



A New Species and a New Record of *Hedychium* J. König (Zingiberaceae) from Thailand

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ABSTRACT: *Hedychium siamense* Picheans. & Wongsuwan, a new species from peninsular Thailand is proposed. The distribution of *H. neocarneum* T.L. Wu, K. Larsen & Turland, previously known only from south China, is extended to Thailand and Lao PDR. Full descriptions and illustrations of both taxa are given. Relationships with their closely related species are also discussed.

KEY WORDS: *Hedychium neocarneum*, *Hedychium siamense*, new record, new species, Thailand, Zingiberaceae.

INTRODUCTION

The genus *Hedychium*, established in 1783 by J. König, is one of the medium-size genera in the Zingiberaceae. Members of the genus could be easily recognized by its showy, numerous-flowered terminal spikes, some of which have been cultivated worldwide. Several species are medicinal plants in many Asian countries. Several taxa occurred throughout its distribution range have or may have horticultural potential.

Previous attempt to revise the genus *Hedychium* J. König (Zingiberaceae) in Thailand resulted in an account of 17 species (with one unknown taxon) (Siriruga and Larsen, 1995). Since then, two new species, *H. khaomaenense* Picheans. & Mookamul and *H. thaianum* Mookamul & Picheans. were added (Picheansoonthon and Mookamul, 2005). Later, however, Larsen and Larsen (2006) preliminarily listed 22 species for Thailand.

Based on our recent study, 24 taxa (22 species and two varieties) were recognized for Thailand, including a newly-recorded Malayan taxon, *H. malayanum* Ridl. (Picheansoonthon and Wongsuwan 2008). More recently, two new taxa, *H. muanwongyathiae* Picheans. & Wongsuwan and *H. phuluangense* Picheans. & Wongsuwan, were added (Picheansoonthon and Wongsuwan, 2009).

From herbarium specimen investigation and intensive field studies throughout Thailand and Malay Peninsula during the past decade, we have completed our revision of this genus by further recognized a new species from peninsular Thailand and a new record from north and northeast Thailand, with complete

descriptions and illustrations (Wongsuwan, 2010).

TAXONOMIC TREATMENTS

1. *Hedychium siamense* Picheans. & Wongsuwan, *sp. nov.* Figs. 1 & 2

Type: Thailand: Changwat Ranong, Klong Naka Wildlife Sanctuary, Mueng Chone, N 09°19.082', E 98°30.943', alt. 943 m, 21 November 2008; Picheansoonthon & Wongsuwan 73, in spirit no. 32 (holotype BKF).

Hedychio cylindrico similis, *ligula glabra*, *corollae tubo glabro*, *bracteis unifloris*, *labello obovato apice bilobato differt.*

Epiphytic, perennial herb with tuberous rhizomes. Pseudostems 48-81 cm high, leaf sheaths green, bladeless sheaths 1-2. Ligules oblong, 5.7-6.4 by 2.2-2.8 cm, apex acute-acuminate, membranous, glabrous, pale greenish. Leaves elliptic-lanceolate, 22.2-27.5 by 9.9-10.5 cm, base cuneate, apex acute or shortly acuminate, margin slightly undulate, both surface glabrous. Inflorescence a terminal spike, cylindrical, erect, ca. 14.5 cm long, hairy; peduncle ca. 5.3 cm long, hairy; bracts imbricate, overlapping, broadly ovate, 5.5-5.6 by 3.7-4.1 cm, apex obtuse-acute, green with brownish, lower half sparsely hairy, each subtending a cincinnus of 1 flower; bracteoles tubular, 5.2-5.4 by 2.1-2.3 cm, apex acute, split on one side to a depth of 1.3- 1.5 cm, hairy, greenish. Flowers white; calyx tube slender 4.4-4.6 cm long, apex acute or 2-dentate, hairy; corolla tube 9.4-10.5 cm by 3-4 mm, hairy, 3 -lobed,

