

Three new species of *Piper* (Piperaceae) from Thailand

CHALERMPOL SUWANPHAKDEE*, DAVID A. SIMPSON** & PRANOM CHANTARANOTHAI*

ABSTRACT. Three new species of *Piper* (Piperaceae) from Thailand, *P. doiphukhaense*, *P. khaoyaiense* and *P. smitinandianum* are described and illustrated.

KEY WORDS: *Piper*, new species, Thailand.

INTRODUCTION

Piper L. is the largest genus of the family Piperaceae, with c. 1,050 species (Mabberley, 2008) distributed mainly in tropical and subtropical regions. In Thailand, 46 taxa (45 species and two varieties) are enumerated (Suwanphakdee, 2012). Morphologically the genus is rather uniform, characterized by simple, alternate leaves and jointed stems with enlarged nodes. Branches are brittle. The stem anatomy is unusual for dicotyledons because it retains scattered vascular bundles in mature tissues (Metcalfe & Chalk, 1957). In preparation for publication of the Piperaceae for the Flora of Thailand, it has become necessary to publish a number of novelties.

The unidentified specimens deposited in BKF and QBG possess morphological characters which are not matched with known species. The collections consist of immature inflorescence and mature fruits that are clearly distinguishable from other known taxa. Moreover, some materials were recollected in the field for examination by the first author. Additional specimens from AAU, BK, BKF, BO, C, G, G-DC, K, K-W, KEP, KKU, L, PSU, QBG & SING (Thiers, 2012) were also consulted and studied.

NEW SPECIES

1. *Piper doiphukhaense* Suwanph. & P. Chantar. sp. nov., differs from *P. macropiper* Pennant in its

glabrous, pinnately veined leaves and smaller fruits. Type: Thailand, Nan, Doi Phu Kha National Park, 24 Aug. 2001, *P. Srisanga & C. Maknoi* 2095 (holotype QBG). Fig. 1.

Woody climber, dioecious, glabrous; nodes swollen with climbing roots. Leaves with petioles 1.0–1.5 cm long, glabrous; stipules hood-like, lanceolate, glabrous, caducous; lamina subcoriaceous or coriaceous, ovate or elliptic, asymmetric, 7–10 by 2–4 cm, base acute or oblique, apex acuminate or aristate, margin undulate, upper surface dark green, lower surface pale green; venation pinnate with 2–3 veins per side. Inflorescence a terminal or leaf opposed catkin, pendulous, cylindrical, greenish-white; rachis hairy, with dense flowers; floral bract peltate ca. 1 mm diam., with stalk ca. 1.5 mm long and hairy at base. Infructescence 5–12 by 0.3–0.5 cm, pendulous; peduncles 2.0–2.5 cm long, glabrous. Fruit free, sessile, ellipsoid-subglobose, ca. 1.5 by 1 mm, dense on rachis, base rounded, apex acute with persistent stigma and floral bract.

Thailand.— NORTHERN: Nan [Doi Phu Kha National Park, 24 Aug. 2001, *P. Srisanga & C. Maknoi* 2095 (holotype QBG)].

Distribution.— Endemic to Thailand.

Ecology.— In shaded areas by streams and waterfalls in dry evergreen forest. Flowering and fruiting; August.

Etymology.— The specific epithet of this

* Applied Taxonomic Research Center, Department of Biology, Faculty of Science, Khon Kaen University, Khon Kaen, 40002, Thailand. Email: PP_SCKU56@yahoo.com

** Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey, TW9 3AB, UK.

species refers to the locality, Doi Phu Kha National Park, Nan Province where the plant was collected.

Note.— A comparison of morphological

features indicates that this species appears most closely related to *Piper macropiper* Pennant rather than to *Piper pedicellatum* C.DC. see below.

