



A new species and three taxonomic changes in *Piper* (*Piperaceae*) from Thailand

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Key words

Piper
Piper chiangdaoense
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synonym
Thailand

Abstract A new species, *Piper chiangdaoense* from Doi Chiangdao Wildlife Sanctuary, Chiang Mai province, Thailand, is described and illustrated. *Piper trichostigma* is raised to specific status and an epitype is selected. *Piper maculaphyllum* and *P. rubroglandulosum* are reduced to the synonymy of *P. argyrites* and *P. betle*, respectively. A lectotype for *P. argyrites* is selected.

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INTRODUCTION

Piper L. is the largest genus in the family *Piperaceae* with over a thousand species (Mabberley 2008). Members of the family occur throughout the tropics of both hemispheres, with major concentrations occurring in Latin America and in Malaysia (Yuncker 1958). The genus can easily be recognized on gross morphological characters, but the species are difficult to identify. The flowers are minute and densely set on the rachis, the perianths are absent and the stamens vary in number. The fruits and infructescence are of high importance for species identification.

In preparation of the treatment of *Piperaceae* for the Flora of Thailand (Office of Forest Herbarium 2010), one new species of *Piper*, *P. chiangdaoense*, is here described. Two recently described Thai species are reduced to synonymy and a variety is raised to specific rank.

DESCRIPTION OF THE SPECIES

1. *Piper chiangdaoense* Suwanp. & Chantar., *sp. nov.* — Fig. 1–3

Affinis *Piper lonchites* sed foliis cordatis subtus velutinis, inflorescentiis et infructescenciis brevioribus, fructibus minoribus differt. — Typus: *T. Smitinand, M.E.D. Poore & R.G. Robbins 7806* (holo BKF; iso E), Thailand, Chiang Mai, Doi Chiangdao Wildlife Sanctuary, 10 Nov. 1962.

Woody climber, dioecious, nodes swollen with climbing roots, terminal shoot velutinous. Leaves with petiole 1–1.5 cm long, velutinous; stipules hood-like, lanceolate, caducous; lamina subcoriaceous, broadly ovate, asymmetric, 2.5–3.5 by 3.5–4.5 cm, base cordate or rarely oblique or rounded, apex acute or rarely rounded, margin undulate, upper surface puberulous, lower surface velutinous; venation pinnate with 3 pairs of veins from basal third of midrib. Inflorescence a terminal or leaf-opposed catkin, pendulous, cylindric, yellowish green; rachis hairy, with dense flowers; floral bract glabrous with a c. 0.05 mm long stalk, bract-head peltate, c. 0.1 mm diam margin entire. Male inflorescence 3–4 by 0.1–0.2 cm; peduncle

Table 1 Comparison of some characters of *P. lonchites* and *P. chiangdaoense*.

Character	<i>P. lonchites</i>	<i>P. chiangdaoense</i>
Terminal shoot	glabrous or puberulous	velutinous
Lower leaf surface	glabrous, puberulous or pilose	velutinous
Leaf base	oblique, cuneate, cordate or truncate	cordate rarely oblique
Leaf shape	elliptic, elliptic-oblong or ovate	broadly ovate
Male inflorescence	2–9 cm long	3–4 cm long
Female inflorescence	3–7 cm long	2–4 cm long
Peduncle	glabrous	puberulous or velutinous
Infructescence	3–15 cm long	3–5 cm long
Fruit	4–5 by 3–4 mm	2–3 by 1–2 mm

1–1.5 cm long, pilose. Male flower: stamens 4–6; filament very short and basally swollen; anther 2-valved and slightly exerted at anthesis, c. 0.08 mm diam, dehiscence lateral. Female inflorescence 2–4 by 0.1–0.2 cm; peduncle 1–2 cm long. Female flower: ovary ± elliptic, stigma star-shaped, 3–5-lobed, 1–1.5 mm diam, hairy. Infructescence 3–5 by 0.8–1 cm, pendulous, cylindric; peduncle 1–2 cm long. Fruit free, sessile, ± elliptic, 2–3 by 1–2 mm, dense or well-spaced on rachis, base rounded, apex acute with persistent stigma and floral bract.

Distribution — Northern Thailand (Doi Chiangdao, Chiang-mai).

Habitat & Ecology — Lower montane forest, at 1500–2175 m altitude.

Phenology — Flowering: May; fruiting: June.