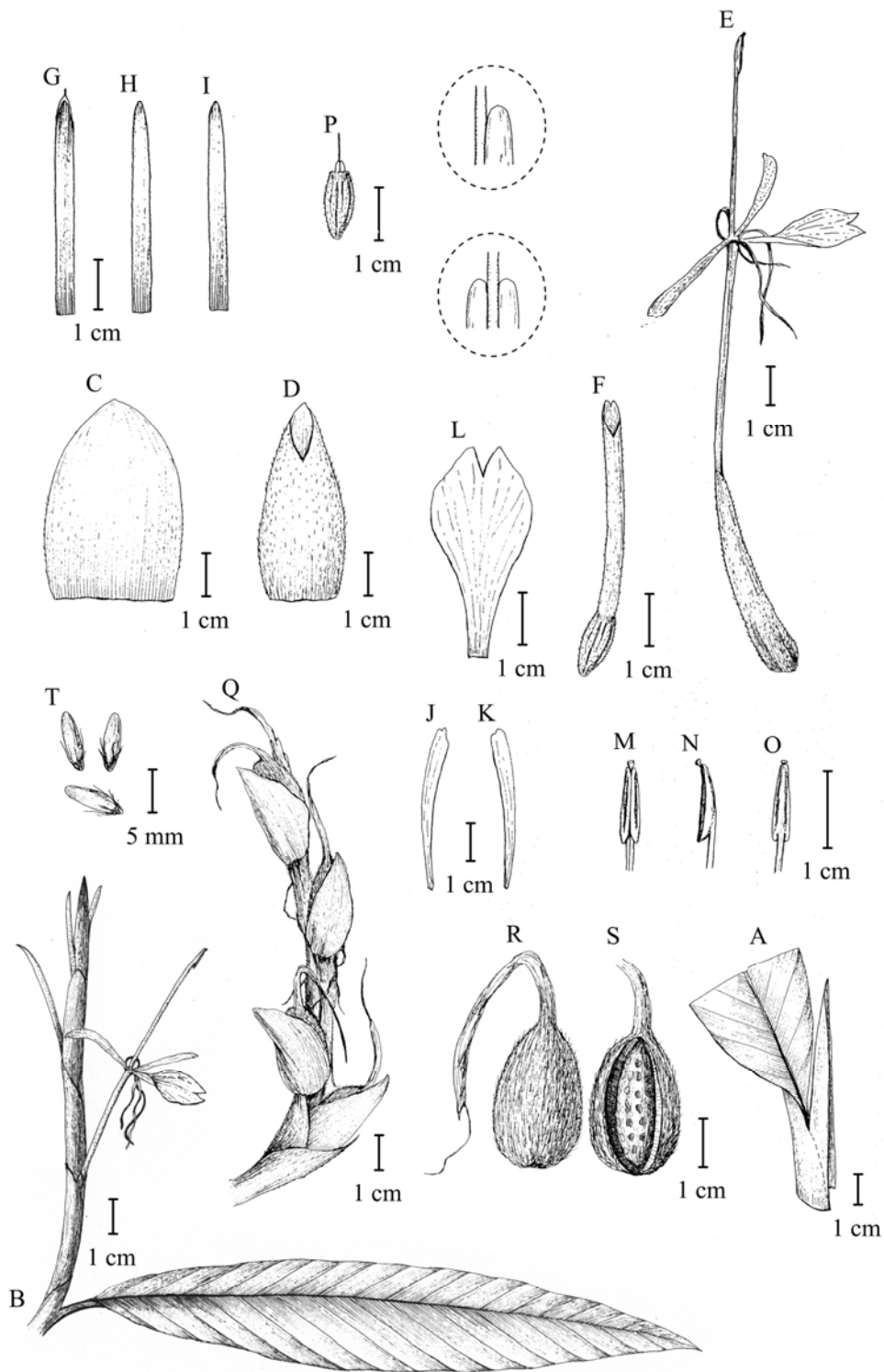


Fig. 1. *Hedychium siamense* Picheans. & Wongsuwan. A: Part of a leaf with a ligule. B: An inflorescence with a leaf. C: Bract. D: Bracteole. E: A flower with the bracteole attached. F: Calyx tube with an ovary. G: Dorsal corolla lobe. H, I: Lateral corolla lobes. J, K: Staminodes. L: Labellum. M, N, O: Part of the filament showing the anther, and stigma (front, side and rear views). P: Ovary, part of the style, and styliod glands. Q: Infructescence. R: Fruit. S: Fruit with part of the pericarp removed revealing red aril of the seeds. T: Seeds. Drawn by Chalermchoke Boonchit.

