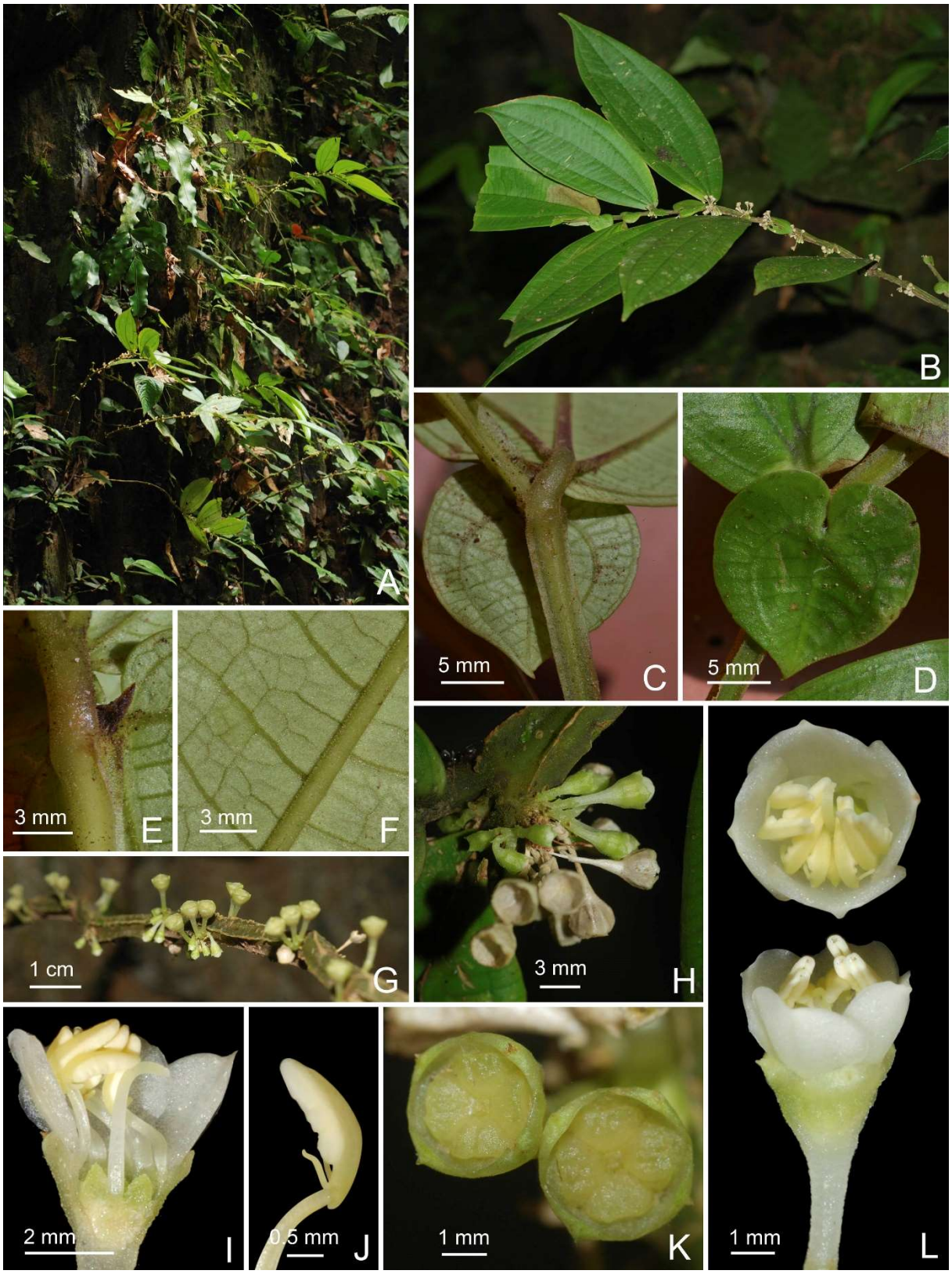

Fig. 2. ***Driessenia phasmolacuna*** C.W. Lin. **A**. Habit and habitat; **B**. Flowering branch; **C**, **D**. Smaller leaf, abaxial and adaxial surfaces; **E**. Petiole; **F**. Portion of leaf abaxial surface; **G**. Inflorescences on stem; **H**. Inflorescence; **I**. Longitudinal section of flower; **J**. Stamen; **K**. Immature fruits; **L**. Flower, face and side views.

