Two New *Kaempferia* L. (Zingiberaceae) from Southern Laos

Chayan Picheansoonthon[1,2*] and Supachai Koonterm[2]

1. The Academy of Science, The Royal Institute of Thailand, Sanam Suea Pa, Sriayudhaya Road, Khet Dusit, Bangkok 10300, Thailand.
2. Pharmaceutical Botany and Pharmacognosy Research Unit, Faculty of Pharmaceutical Sciences, Khon Kaen University, Khon Kaen 40002, Thailand.
** Corresponding Author. Email: chayan@kku.ac.th*

(Manuscript received 16 November 2008; accepted 20 January 2009)

ABSTRACT: Two new *Kaempferia* species (Zingiberaceae), *K. gigantiphylla* and *K. attapeuensis*, from Southern Laos, is described and illustrated. Relationship with their closely related taxa is also discussed.

KEY WORDS: new species, *Kaempferia gigantiphylla*, *Kaempferia attapeuensis*, Zingiberaceae, Southern Laos.

INTRODUCTION

In continuation of our long time investigation of the medicinal plant genus *Kaempferia* L. (Zingiberaceae) in Thailand, we have extended our fieldwork beyond the political boundary into Lao PDR in order to understand the biogeography of this plant group. Among the 16 taxa recently recognized for Thailand (Picheansoonthon and Koonterm, 2008), at least 13 species were native to Northeastern Thailand, and at least 10 taxa can be found along the Thai-Lao border. Therefore the presence of the taxa previously assumed to be the Thai endemisms are expected to be also found across the Mekhong River into Laos. As the result from our field experiences, *K. larsenii* Sirirugsa and *K. filifolia* K. Larsen, are the good examples.

During our intensive fieldwork in Laos since 2004, we have encountered several undescribed taxa additional to the 8 taxa preliminarily listed for Laos (Newman et al., 2007). Two new taxa, *K. chayanii* Koonterm and *K. champasakensis* Picheans. & Koonterm, were recently reported consecutively (Koonterm, 2008; Picheansoonthon & Koonterm, 2008). In this paper, we further recognized 2 more new taxa, *K. gigantiphylla* Picheans. & Koonterm and *K. attapeuensis* Picheans. & Koonterm, both from Southern Laos. With these 2 new taxa, 12 *Kaempferia* species were now formally enumerated for Lao. The relationship to other closely related taxa is also discussed.

TAXONOMIC TREATMENTS

1. ***Kaempferia gigantiphylla*** Picheans. & Koonterm, *sp. nov.* Figs. 1 & 2

Type: Lao PDR, Salawan Province, Tad Loa Waterfalls, N 15° 27.363' E 106° 44.120', alt. 482 m, 4 July 2007, *Picheansoonthon & Koonterm 117* (holotype BKF, isotypes BK, SING).

Kaempferiae siamensi similis, foliis supra conspicue nervosis, utrimque pubescentibus, ad 27.3-41.3 cm longis 15-30.2 cm latis, pedunculo ad 3.2 cm longo, bracteis oblongis ad triangularibus pubescentibus, bracteolis sparse pubescentibus, calycis tubo corollae tubo multo breviore pubescenti, corollae tubo sparse pubescenti, antherae crista ovata ad suborbiculari apice rotundato vel emarginato, ovario pubescenti differt (Table 1).