Character	<i>P. doiphukhaense</i>	<i>P. macropiper</i>	<i>P. pedicellatum</i>
Leaves			
: texture	semicoriaceous	coriaceous	chartaceous
: indumentum	glabrous	glabrous	pilose
: vein	pinnate	palmate	pinnate
Petiole	glabrous	puberulous, pilose, hirsute	puberulous, pilose, velutinous
Peduncle	glabrous	glabrous	velutinous
Floral bract			
: shape	peltate	peltate	rounded
: margin	glabrous	glabrous	ciliate
: stalk	hairs at base	hairs at base	sessile
Fruit			
: shape	ellipsoid-subglobose	ellipsoid	globose
: size	c. 1.5 by 1 mm	1–1.5 by 0.5–0.8 mm	1–1.5 mm diam.
: character	unfleshy, nut-like	unfleshy, nut-like	fleshy, drupe

2. *Piper khaoyaiense* Suwanph. & D.A. Simpson. sp. nov., in general appearances similar to *P. attenuatum* Buch-Ham. ex Miq., but differs most obviously in its rounded or peltate floral bract with ciliate margin, stamens in a dense cluster of 5–7, larger and oblong-globose fruits. Type: Thailand, Nakhon Ratchasima, Khao Yai National Park, 9 April 2004, C. Suwanphakdee 153 (holotype **BKF**; isotypes **BK**, **KKU**, **QBG**). Figs. 2 & 4.

Woody climbers, dioecious, glabrous or puberulous; nodes swollen with climbing roots. Leaves with petioles 1–1.5 cm long; stipules hood-like, lanceolate, glabrous or puberulous, caducous; lamina chartaceous, young leaves cordate to broadly cordate, rarely aristate, mature leaves ovate, rarely cordate, symmetric or asymmetric, 8–11 by 6–9 cm, base oblique, cuneate, rarely cordate, apex acuminate or aristulate, margin undulate, upper surface green, lower surface pale green or yellowish green, glabrous, puberulous or glabrescent; venation pinnate, with 2 (–3) vein per side, glabrous or glabrescent. Inflorescence a terminal or leaf-opposed catkin, pendulous, cylindrical, yellow or

yellowish-green; rachis hairy, with dense flowers; floral bract rounded ± short stalk, ca. 1 mm diam., margin ciliate. Male inflorescence 4–7 by 0.1–0.2 cm; peduncles 1–2 cm long. Male flower: stamens in a dense cluster of 5–7, uniformly distributed throughout inflorescence, filament 0.6–0.8 mm long, anther 2-valved, slightly exserted at anthesis, 0.5–0.7 mm long, laterally dehiscent. Female inflorescence 4–6 by 0.1–0.2 cm; peduncles 1–2 cm long. Female flower: ovary ± globose, stigma star-shaped 3–5-lobed, 2–3 mm diam., hairy. Infructescence 8–16 by 1–2 cm, pendulous, cylindrical, green; peduncles 0.5–3 cm long. Fruit free, sessile, ± globose, 4–5 by 3–4 mm, dense or sparse on rachis, base rounded, apex mucronulate with persistent stigma and floral bract, ripening fruit yellow, dark orange or red.

Thailand.— EASTERN: Nakhon Ratchasima [Khao Yai National Park, 16 July 1962, T. Smitinand 7443 (**BKF**), 9 April 2003, C. Suwanphakdee 52 (**BK**, **BKF**, **KKU**), 9 April 2004, C. Suwanphakdee 153 (holotype **BKF**; isotypes **BK**, **KKU**, **QBG**)]; SOUTH-EASTERN: Prachin Buri

