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A New Species of *Zingiber* (Zingiberaceae) from Northern Thailand

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ABSTRACT: A new species of the genus *Zingiber* Miller (Zingiberaceae), *Zingiber phumiangense* A. Chaveerach & P. Mokkamul from Phu Miang, Uttaradit Province in the northern Thailand, is described and illustrated. It's closely related to *Z. neotruncatum* Wu, Larsen & Turland, but differs in several characters. The important different characters are leaf blades elliptic-oblong, bracts green with margin usually translucent and ciliate, calyx tube apex trilobed, anther basifixed, ovary glabrous.

KEY WORDS: ***Zingiber*, Zingiberaceae, new species, Thailand, Uttaradit.**

INTRODUCTION

The genus *Zingiber* was described by Miller in 1754 (Larsen and Larsen, 2006). Members of the genus are represented by 141 species, distributed throughout tropical Asia including China, Japan and tropical Australia (Sabu, 2003). The genus was included in the tribe Zingiberareae along with *Kaempferia*, *Amomum*, *Hedychium*, *Curcuma* etc. Thai people use the rhizome of some species as a part of Thai traditional medicine formula, especially *Z. officinale* Rosc. and *Z. montanum* (Koenig) Link ex Dietr. This herbal medicine is used for stimulant and blood circulation tonic (Picheansoonthon et al., 2001).

Zingiber is distinct from other genera of the family by the presence of a single anther with a beak or horn-like shape appendage, which embraces the upper part of the style. This character is the origin of a Sanskrit word of the genus name. In 1950, Holttum described 13 species and 3 varieties from Malay Peninsula. Twenty six species from Thailand were reported by Theilade (1999) with key to species of the genus and descriptions. In 2000, Wu and Larsen enumerated 42 species from China included 34 endemic species for Flora of China. Lim (2003) described a new species from Peninsular Thailand, *Z. raja* C. K. Lim & B. Kharukanant. Poulsen (2006) reported 13 species from Sarawak in his pocket guide book, Ginger of Sarawak. In the same year, Sabu (2006) reported eight species from South India in his book, Zingiberaceae and Costaceae of South India. Sixty seven species from Thailand were enumerated by Triboun (2006) for Doctor of Philosophy Thesis in Biology, Khon Kaen University. The latest report is an important evidence to show that Thailand is the center of biodiversity of the genus.

From the plant community exploration across the country by the authors for eight years (1998-2006), the members of the family Zingiberaceae and Piperaceae are in our criteria for surveying. In 2005, we found this new species growing on the hillside of Phu Miang. At first we identified it as *Z. neotruncatum* T. L. Wu, K. Larsen & Turland because the bract coloration of the two species is very similar. After carefully compared this new taxon with other taxa from our literature surveys and specimen examined, *Y. Paisooksantivatana Y2276-88* (Bangkok herbarium: BK!); *P. Srisanga 942* (Queen Sirikit Botanic Garden: QBG!); *P. Srisanga and C. Maknoi 2004* (QBG!); *P. Triboun 834*-In alcohol (BK!), *P. Triboun 1418*-In alcohol (BK!), *P. Triboun 1489*-In alcohol (BK!, KKU!), *P. Triboun 1500*-In alcohol (BK!, KKU!), *P. Triboun 1532*-In alcohol (BK!, Khon Kaen University herbarium: KKU!); *K. Tsuchiya and M. N. Tamura T-60532* (Bangkok Forest herbarium: BKF!), we found some characters are distinctly different. In 2006, we revisited its natural location again to make a repeated observation of every plant parts. We finally designated it as a new taxon of the genus. In the present study, this new species from northern Thailand is reported in details below.

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Key to the species

1. Leaf blades elliptic-oblong; bracts green with margin usually translucent and ciliate; calyx tube apex trilobed, anther basifixed, ovary glabrous ……..... *Z. phumiangense*
1. Leaf blades narrowly lanceolate; bracts red with densely white pubescent; calyx tube apex truncate; anther sessile; ovary pubescent ……..... *Z. neotruncatum*

Zingiber phumiangense A. Chaveerach & P. Mokkamul sp. nov. Figs. 1-4

Diagnoses: This new species is similar to *Z. neotruncatum*, but differs in the following characters; leaf sheaths long brown hairy; leaf blades elliptic-oblong, green on upper surface, purplish-red or reddish-green beneath, hairy; petioles very short, hairy; ligules 1.0-1.2 cm long, ochreate, usually spilt down on one side. Inflorescences 1-3, radical, erect, peduncle 5-8 cm long, sheaths dark purplish-red; bracts green with purplish-red patch at the tip, margin usually translucent and ciliate; bracteole ovate, apex acute, margin ciliate; calyx tube apex trilobed, lobe apex acute; anther basifixed, ovary glabrous.