Perrenial herb, rhizome bearing several tuberous roots. Leaves usually solitary, sessile; blade horizontal, near the ground, suborbicular to orbicular, both surfaces hairy, upto 27.3-41.3 x 15.0-30.2 cm, the base rounded or subcordate, apex rounded or mucronate; leaf-sheath 4-6 cm long, glabrous; bladeless sheath *ca.* 6 cm long, glabrous; ligule inconspicuous. Inflorescence enclosed in the two innermost leaf sheaths, peduncle to 3.2 cm long; flowers 10-13. Bracts oblong to triangular, 1.7-2.9 x 4-8 mm, apex acute, hairy; bracteoles 2, attached to the base on both side of the ovary, *ca.* 1.7 x 2.5 mm, apex subacute to rounded, sparsely hairy. Calyx tubular, 2.7-3.2 cm long, split on one side to 0.7-1.0 cm deep, hairy, apex acute. Collora tube 3.2-4.2 cm long, sparsely hairy, dorsal lobe narrowly lanceolate, hooded with apex produced into *ca*. 0.5 mm thorn-like point, 1.9-2.6 x 3 mm, lateral lobes ligulate, 2.0-2.3 x 2 mm, apex hooded, glabrous. Staminodes pure white, lanceolate to elliptic, 1.6-1.8 x 5-7 mm, apex rounded; Labellum oblanceolate, white with purple blotch near the apex and purple lines down to the base, 2.0-2.3 x 8 mm, divided to the middle, each lobe broadly obovate to suborbicular, 5-7 x 4-5 mm long. Stamen with filament *c.* 3 mm long, anther *ca.* 4-7 mm long, anther crest ovate to suborbicular, apex rounded or emarginated, *ca.* 3 x 2 mm. Ovary *ca.* 5 x 2 mm, hairy, 3-locular, ovules several, the placentation axile; stigma funnel-shaped. Fruits fleshy, cylindric to ovate, greenish, *ca.* 2.3 x 3 mm. Seeds many, dull greenish to light yellow, narrowly ellipsoid to deltoid, *ca.* 5 x 3-4 mm, hairy, with white aril at the base.

