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A New Species of *Alpinia* Roxb. (Zingiberaceae) from Northeastern Thailand

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ABSTRACT: *Alpinia macrostaminodia* A. Chaveerach & R. Sudmoon, a distinctive taxon was found on the Phu Wua sandstone flat plateau of Phu Wua Wildlife Sanctuary in northeastern Thailand. It is described and illustrated as a new species of the genus *Alpinia* Roxb. (Zingiberaceae). It is closely related to *A. uraiensis* Hayata, but differs in several characters. The important different characters are details of leaf, bracteole, calyx, labellum and staminodes.

KEY WORDS: ***Alpinia macrostaminodia*, Zingiberaceae, new species, Thailand, Phu Wua Wildlife Sanctuary.**

INTRODUCTION

Alpinia was described by Roxburgh in 1810 (Wu and Larsen, 2000). Up to now, the genus contains more than 300 species which may suggests that it is the biggest genus of the family Zingiberaceae. Most members of the genus have distribution ranges in subtropical and tropical rain forest of Asia, Australia and Pacific Islands (Wu and Larsen, 2000). Some members of the genus are well known for ethnomedicinal importances and food as spicy materials especially *A. nigra* (Gaertner) B.L. Burtt, *A. galanga* Willd., *A. conchigera* Griff., *A. siamensis* K. Schum., etc.

Twenty-three species of *Alpinia* found in Malay Peninsula were recorded by Ridley (1924). In 1950, Holttum listed eight species and two varieties from Malay Peninsula. Smith (1975) enumerated 55 species in "A preliminary review of the large bracteate species of *Alpinia*". Fifty-one species included 35 endemic species were enumerated in China (Wu and Larsen, 2000). Yang and Wang (2002) reported 11 species and three varieties in Taiwan. Twenty-one species of the genus including one new species, *A. peninsularis*, and three new records from Thailand, *A. blepharocalyx* var. *blepharocalyx* Handel-Mazzetti, *A. blepharocalyx* var. *glabrior* T.L. Wu and *A. scabra* Baker, were accounted by Saensouk et al. (2003). One species from Peninsular Malaysia and Thailand previously identified as *A. rafflesiana* Wall. ex Baker var. *hirtior* Holttum was revised as a new species, *A. mythiana* C.K. Lim by Lim (2004). Saensouk (2006) reported 18 species and showed that the genus *Alpinia* in Thailand is divided into two groups: *Alpinia* and *Dieramalpinia*. The *Alpinia* group is distinguished by its usually concave labellum which is often incurved margins, sometime held flat or pendulous (Smith, 1990). It contains 17 species and 23 taxa. It is divided into five subgroups as follows: *Allughas*, *Alpinia*, *Catimbium*, *Cenolophon* and *Guillainia*. The *Dieramalpinia* group is distinguished by its labellum which is erect, closely pressed against the stamen and not well developed lateral margins. Only *A. luteocarpa* is a member of this group in Thailand. In the same year, 13 species and one variety of *Alpinia* from Sarawak were reported by Poulsen (2006).

While the authors were doing field works of *Piper* L. (Piperaceae) and *Caulokaempferia* Larsen (Zingiberaceae) across the country, the new species was firstly discovered in 2002 at Phu Wua Wildlife Sanctuary, Nong Khai province in the northeast of Thailand. We began to observe the characters of *Alpinia* from living specimens found at each natural location compared with this new species. It is very different from other members of the genus. From revisiting and carefully observation, taxonomic identifications were investigated based on available above references. Specimens from many herbaria including type specimen of *Alpinia uraiensis* Hayata,

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Shimada 5385 (TAI!) were checked. We decided that the species is a new taxon of the genus *Alpinia* from Thailand. The details of this new species were described below. Its botanical illustrations are shown.