Latin Diagnoses: Species haec nova Z. neotruncatum similis sed differt vaginis foliorum pilis longis brunneis instructis; laminis foliorum elliptico-oblongis, omnibus in pagina superiore viridibus et in pagina inferiore vinosis vel rubroviridibus, pagina inferiore pubescenti; petiolis brevissimis pubescentibus, ligulis 1.0-1.2 cm longis, ocrea plerumque in uno latere fissa; inflorescentiis 1-3 radicalibus erectis, pedunculo 5-8 cm longo, vaginis atrovinosis; bracteis viridibus ad apicem macula vinosa, margine plerumque translucenti ciliatoque; bracteola ovata, apice acuto, margine ciliato; apice tubi calycis trilobo, apice cuiusque lobi acuto, anthesis basifixus, ovarium glabratus.

Type: Phu Miang, Klong Tron Waterfall National Park, alt. 1,400 m, Uttaradit Province in the north of Thailand, 17 July 2006, *P. Mokkamul & A. Chaveerach 318*, (holotype: BKF!, isotype: BK!) .

Perennial herbs with stout storage rhizomes, roots fibrous, leafy shoots 1-1.5 m high and ca. 2 cm in diameters at base. Bladeless sheaths 7-9, glabescent or short hairy, basal one purplish-red, upper one reddish-green with red margin; leaf sheaths green, long brown hairy; petioles very short, 2.0-3.0 mm long, purplish-green, hairy; ligules hairy, shallowly bilobed, 1.0-1.2 cm long, lobes irregularly truncate, ochreate, split down on one side ca. 1.0 cm long, green with brown at margin. Leaves 20-30 cm, leaf blades elliptic-oblong, 29.5-33.0 cm by 6.6-6.8 cm, apex acuminate, margin entire, base round, under surface purplish-red or reddish-green, hairy, upper surface green, glabrous. Inflorescences basal, 1-3, radical, erect; peduncle 5.0-8.0 cm long with 5-8 sheaths, lower one smaller than the upper one, dark purplish-red, glabrous. Spike oblong, 8.0-10.0 cm by 4.5-6.0 cm; bracts imbricate, upper one smaller than the lower one, the biggest one broadly ovate, 3.5-4.2 cm by 3.5-3.8 cm, green with purplish-red patch at the tip, apex acute or obtuse, margin usually translucent and ciliate, glabrous, 1-flowered per bract; bracteoles membranous, ovate, 3.0-3.5 cm by 1.8-2.0 cm, apex acute, margin ciliate, folded, glabrous. Calyx tube 0.8-1.0 cm by 0.4 cm, apex trilobed, lobe apex acute, yellowish-white; corolla tube 2.0-2.2 cm long, yellow, glabrous, apex 3-lobed; dorsal lobe ovate to elliptic, 1.8-2.3 cm by 1.0-1.3 cm, boat-shape, apex hooded and acute, yellow, glabrous, lateral lobes narrowly ovate or lanceolate, 2.0-2.2 cm by 0.5 cm, apex acute, yellow, glabrous. Labellum orbicular-oblong, 2.8-3.0 cm by 2.0-2.3 cm, apex rounded, margin slightly undulate, yellow, glabrous, side lobes irregularly ovate, 0.8-1.0 cm by 0.7-0.9 cm, apex rounded, yellow. Filament very short, ca. 2 mm long and ca. 4 mm wide, flat; anther basifixed, oblong, 1.3-1.5 cm by 0.5-0.6 cm, yellow, glabrous, appendage linear, 1.5-1.7 cm by 0.3-0.4 cm, recurved, tip deltoid longer than stigma, 2.0-2.5 mm long, yellow. Stigma conical, apex ciliated, white; ovary 3.5 mm by 2.5 mm, glabrous. Fruits not found. Flowering July-August.

Distribution: This new species has been found only at Phu Miang, Klon Tron National Park, Uttaradit Province in the north of Thailand, near the border of Thai-Laos.

