

***Kaempferia sipraiana* (Zingiberaceae), a new species from Thailand and a new record of *Kaempferia pseudoparviflora* for Myanmar**

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Abstract. Boonma T, Saensouk S, Saensouk P. 2022. *Kaempferia sipraiana* (Zingiberaceae), a new species from Thailand and a new record of *Kaempferia pseudoparviflora* for Myanmar. *Biodiversitas* 23: 2203-2211. *Kaempferia sipraiana* Boonma & Saensouk, a new species of *Kaempferia* subgenus *Protanthium* (Zingiberaceae) from northern Thailand and *K. pseudoparviflora* Saensouk P. & Saensouk, a new record species of *Kaempferia* subgenus *Kaempferia* for Myanmar are described, illustrated, and photographed. The dominant characters of *Kaempferia sipraiana* were leaves narrowly elliptic, green with short white stripes arranged parallel along the leaf edges, between the midrib and both sides of the edges, apex acuminate with slightly mucronate, base attenuate-oblique; peduncle glabrous; bracts apex mucronate, glabrous, red with dark red veins; bracteoles glabrous; floral tube shorter than calyx; calyx glabrous; staminodes oblanceolate, apex 3-lobes like curly brackets; labellum white at the base with pinkish purple in the middle gradually fade to pale pink and to reach to white tip and edge respectively, apex 3-lobes like curly brackets, each lobe 3.0–3.3 cm long; apex 4 lobes, outer lobes acute, inner lobes obtuse rarely combined to truncate; stigma with pink lips. The dominant characters of *K. pseudoparviflora* were one leaf and dark green with light grey markings, the inflorescence looks like inflorescence of *K. parviflora*. The information on vernacular name, distribution, phenology, ecology, conservation status, specimens examined, and an identification key to both species of *Kaempferia* in Thailand is revised and presented.

Keywords: *Kaempferia*, Myanmar, new record, new species, Thailand, Zingiberaceae

INTRODUCTION

The genus *Kaempferia* L. is classified in the Zingiberaceae family established by Linnaeus in 1753. The *Kaempferia* is divided into two subgenera based on the position of the inflorescence, namely subgenus *Kaempferia* L. produces terminal inflorescences and subgenus *Protanthium* (Horan.) Baker produces the inflorescences directly from the rhizome before the leafy shoot arises (Horaninow 1862; Baker 1890; Kam 1980; Insisiengmay et al. 2018). About 60 species of *Kaempferia* are found and distributed from India to Southeast Asia (Kress et al. 2003).

There are about 40 species of *Kaempferia* in Thailand (Sirirugsa 1992; Boonma et al. 2020, 2021; Jenjittikul and Larsen 2020; Nopporncharoenkul et al. 2021; Saensouk and Saensouk 2021a, 2021b). Currently, 13 species are recognized in *Kaempferia* subgenus *Protanthium* which 12 species were distributed in Thailand, there are *Kaempferia rotunda* L. (Linnaeus 1753), *K. simaoensis* Y.Y. Qian (Qian 1995; Nopporncharoenkul et al. 2016), *K. grandifolia* Saensouk & Jenjitt. (Saensouk and Jenjittikul 2001), *K. lopburiensis* Picheans. (Picheansoonthon 2010), *K. udonensis* Picheans. & Phokham (Phokham et al. 2013), *K. noctiflora* Noppornch. & Jenjitt. (Nopporncharoenkul and Jenjittikul 2017), *K. graminifolia* Noppornch. & Jenjitt. (Nopporncharoenkul and Jenjittikul 2018), *K. albiflora* Jenjitt. & Ruchis. (Jenjittikul and Ruchisansakun 2020), *K.*

aurora Noppornch. & Jenjitt., *K. caespitosa* Noppornch. & Jenjitt. (Nopporncharoenkul et al. 2020), *K. kamolwaniae* Picheans., Meechonk. & Wongsuwan (Wongsuwan et al. 2020), *K. takensis* Boonma & Saensouk (Boonma et al. 2020), and *K. jenjittikuliae* Noppornch. (Nopporncharoenkul et al. 2021). While *K. xiengkhouangensis* Picheans. & Phokham (Phokham et al. 2013) is an endemic species to Laos.

During the explorer project about the species diversity of the Zingiberaceae in Thailand, the undescribed species of *Kaempferia* produces the inflorescences directly from the rhizome was discovered in Tak Province. After comparing and examining species with similar characteristics, especially in subgenus *Protanthium*, we found that this specimen did not match any existing taxa; hence it is described and illustrated here as new species to science under the name of *Kaempferia sipraiana* in honoured and commemorated of the first discoverer of this species. A key to the species of *Kaempferia* in Thailand is also revised and provided for facilitating their identification.

A new record of *Kaempferia pseudoparviflora* (Saensouk and Saensouk 2021a), a species of *Kaempferia* subgenus *Kaempferia* was recently reported as new species from northern Thailand in earlier 2021. Later, the undescribed *Kaempferia* from southern Myanmar was found and collected by the first author. After comparing the living specimens in morphological characters to the existing taxa, we found that this undescribed species

matches *Kaempferia pseudoparviflora*. We also found the photographs online of this species occurring in Mon State, southern Myanmar as well. Thus we reported and described here a new record of *Kaempferia pseudoparviflora* for Myanmar.