臺灣大學學術期刊資料庫

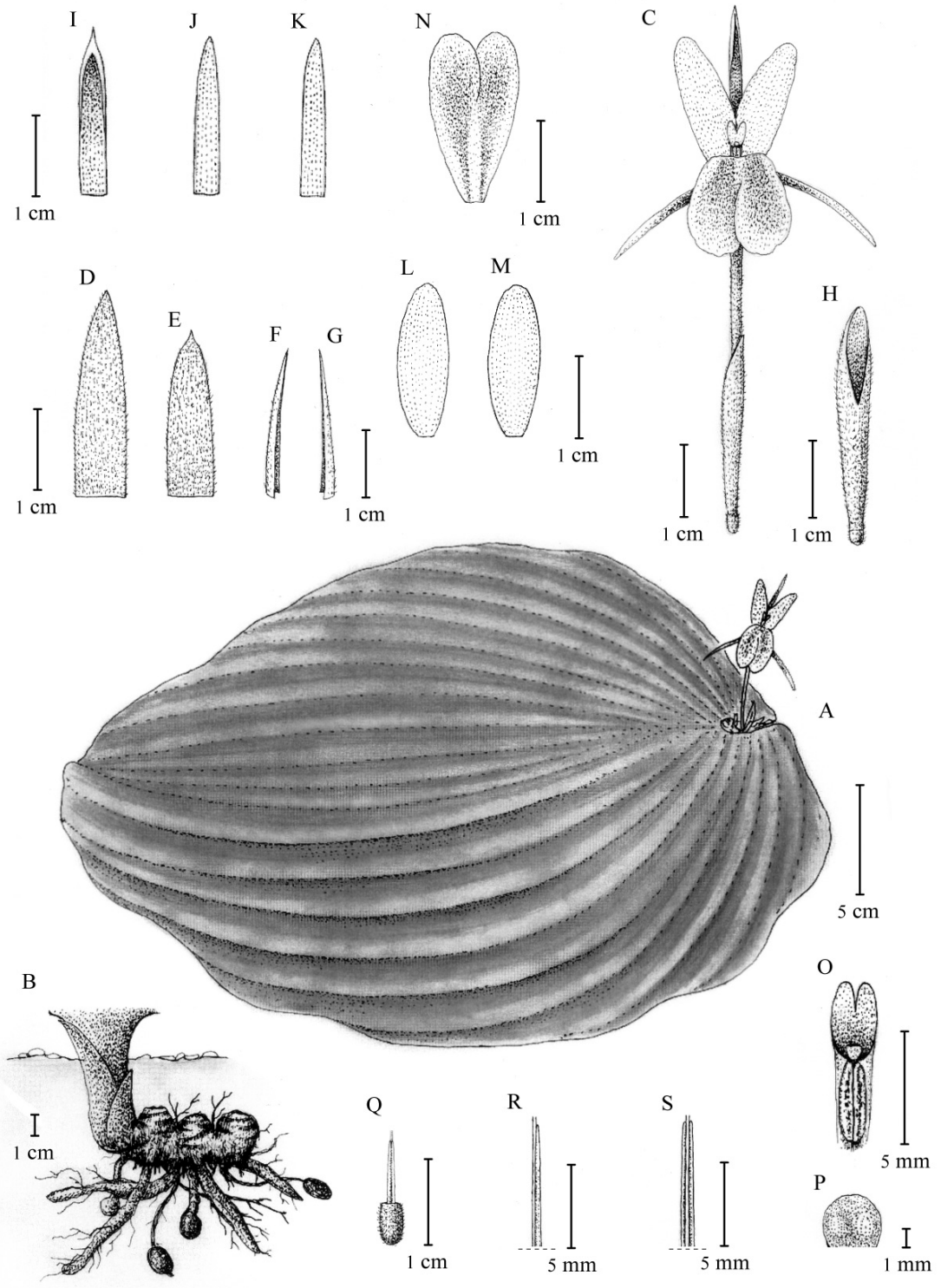


Fig. 1. *Kaempferia gigantiphylla* Picheans. & Koonterm. A: Habit. B: Rhizomes, roots and lower part of thr pseudostem. C: A flower. D, E: Bracts. F, G: Bracteoles. H: Ovary and calyx tube. I: Dorsal corolla lobe. J, K: Lateral corolla lobes. L, M: Lateral staminodes. N: Labellum. O: Anthers, stigma and anther crest. P: Different form of the anther crest. Q: Ovary with part of a style and the stylodes. R, S: Side view (R) and rear view (S) of the stylodes (drawn from living specimens by Chalermchoke Boonchit).