Note — *Piper chiangdaoense* is similar to *P. lonchites* Schult. but differs in having a cordate leaf which is velutinous on the lower surface, a shorter inflorescence and a smaller infructescence and fruits. The differences in character are shown in Table 1.

2. *Piper trichostigma* (Chaveer. & Sudmoon) Suwanp. & Chantar., *comb. & stat. nov.* — Fig. 1

Piper thomsonii (C.DC.) Hook.f. var. *trichostigma* Chaveer. & Sudmoon, Acta Phytotax. Geobot. (2007) 35. — Type: A. Chaveerach 49 (holo BK), Thailand, Mae Hong Son, Mae Sariang; C. Suwanphakdee 259 (epitype BK, BKF, KKU, QBG, here selected), Thailand, Phetchaburi, Kaeng Krachan National Park, 26 Dec. 2008.

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Fig. 1 a–c: *Piper chiangdaoense* Suwanp. & Chantar. a. Plant habit; b. portion of male inflorescence; c. infructescence. — d–f: *Piper trichostigma* (Chaveer. & Sudmoon) Suwanp. & Chantar.: d. male inflorescences; e. floral bracts and stamens; f. infructescences.

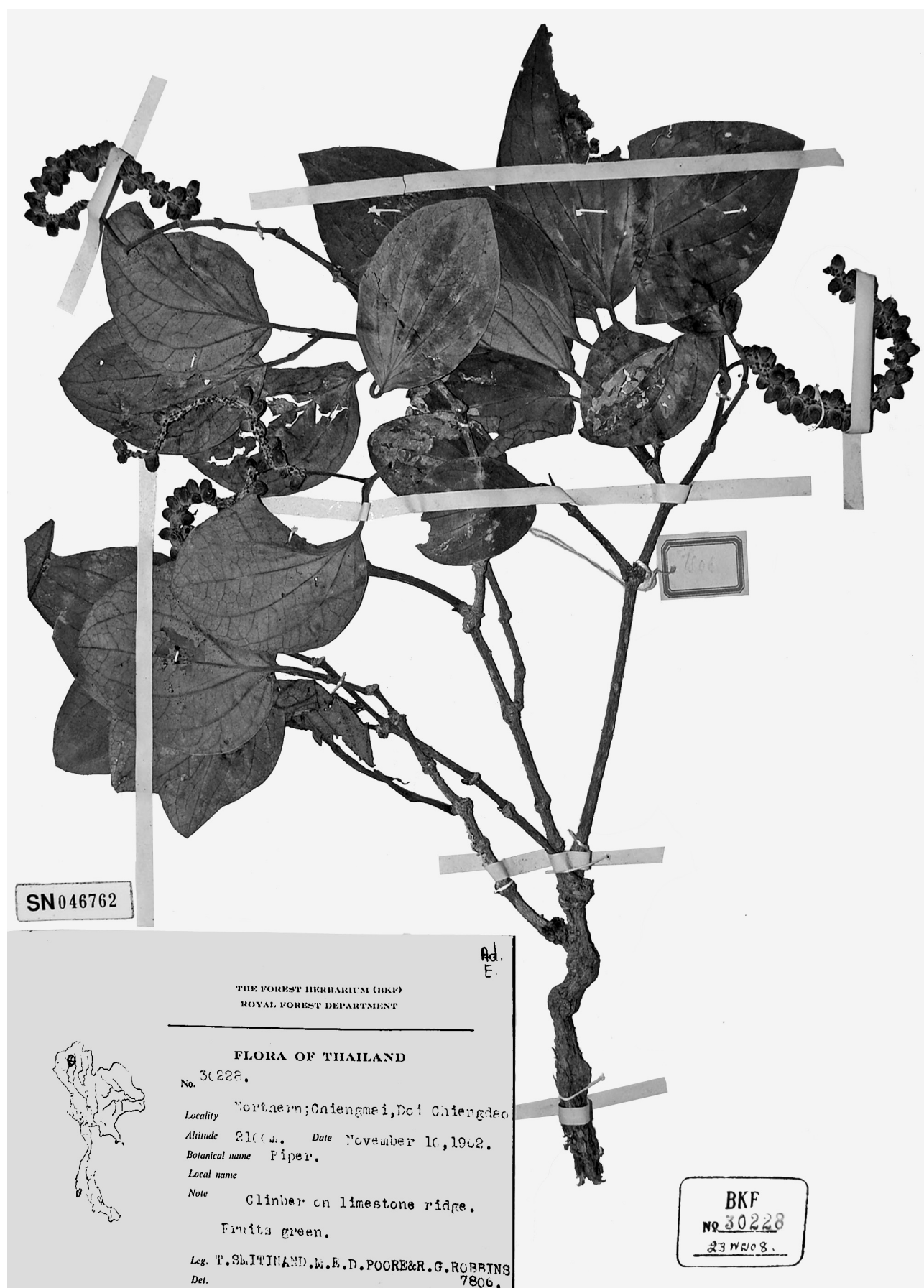


Fig. 2 Type specimen of *Piper chiangdaoense* Suwanp. & Chantar. (T. Smitinand et al. 7806, BKF).