MATERIALS AND METHODS

Live specimens of *Kaempferia* were collected from the field in Tak Province, northern Thailand and Kayin State, southern Myanmar. The measurements of the plant parts were taken by vernier caliper and ruler. The protologues of morphologically similar species (Linnaeus 1753; Nopporncharoenkul et al. 2020; Saensouk and Saensouk 2021) and type specimens were deposited in various herbaria, such as BK, BKF, KKU, QBG in Thailand, including digital images available online were compared.

RESULTS AND DISCUSSION

Taxonomic treatment

Kaempferia sipraiana Boonma & Saensouk, sp. nov.–

Figures 1–2; Table 1

This new species is closely related to *K. aurora* Noppornch. & Jenjitt. But differs in having leaves narrowly elliptic, green with short white stripes arranged parallel along the leaf edges, between the midrib and both sides of the edges, apex acuminate with slightly mucronate, base attenuate-oblique; peduncle glabrous; bracts apex mucronate, glabrous, red with dark red veins; bracteoles glabrous; floral tube shorter than calyx; calyx glabrous; staminodes oblanceolate, apex 3-lobes like curly brackets; labellum white at the base with pinkish purple in the middle gradually fade to pale pink and reaching to white tip and edge respectively, apex 3-lobes like curly brackets, each lobe 3.0–3.3 cm long (longer than *K. aurora*); apex 4 lobes, outer lobes acute, inner lobes obtuse rarely combined to truncate; stigma with pink lips; epigynous glands shorter (6–7 mm long).

Type: Thailand, Tak Province, Mae Sot District, 700–800 m asl., 14 May 2019, *T. Boonma*11 (Holotype: KKU!; isotypes: QBG! BKF! BK!)

Perennial herb, rhizome short ovoid to subglobose, pale yellow inside and fragrant. *Root* tuberous with fibrous roots. *Leafy shoot* 20–40 cm tall. *Leafless sheaths* 2–3, dark red, with white underground part, apex mucronate, margin entire, sparsely pubescent, 3–10 cm long. *Leaf-sheaths* alternate, green with red at the base or dark red, with white underground part, sparsely pubescent, 5–7 cm. *Petiole* green with red at the base or red, sparsely pubescent, 5–7 cm long. *Ligule* membranous, glabrous ca. 1 mm. *Lamina* 3–5, narrowly elliptic, apex acuminate with slightly mucronate, attenuate-oblique, margin undulate, adaxially surface green with short white stripes arranged to parallel along the leaf edges, between the midrib and both sides of the edges, glabrous, abaxially red or green with reddish tinge pubescent, pubescent, 4.5–7 x 17–27 cm. *Inflorescence* directly from the rhizome enclosed by bracts appears before the new leaves, 0.5–1 cm in diam. *Peduncle*

white, glabrous, 1.8–2.0 cm long and 2.2–2.8 mm in diam. *Bracts* 1–2, 2–3 x 1–1.4 cm, ovate, red with dark red veins, apex mucronate, margin entire, glabrous. *Bracteole* 1 per flower, 8.5–10.5 x 4.5–4.8 mm, narrowly ovate, apex acute, margin entire, glabrous. *Flowers* 4–7 per inflorescence, white with pale purple, 7–8 cm long. *Calyx* pale pink with red veins, 3.6–4.7 cm long, apex 3-lobed with the deep incision up to 1.3 cm, glabrous. *Floral tube* white, 3.6–4.2 cm long, glabrous; *dorsal corolla lobe* one and hooded, white, linear, apex caudate, margin entire, glabrous, 0.4–0.5 cm wide and 3.5–4 cm long; *lateral corolla lobes* 2, white, linear, hooded, apex caudate, margin entire and roll in, glabrous, 0.35–0.5 cm wide and 3.2–4 cm long. *Lateral staminodes* 2, upright to slightly arcuate, white, oblanceolate, apex 3-lobes like curly brackets, outer lobes rounded, middle lobe acute, glabrous, 3.4–3.6 x 0.9–1.0 cm. *Labellum* bilobed, deeply divided half of the length of the labellum, each lobe narrowly elliptic, partly overlapping, white at the base with pinkish purple in the middle gradually fade to white tip and edge, apex 3-lobes like curly brackets, glabrous, 3.0–3.3 x 1.0–1.1 cm. *Stamen* ca. 13.3 mm long with very short filament; *anther* pale yellow, ca. 5 mm long, ca. 1.2 mm wide; *anther crest* oblong, apex usually 4-lobes, outer lobes acute, inner lobes obtuse rarely combined to truncate, white, ca. 6 mm long, ca. 3.3 mm wide, glabrous. *Stigma* white with pink lips ca. 1.2 x 0.8 mm. *Style* very slender, ca. 5 cm long. *Epigynous glands* acicular 2, very slender 6–7 mm long. *Ovary* cylindrical ca. 2.6 mm in diam. and 3.5 mm long, 3 carpels, glabrous. *Ovule* axile placentation. Fruit and seed not seen. A morphological comparison to its allied species is presented in Table 1.

Vernacular name: “Perāa-Siprai” in the Thai language. Perāa is the Thai vernacular name of plants in *Kaempferia* genus and “Siprai” is a name in honor and commemorates the first discoverer.