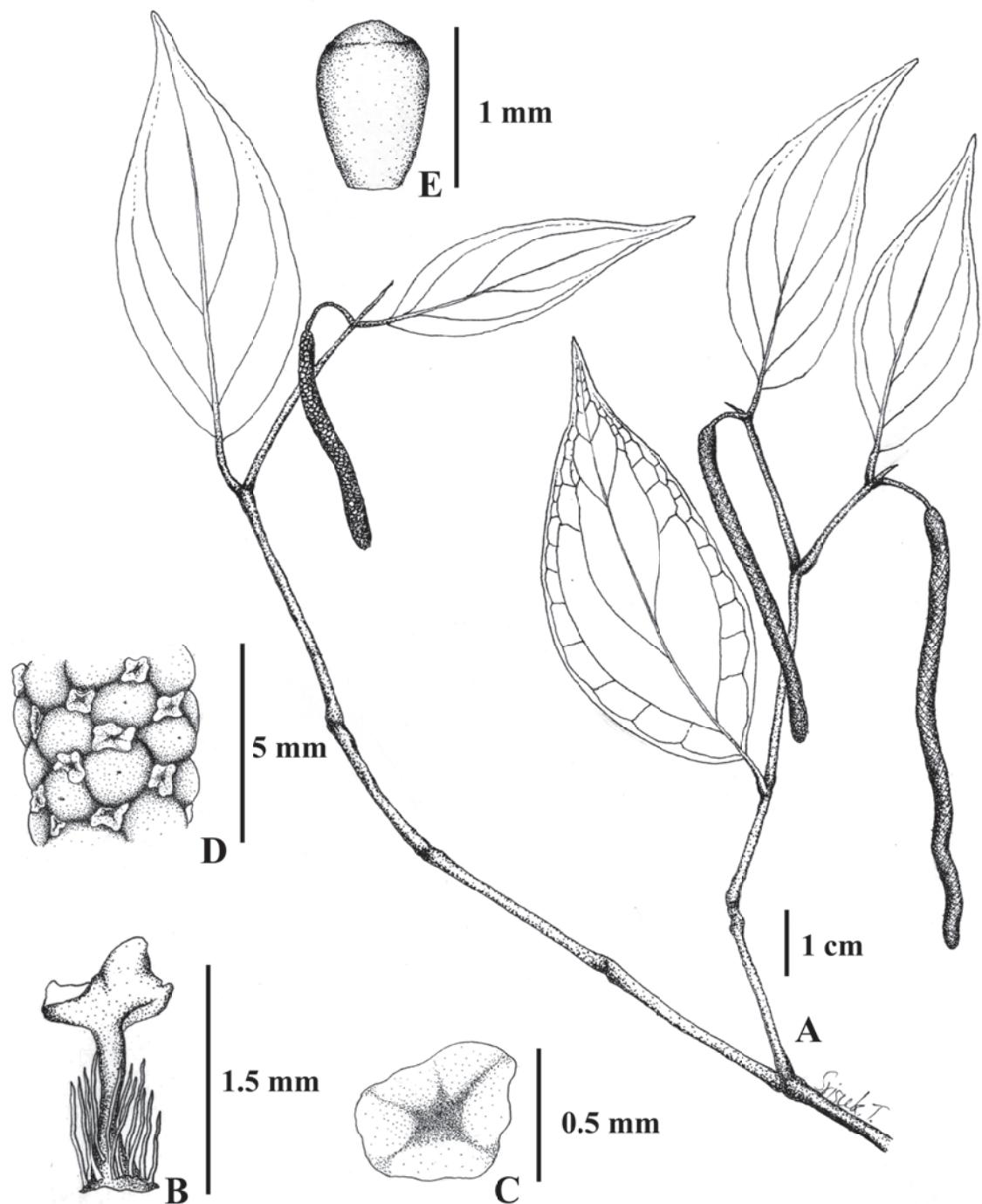


Figure 1. *Piper doiphukhaense* Suwanph. & P. Chantar.: A. Branch with infructescences; B. & C. Side and top views of floral bract; D. A portion of infructescence; E. Fruit.

[Khao Yai National Park, 8 March 2009, C. Suwanphakdee 264 (**BK**, **BKF**, **KKU**)].

Distribution.—Endemic to Thailand.

Ecology.—Shaded or slightly open area along streams or waterfalls in evergreen forest. Flowering and fruiting; March to July.

Etymology.—The specific epithet is referred to Khao Yai National Park, eastern Thailand where the type specimen was collected.