Table 1. Comparison of *Driessenia phasmolacuna* C.W. Lin, ***D. attenuate*** C. Hansen, ***D. microthrix*** Stapf, ***D. minutiflora*** Schwartz, ***D. planopetiolata*** C. Hansen and ***D. sessiliflora*** C. Hansen

	D. phasmolacuna	***D. attenuata***	***D. microthrix***	***D. minutiflora***	***D. planopetiolata***	***D. sessiliflora***
Stem	4-winged	wing absent	wing absent or with 4-winged	wing absent	wing absent	wing absent
Leaf	dimorphic, strongly unequal	isomorphic and subequal	dimorphic, strongly unequal	isomorphic and equal to subequal	isomorphic and subequal	dimorphic, strongly unequal
size (cm)						
larger leaf	18–22×5–7	9–15.5×4.3–7	16–28.5(–36)×4–8.5(–13)	11–23(–27)×6–12(–14.5)	9×4.5	13–14.5×3.7–5*
smaller leaf	1.5–2.5×1.3–2.4	4.2–7.5×1.9–3.3	never develops	same as larger leaf	16×6.5	0.6–1×0.6–0.9*
persistent of smaller leaf	persisting at least at upper nodes	persisting at least at upper nodes	caducous, present only in very young stages of shoot apex	persisting at least at upper nodes	persisting at least at upper nodes	persisting at least at upper nodes
Inflorescence						
length of peduncle (mm)	subsessile	0.5	unknown	to 1	2–10	2–3*
length of pedicel (mm)	3–5	to 1	0.6–1.8	0.6	2	0.1–0.2(–0.5)
Length of bracts (mm)	*ca*. 0.3	unknown	to 0.5	unknown	to 0.5	1–1.5
Flower						
petal color	white	probably yellow	white or cream	white or lilac	yellow	yellowish
Fruit						
length of ovary	subequal to hypanthium	subequal to hypanthium	shorter or subequal to hypanthium	shorter than hypanthium	about two thirds the length of the hypanthium	exceeding hypanthium by one fourth
Reference	Present, Figs. 1, 2	Hansen 1985: Figs. 4E, 5C	Stapf 1894	Irmscher 1931	Hansen 1985: Figs. 1C, 2C, 4C, 5F	Hansen 1985: Figs. 2A, 4F, 5E)

* Based on observation of specimens (*Sylvester Tong 33589*, K).

entire, adaxial surface green, glabrous; abaxial surface pale green, minutely tomentose on veins; nerves *ca*. 5, with an indistinct nerve close to margin, prominent on the abaxial surface. *Smaller leaves* sessile, widely ovate, 1.5–2.5 cm long, 1.3–2.4 cm wide, base cordate, apex acute, adaxially glabrous, abaxially minutely tomentose on veins, margin entire. ***Inflorescence*** axillary thyrses, congested, flowers up to 20 in an axil, minutely puberulous. *Bracts* caducous, pale-green, ovate, *ca*. 0.3 mm long. peduncle subsessile, pedicel 3–5 mm long, beset with minute glandular trichomes. *Hypanthium* campanulate, *ca*. 2 mm long, 2 mm wide, beset with minute glandular trichomes. *Sepals* 4, shallowly triangular, *ca*. 1 mm long, apex mucronate, beset with glandular trichomes. *Petals* 4, white, widely depressed-obovate, *ca*. 3 mm long, 3 mm wide, glabrous. *Stamens* 8; filaments linear, *ca*. 2 mm long; anthers narrowly ovate, obtuse to lanceolate, creamy yellow, shorter or subequal to the filaments, *ca*. 1.8 mm long, 0.5 mm wide, thecae undulate; connective slightly prolonged below anther sacs, ventrally prolonged into two narrow, slightly flat, 0.5–0.7 mm long appendages, dorsally a rim? or prolonged into a short spur to 0.3 mm long. *Ovary* about four fifths the length of the hypanthium and adnate to it for half its length; anther pockets extending to base of ovary; crown lobes free beset with minute glands or glandular trichomes distributed only apically; placenta axile. *Styles* filiform, *ca*. 3.5 mm long; stigma capitate. ***Fruit*** a capsule, cup-shaped, with 8 conspicuous ribs, *ca*. 3 × 3 mm, ovary crown not exceeding hypanthium. Mature seeds not seen.