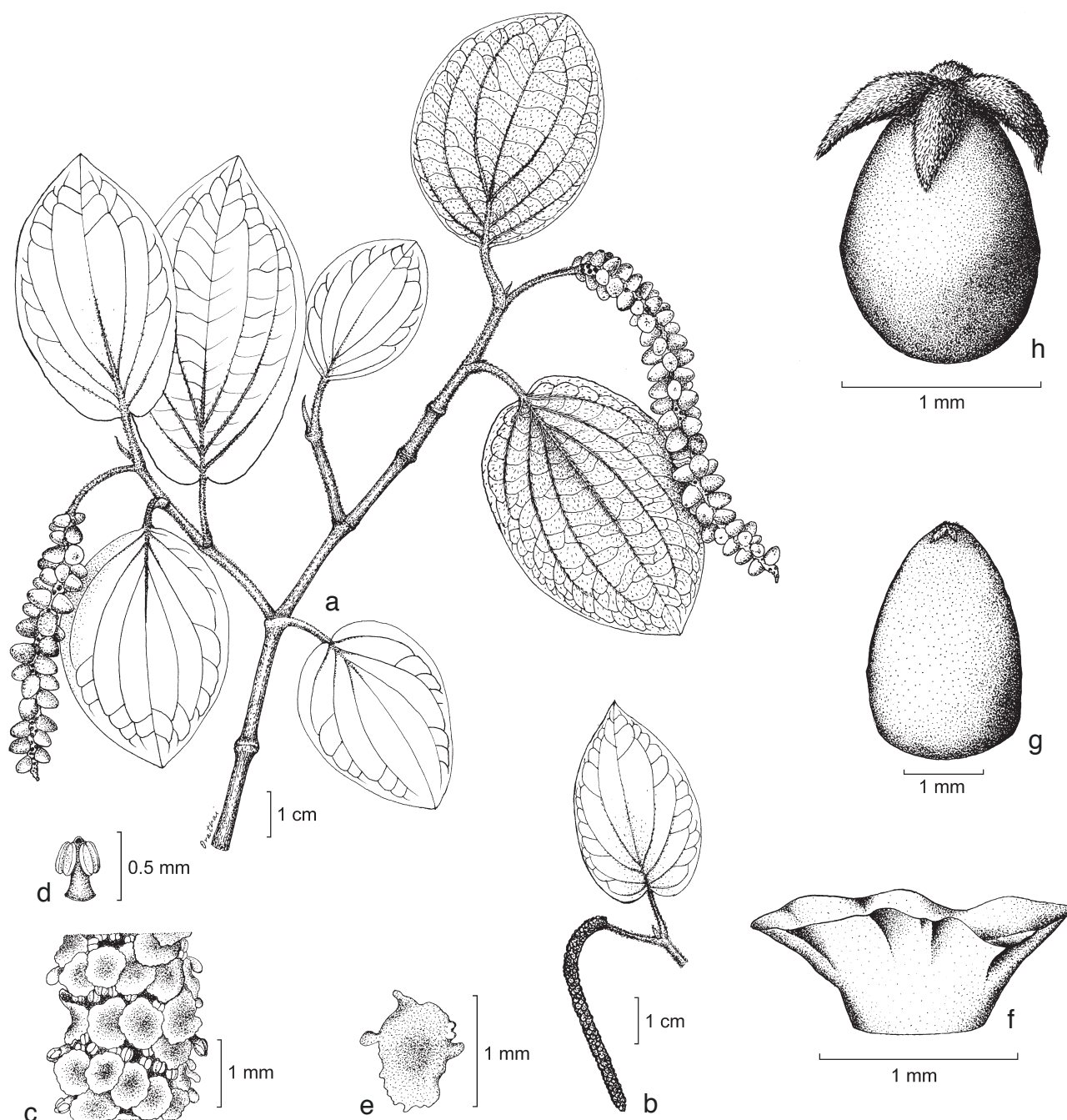


Fig. 3 *Piper chiangdaoense* Suwanp. & Chantar. a. Branch with infructescences; b. male inflorescence; c. portion of male inflorescence; d. stamen; e, f. floral bract (top and side views); g. fruit; h. ovary with stigma (a: *T. Smitinand et al.* 7806 (BKF); b–f: *S. Wathana* 1266 (QBG)). — Drawn by Orathai Kerdkaew.

Table 2 Comparison of some characters of *P. thomsonii* and *P. trichostigma*.

Character	<i>P. thomsonii</i>	<i>P. trichostigma</i>
Leaves	subcoriaceous	chartaceous
Male inflorescence	2.3–5 cm long	4–10 cm long
Floral bract	peltate or rounded	rounded
Fruit	connate c. 3/4	free
Fruit apex	acute	retuse
Mature fruit	dark purple or black	orange
Infructescence	shorter than peduncle	longer than peduncle
Infructescence size	5–10 by 5–12 mm	2–6 by 0.5–1 cm
Infructescence shape	subglobose	long cylindrical
Dried leaf	black	brown

Distribution — Thailand: Northern: Chiang Mai, Chiang Rai, Nan, Payao, Phrae, Tak; Central: Nakhon Nayok; South-western: Kanchanaburi, Phetchaburi; Peninsular: Chumphon, Phangnga.

Habit & Ecology — In evergreen forest by stream or waterfall.

Phenology — Flowering: March–April; fruiting: March–May.

Note — Because of the magnitude of the differences between this and *P. thomsonii*, some of which are listed in Table 2, we raise *P. thomsonii* var. *trichostigma* to specific rank. In general the best characteristic for delimitation of the species is the infructescence but the type of *P. trichostigma* only contains a young inflorescence and no infructescence. Therefore, we select *C. Suwanphakdee* 259 as epitype because it has mature infructescences.

3. *Piper argyrites* Ridl.

Piper argyrites Ridl. (1912) 25. — Type: *Ridley 8176* (lecto SING; isolecto G-DC, here selected), Malaysia, Selangor, Gua Batucave, Dec. 1920.