Distribution: *Kaempferia sipraiana* is an endemic species to Thailand and is currently found only in the type locality in Tak Province, northern Thailand (Figure 3).

Phenology: Flowering before the leaves in April to May. Diurnal anthesis, fully open is about 8.00 a.m.

Ecology: The species grows in the mixed deciduous forest at elevations of 700–800 m asl. in sandy loam soil mixed with rocks, in semi-open area, and under the shade of the perennials tree.

Etymology: The specific epithet “*sipraiana*” is derived from the name in the Thai language in honor and to commemorate “*Siprai Buranapattama*” who first discovered this plant.

Conservation status: This new species is hitherto known from the type locality in Tak province, northern Thailand. Available information about this species is insufficient for a proper assessment of its conservation status. Thus according to IUCN criteria (IUCN 2022), it should be listed as Data Deficient (DD). However, we expect this plant to be found distributed elsewhere in the nearby area, where suitable habitats still seem to exist. Further fieldwork and observations are needed to assess changes in population, distribution, and abundance of this taxon in the future.

Table 1. Morphological comparison of *Kaempferia sipraiana*, *K. aurora*, and *K. rotunda*

Characters	<i>K. sipraiana</i> Boonma & Saensouk	<i>K. aurora</i> Noppornch. & Jenjitt.	<i>K. rotunda</i> L.
Lamina, size	Narrowly elliptic 17–27 × 4.5–7 cm	Lanceolate oblong to elliptic 12–25 × 5.5–8.5 cm	Elliptic to lanceolate oblong (7-)12–25(36) × 4–6(-11) cm
Leaf – adaxially	Green with short white stripes arranged parallel along the leaf edges, between the midrib and both sides of the edges	Light green to dull green, sometimes with a white variegation pattern and with a deep purplish-red patch towards the midvein	Variegated or patterned dark and pale green on either side of the midvein
Leaf – abaxially	Red or green with reddish tinge Pubescent	Light green Sometimes with sparse hair	Reddish Hairy
Leaf – apex	Acuminate with slightly mucronate	Attenuate to acute	Acute
Leaf – base	Attenuate-oblique	Obtuse	Cuneate
Peduncle	Glabrous	Hairy	Hairy
Bracts	Ovate Apex mucronate Glabrous Red with dark red veins	Ovate to lanceolate–ovate Apex acute to acuminate Hairy Pale yellow with reddish to deep brownish-red veins from the apex	Lanceolate Apex mucronate Hairy Reddish
Bracteoles	Narrowly ovate 8.5–10.5 × 4.5–4.8 mm Glabrous	Lanceolate 5–9 × 2–3 mm, Hairy	Lanceolate 18–23 × 10 mm Hairy
Calyx	3.6–4.7 cm long Glabrous Incision up to 1.3 cm Pale pink with red veins	Ca. 4.5 cm long Glabrous Incision 1.4–1.6 cm long Yellowish-white, sometimes with brownish-red veins from the apex	4–7 cm Hairy White or greenish
Floral tube	Floral tube shorter than calyx	Floral tube longer than calyx	Floral tube equalling calyx
Staminodes	Oblanceolate White Apex 3–lobes like curly brackets 3.4–3.6 × 0.9–1.0 cm	Oblong to narrowly elliptic White Apex acute 2.5–3.8 × 0.7–1.5 cm	Lanceolate to oblong White with purple-tinted Apex acute 3–4 × 1.6 cm
Labellum–color	White at the base with pinkish purple in the middle gradually fade to white tip and edge	White with pale yellow to white band from sinus towards the base, surrounded by two purple stripes from the base toward sinus and spreading to half of each lobe	Purple
Labellum–apex	Apex 3–lobes like curly brackets	Apex rounded to slightly crenate	Apex rounded or mucronate
Labellum–size of each lobe	3.0–3.3 × 1.0–1.1 cm	1.5–2.2 × 0.8–1.3 cm	4 × 2–2.5 cm
Anther crest	Apex 4 lobes, outer lobes acute, inner lobes obtuse rarely combined to truncate	Apex tridentate with each tooth acute to obtuse	Apex bilobed with 1–3 small teeth
Stigma	White with pink lips	White	White
Epigynous glands	6–7 mm long	10–11 mm long	2–5 mm long
Ovary	3.5 × 2.6 mm, glabrous	4 × 2–3 mm, glabrous, occasionally hairy	4–6 × 2–4 mm, hairy