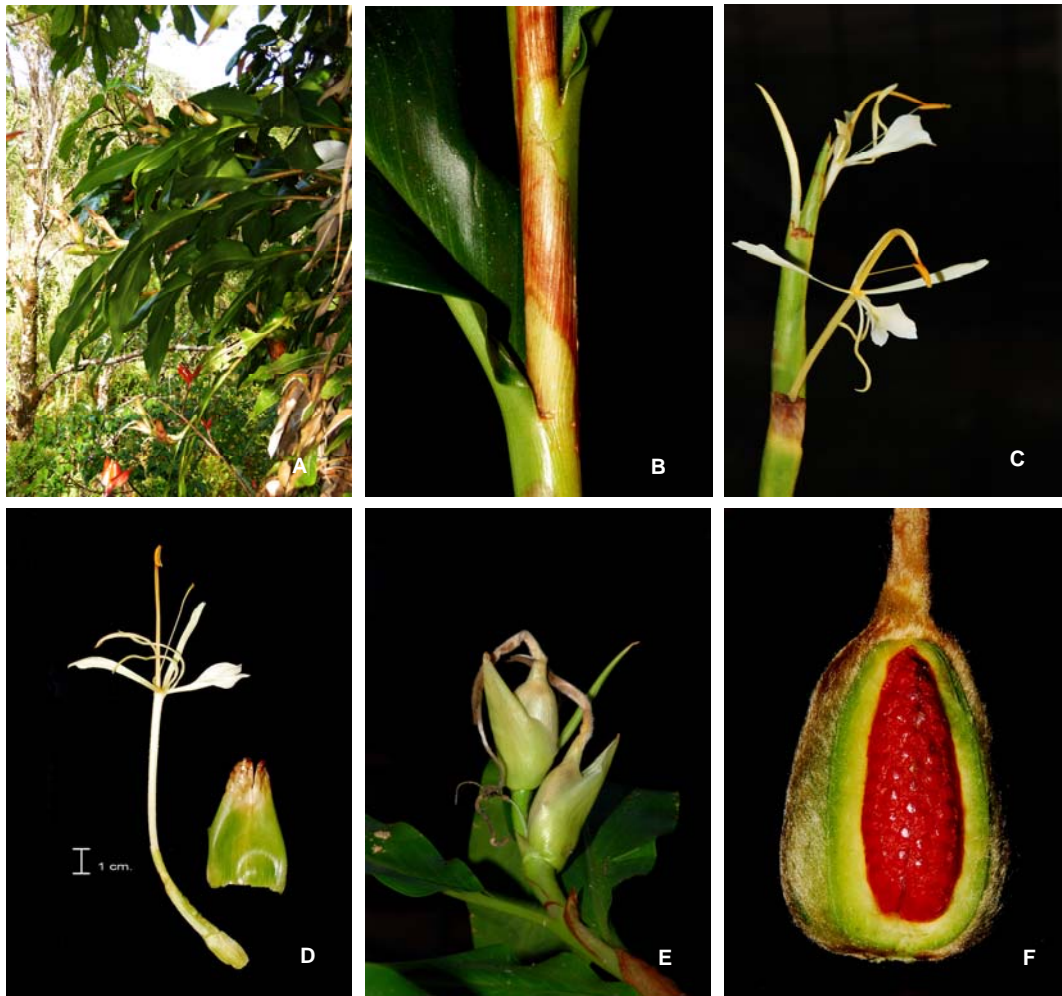


Fig. 2. *Hedychium siamense* Picheans. & Wongsuwan. A: The plant in the type location. B: Part of the pseudostem showing the lower part of leaves and ligules. C: An inflorescence. D: Detail of a flower and the bract. E: An infructescence. F: A fruit with part of the pericarp removed revealing the red aril of the seeds. Photographed by Supachai Koonterm (A) and Pornpimon Wongsuwan (B-F).

lobe linear, 4.4-5.4 cm by 4-5 mm, apex hooded, lower half hairy; lateral staminodes narrowly lanceolate-oblong, 3.8-4.5 cm by 5-6 mm, apex emarginate; labellum shorter than stamenodes, obovate, 3.2-3.4 by 1.9-2.2 cm, base attenuate into a 0.8-1.2 cm by ca 3 mm claw, apex bilobed; filament 4.6-5.5 cm long, anthers dorsified, 0.9-1.0 cm long, base divaricate, yellowish; ovary ca. 1.3 cm by 7-8 mm, brownish, hairy; epigynous glands 2, ca. 3 mm long, yellowish; stigma densely ciliate, greenish. Fruits broadly ellipsoid to broadly ovoid, (3.1-)3.3-4.4 by (1.9-)2.2-2.8 cm, trilobe, hairy, greenish, crowned with persistent calyx. Seeds numerous, oblong ca. 5 by 2-3 mm, reddish aril.

Distribution: Thailand, Changwats Kanchanaburi [Amphur Thong Pha Pum, Mueng Pilok], Ranong [Klong Naka Wildlife Sanctuary, Mueng Chone (Type)]

and Tak [Amphoe Maesod, Doi Muser]

Ecology: Tropical evergreen rain forest, at the altitude of ca. 943 m.

Phenology: Flowering in November, fruiting from November to December.

Note: Previously, six *Hedychium* species were accounted for peninsular Thailand: *H. collinum* Ridl. [*H. paludosum* M.R. Hend, J. Malayan Branch. Roy. Asiat. Soc. 5: 273. 1927, *syn. nov.*], *H. khaomaenense* Picheans. & Mokkamul, *H. gomezianum* Wall., *H. longicornutum* Griff. ex Baker, *H. malayanum* Ridl., and *H. roxburghii* Blume [*H. samuiense* Sirirugsa & Larsen, Nord. J. Bot. 15: 301. 1995, *syn. nov.*]. This new taxon is the seventh species enumerated for the region and can be easily recognized by its cylindrical spikes with tightly imbricate, 1-flowered bracts. It is closely related to *H. cylindricum* Ridl., An Indonesian

**Table 1. Comparison of key morphological characters of *Hedychium siamense*, *H. cylindricum*, *H. khaomaenense* and *H. malayanum*.**

Character \ Taxon	<i>H. siamense</i>	<i>H. cylindricum</i>	<i>H. khaomeanense</i>	<i>H. malayanum</i>
1. Leaf shape	elliptic-lanceolate	elliptic-lanceolate	elliptic	elliptic-oblong
2. Leaf surface	glabrous	glabrous	hairy along the midrib	hairy along the midrib
3. Ligule	oblong, 5.7-6.4 cm long, glabrous, pale greenish	oblong, 4.5-5.2 cm long, hairy, greenish	oblong, 3.1-4.0 cm long, glabrous, reddish	ovate-oblong, 5.2-5.6 cm long, sparsely hairy, pale greenish
4. Inflorescence	lax-flowered	dense-flowered	lax-flowered	lax-flowered
5. No. of flower(s) per bract	1	2	1-2	1-2
6. Bract	broadly ovate, apex obtuse-acute, lower half sparsely hairy	obovate, apex obtuse-acute, hairy	ovate to oblong, apex acute or obtuse, glabrous	broadly ovate, apex rounded or acute, sparsely hairy
7. Bracteole	tubular, apex acute, hairy	tubular, apex acute, hairy	tubular, apex acute, glabrous	tubular, apex acute, hairy
8. Calyx tube	shorter than bract, hairy	about the same as a bract, hairy	longer than bract, glabrous except ciliate apex	longer than bract, glabrous
9. Corolla tube	9.4-10.5 cm long, lower half hairy	8.0-9.3 cm long, glabrous	13.4-13.8 cm long, glabrous	9.0-11.5 cm long, glabrous
10. Staminode	narrowly lanceolate-oblong, apex emarginate	lanceolate, apex acute	lanceolate, apex acute	narrowly lanceolate-oblong, apex acute
11. Labellum	obovate, apex bilobed	boradly obovate-sub orbicular, deeply bilobed	broadly obovate, deeply bilobed, apex of each lobe shortly acuminate	obovate, deeply bilobed
12. Length of anther (cm)	0.9-1	ca. 1	1.4-1.5	0.8-1
13. Ovary	brownish, hairy	brownish, hairy	greenish, glabrous	greenish, glabrous
14. Fruit	broadly ellipsoid to broadly ovoid, trilobed, hairy, greenish	-	oblong, glabrous, red	broadly ellipsoid to broadly ovoid, glabrous, pale reddish/greenish