Distribution and ecology**:** This new species is endemic to Sarawak, currently only known from Batang Ai (Fig. 3). It grows in lowland mixed dipterocarp forest, on semi-shaded sandstone cliffs at 100–250 m elevation.

Etymology**:** Named after Lubok Antu, in Malay language which means 'Ghost Pool', where the new species was discovered.

Proposed IUCN Category**:** Data Deficient (DD), according to IUCN (2017). This species is rare but possibly not threatened as it grows in an inaccessible location.

Note**:** *Driessenia phasmolacuna* belongs to a distinct group of *Driessenia* that have subequal or unequal leaves in each pair, often congested cymose inflorescence with many tiny flowers. Among this group that includes 5 species: *D. attenuata*, *D. microthrix*, *D. minutiflora*, *D. planopetiolata* and *D. sessiliflora*. The new species is most similar to *D. sessiliflora*, despite the close proximity of Batang Ai (type locality of *Driessenia phasmolacuna*) and bordering Lanjak Entimau (type collection locality of *D. sessiliflora*), both of these species shows clear differences; *D. phasmolacuna* has 4-winged stems, larger leaves, and much longer pedicels.

Additionally, *D. phasmolacuna* is a lowland species (100–250 m), whereas *D. sessiliflora* was collected from mountain forest at 800–900 m elevation. In summary, *D. phasmolacuna* is a sharply distinct species. Detailed comparison of the new species with five phenetically similar species are presented in Table 1

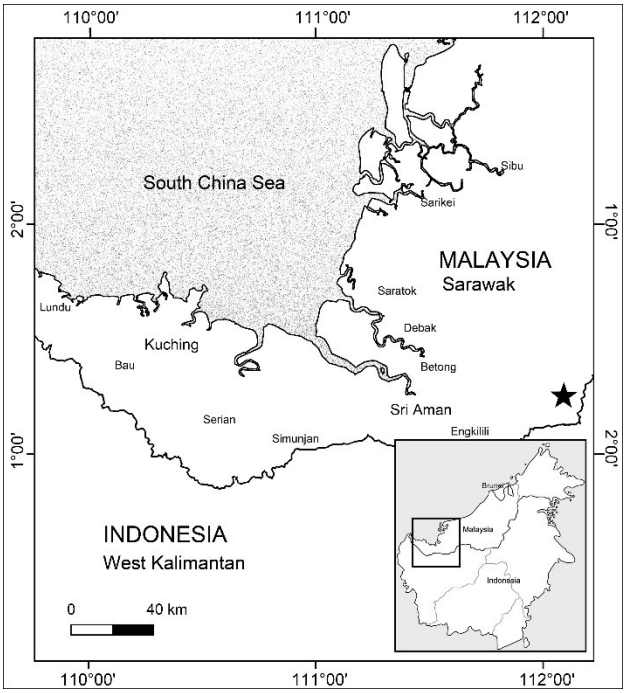

Fig. 3. Type locality of ***Driessenia phasmolacuna*** (star) in Sarawak, Borneo.

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