

## The genus *Tarennoidea* (Rubiaceae) in Thailand

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**ABSTRACT.** The genus *Tarennoidea* Tirveng. & Sastre composing of a species, *T. wallichii* (Hook.f.) Tirveng. & Sastre from Thailand is presented. The descriptions, distribution data and map, specimens examined and also photographs of the species are provided. Lectotypes of four taxa, *Randia wallichii* Hook.f. var. *subtruncata* Craib, *Tarenna incerta* Koord. & Valeton, *Webera henryi* H. Lév. and *W. pallida* Franch. ex Brandis are designated.

**KEYWORDS:** distribution, Gardenieae, lectotypification, *Tarennoidea*, Thailand

### INTRODUCTION

*Tarennoidea* Tirveng. & Sastre is a small genus in the family Rubiaceae, tribe Gardenieae, with two species, *T. axillaris* (Ridl.) Tirveng. & Sastre and *T. wallichii* (Hook.f.) Tirveng. & Sastre, and is distributed in tropical and subtropical Asia through Australia. The genus was formerly enumerated in *Aidia* Lour. (*A. wallichii* (Hook.f.) T. Yamaz.), *Randia* L. (*R. wallichii* Hook.f.), *Tarenna* Gaertn. (*T. incerta* Koord. & Valeton and *T. pallida* (Franch. ex Brandis) Hutch.) and *Webera* Schreb. (*W. cavaleriei* H. Lév. and *W. pallida* Franch. ex Brandis) (Chen & Taylor, 2011). Tirvengadum &

Sastre (1979) proposed it as a new genus namely *Tarennoidea*, because the two known species show superficial similarities of dichasial ramification with *Tarenna* and the genus can serve as a link between the marginal genera of the tribe Gardenieae (*Aidia*, *Anomanthodia* Hook.f. etc.) with *Tarenna* of tribe Ixoreae. The distinguished characteristics of both genera are indistinctly 4-angled on young stems and branches and the fruits are thick and leathery skin in *Tarennoidea* whereas distinctly 4-angled on young stems and branches and the fruits are never thick and leathery skin in *Tarenna*.

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The first report of the genus in Thailand by Craib (1934), as *Randia* with two taxa, *R. wallichii* and also proposed a new variety, *R. wallichii* var. *subtruncata* Craib. Based on the molecular phylogenetic studies of the family (Bremer, 2009), now *Randia*, confined to the Americas and most Asian species are placed in other genera. During the working on many genera of the Thai Rubiaceae, including the genus *Tarennoidea*. The resulting information has indicated the necessity of lectotypification for four taxa, *R. wallichii* var. *subtruncata*, *Tarenna incerta*, *Webera henryi* and *W. pallida*. The aim of this paper is to provide a detail of *Tarennoidea wallichii* which will be served as a basis for the treatment of the genus for the Thai flora account.

## MATERIALS AND METHODS

This study is largely based on the specimens kept at the following herbaria: BKF, K, KKU, KYO, L, PSU and QBG. All type and non-type specimens cited have been seen or high-resolution images were obtained from E, K and P.

## TAXONOMIC TREATMENT

### TARENNOIDEA

Tirveng. & Sastre, Mauritius Inst. Bull. 8(4): 90. 1979. Type species: *T. wallichii* (Hook.f.) Tirveng. & Sastre.

Unarmed shrub, tree up to 20 m tall. *Leaves* opposite, entire, mostly on short distal branchlets, isophyllous except for the leaf pair below inflorescence, petiolate; domatia

present; raphides absent. *Stipules* interpetiolar or shortly united around stem, triangular to oblong-lanceolate or ovate, cuspidate, caducous. *Inflorescences* terminal or sometimes pseudoaxillary or appearing leaf-opposed due to anisophylly with 1 leaf caducous at subtending node, pyramidal, corymbose or compound-cymose; several to many flowered, pedunculate or sessile and tripartite, bracteate; pedicels very short. *Flowers* 5-merous, small, bisexual, monomorphic, pedicellate. *Calyx* cupulate, truncate to 5-dentate. *Corolla* yellow to white, campanulate or salverform; tube with dense ring of villosulous hairs in throat; lobes contorted in bud, spreading-reflexed in open flowers. *Stamens* 5, inserted around the throat; filaments short; anthers subsessile, dorsifixed, exserted and spreading. *Ovary* 2-locular, with (1–)2–6 ovules in each locule on axile placentas; style head fusiform, exserted; stigmatic areas 2-lobed. *Fruit* black, berry-like, globose or subglobose, leathery or fleshy, small, without calyx. *Seeds* (1–)2(–8), ellipsoid to subglobose, usually hemispheric.