臺灣大學學術期刊資料庫

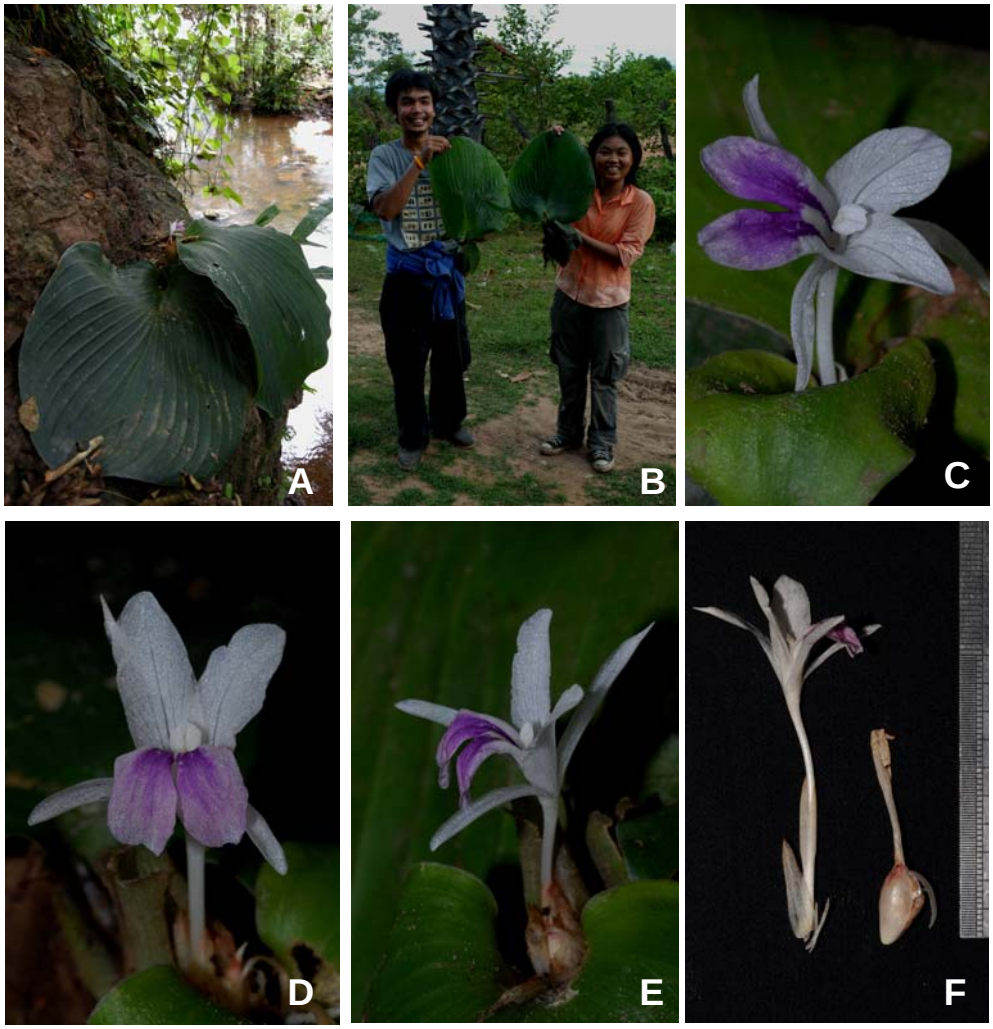


Fig. 2. *Kaempferia gigantiphylla* Picheans. & Koonterm. A: The plant habit. B: Leaves. C, D, E: Different views of a flower. F: a flower showing bract and bracteoles, and a fruit (photographed by Chayan Picheansoonthon).

Distribution: This new species is known from several location in Southern Laos from Champasak (from foothill of Phu Kang Huaen to Phu Sawan) to Attapeu Provinces (foothill of the Bolaven Plateau).

Ecology: In sandy soil or on rocks, under the shade in dry evergreen forest or lower montane scrub, from the altitude of 88 to 696 m.

Vernacular Name: Pro Bai Yak, Toobmoob Bai Yak.

Uses: Medicinal.

Other materials studied: Lao PDR, Attapeu Province, Ban Kasome, on the foothill of the Bolaven Plateau, N 14° 50.167' E 106° 57.515', alt. 88 m, 26 April 2008, *Picheansoonthon & Koonterm 219* (BK); Lao. PDR, Champasak Province, Phu Sawan, N 15°23.355' E 105°41.318', alt. 696 m, 14 June 2007, *Picheansoonthon & Koonterm 105* (BK).

Note: Among the *Kaempferia* species known for Indochina, only *K. siamensis* Sirirugsa generally has only one leaf. This new taxon is the second species of the *Kaemferia* recognized with only one leaf. It can be easily distinguished by its single large (to 27.3-41.3 by 15.0-30.2 cm) prominently-veined leaves, both surface hairy; peduncle to 3.2 cm long; bracts oblong to triangular, hairy; bracteoles sparsely hairy; calyx tube much shorter than corolla tube, hairy; collora tube sparsely hairy; anther crest ovate to suborbicular, apex rounded or emarginated; and hairy ovary.