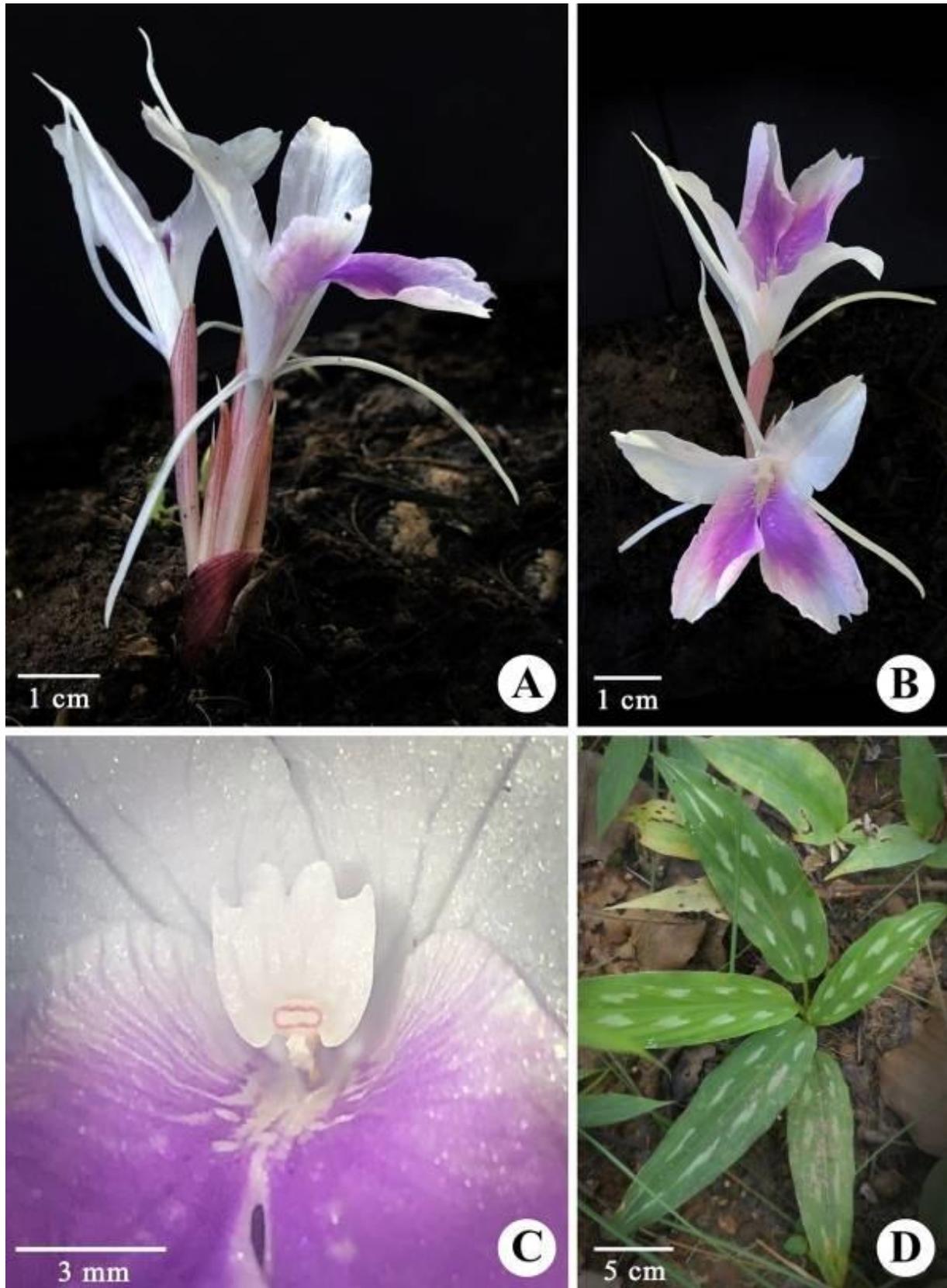


Figure 1. *Kaempferia sipraiana* Boonma & Saensouk sp. nov. (A) inflorescence with flowers—side view, (B) flowers—oblique top view, (C) flower—top view, (D) plant in natural habitat. Photographs by Thawatphong Boonma