species, but can be easily distinguished by its glabrous ligules, hairy corolla tubes, strictly 1-flowered bracts, obovate labella with bilobed apices. Of all the native Thai taxa, it is the closest species to *H. khaomaenensis* and *H. malayanum*, but can be differentiated from the latter two species by its strictly 1-flowered bracts. Comparison of key morphological characters of this new species and its two closely related taxa is shown in Table 1.

The presence of this new taxon at the type location has long been known by some Thai ginger researchers. However, the type location is well protected in the wildlife sanctuary, and is not easily accessed. During the past five years, we visited the type location seven times, we finally obtained the flowering and fruiting specimens for taxonomic and molecular studies.

Living specimens of this new species were also obtained from two other locations. The first one was donated to us by Mr. Poonsak Watcharakorn, a Thai horticulturist and plant collector, claimed to be collected from Pilok Mine in Thong Pha Pum National Park of Changwat Kanchanaburi. The other one was found selling in Doi Musue's hilltribe market, and was claimed to be collected from the forest around Doi

Musue. Both living specimens were brought to our living specimen collection, and were bloomed several times in cultivation. Morphological and molecular studies of these two specimens, compared with the type specimen, confirmed that they are all identical (Wongsuwan, 2010).

Specimens studied: *Hedychium siamense*: **Thailand**, Changwat Ranong, Klong Naka Wildlife Sanctuary, Mueng Chone, 943 m, 21 xi 2008; *P. Wongsuwan* 130, 49-in spirit, 57-in spirit (BKF). *Hedychium cylindricum*: **Indonesia**: Sumatra, Bogor, 14 viii 1928, *J. A. Lörzing* 13489 (K); Sumatra, Berasayi Woods, *H. N. Ridey* s.n. (Type K); Cultivated material: Kew, 21 xi 1978, *Burt & Martin* B5382 (K); Trail from Medan road to ton of Sihaiak colcano, 15 ii 1932, *Walter N. & Catherine M. Bangham* 1041 (K); 28 i 1927, *H.H. Bartlett* 6506 (L); Borneo, 1 ii 1932, *J. Clemens & M.S. Clemens* 18170 (L); same locality, 5 viii 1981, *R. Geesink* 9235 (L); same locality, 25 ii 1964, *RSNB* 4540 (L). *Hedychium khaomaenense*, **Thailand**, Changwat Nakhon Si Thammarat, Yong Waterfall National Park, Khao Maen, 1,123 m, 23 vii 2003, *Picheansoonthon & Mokkamul* 544 (holotype BKF, paratypes SING, PEK); same locality, 3 vii 2008; *P. Wongsuwan* 64, 48-in spirit (BKF). *Hedychium malayanum*: **Thailand**, Cultivated material: KKKU, 22 iv 2003, *Picheansoonthon* 168 (BKF); Cultivated material: KKKU, 15 viii 2008, *P. Wongsuwan* 64 (BKF); **Peninsular Malaysia**, Pahang, Fraser's Hill, x 1921, *Ferguson-Davie* s.n. (holotype K, isotype SING); Cultivated material: Lim Chong Keat's private collection, 9 ix 2005, *Picheansoonthon* 181 (BKF).