2. ***Kaempferia attapeuensis*** Picheans. & Koonterm, *sp. nov.* Figs. 3 & 4

Type: Lao PDR, Attapeu Province, Ban Udomxai, N 14°45.167' E 106°60.415', alt. 80 m, 5 July 2007,

臺灣大學學術期刊資料庫

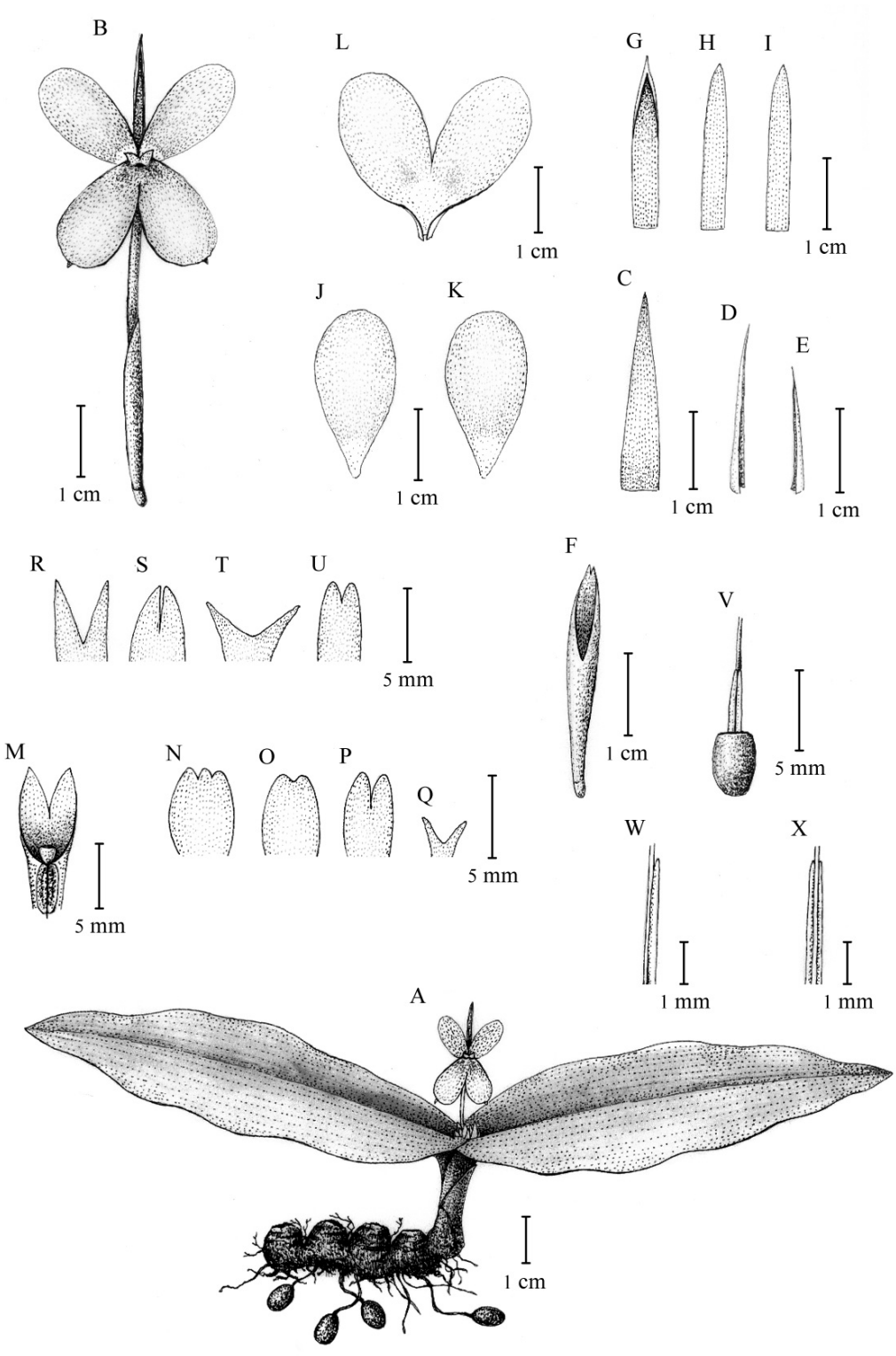


Fig. 3. ***Kaempferia attapeuensis*** **Picheans. & Koonterm. A: Habit. B: A flower. C: Bracts. D, E: Bracteoles. F: Ovary and calyx tube. G: Dorsal corolla lobe. H, I: Lateral corolla lobes. J, K: Lateral staminodes. L: Labellum. M: Anthers, stigma and anther crest. N-U: various shapes of the anther crests. V: Ovary with part of the style and the stylodes. W, X: side view (W) and rear view (X) of the stylodes. (drawn from living specimens by Chalermchoke Boonchit).**