Note.—Morphological differences between *P. khaoyaiense* and the similar *P. attenuatum* are shown below.

character	<i>P. khaoyaiense</i>	<i>P. attenuatum</i>
Stem	glabrous or puberulous	glabrous
Petiole	puberulous	hispidulous
Floral bract		
: shape	rounded or peltate	oblong (flowering), spathulate (fruiting)
: margin	ciliate	glabrous
Stamen	in a dense cluster of 5–7	2–4
Fruit		
: shape	oblong-globose	ovoid-globose
: size	4–5 by 3–4 mm	2–3.5 by 2–3 mm

3. *Piper smitinandianum* Suwanph. & P. Chantar. sp. nov., similar to *P. sclerophloicum* C.DC. but differs by its small shrub, coriaceous leaves, with 6–8 pairs of pinnate veins and narrowly ovoid fruit shape with persistent style and spine-like stigma. Type: Narathiwat, Waeng, 12 June 1970, T. Smitinand 10907 (holotype **BKF**). Fig. 3.

Small shrubs, 0.5–1 m high, dioecious, glabrous; nodes swollen without climbing root. Leaves with petioles 1–2 cm long; stipules hood-like, oblong-lanceolate, glabrous, caducous; lamina coriaceous, elliptic or elliptic-ovate, asymmetric, 16–27 by 7–16 cm, base cuneate or oblique, apex acute to acuminate rarely aristate, margin undulate; venation pinnate with 6–8 veins per side. Inflorescence a terminal or leaf-opposed catkin, erect, oblong-subglobose; rachis hairy, with dense flowers; floral bract rounded, ca. 1 mm diam. Inflorescence a terminal, erect, leaf-opposed, cylindrical, ca. 4 by 1–1.5 cm; peduncles ca. 1 cm long. Fruit free, sessile, narrowly ovoid, 0.6–0.8 by 0.2–0.3 cm diam., dense on rachis, with persistent style and stigma spine-like and floral bract.

Thailand.—PENINSULAR: Narathiwat [Waeng, 20 Sept. 1965, C. Phengklai & T. Smitinand 1188 (**BKF**), same locality, 12 June 1970, T. Smitinand 10907 (holotype **BKF**), same locality, 22 Nov. 1971, C.S.S. 268 (**BKF**)].

Distribution.—Endemic to Thailand.

Ecology.—Open area in evergreen forest. Flowering and fruiting; September to November.

Etymology.—The new species is named in honour of Prof. Tem Smitinand (1920–1995), outstanding Thai botanist and forester, who also initiated the Flora of Thailand Project.

ACKNOWLEDGEMENTS

We gratefully thank the directors, curators and staff of herbaria cited above for permission to study the specimens and references. We also would like to thank Teerawut Srisuk, La-Ongda Leukhachon & Orathai Kerdkaew for the line drawings. This work was supported by the Applied Taxonomic Research Center, Khon Kaen