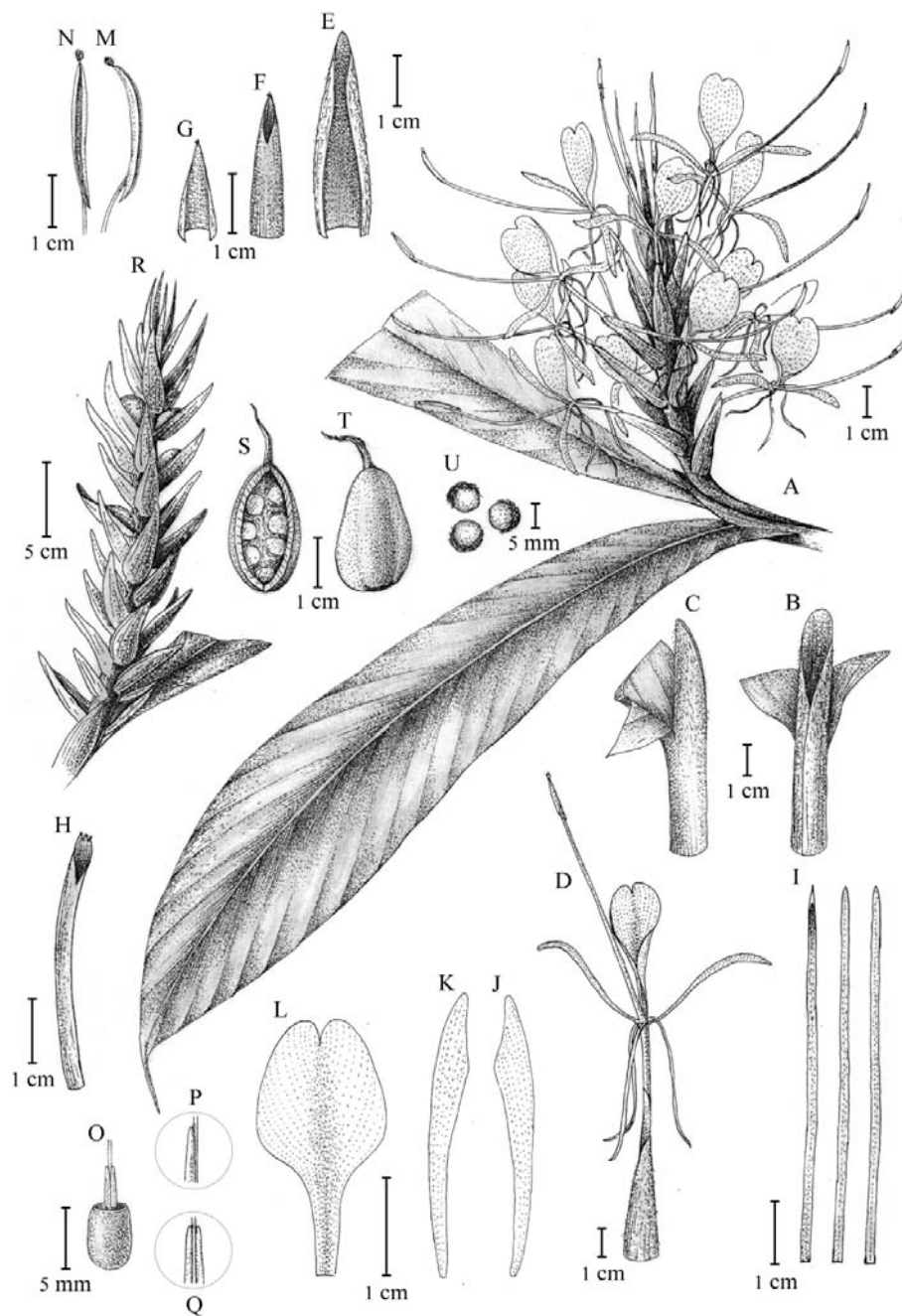


Fig. 3. *Hedychium neocarneum* T. L. Wu, K. Larsen & Turland. A: An inflorescence. B, C: Ligule (front and side views). D: Flower with the bract attached. E: Bract. F: The first bracteole. G: The second bracteole. H: Calyx tube. I: Corolla lobe. J, K: Staminode. L: Labellum. M, N: Part of a filament showing the anthers, and a stigma (side and front views). O: Ovary, part of the style, and stylodial glands. P, Q: stylodial glands (side and rear views). R: Infructescence. S: Fruit with part of the pericarp removed revealing seeds and aril. T: Fruit. U: Seeds. Drawn by Chalermchoke Boonchit.

2. *Hedychium neocarneum* T. L. Wu, K. Larsen & Turland, *Novon* 10: 91. 2000; T. L. Wu & K. Larsen in Z. L. Wu & P. H. Raven, *Fl. China* 24: 376. 2000. – *H. carneum* Y.Y. Qian, *Acta Bot. Austron*

Sin. 9: 48. 1994; Not Loddiges, *Bot. Cab.* 7: t. 693. 1823. Figs. 3 & 4. *New record for Thailand.*

Type: China: Yunnan Province, Simao Xian, alt. 1,000-1,900 m; Y.Y. Qian 1832 (holotype SMAO).