臺灣大學學術期刊資料庫

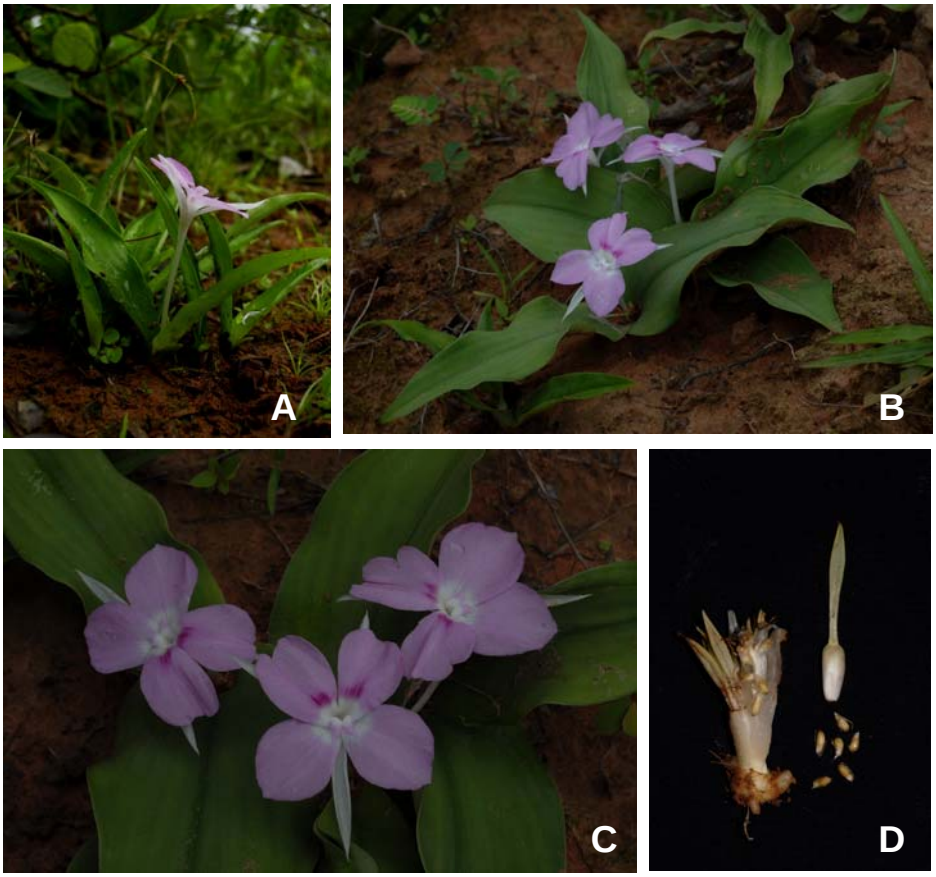


Fig. 4. *Kaempferia attapeuensis* Picheans. & Koonterm. A: Habit. B: Leaves and flowers. C: Detail of the flowers. D: The infructescence, a fruit and seeds (photographed by Chayan Picheansoonthon)

Picheansoonthon & Koonterm 123 (holotype BKF, isotype BK, SING).

Kaempferiae larsenii similis, foliis interdum solitariis vulgo binis oblongo-ellipticis ad late ovatis apice non cucullato margine paulo undulato ad undulato, pedunculo ad 1.7 cm longo, bractea calyce breviore, antherae crista ovata obovatove vel rectangulari 3-4 m longa 2-5 mm lata, apice variabili e bilobato ad bifido lobis rotundatis ad acuminatis differt (Table 2).