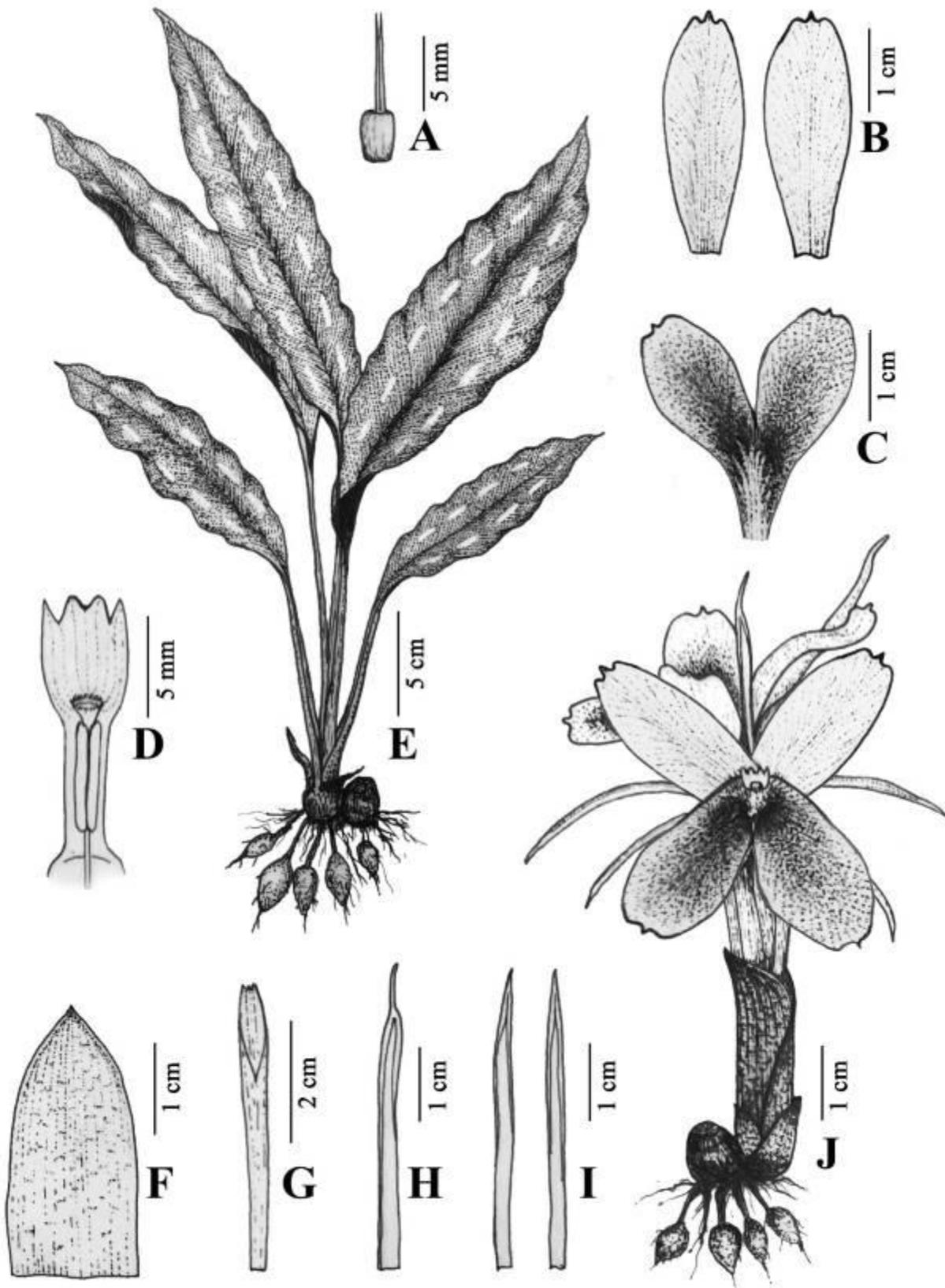


Figure 2. *Kaempferia sipraiana* Boonma & Saensouk sp. nov. (A) ovary with epigynous glands, (B) lateral staminodes, (C) labellum, (D) anther with crest and stigma, (E) habitus–side view, (F) bract, (G) calyx, (H) dorsal corolla lobe, (I) lateral corolla lobes, (J) inflorescence. Drawn by Thawatphong Boonma

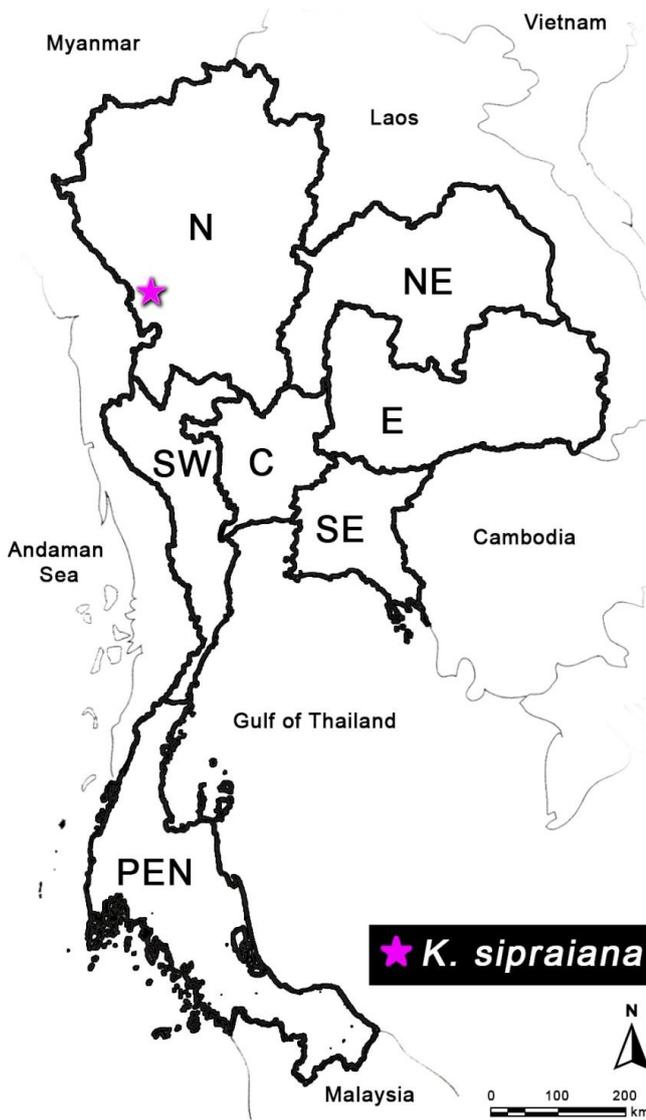


Figure 3. Distribution of *K. sipraiana* Boonma & Saensouk sp. nov. in Thailand

Key to species of *Kaempferia* in Thailand

- 1a. Inflorescence terminal from pseudostem, appears along with leaves (subgen. *Kaempferia*) 2
- 1b. Inflorescence directly from rhizome, appears before the new leaf (subgen. *Protanthium*) 29
- 2a. Leaves erect from the ground 3
- 2b. Leaves horizontal near the ground..... 13
- 3a. Lamina filiform, linear or less than 4 cm broad..... 4
- 3b. Lamina lanceolate to orbicular, broader than 4 cm.... 8
 - 4a. Leaves villous below..... *K. spoliata*
 - 4b. Leaves glabrous..... 5
- 5a. Stamines absent..... *K. sisaketensis*
- 5b. Stamines present..... 6
- 6a. Ligules present; leaves elliptic-linear to linear, 0.5–1 cm broad..... *K. larsenii*
- 6b. Ligules absent; leaves filiform, less than 0.5 cm broad..... 7
- 7a. Leaves up to 14 cm; anther-crest not divided or crenate..... *K. fallax*