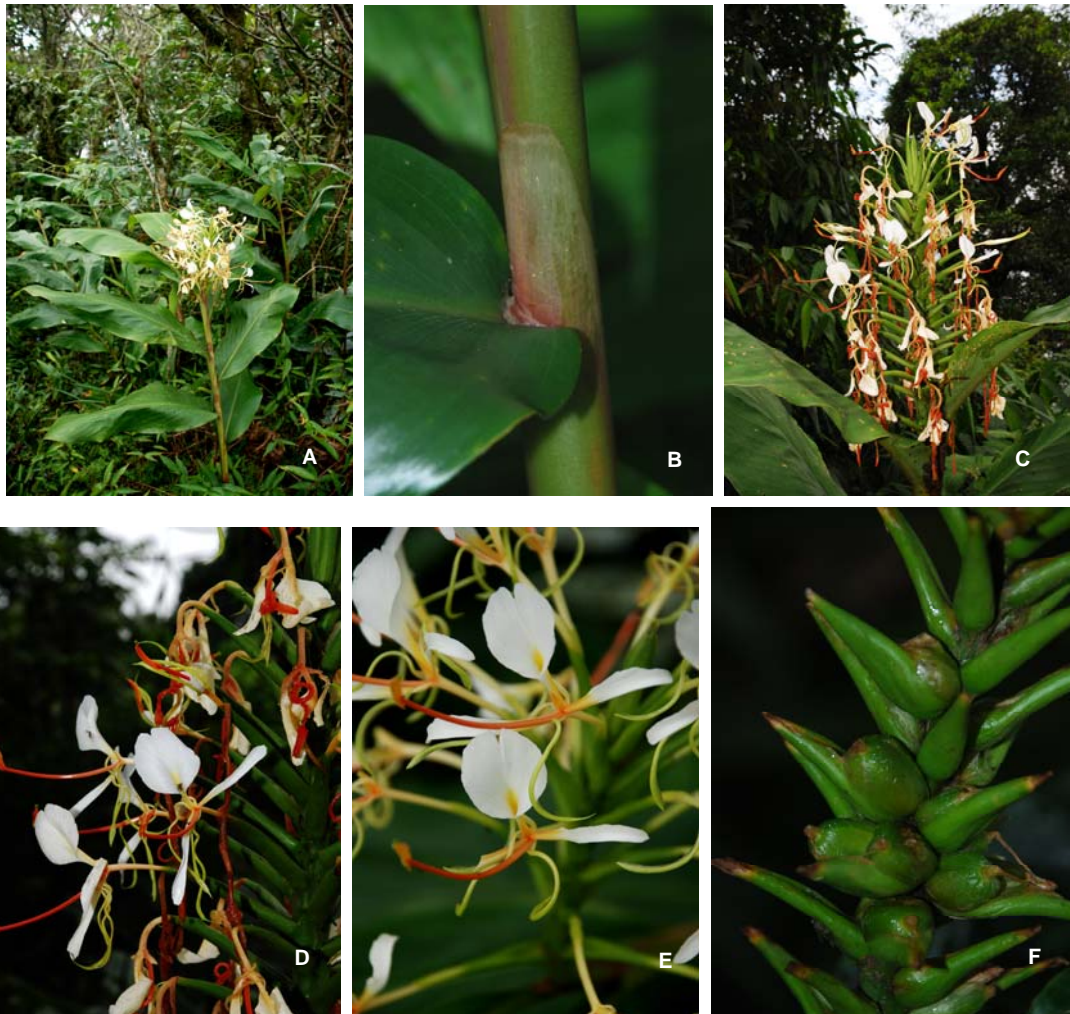


Fig. 4. *Hedychium neocarneum* T. L. Wu, K. Larsen & Turland. A: The plant habit. B: A ligule. C: Part of an inflorescence. D, E: Close-up of flowers. F: An infructescence. Photographed by Pornpimon Wongsuwan.

Terrestrial, perennial herb. *Pseudostems* 0.6-1.5 m high, leaf sheaths greenish, bladeless sheaths 2-4. *Ligules* oblong, 2.3-4 by 1.3-2.8 cm, apex bilobed-rounded, membranous, pubescent, greenish. *Leaves* sessile; blade elliptic-oblong, 16.5-32.4 by 7.2-12 cm, base cuneate, apex acute-acuminate, margin entire-slightly undulate, upper surface glabrous, lower surface pubescent. *Inflorescences* a terminal spike, erect, 11.2-24.5 cm long; peduncle 3.3-4.8 cm long, hairy; bracts, folded, green, obovate-lanceolate, 3.4-4.2 by 1.6-2.8 cm, apex acute, pubescent, each subtending a cincinnus of 2-4 flowers; first bracteole ovate-broadly ovate, 2.3-3 cm by 6-7 mm, apex acute, pubescent, greenish; second bracteole ovate, 1.3-1.6 cm by 4-8 mm, apex acute, pubescent; *Flowers* white to pale yellow, fragrant; calyx tubular, 3.9-4.6 cm by 3-4 cm, apex 3-dented, pubescent except apex; corolla tube slender, 5.3-5.8 cm by ca. 3 mm, 3-lobed, lobes linear,

3.7-5 cm by 2-3 mm, apex hooded, yellowish; lateral staminodes oblanceolate, 2.8-3.3 cm by 4-5 mm, base attenuate into a 3-5 by 2-3 mm claw, apex rounded; labellum elliptic-suborbicular, 2.4-2.6 by 1.5-2.4 cm, base attenuate into 6-8 by 3-4 mm claw, white with yellow-red patch at base, apex 2-cleft, 0.4-1 cm; filament pale salmon red, 4.1-5.3 cm long; anther dorsifixed, base divaricate, 1.1-1.2 cm by 2-3 mm, yellowish; ovary 4-5 by 3-4 mm, 3-loculed, placentation axile, pubescent; epigynous glands 2, slender, ca. 3 by 1 mm, yellowish; stigma densely ciliate, green. *Fruits* ovoid to oblong, 2.7-3 by 2.1-2.2 cm, pubescent, green. *Seeds* numerous, ellipsoid to globose, 4-9 by 4-6 mm, reddish orange.

Distribution: China [Yunnan Province, Simao Xian]; Thailand: Changwats Nan [Doi Phu Ka National Park], Pitsanulok [Phu Hin Rongkla National Park],

**Table 2. Comparison of key morphological characters of *Hedychium neocarneum*, *H. gardnerianum* and *H. stenopetalum*.**