Perennial herb, rhizome slender, long creeping, bearing several roots in a fascicle. Leaves (1-)2, sessile, blade horizontal near the ground or erect 30°-80° above the ground, oblong-elliptic to broadly ovate, 1.3-12.4 x 7.1-13.9 cm, base attenuate to cuneate, margin slightly undulate to undulate, apex acute, both surfaces glabrous; leaf-sheaths 1.2-3.1 cm long, glabrous; bladeless sheath 2-3, 0.5-2 cm long, glabrous, the upper one sometimes with reduced lamina; ligule inconspicuous. Inflorescence sessile to pedunculated, peduncle up to 1.7 cm long, embedded in the two innermost leaf sheaths; flowers 3-13. Bracts 1, lanceolate to triangular, 1.8-3.0 x 3-5 mm, apex acute. Bracteoles 2, linear, 1.3-2.0 x 1 mm, apex acuminate, glabrous. Calyx tubular, 2.4-3.2 cm long, split on one side, 0.8-1 cm long, glabrous, apex bifid. Corolla tube, 4.2-5.7 cm long, whitish, glabrous; dorsal corolla lobe narrowly lanceolate, 1.8-2.2 x 3 mm, apex acute; lateral corolla lobes narrowly lanceolate, 1.6-2.1 x 2 mm, apex acute. Staminodes lilac, broadly obovate, 2-2.6 x 0.7-1.8 cm. Labellum lilac, broadly obovate, 2.3-2.8 x 1.8-2.3 cm, divided to the base, each lobe obovate,1.7-2 x 0.8-1.8 cm. Stamen sessile, anther 2-4 mm long, anther crest ovate, obovate or regtangular, 2-5 x 3-4 mm, apex varied from bifid to bilobe with the apex of each lobe round to acuminate. Stigma funnel-shaped. Ovary cylindrical 3-4 x 2 mm, glabrous, 3-locular, placentation axile, ovules many; stylode 1, filiform, very slender, 4-5 mm long. Fruits fleshy, obovate-oblong to oblong, *ca.* 1.3 x 7 mm. Seeds many, narrowly ellipsoid to deltoid, brownish, 2-3 x 1-2 mm; capped with whitish aril.

Distribution: This new species is known from several locations in Attapeu Province of Lao PDR.

Ecology: In sandy soil in lowland dry deciduous forest or dry evergreen forest, from the altitude of 88 to 590 m.

臺灣大學學術期刊資料庫

Table 1. Morphological comparison between *K. siamensis* Sirirugsa and *K. gigantiphylla* Picheans. & Koonterm

Characters	*K. siamensis*	*K. gigantiphylla*
1. Leaves		
surface	both surfaces glabrous	upper surface prominently veined, both surface hairy
size	6.2-15.4 x 6–14.5 cm	to 27.3-41.3 x 15-30.2 cm
2. Inflorescence		
peduncle	- (sessile)	to 3.2 cm long
bracts	lanceolate, glabrous	oblong to triangular, hairy
bracteoles	glabrous	sparsely hairy
calyx tube	glabrous	hairy
corolla tube	glabrous	sparsely hairy
anther crest	deeply bilobed, the lobe lanceolate	ovate to suborbicular, apex rounded or emarginated
ovary	glabrous	hairy

Table 2. Morphological comparison between *K. larsenii* Sirirugsa and *K. attapeuensis* Picheans. & Koonterm

Characters	*K. larsenii*	*K. attapeuensis*
1. Leaves		
number	(1-)2	2-4
shape	elliptic-linear to linear	oblong-elliptic to broadly ovate
petiole	0.7-1.2 cm	- (sessile)
apex	hooded	not hooded
margin	entire	slightly undulate to undulate
2. Inflorescence		
peduncle	(sessile)	to 1.7 cm long
anther crest	obovate, the apex rounded, entire or slightly crenate	ovate, obovate, or regtangular, apex varied from bilobe to bifid with the apex of each lobe round to acuminate

Vernacular Name: Toobmoob Dok Muang, Wan Toobmoob

Uses: Medicinal.