Key to a new species of *Alpinia*

1. Leaf blade oblong to oblanceolate, base oblique, tip acuminate, margin hairy, lower surface not hairy on both sides along the midrib; bracteole white, tip pink, base hairy; calyx white, tip pink, outer surface minutely pubescent; labellum involute, yellow with red stripes and spots at the center, apex emarginated; staminodes linear with red stripes ..... *A. uraiensis*
1. Leaf blade elliptic-oblong, base rounded, tip rounded with mucronate, margin translucent, lower surface hairy on both sides along the midrib; bracteole brownish, hairy; calyx white, outer surface pubescent; labellum flat, apex 2-clef subtending nearly to base, yellow with two dark red bands at the centre, red stripes and red spots at the centre arising to the margin of labellum; staminodes obovate with densely dark red spots ..... *A. macrostaminodia*

Alpinia macrostaminodia A. Chaveerach & R. Sudmoon *sp. nov.* Figs. 1 & 2

Diagnose: This new species is similar to *A. uraiensis* Hayata, but different in the following characters: leaf blades elliptic-oblong, base rounded, apex rounded with short mucronate, margin translucent, lower surface hairy on both sides along the midrib; bracteole brownish, hairy; calyx white, outer surface pubescent; labellum flat, apex 2-clef subtending nearly to base, yellow with 2 dark red bands at the center, red stripes and spots at the center arising to the margin of labellum; staminodes obovate with densely dark red spots.

Latin diagnose: Folia elliptica-oblonga, curva ad terram, apicem curvum cum una parva cuspide acuta dura, marginem pellucidum, imam partem pilo vestitam super ambos lateros secundum venas; bracteam subfuscam pilo vestitam; calycem album, externam partem pilo vestitam; labellum planum, apicem cum 2 clavis in ima parte, flavium cum 2 fascis mediis fuscis fulvis, aliis fulvis fascis et maculis mediis in labello marginis; stamines steriles ovatos cum maculis fuscis fulvis.

Type: Phu Wua Wildlife Sanctuary, alt. 300 m, Nong Khai province, northeastern Thailand, 28 May 2006, *P. Mokkamul & A. Chaveerach 317* (holotype: BKF!, isotype: BK!).

Perennial herb with cylindrical branching rhizome, ca. 1.5 cm in diameter. Pseudostems slender, up to 1.5 m tall, terete, green, basal purplish, glabrous. Leaf sheaths 3-4, green, densely small quadrangle lacunas along the sheath. Ligules sheath-like thick, 0.5-0.6 cm long, apex rounded, sparsely short hair. Leaf subsessile to petiolate ca. 1 cm long, green, glabrous; blades elliptic-oblong, the lower one bigger than the apical one, the biggest one 5.0-8.0 cm by 20.0-28.0 cm, base round or short cuneate, apex rounded with short mucronate ca. 0.3 cm long, margin translucent stripe ca. 0.1 cm wide from base to apex, ciliate, primary vein unconspicuous, adaxially dark green, glabrous, abaxially light green, hairy on both sides of midrib. Inflorescences thyrse, erect, flower-bearing part 12.0-30.0 cm long, peduncle 7.0-15.0 cm long, covered by two leaf sheaths, green, pubescent, rachis pubescent. Flowers 2-3 per a cincinnus. Pedicel short, 0.3-0.5 cm long, pubescent. Bracts linear-oblong or narrowly oblanceolate, 16.0-18.0 cm by 2.5-3.0 cm, usually dried when flowering, apex hooded, rounded or obtuse, glabrous. Bracteoles campanulate, 0.7-1.0 cm by 0.4-0.8 cm, apex truncate, split down on one side ca. 0.3 cm long, brownish, hairy, stalk very short ca. 0.3 cm long, hairy. Calyx tubular, ca. 1.0 cm by 0.5 cm, apex trilobed, rounded, white, outer surface pubescent. Corolla tube as long as calyx, white, pubescent; dorsal lobe elliptic-oblong, ca. 1.5 cm by 0.7 cm, apex concave, outer surface densely sericeous pubescent, white, basal reddish, lateral lobe ovate, ca. 1.0 cm by 0.7 cm, apex concave, outer surface densely sericeous pubescent. Lateral staminodes obovate, ca. 1.0 cm by 0.5 cm, apex erose, distributed with densely dark red spots. Labellum deltoid, flat, ca. 1.5 cm by 1.5 cm, broadest at base, apex 2-cleft subtending nearly to base, margin erose, yellow with 2 dark red bands at the centre, red stripes and red spots at the center arising to the margins of labellum. Filament flat, ca. 1 cm long, procumbent, yellow with basal reddish. Anther oblong, 0.7-0.8 cm by 0.4-0.5 cm, apex emarginated, yellow, sparsely short hairs. Stigma funnel-form, yellowish, apex ciliated. Ovary globose, ca. 0.4 cm by 0.4 cm, green, pubescent, trilocular, placentation axile. Fruit not seen. Flowering May-July.