Taxon Characters	<i>H. neocarneum</i> (Thai specimens)	<i>H. neocarneum</i> (Chinese specimens)	<i>H. gardnerianum</i> (Butanese specimens)	<i>H. stenopetalum</i> (Thai specimens)
1. Leaf shape	elliptic-oblong	lanceolate, rarely oblanceolate, oblong or ovate	lanceolate or lanceolate-oblong	lanceolate-oblong
2. Leaf surface	pubescent	villous	-	hairy
3. Ligule	oblong, 2.3-4.0 cm long, pubescent, greenish	oblong, 1.5-6.0 cm, cm long, villous	oblong, 1.5-2.5 cm long, glabrous	ovate-oblong, 4.3-5.9 cm long, hairy, greenish or reddish
4. Inflorescence	dense-flowered	dense-flowered	dense-flowered	lax-flowered
5. No. of flower(s) per bract	2-4	(1-)2-4	1-2	(2-3)-7-11
6. Bract	obovate-lanceolate, apex acute, pubescent	oblong or lanceolate, villous	oblong- lanceolate, apex obtuse, glabrous	lanceolate to obovate, apex acute, hairy
7. Frist bracteole	ovate-broadly ovate, apex acute, pubescent	ovate or oblong, pubescent	oblong, apex obtuse or 3-dented	triangular, apex acute, hairy
8. Calyx tube	longer than bract, pubescent	about the same as a bract, villous	about the same as a bract, pilose	about the same as a bract, hairy
9. Corolla tube	5.3-5.8 cm long, glabrous	5.3-6 cm long, glabrous	5.0-5.5 cm long, glabrous	6.2-6.4 cm long, glabrous
10. Staminode	oblanceolate, apex rounded	linear-oblanceolate	oblanceolate, apex acute	oblanceolate-oblong, apex emarginate
11. Labellum	elliptic-suborbicular, white with yellow-red patch at the base, apex 2-cleft	suborbicular, white with flesh red at the base, apex 2-cleft	obovate to sub-orbicular, bright yellow, apex emarginate	sub-orbicular to orbicular, white with pale greenish patch at the base, apex 2-cleft
12. Filament	4.1-5.3 cm long, pale salmon red	5.2-5.7 cm long, flesh red	5.1-6.4 cm long, bright red	4.9-7.4 cm long, white-yellowish
13. Length of anther (cm)	1.1-1.2	1.1-1.4	1.0-1.5	1.2-1.5
14. Ovary	pubescent	sparsely villous	glabrous	hairy
15. Fruit	ovoid to oblong, pubescent, green	long ovoid, yellow	ovoid	ovoid to oblong, hairy, green

Loei [Phu Ruea National Park and Phu Luang Wildlife Sanctuary]; and Laos PDR – *new record* (Vientiane Province, 29 kms south of Kasi Town; and Champasak Province, the Bolaven Plateau).

Ecology: Lower montane scrub, at the altitude of 1,000-1,500 m.

Phenology: Flowering from June-August, fruiting from July-September.

Note: In herbarium specimens, this taxon is resembled *H. gardnerianum* Sheppard ex Ker Gawl. and *H. stenopetalum* Lodd. in their inflorescences with not-imbricate bracts and the labella, leading to the confusion in some previous publications. This species, however, can be easily recognized by its oblanceolate staminodes, elliptic-suborbicular labellum with yellow-red patch at the base and 2-cleft apex, and pale salmon red filament, twice as long as the labellum. Comparison of some key morphological characters of these 3 taxa is given in Table 2, whereas photographic illustrations of the latter two taxa are shown in Fig. 5.

We have also encountered several large populations of this taxon in northeastern Thailand, particularly in Phu Luang Wildlife Sanctuary (Changwat Loei). Some herbarium specimens previously collected from these areas were identified as “*H. gardnerianum*”. Also, very

large populations of this species were also found in southern Laos, particularly on the Bolaven Plateau. The distribution range of this species is, therefore, extended from Yunnan Province in southern China to northeastern Thailand, and central and southern Laos.

Specimens examined: *Hedychium neocarneum*: **China**, Yunnan Province, Simao Xian, 1,000-1,900 m, Y.Y. Qian 1832 (holotype SMAO). **Laos**, Champasak, 900 m, 25 viii 2007, P. Wongsuwan 55 (BKF). **Thailand**, Changwat Nan, Doi Phu Kha National Park, 1,500 m, 16 ix 1999, P. Srisanga & Puff. 1090 (QBG); same locality, 23 ix 2000, P. Srisanga 1660 (QBG); same locality, 5 ix 2001, P. Srisanga 2152 (QBG); same locality, 1,400 m, 21 viii 2001, P. Srisanga & C. Maknoi 2003 (QBG); Changwat Loei, Phu luang Wildlife Sanctuary, 1,000-1,500 m, 29 ix 2007, P. Wongsuwan 59, 60, 13-in spirit (BKF); Phu Ruea National Park, 1,000-1,500 m, 26 vii 2008, P. Wongsuwan 73, 22-in spirit (BKF); same locality, 2 viii 2009, P. Wongsuwan 112 (BKF). *Hedychium gardnerianum*: Cultivated material: Kew, 28 viii 1987, Schilling 2623 (K). *Hedychium stenopetalum*: **Bhutan**, 17 viii 1926, F.K.W. 7307 (K). **India**, Eastern Circle, Shillong, 17 xii 1969, J. Joseph 48802 (CAL). **Vietnam**, Ha Giang, 4 x 1999, NTH 3277 (K); Tonkin, 30 xii 1937, E. Poilane 26943 (P); Annam, Kontum, 14 vi 1924, E. Poilane 10924 (P); same locality, 21 xii 1946, E. Poilane 35994 (P). **Laos**, Pakson, 17 ix 1928, E. Poilane 15593 (P); same locality, 11 xi 1938, E. Poilane 28359 (P). **Thailand**, Changwat Mae Hong Son, Pang Mapha, 4 ix 2008, P. Wongsuwan 96 (BKF), 47-in spirit (BKF); Changwat Chiang Mai, Doi Sutep, 22 ix 1912, A.F.G. Kerr 2699 (K); same locality, 4 vii 1912, A.F.G. Kerr 2632 (K); Doi Phra Kao, 1,500 m, 18 viii 1931, H.B.G. Garrett 696 (K); Ban Pha Mon, 2 x