Other materials studied: Lao PDR, Attapeu Province, Ban Kasome, on the foothill of the Bolaven Plateau, **N** 14° 50.167' E 106° 57.515', alt. 88 m, 5 July 2008, *Picheansoonthon & Koonterm 229* (BKF).

Note: This new species is the closest to *K. larsenii* Sirirugsa distributed in Eastern Thailand (Changwat Ubon Ratchathani) and across the Mekhong River in Northern Part of the Champasak Province (Xanasombun Town) of Lao PDR. Both species are violet-flowered, however, the two taxa are different in both vegetative and floral morphology, as shown in Table 2.

Comparing with *K. larsenii*, this new taxon is greatly variable in shape, size, and orientation of the leaves. Leaves of the prior species is radical, petiolated, elliptic-linear to linear, and upright from the ground. The latter species, however, is with sessile, oblong-elliptic to broadly ovate, horizontal near the ground or upright leaves. Anther crest of *K. attapeuensis* is also varied greatly, ranged from the rectangular shape with the apex varied from bilobed (the apex of each lobe round to acuminate) to bifid.

ACKNOWLEDGEMENTS

This research project is a part of the five-year project entitled “Studies on fundamental botanical knowledge and DNA fingerprints of the Thai medicinal wan”, financially supported by the Thai Traditional Medical Knowledge Fund of the Ministry of Public Health. The author would like to thank Dr. J. F. Veldkamp (Leiden) for the Latin diagnosis, staffs of K, P, SING, BK, BKF, PSU and QBG for herbarium accesses, staffs of our research group: Mr. C. Boonchit, Mr. J. Mayoe, Mr. P. Yupparach, Mr. V. Karndee and Miss. P. Wongsuwan for field assistances, and our Laotian research partners, Mr. K. Deelert and Mr. T. Boonmee

LITERATURE CITED

Koonterm, S. 2008. *Kaempferia chayanii* (Zingiberaceae), a new species from Southern Laos. Folia malaysiana **9**: 17-22.

Newman M., S. Ketphanh, B. Svengsuksa, P. Thomas, K. Sengdala, V. Lamxay and K. Armstrong. 2007. A checklist of the vascular plants of Laos PDR. Royal Botanic Garden Edinburgh,Edinburgh. pp. 364-365.

Picheansoonthon C. and S. Koonterm. 2008. Notes on the genus *Kaempferia* L. (Zingiberaceae) in Thailand. J. Thai Trad. Alt. Med. **6**: 27-51.

Picheansoonthon C. and S. Koonterm. 2008. A New Species of *Kaempferia* (Zingiberaceae) from Southern Laos. Taiwania **53**: 406-409.

臺灣大學學術期刊資料庫

寮國南部薑科山柰屬植物二新種

Chayan Picheansoonthon[1,2*] and **Supachai Koonterm**[2]

1. *The Academy of Science, The Royal Institute of Thailand, Sanam Suea Pa, Sriayudhaya Road, Khet Dusit, Bangkok 10300, Thailand.*
2. *Pharmaceutical Botany and Pharmacognosy Research Unit, Faculty of Pharmaceutical Sciences, Khon Kaen University, Khon Kaen 40002, Thailand.*

* *Corresponding Author. Email: chayan@kku.ac.th*

(收稿日期：2008 年 11 月 16 日；接受日期：2009 年 1 月 20 日)

摘要：本文描述並繪圖介紹寮國南部薑科山柰屬 (*Kaempferia* L.) 植物二新種：巨葉山柰 (*Kaempferia gigantiphylla*) 及阿塔蒲山柰 (*Kaempferia attapeuensis*)，文中也探討與相近種的關係。

關鍵詞：新種、巨葉山柰 (*Kaempferia gigantiphylla*)、阿塔蒲山柰 (*Kaempferia attapeuensis*)、薑科、寮國。

臺灣大學學術期刊資料庫