Ecology: Only two individual plants of this new species are growing on the hillside under the shade of hill in evergreen forests (ecotone area of hill evergreen and open sandstone-grasses vegetation, near the summit of Phu Miang) and the altitude is 1,400 m.

Etymology: The specific epithet of this new species is named following the name of its natural location.

Notes: The vegetation of Phu Miang is very distinguished from that of the other mountains around that area. Most mountains are covered by hill evergreen, moist evergreen or pine forest. The elevation at the highest peak of Phu Miang is 1,674 m. It is usually cloudy, foggy and windy on the top. The summit area of Phu Miang is open sandstone-grasses field scattered with shrubs and herbs without trees. Many species found at this mountain are rare and endemic plants to Thailand, e.g., *Cautleya gracilis* (Smith) Dandy, *Cornukaempferia aurantifloria* Larsen & Mood, *Hedychium*

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Fig. 1. An individual plant in field.

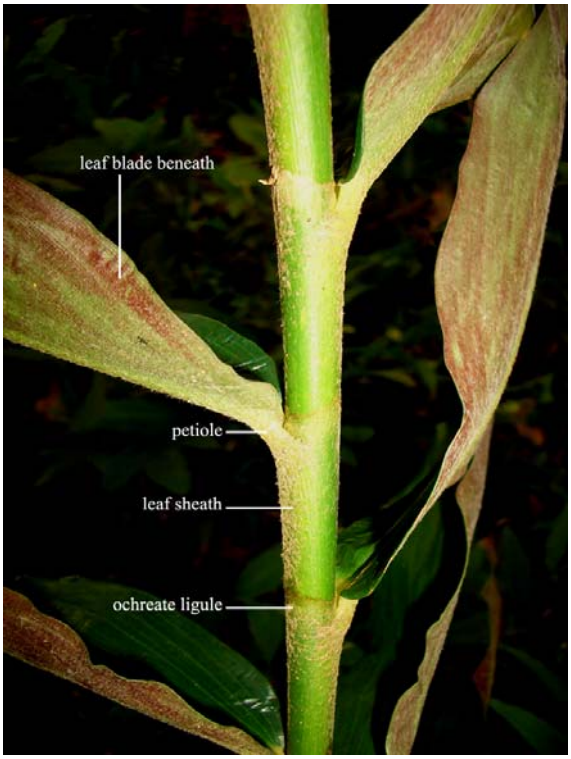


Fig. 2. Close up view of a leafy shoot showing leaf blades beneath, petioles, leaf sheaths, and ochreate ligules.

ellipticum Ham. ex Smith, *Zingiber kerrii* Craib, *Z. larsenii* Theilade, *Caulokaempferia alba* Larsen & Smith, *Lilium primulinum* Bak. var. *burmanicum* Stearn, *Piper khasianum* C. DC. and *Piper umbellatum* L.

From our exploration in 2005 at Phu Miang, we found the population of the new species containing only two individuals. In 2006, we revisited that area again to carefully observe its characters. We found that the population still contained at two individual plants. They grow in a very specific ecology location near the summit of Phu Miang. We decided to leave the rhizomes and leafy shoots of both plants. We collected some specimens by cuting an inflorescence and an upper part of a leafy shoot. We hope that the two plants can survive and increase the number of its population in the future.



Fig. 3. An inflorescence arising from rhizome, showing green bracts with dark purplish-red at tip, young flowers and a blooming golden flower (All photos taken by Piya Mokkamul).