- 7b. Leaves 15–20 cm long; anther-crest divided *K. filifolia*
- 8a. Petioles ≤ 1 cm long..... 9
- 8b. Petioles > 2 to 10 cm long..... 10
- 9a. Ovary glabrous; lamina green, glabrous on both surfaces with wavy margins..... *K. angustifolia*
- 9b. Ovary sparsely hairy; lamina green with dark green spots above, pubescent on both surfaces with entire margin..... *K. maculifolia*
- 10a. Ovary glabrous; leaves glabrous on both surfaces with purple coloration at margins.. *K. mahasarakhamensis*
- 10b. Ovary hairy; leaves pubescent below 11
- 11a. Leaves tomentose on both surfaces; labellum pubescent..... *K. koontermii*
- 11b. Leaves glabrous above, pubescent below; labellum glabrous..... 12
- 12a. Labellum shallowly divided or emarginate; staminodes oblong, $1-1.3 \times c. 0.3$ cm *K. parviflora*
- 12b. Labellum divided to the base; staminodes broadly obovate or sub-orbicular, $1.5-2 \times 1-1.7$ cm *K. elegans*
- 13a. Leaf = 1..... 14
- 13b. Leaf ≥ 2 18
- 14a. Calyx bifid at apex..... 15
- 14b. Calyx acute at apex..... 16
- 15a. Anther crest white with red dots, apex acute *K. siamensis*
- 15b. Anther crest white without red dots, bilobed, apices rounded..... *K. unifolia*
- 16a. Corolla tube 2.9–4.5 cm long, reddish-brown spot; corolla lobes reddish-brown spot; bracts reddish-brown spot..... *K. picheansoonthoni*
- 16b. Corolla tube 1.5–2 cm long, white; corolla lobes white; bracts green..... 17
- 17a. Leaves dark green, apex rounded; anther crest shallowly bilobed, each lobe apex acute... *K. isanensis*
- 17b. Leaves dark green with light grey markings, apex acute; anther crest deeply bilobed, each lobe apex rounded..... *K. pseudoparviflora*
- 18a. Stamines light brown or white..... 19
- 18b. Stamines lilac, purple or violet..... 26
- 19a. Stamines light brown..... *K. saraburiensis*
- 19b. Stamines white..... 20
- 20a. Labellum purple..... *K. marginata*
- 20b. Labellum white..... 21
- 21a. Leaves dull green with dark blotches..... *K. pardi*
- 21b. Leaves green without dark blotches..... 22
- 22a. Labellum white with yellow spot at base..... 23
- 22b. Labellum white with purple, lilac, or red..... 24
- 23a. Leaves glabrous on both surfaces..... *K. roscoeana*
- 23b. Leaf glabrous above and pubescent below..... *K. koratensis*
- 24a. Calyx and ovary hairy; labellum white, sometimes with a darker reddish patch at the inner base of each lobe with longitudinal white line at the base of lobes *K. phuphanensis*
- 24b. Calyx and ovary glabrous; labellum white with purple blotch at center or with purple marking at base..... 25
- 25a. Bracts hairy..... *K. laotica*
- 25b. Bracts glabrous..... *K. galanga*