Distribution: *Alpinia macrostaminodia* has only been found on the flat plateau of Phu Wua Wildlife Sanctuary, Bungkhla district, Nong Khai province, northeastern Thailand, at altitude 300 m.

Ecology: Populations of this new species are growing on ground with water logged sandstone flat plateau in deciduous forest under the shade of Dipterocarpaceae community scattered namely *Shorea obtusa* Wall. ex Blume, *Shorea siamensis* Miq., *Dipterocarpus obtusifolius* Teijsm. ex Miq. etc., and ground covered with grasses.

Etymology: The specific epithet "*macrostaminodia*" is named following the character

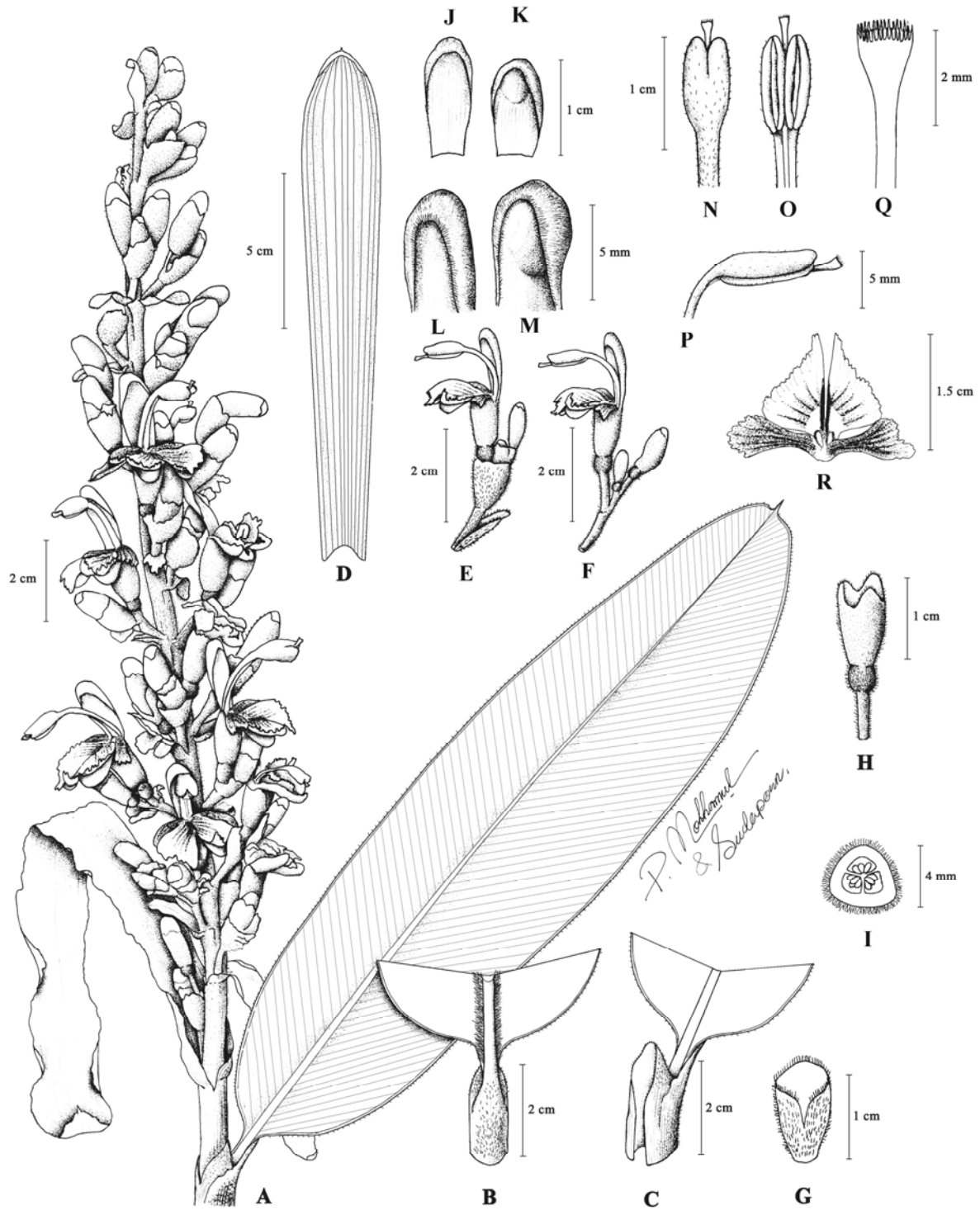

Fig. 1. *Alpinia macrostaminodia* A. Chaveerach & R. Sudmoon. A: Leaf and inflorescence. B: Dorsal side of a lower part of a leaf. C: Ligule with lower part of a leaf. D: Bract. E: A cincinnus holding 3-flowered. F: A cincinnus after taken bracteole off. G: Bracteole. H: Calyx tube with ovary and pedicel. I: Cross section of an ovary. J-M: Corolla lobe. J: Dorsal lobe. K: Lateral lobe. L: Apex of dorsal lobe. M: Apex of lateral lobe. N-P: Anther. N: Dorsal side. O: Ventral side. P: Side view. Q: Stigma. R: Labellum with staminodes. Drawing by Piya Mokkamul & Sudaporn Sepsawat.