A small genus with possibly only two species, centered in continental Southeast Asia, extending to the Malesian region and Northern Territory to Australia. One species in Thailand.

***Tarennoidea wallichii*** (Hook.f.) Tirveng. & Sastre, Mauritius Inst. Bull. 8(4): 90. 1979.— *Randia wallichii* Hook.f., Fl. Brit. India 3(7): 113. 1880.— *Aidia wallichii* (Hook.f.) T. Yamaz., J. Jab. Bot. 45(11): 339. 1970, non Tirveng., 1987. Type: Bangladesh, Sylhet & Khasia, *de Silva in Wallich list no. 8445* (lectotype K-W [K001125532!], designated by Tirvengadum & Sastre, 1979).— *R. wallichii* var. *subtruncata* Craib,

Fl. Siam 2: 114. 1932. Type: Thailand, Kanchanaburi, Khao Ri Yai, 2 Feb. 1926,

*Kerr 10411* (lectotype K! without barcode, designated here). Figs. 1–2.

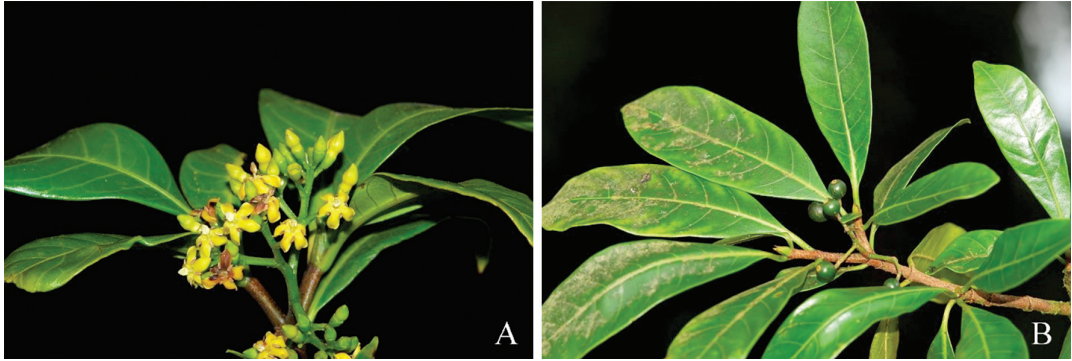


FIGURE 1. *Tarennoidea wallichii*: A. inflorescence; B. infructescence. Photos by P. Phonsena.

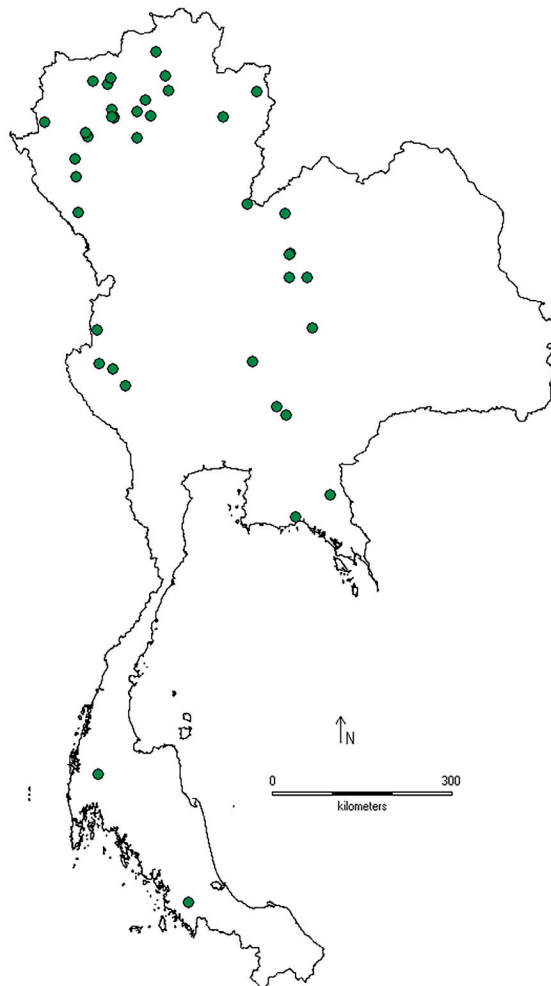


FIGURE 2. Distribution map of *Tarennoidea wallichii* in Thailand.