- 26a. Calyx and ovary glabrous..... *K. minuta*
 26b. Calyx and ovary hairy..... 27
 27a. Stigma capitate, deep red purple; anther crest reniform; leaves glaucous, green..... *K. glauca*
 27b. Stigma 2-lipped, creamy white or white; anther crest triangular or linear; leaves dark olivaceous black with grey markings above or black or black with light grey markings 28
 28a. Peduncles less than 1 cm long; stamens sessile; anther crest triangular and bend to the back; staminodes broadly obovate, light purple with white spot at base, longer than labellum; labellum light purple with pure white spot at base; leaves sessile, black or black with light grey markings, sparsely hairy above *K. nigrifolia*
 28b. Peduncles c. 7.6 cm long; stamens with very short filament; anther crest very long linear apex entire rounded, recurved; staminodes obovate, mauve, as long as labellum; labellum lilac with the base pale yellowish-white spots; leaves petiolate, dark olivaceous black with grey markings above, glabrous above..... *K. pulchra*
 29a. Leaves horizontal, near the ground..... 30
 29b. Leaves erect, pseudostem well developed..... 33
 30a. Floral plane perpendicular to the ground, staminodes upright to slightly arcuate..... *K. jenjitikuliae*
 30b. Floral plane parallel to the ground, lateral staminodes and labellum horizontal, arranged in the same plane ...31
 31a. Leaves sparsely hairy above..... *K. lopburiensis*
 31b. Leaves glabrous above..... 32
 32a. Staminodes broadly obovate, light purple; labellum light purple with deep purple at base... *K. udonensis*
 32b. Staminodes oblong, white; labellum white with pale yellow spot at base, obovate..... *K. grandifolia*
 33a. Leaves less than 5 cm wide *K. graminifolia*
 33b. Leaves more than 5 cm wide..... 34
 34a. Rhizome producing several shoots *K. caespitosa*
 34b. Rhizome producing a single shoot..... 35
 35a. Nyctanthous, flower opens around 06 pm..... 36
 35b. Hemeranthous, flower opens around 05 am..... 37
 36a. Staminodes and labellum laid on the same plane; sinus depth two-third of labellum length; anther crest with irregular tridentate apex, the middle tooth shorter and wider than the others..... *K. albiflora*
 36b. Staminodes upright with deflexed distal half of the labellum; sinus depth half of labellum length; anther crest with bilobed apex, usually with two small teeth between lobes..... *K. noctiflora*
 37a. Labellum with two conspicuous yellow bands from base to sinus *K. simaensis*
 37b. Labellum with white or pale yellow band from base to sinus..... 38
 38a. Staminodes light pink..... *K. takensis*
 38b. Staminodes white or white with purple tinge 39
 39a. Anther crest apex bilobed, usually with 1-3 small teeth; epigynous glands \leq 6 mm long..... 40
 39b. Anther crest apex 3-4 lobes; epigynous glands $>$ 6 mm long 41
 40a. Leaves sessile; peduncle glabrous *K. kamolwaniae*
 40b. Leaves petiolate; peduncle hairy..... *K. rotunda*
 41a. Stigma white; bracts and bracteole hairy; labellum apex rounded to slightly crenate..... *K. aurora*
 41b. Stigma white with pink lips; bracts and bracteole glabrous; labellum apex 3-lobes like curly brackets *K. sipraiana* sp. nov.

A new record of *Kaempferia* L. for Myanmar

Kaempferia pseudoparviflora Saensouk & Saensouk P. Asian J. Plant Sci. 20: 414–420. Figs. 4–5.

Type: Myanmar, Kayin State, 7 May 2020, *T. Boonma* 32 (KKU!).

Perennial herb, rhizome yellowish internally, bearing several fascicle roots. *Short pseudostems* 2.5–3 cm tall, horizontal on the ground. *Bladeless sheaths* 2, 1–1.5 cm long, green with red tinge, glabrous. *Leaf* 1; *leaf-sheath* 1–2.3 cm long, glabrous, reddish; *petiole* very short ca. 0.5 cm long, glabrous, reddish; *ligule* inconspicuous; *lamina* horizontal near the ground, broadly obovate to sub-orbicular, 8–14 × 8–12 cm, adaxially dark green with light grey markings, abaxially pale green, margin undulate, base rounded, apex acute, both surfaces glabrous. *Inflorescence* terminal, enclosed by bladeless sheaths and one leaf-sheath; *peduncle* short up to 1 cm long, light pale green with white at base, glabrous. *Bract* one per flower, lanceolate, 2–2.4 × 1–1.2 cm (the outermost largest), green with white at base, both surfaces glabrous. *Bracteoles* keeled, lanceolate 1.5–1.9 × 0.8–1 cm, translucent white, glabrous. *Flowers* 7–12 per inflorescence, exerted from bracts. *Calyx* tubular, 1–1.2 cm long, translucent white, glabrous, unilaterally slit 0.5–0.7 cm long. *Corolla tube* 1.5–2 cm long, white, glabrous; *dorsal corolla lobe* narrowly lanceolate 2.8–3 × 0.5–0.6 cm, apex mucronate, hooded, translucent white, glabrous; *lateral corolla lobes* narrowly lanceolate, 2.5–2.6 × 0.5–0.6 cm, apex acute slightly mucronate, translucent white, glabrous. *Labellum* longer than broad, 3.5–3.8 × 3–3.2 cm, bilobed, lobes overlapping, each lobe obovate, apex obtuse to rounded, whitish or pale purple with dark purple patches towards the base and pure white spot at base, further inside purple with sparsely white spots. *Lateral staminodes* obovate, 3–3.2 × 1–1.2 cm, white, apex obtuse to rounded. *Anther theca* ca. 5 mm long, parallel, white; *crest* 7–8 × 8 mm, deeply bilobed, white. *Stigma* subglobose with lateral ciliate. *Ovary* cylindrical, 6.5–7 × 3–4 mm, glabrous, creamy white, 3-locules, axile placentation; *ovules* many; *styles* 2, filiform, ca. 5 mm long. Fruit and seed not seen.

Vernacular name: “Luupyao a rwat gyinn” in Myanmar language means single leaf ginger refers to this species has a single leaf.

Distribution: *Kaempferia pseudoparviflora* is found in Tak Province, northern Thailand and Kayin State and Mon State, southern Myanmar.

Phenology: Flowering in late April to June. Flowers are fully open in the morning and last a single day. Emerge

from the ground around late March to April and dormancy beginning in late October.

Ecology: The species grows in the mixed deciduous forest in sandy loam soil mixed with rocks, semi-open to open area, and under the shade of the perennials tree.