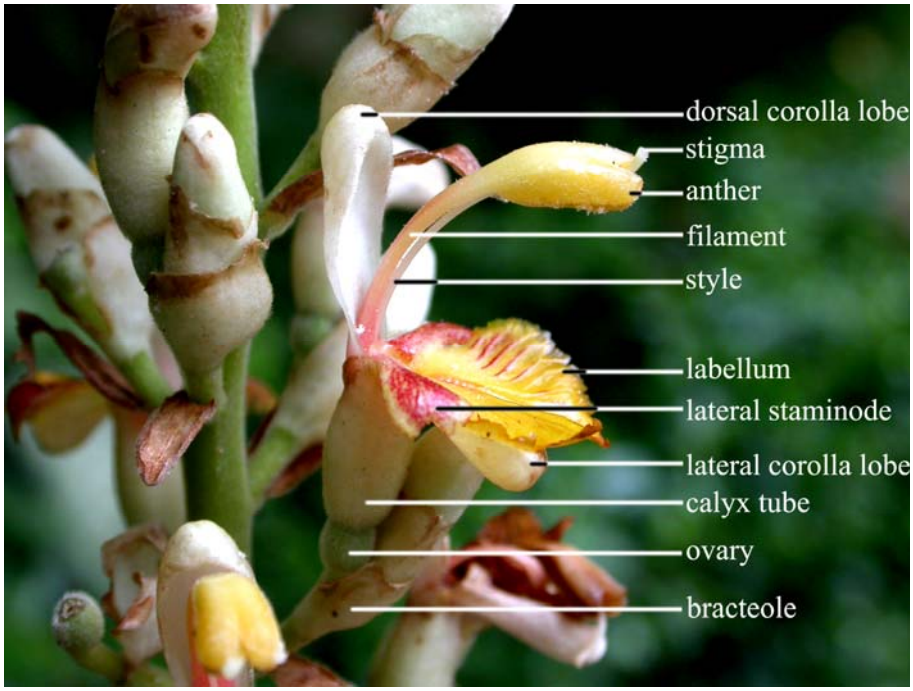

Fig. 2. *Alpinia macrostaminodia* A. Chaveerach & R. Sudmoon. Inflorescence showing finely pubescent on all parts of raceme, bracteole, a flower with ovary, calyx tube, corolla lobes, labellum, filament, anther, style and stigma. Photographs by Piya Mokkamul.

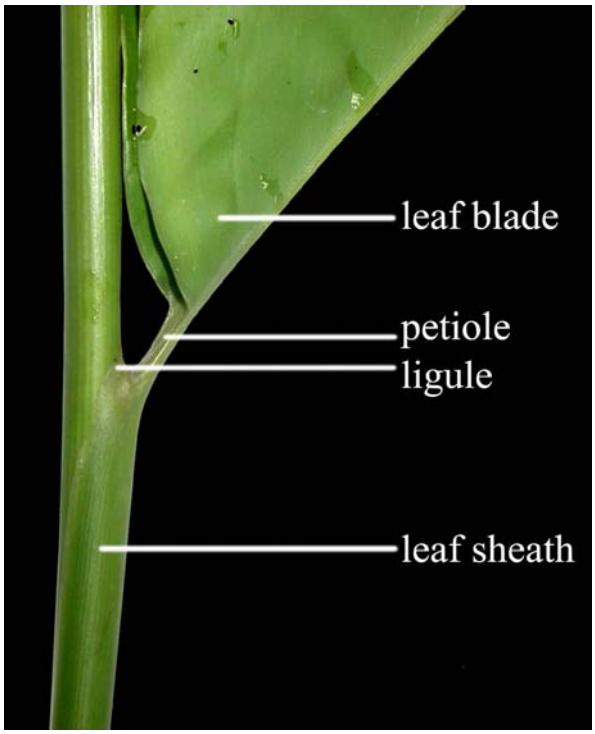

Fig. 3. *Alpinia macrostaminodia* A. Chaveerach & R. Sudmoon. Pseudostem with lower part of a leaf showing leaf blade, petiole, ligule, and leaf sheath. Photographs by Piya Mokkamul.

that can be easily observed and identified. That is its conspicuous shape and size of lateral staminodes, different from other species by shape, size and coloration. Also, several characters of thyrse distinguish from the other members of the genus especially color of flower, labellum, leaf shape, apex, margin, and bract.

Notes: *A. macrostaminodia* A. Chaveerach & R. Sudmoon is similar to *A. uraiensis* Hayata from Taiwan with following characters: leaf sessile or petiolate, leaf margin ciliated; ligule hairy on outer surface; inflorescence racemose, erect, pubescent; flower pedicellate, calyx tubular, white, apex trilobed, outer surface pubescent, corolla white, lobe oblong, outer surface pubescent, margin ciliate; labellum dark yellow with red stripes and spots at the base to the center; stigma funnel-form, apex hairy; ovary greenish, pubescent. The plant differs from *A. uraiensis* Hayata by its diagnose.

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泰國東北部月桃屬(薑科)一新種

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摘　　要

在泰國東北部 Phu Wua 野生動物保護區砂岩高原發現一獨特之薑科月桃屬類群，並描繪為新種－*Alpinia macrostaminodia* A. Chaveerach & R. Sudmoon。本種非常類似大輪月桃，但可以數個特徵區別。最重要的區別特徵為葉片、小苞片、萼片、唇瓣以及假雄蕊。

關鍵詞：*Alpinia macrostaminodia*、薑科、新種、泰國、Phu Wua 野生動物保護區。

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