— *Tarenna incerta* Koord. & Valeton, Meded. Lands Plantentuin 59: 269. 1902.— *Stylocoryna incerta* (Koord. & Valeton) Elmer, Leaf. Philipp. Bot. 1: 33. 1906. Type: Indonesia, Java, *Koorders & Valeton 6752-β* (lectotype K [K000265524!], designated here; isolectotypes *Koorders & Valeton 6737-β* [NY00133408!], *6749-β* [P00836458!], *6751-β* [P00836463!], *39255-β* [P00836459!], NY00133407], *39260-β* [NY00133406!]).

— *Webera pallida* Franch. ex Brandis, Indian Trees: 378. 1906.— *Tarenna pallida* (Franch. ex Brandis) Hutch. in Sargent, Pl. Wilson. 3(2): 410. 1916. Type: China, Yunnan, 8 Apr. 1884, *Delavay 902* (lectotype P [P00836456!], designated here; isolectotypes K [K000742859!, K000742860!], P [P00836451!, P00836452!, P00836453!, P00836454!, P00836455!, P00836457!]).

— *Webera cavaleriei* H. Lév., Repert. Spec. Nov. Regni Veg. 9: 323. 1911. Type: China, Kouy-Tchéou, Pin-Fa, 8 Jun. 1905, *Cavalerie 2342* (holotype E [E00327832!]).

— *Webera henryi* H. Lév., Sert. Yunnan.: 1: 1916. Type: China, Yunnan, Szemao mts., *Henry 11923A* (lectotype E [E00327830!], designated here; isolectotype E [E00327831!]).

Tree 2–10 m tall; branches stout, compressed to angled, glabrous, with thin wrinkled and cracked, coppery brown to reddish-purple-brown, deciduous leaving stems wrinkled to smooth. *Leaves* coriaceous, narrowly elliptic or oblanceolate, elliptic-oblong, oblanceolate-oblong or elliptic-lanceolate, glabrous, 7–20 × 2–6 cm, drying leathery and often paler below, apex obtuse

to acuminate with tip often ultimately obtuse, base attenuate or cuneate, margin often thinly revolute, upper surface dark shiny green and glabrous, lower surface dull light green, puberulent to glabrous, with foveolate and/or pilosulous domatia; lateral veins 5–13 pairs; petioles 1–2 mm long, glabrous. *Stipules* 4–10 mm long, glabrous, apex acute to acuminate. *Inflorescences* 4–12 cm long, usually dense, pubescent (densely hirtellous or pilosulous to tomentulose); bracts 1–3 mm long, triangular, lanceolate to spatulate, apex acute to rounded, caducous; pedicels 1–5 mm long. *Calyx* light green; tube 1–2 mm long, obconical, densely puberulent to tomentulose; lobes linear to narrowly triangular, 0.5–0.7 mm long. *Corolla* pale green or creamy white but becoming pale yellow then orange when older; tube 3–4 mm long, glabrous to sericeous outside, pilosulous in throat with pubescence sometimes extending onto lobes; lobes ovate or spatulate-oblong, 3–5 mm long, apex acuminate, obtuse to rounded, spreading or reflexed. *Stamens*: filaments *ca.* 0.6 mm long, inserted at rim of tube; anthers brown, *ca.* 1.8 mm. *Style* whitish, *ca.* 6.5 mm long; stigma pale brown. *Fruit* a berry, dark green, ovoid to subglobose, 7–15 mm in diam., glabrous; fruiting pedicels up to 10 mm long. *Seeds* 5–6 mm long.

Thailand.— NORTHERN: Mae Hong Son [Khun Yuam, 22 May 1921, *Kerr 5449* (K)]; Chiang Mai [Doi Chiang Dao WS, 1 Jun. 1921, *Kerr 5543* (K); *ibid.*, 1 Dec. 1961, *Smitinand & Anderson 7209* (BKF, K); *ibid.*, 27 May 1989, *Maxwell 89-666* (BKF); *ibid.*, 3 Mar. 1995, *Maxwell 95-187* (L); Doi