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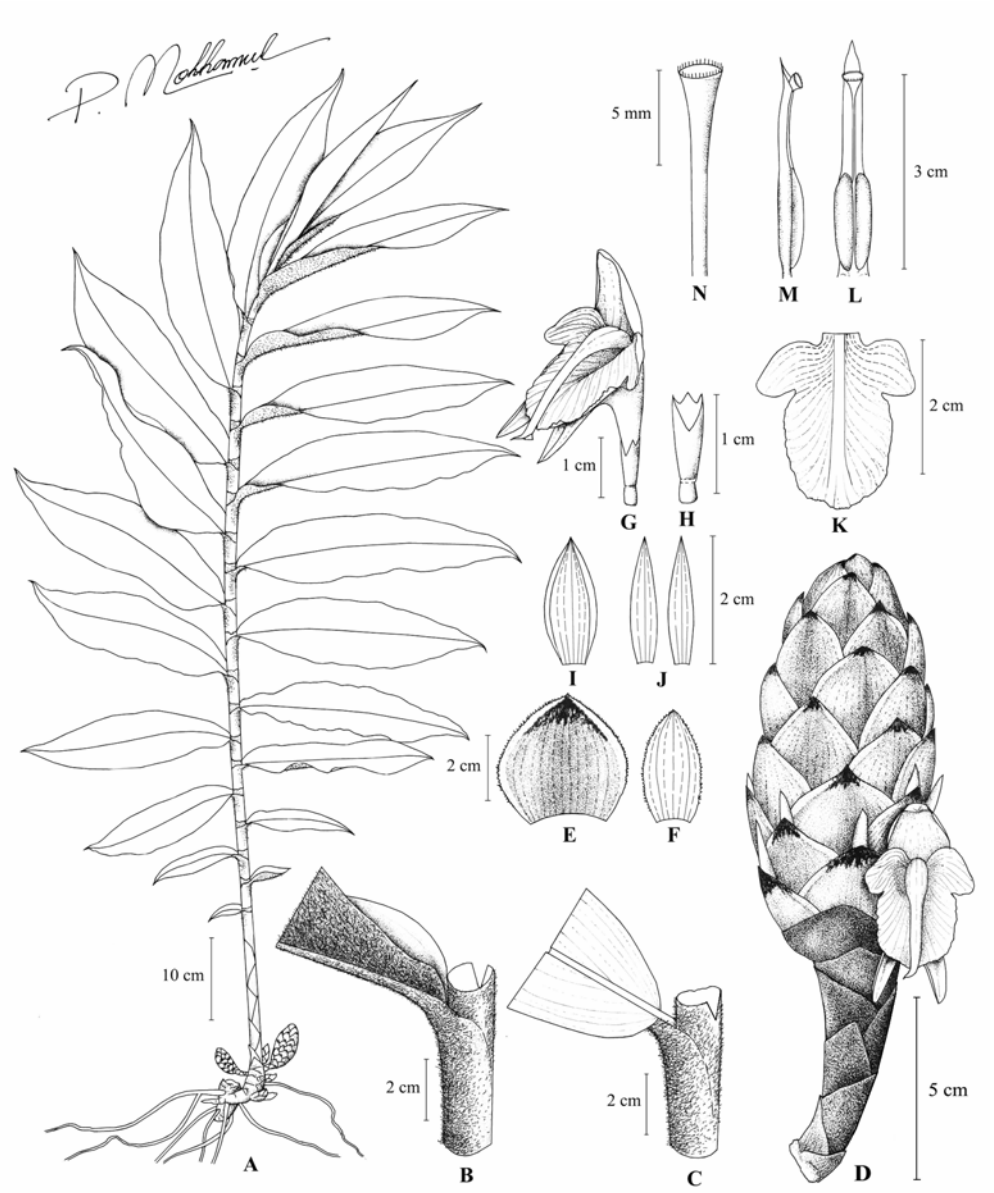


Fig. 4. *Zingiber phumiangense* A. Chaveerach & P. Mokkamul. A: plant habit. B: upper part of leaf sheath; ochreate ligule and lower part of a leaf (ventral view). C: upper part of leaf sheath, ochreate ligule and lower part of a leaf (side view). D: an inflorescence with a blooming flower. E: bract. F: bracteole. G: a flower with ovary and calyx tube. H: calyx tube with ovary. I: dorsal lobe. J: lateral lobes. K: labellum with side lobes. L: anther, appendage and stigma (ventral view). M: anther; appendage and stigma (side view). N: stigma (Drawn by Piya Mokkamul).

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泰國北部一新種薑科植物

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摘　　要

本文報導採自泰國北部烏達臘迪省（Uttaradit）普邁（Phu Miang）地區的一種薑科薑屬新的植物：普邁薑（*Zingiber phumiangense* A. Chaveerach & P. Mokkamul），本種以葉片橢圓-長橢圓形、苞片綠色且具半透明及纖毛的邊緣、萼片筒先端三裂、花藥基部癒合及子房光滑無毛等特徵可和其相近種 *Z. neotruncatum* Wu, Larsen & Turland 區別。文中包括分類描述及繪圖。

關鍵詞：薑、薑科、新種、泰國、烏達臘迪省。

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