Piper maculaphyllum Chaveer. & Sudmoon (2008) 120. — Type: *A. Chaveerach 126* (holo BK; iso BKF), Thailand, Phuket, Khao Phra Thaeo Wildlife Conservation Development and Extension Center, syn. nov.

Distribution — Malaysia, Singapore, Thailand (South-eastern and Peninsular).

Habitat & Ecology — Growing near stream, along stream or evergreen hill forest.

Phenology — Flowering and fruiting: October–December.

Note — Of the two specimens cited by Ridley (1912) we were unable to find *Ridley 7611* in K, G-DC or SING, and we choose *Ridley 8176* as lectotype for *Piper argyrites*. Chaveerach et al. (2008) indicated that the type specimens of *P. maculaphyllum* were deposited in BK and BKF. However, we were unable to find these specimens and, from discussion with staff in BK and BKF, we understand that they were not actually deposited in these herbaria. We have examined the line drawing and description of *P. maculaphyllum* and found that features of leaves, inflorescence, floral bract, stamens and especially fruits and infructescence match with *P. argyrites*. Therefore, *P. maculaphyllum* is reduced to synonymy under *P. argyrites*. This species is widely distributed in South-eastern and Peninsular Thailand.

4. *Piper betle* L.

Piper betle L. (1753) 28. — Type: Herb. Hermann 3: 32; 4: 9, No. 27 (lecto BM, selected by Huber 1987), India.

Piper rubroglandulosum Chaveer. & Mookkamul (Chaveerach et al. 2008) 142, (Chaveerach et al. 2010) 175. — Type: *Chaveerach 314* (holo BK?; iso BKF?), Thailand, Surat Thani, Klong Panom National Park, syn. nov.

Distribution — India, Sri Lanka, China, Myanmar, Laos, Vietnam, Cambodia, Malaysia, Singapore, Thailand (Northern, South-eastern, Peninsular), Philippines, Indonesia, Papua New Guinea.

Habitat & Ecology — In evergreen forest near stream, fruit plantation, disturbed area.