- Inthanon (Doi Nang Ka), 22 Apr. 1931, *Put 3731* (K); *ibid.*, 14 Apr. 1960, *Smitinand & Anderson 6661* (BKF); *ibid.*, 1 Mar. 1978, *Niyomdham 13* (BKF-2 sheets); *ibid.*, 29 Jul. 1988, *Phengkklai et al. 7360* (BKF); *ibid.*, 14 Jul. 1990, *Phengkklai et al. 7508* (BKF-2 sheets); Doi Inthanon to Pha Ngam, 9 Mar. 2001, *Chayamarit et al. 2528* (BKF-2 sheets); Doi Liam, 6 Apr. 1925, *Winit 1356* (BKF, K); Doi Suthep, 9 May 1909, *Kerr 629* (K); *ibid.*, *Kerr 1196* (K); *ibid.*, 23 May 1921, *Kerr 1196A* (K); *ibid.*, 18 Nov. 1921, *F.H.W. Kerr 39* (K); *ibid.*, 9 Nov. 1958, *Sørensen et al. 6085* (BKF); *ibid.*, 17 May 1988, *Maxwell 88-643* (BKF); *ibid.*, 15 Sept. 1988, *Maxwell 88-1088* (BKF), *ibid.*, 28 Jul. 1992, *Larsen et al. 43715* (PSU); Doi Suthep to experimental station compound, 6 Apr. 1956, *Smitinand 3294* (BKF); Doi Suthep to Montha Than waterfall, 17 Sept. 1987, *Maxwell 87-1001* (BKF); Doi Suthep-Pui NP, 9 Jun. 2004, *Maxwell 04-200* (L); Mae Rim, 9 Jan. 1994, *Fukuoka & Koyama T-62055* (BKF); *ibid.*, 21 May 2004, *Glamwaewwong 825* (PSU, QBG); *ibid.*, 16 May 2007, *Glamwaewwong 1396* (QBG); Mae Rim to Doi Mon Long, 21 Dec. 1995, *Nanakorn et al. 5476* (BKF, QBG); Mae Rim to Rock Town, 20 Jan. 1996, *Nanakorn et al. 5548* (BKF, QBG); Mae Sa valley, 6 Dec. 1995, *Nanakorn et al. 5400* (BKF, QBG); Mae Taman watershed research station, 20 May 2004, *Santisuk et al. 054-2* (BKF-2 sheets); Mae Taeng to Doi Chang, 19 Feb. 1968, *Hansen & Smitinand 12678* (BKF, L); *ibid.*, 23 Oct. 1979, *Shimizu et al. T-20504* (BKF); Mae Taeng to Doi Hua Chang, 19 Mar. 1990, *Smitinand 90-29* (BKF-2 sheets); Om Koi, 23 Dec. 1978, *Niyomdham et al. 122* (BKF-2 sheets); Om Koi to Ban Na Kian, 11 Mar. 2015, *Pongamornkul 4834* (BKF, QBG); Queen Sirikit Botanic Garden, 15 Jan. 2013, *Scheur et al. 25* (L); *ibid.*, 13 Feb. 2013, *Scheur et al. 204* (L); *ibid.*, 27 Feb. 2013, *Scheur et al. 230* (L); *ibid.*, *Scheur et al. 305* (L); Chiang Rai [Champa Thong waterfall, 9 Jul. 2022, *Chamchumroon et al. V.C. 1785* (BKF-2 sheets); Khun Chae NP, 16 Nov. 1997, *Maxwell 97-1353* (BKF, L); *ibid.*, 21 Nov. 1997, *Wongchai 056A* (BKF); *ibid.*, 12 Feb. 1998, *Wongchai 96* (BKF-2 sheets); Mae Tuen, 30 Jan. 1922, *Kerr 6191* (K); Phan, Doi Luang NP, 18 Jun. 1997, *Maxwell 97-667* (BKF, L); Wiang Papao, Doi Luang NP, 27 Oct. 1997, *Maxwell 97-1231* (BKF, L); Phayao [Doi Luang NP to Champa Thong waterfall, 26 May 1997, *Gardner & Sidisunthorn 2144* (BKF, L)]; Nan [Doi Yao, 23 Feb. 1921, *Kerr 4879* (K)]; Pua to Doi Phu Kha, 7 Jul. 2001, *Srisanga 1977* (BKF, QBG); *ibid.*, 31 Aug. 2000, *Srisanga 1518* (BKF, QBG); Tha Wang Pha to Doi Phu Kha NP, 22 Jul. 1994, *Maxwell 94-783* (L)]; Lamphun [Doi Khun Tan NP, 16 Jul. 1993, *Maxwell 93-765* (BKF-2 sheets, L); *ibid.*, 1 May 1994, *Maxwell 94-580* (BKF, L)]; Lampang [Chae Son NP, 18 Jan. 1914, *Kerr 3108* (K); *ibid.*, 21 Oct. 1995, *Maxwell 95-937* (BKF)]; Doi Khun Tan NP, 11 Feb. 1976, *Put 142* (BKF); Phu Chom Dao, 1 Apr. 2014, *La-ongsri et al. 3297* (BKF, QBG)]; NORTH-EASTERN: Phetchabun [Nam Nao NP, May (without date & year), *Smitinand 489* (BKF); *ibid.*, 21 May 1951, *Smitinand 4889* (L); *ibid.*, 3 Mar. 1976, *Bunnak 3062* (BKF-2 sheets); *ibid.*, 8 May 2003, *Chantaranonthai*