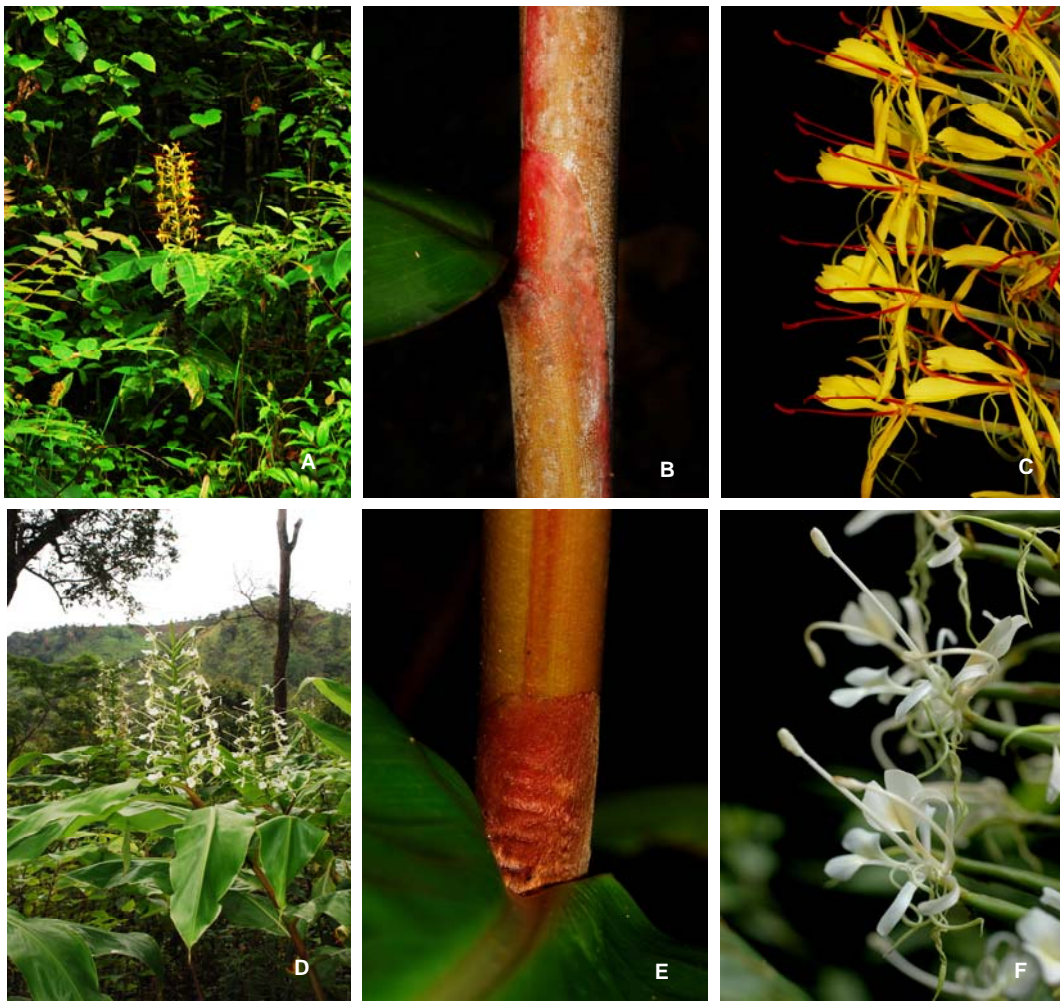


Fig. 5. A-C: *Hedychium gardnerianum* Sheppard ex Ker Gawl. A: The plant habit. B: A ligule. C: Close-up of flowers. D-F: *H. stenopetalum* Lodd. D: The plant habit. E: A ligule. F: Close-up of flowers. Photographed by Chayan Picheansoonthon (A-C) and Pornpimon Wongsuwan (D-F).

1971, J.E. Vidal 5287 (P); Mae Tang, 1,200-1,450 m, 7 xii 1977, T. Santisuk 1525 (K); Mae Sa, 1,300-1,400 m, 18 ix 1995, K. Larsen, S.S. Larsen, C. Tange & D. Sookchaloem 46651 (BKF); Mae Sa valley, 900-1,000 m, 19 x 1998, P. Sirirugsa 1177 (PSU); Siriphum waterfall, 12 viii 2007, P. Wongsuwan 48 (BKF); Chiang Mai, Mae rim, Pong Yang, 10 viii 2008, P. Wongsuwan 78 (BKF), 36-inspirit (BKF); Doi Angkhang, 10 vii 2008, P. Wongsuwan 80 (BKF), 40-inspirit (BKF); same locality, 26 ix 2009, P. Wongsuwan 114 (BKF); Changwat Tak, Lan Sang National Park, 21 iv 1985, C. Niyomcham 914 (K).

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泰國蝴蝶薑屬 (*Hedychium*, 薑科, Zingiberaceae) 的新種及新紀錄種

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摘要：本文提出泰國半島的一個新種 *Hedychium siamense*；並將過去僅知道分布中國南部的肉紅薑花 (*H. neocarneum*) 之分布範圍擴展到泰國和寮國人民民主共和國。兩种植物的完整描述及手繪圖均於文中呈現；並與其關係密切之物種進行討論。

關鍵詞：肉紅薑花、*Hedycium siamense*、新紀錄、新種、泰國、薑科。