Phenology — Flowering: March–June; fruiting: May–July.

Note — Again, as with *P. argyrites*, we were unable to find the type of *P. rubroglandulosum* at BK and BKF as indicated by Chaveerach et al. (2008). We have carefully examined the description, line drawing and photographs of *P. rubroglandulosum* and found that it is a wild form of *P. betle*. Therefore, *P. rubroglandulosum* is reduced to synonymy of *P. betle*. Female plants of *P. betle* are cultivated throughout Thailand, but the wild form of both female and male plants can be found in nature only in south-eastern and southern regions.

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IDENTIFICATION LIST

<i>Piper</i>	
1 = <i>argyrites</i>	4 = <i>lonchites</i>
2 = <i>betle</i>	5 = <i>thomsonii</i>
3 = <i>chiangdaoense</i>	6 = <i>trichostigma</i>

- Adisai 48: 6 – Anderson 5258: 2.
- Bloembergen 619: 6 – Bunwong 199: 4.
- Chamchamroon et al. 1484: 6 – Chaveerach 49: 6 (type) – Chayamarit 1326: 6.
- Geesink & T. Santisuk 5195: 6 – Geesink et al. 5703: 6; 6715: 1; 6878: 4.
- Hooker & Thomson 181: 5 (type).
- Kerr 4741: 4; 5654: 4; 5759: 4; 6221: 4; 8451: 4; 11806: 2; 12207: 2; 13793: 2 – Konta et al. 4751: 4 – Kostermans 351: 6; 351a: 6 – Koyama T-61908: 4; T-61136: 4 – Koyama & C. Phengklai T-49903: 4 – Koyama et al. T-31828: 4.
- Larsen & S.S. Larsen 33211: 2; 33927: 4 – Larsen et al. 3053: 6; 43153: 6; 46521: 4.
- Maxwell 88-693: 4; 88-987: 4; 89-428: 6; 93-841: 4; 93-1115: 4; 95-53: 4; 95-498: 6; 95-841: 4; 95-1215: 4; 96-849: 4; 99-70: 4 – Middleton et al. 1644: 6 – Mitsuta et al. T-43155: 4. Nagamasu T-50068: 4 – Nakkas 2: 4 – Nanakorn et al. 2597: 4; 4722: 4; 9175: 4.
- Palee 253: 4 – Phengklai 1272: 1; 7075: 4; 7477: 4 – Phengklai et al. 2940: 6; 4107: 4 – Pongamornkul 1910: 4 – Pooma 621: 4 – Put 1034: 2; 3394: 4.
- Ridley 8176: 1 (type).
- Sangkachand 1450: 6 – Santisuk 1065: 4 – Santisuk & E. Warncke 2554: 6 – Shimizu T-10048: 4 – Shimizu et al. T-10948: 3; T-23682: 4 – Smitinand 5471: 4; 6007: 6; 7806: 4; 11544: 4 – Smitinand et al. 7806: 3 (type) – Srisanga 1699: 6 – Srisanga & C. Maknoi 2188: 4 – Suvarnakoses 1155: 6; 2173: 2 – Suwanphakdee 4: 6; 13: 2; 31: 6; 44: 2; 59: 4; 66: 4; 68: 2; 79: 4; 84: 4; 91: 4; 94: 6; 97: 4; 103: 2; 123: 6; 129: 6; 130: 6; 131: 4; 132: 2; 145: 4; 152: 6; 157: 4; 158: 4; 163: 6; 164: 4; 165: 6; 167: 1; 170: 2; 172/1: 1; 173: 4; 245: 1; 246: 1; 247: 1; 254: 4; 259: 6 (epitype); 260: 4; 268: 2; 274: 6; 276: 4; 286: 1; 290: 4; 292: 4; 293: 6; 311: 4; 313: 2; 314: 2; 317: 1.
- Tagawa et al. T-1536: 4; T-9158: 4 – Takahashi T-63531: 4 – Tanaka 8146: 4.
- Van Beusekom & C. Phengklai 136: 6; 250: 6; 1359: 3; 2444: 4 – Van Beusekom & T. Smitinand 2151: 4 – Van Beusekom et al. 4516: 4 – Van de Bult 621: 6 – Vidal et al. 6181: 4.
- Wattana 1266: 3; 2428: 4 – Wattana et al. 605: 4 – Williams et al. 1108: 4; 1221: 6.