Conservation status: This species is currently found in 5 habitats with the present total extent of occurrence being about 26,000 km², the total area of occupancy is less than 300 km² and the number of mature individuals is less than 200 individuals in each habitat, occurs in Tak province, northern Thailand, and some part of Kayin State and Mon State, southern Myanmar. Based on the information, we propose to preliminary treat this plant as Endangered species [EN: B2ab(ii), C2a(i)] according to IUCN criteria (IUCN, 2022). Further fieldwork is needed as suitable habitats still seem to exist to assess changes in population, distribution, and abundance in the future.

Specimens examined: *Kaempferia pseudoparviflora* Saensouk & Saensouk P.: THAILAND. Saensouk 2000, Umphang District, Tak Province, 10 June 2018 (holotype KKU! isotype BK! BKF!).

Key to species of *Kaempferia* in Myanmar

- 1a. Inflorescence directly from rhizome, appears before the new leaf (subgen. *Protanthium*).....*K. rotunda*
- 1b. Inflorescence terminal from pseudostem, appears along with leaves (subgen. *Kaempferia*)..... 2
- 2a. Leaves erect from the ground..... 3
- 2b. Leaves horizontal near the ground..... 7

- 3a. Petioles ≤ 1 cm long..... 4
- 3b. Petioles > 2 to 10 cm long..... 5
- 4a. Leaves green.....*K. angustifolia*
- 4b. Leaves green with white or pale yellow variegated along the margins..... *K. gilbertii*
- 5a. Leaves tomentose on both surfaces; labellum pubescent.....*K. koontermii*
- 5b. Leaves glabrous above, pubescent below; labellum glabrous..... 6
- 6a. Labellum shallowly divided or emarginate; staminodes oblong, 1–1.3 × c. 0.3 cm..... *K. parviflora*
- 6b. Labellum divided to the base; staminodes broadly obovate or sub-orbicular, 1.5–2 × 1–1.7 cm...*K. elegans*
- 7a. Leaf = 1..... *K. pseudoparviflora*
- 7b. Leaf ≥ 2..... 8
- 8a. Anther crest deeply divided..... 9
- 8b. Anther crest entire or emarginate, acute or rounded 10
- 9a. Leaf-margin purple; labellum purple, sometimes with longitudinal white bands near the margins *K. marginata*
- 9b. Leaf-margin usually white; labellum white with purple marking at the base..... *K. galanga*
- 10a. Inflorescence pedunculate; calyx and ovary hairy; anther crest orbicular to oblong, apex acute or rounded *K. pulchra*
- 10b. Inflorescence sessile; calyx and ovary glabrous; anther crest rectangular, apex entire or emarginate *K. roscoeana*



Figure 4. *Kaempferia pseudoparviflora* Saensouk P. & Saensouk in Mon State, southern Myanmar.(A) plant in natural habitat,(B-C) habitus – top view. (Photo by Nyi Nyi Htway)

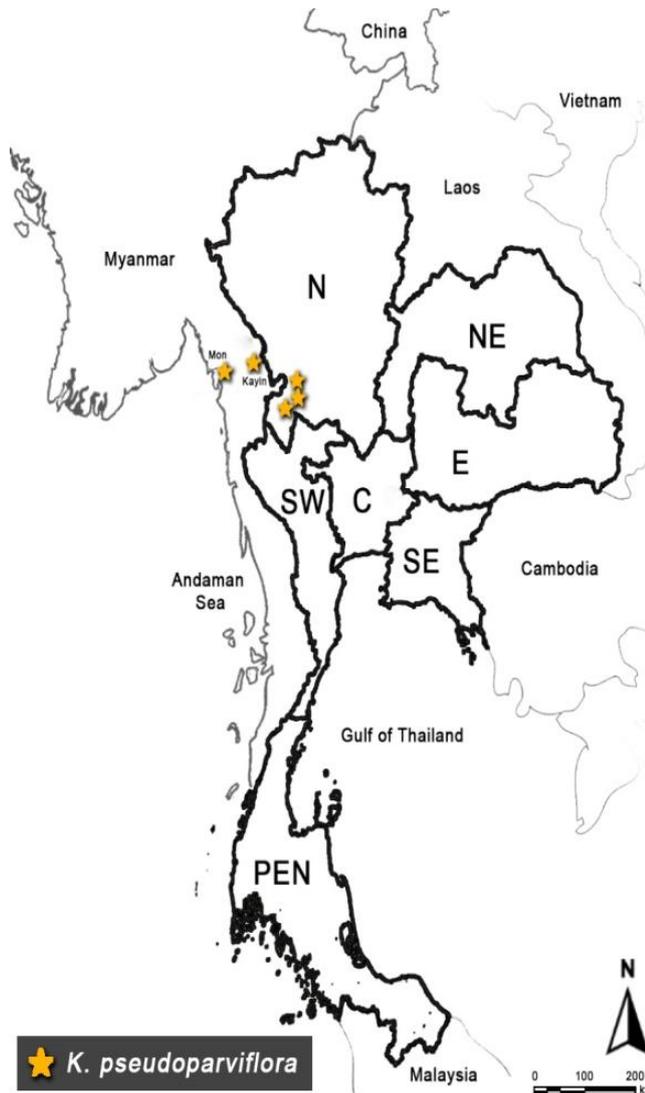


Figure 5. Distribution of *K. pseudoparviflora* Saensouk P. & Saensouk in northern Thailand and southern Myanmar

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