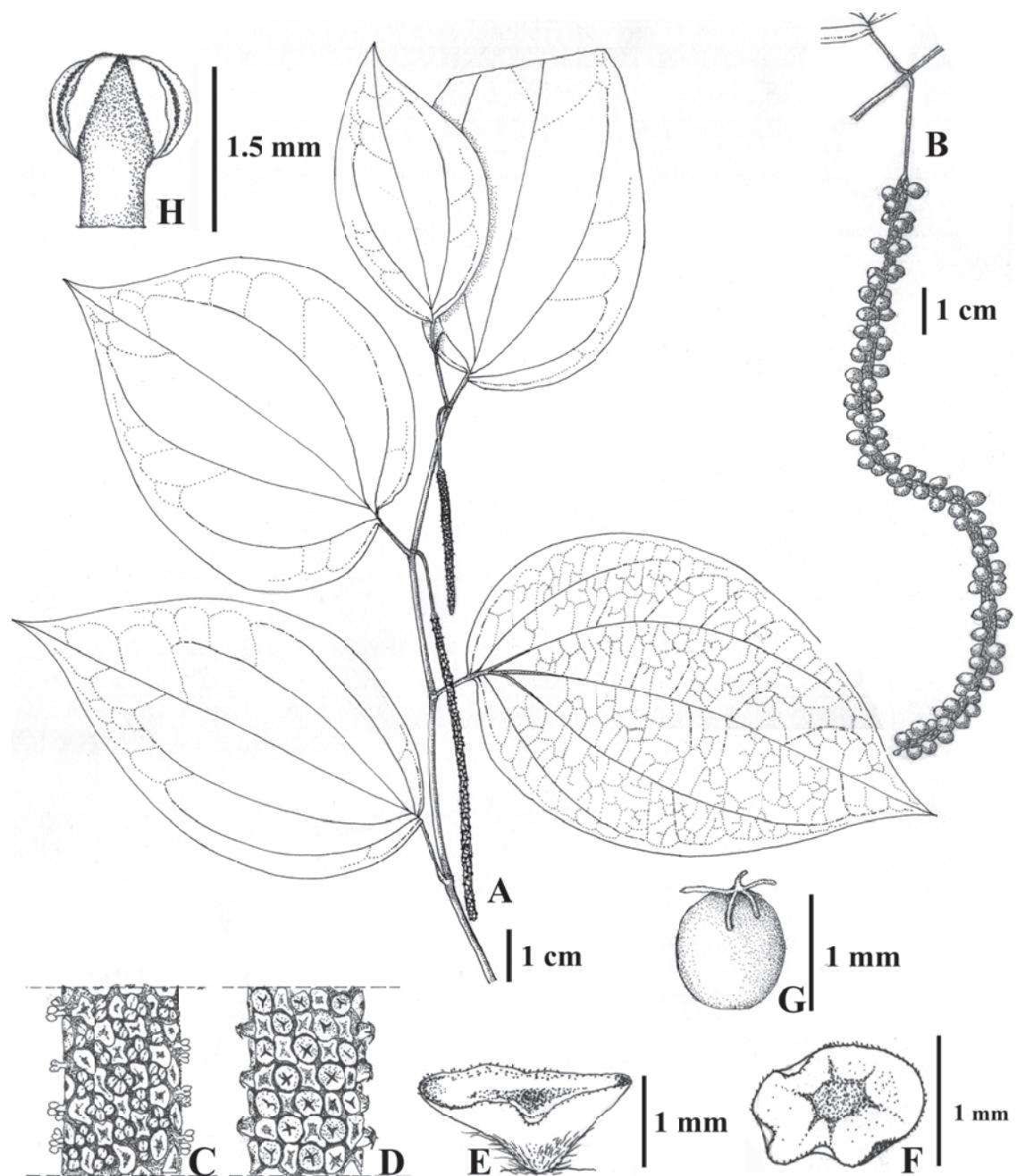


Figure 2. *Piper khaoyaiense* Suwanph. & D.A. Simpson: A. Branch with inflorescences; B. Infructescence; C–D. A portion of male and female inflorescences; E–F. Side and top views of floral bract; G. Ovary; H. Stamen.



Figure 3. *Piper smitinandianum* Suwanph. & P. Chantar.: Branch with an infructescence.

University grant ATRC_R5303, Khon Kaen University, Thailand.

REFERENCES

- Mabberley, D.J. (2008). Mabberley's plant-book, A portable dictionary of plants, their classification and uses. 3rd edition, Cambridge University Press.
- Metcalfe, C.R. & Chalk, L. (1957). Anatomy of the Dicotyledons- leaves, stem and wood in relation to taxonomy with notes on economic uses. Clarendon Press, Oxford.

Suwanphakdee, C. (2012). Systematics and utilization of family Piperaceae in Thailand. Ph. D. Thesis, Khon Kaen University.

Thiers, B. (2012). Index Herbariorum: A global directory of public herbaria and associated staff. New York Botanical Garden's Virtual Herbarium. <http://sweetgum.nybg.org/ih/> available on: 9 Mar. 2012.



Figure 4. *Piper khaoyaiense* Suwanph. & D.A. Simpson: A. Male inflorescences; B. Female inflorescences; C. Infructescence; D. Fruits (Photos by C. Suwanphakdee).