*et al.* (KKU-2 sheets)]; Loei [Phu Kradueng NP, 13 Jun. 1992, *Niyomdham 2935* (BKF-2 sheets)]; *ibid.*, *Tagane et al. T3363* (BKF-2 sheets)]; Phu Luang WS, 11 Aug. 1977, *Bunchoo 3150* (BKF-2 sheets)]; Phu Suan Sai NP to Na Hao, 18 Jan. 2008, *Maknoi 1958* (BKF, QBG)]; EASTERN: Chaiyaphum [Hua Bak Dang, 20 May 1971, *C.H. 167* (BKF)]; Phu Khiao WS, 1–3 May 1997, *Puff 970502-1/8* (BKF)]; Nakhon Ratchasima [Khao Yai NP, 15 Mar. 1968, *van Beusekom & Phengklai 56* (KYO)]; SOUTH-WESTERN: Kanchanaburi [Sangkhla Buri to Khao Ngi Yai, 5 Apr. 1968, *van Beusekom & Phengklai 359* (BKF, K, KYO, L)]; Khao Yai, 28 Mar. 1968, *van Beusekom & Phengklai 168* (K, KYO)]; *ibid.*, 28 Mar. 1968, *van Beusekom & Phengklai 306* (L)]; Liao Long to Khao Yai, 3 Apr. 1968, *van Beusekom & Phengklai 306* (BKF, KYO)]; Si Sawat to Dong Yai, 4 Apr. 1975, *Samruay et al. 185* (BKF-2 sheets)]; Khao Ri Yai, 2 Feb. 1926, *Kerr 10411* (ABD, K, type of *R. wallichii* var. *subtruncata*)]; Thung Yai Naresuan WS, 6 May 1992, *Santisuk et al. 282* (BKF-2 sheets)]; CENTRAL: Nakhon Nayok [Khao Yai NP, 18 May 2004, *Boonkongchart 332* (L)]; SOUTH-EASTERN: Rayong [Klaeng, 8 Nov. 1994, *Maxwell 94-1197* (BKF)]; Chanthaburi [Khao Soi Dao WS, 19 May 2013, *Tagane et al. T1744* (BKF)]; *ibid.*, 15 Mar. 2014, *Tagane et al. T2549* (BKF)]; PENINSULAR: Surat Thani [Khlung Phanom NP, 19 Jun. 2004, *Gardner & Setsin ST0801* (BKF-3 sheets, K, L)]; Krabi [Ao Luek, Satun, Khuan Kalong waterfall, 30 Jan. 1961, *Suvanakoses 1697* (BKF)].

Distribution.— India, Nepal, Bhutan, Bangladesh, Myanmar, China, Taiwan, Laos, Cambodia, Vietnam, Malaysia, Java, Borneo, Philippines, Lesser Sunda, Sulawesi, Celebes, Timor Leste, New Guinea, Solomon Islands, Australia (Northern Territory).

Ecology.— Mostly in evergreen forest types, often in dry evergreen forest and mixed deciduous forest, 80–2,200 m alt. Flowering: March–June and fruiting: July–February.

Vernacular.— Chan thana bai lek (จันทนาใบเล็ก), lek ki (เหล็กกี) (Northern), lek khi din (เหล็กขี้ดิน) (North-eastern).

Notes.— *Tarennoidea wallichii* is distributed in partly open or shaded areas in many forest types, especially in mixed deciduous and dry evergreen forests, usually more than 600 to 2,200 m alt. The species is known to flower and fruit thorough out the year, but the peak flowering is in May.

*Kerr 10441* which has two duplicates, ABD (ABDUH:2/723) and K (without barcode), cited in the original description of *Randia wallichii* var. *subtruncata*, the specimen at K, is the best preserved. Therefore, it is designated here as the lectotype. The *Kerr 7556* (K) was collected, 1 August 1923, from Gunung Inas (Ina), Betong. I have checked Kerr's itinerary of this specimen from Jacobs (1962) with the map of Thailand and Malaysia. The present area is in the Perak frontier, Peninsular Malaysia. Consequently, the species no longer exists in Betong, Yala province.

The original description of *Webera pallida* was based on two Chinese collections, *Delavay 902* at K (K000742859 & K000742860) and P (P00836451, P00836452, P00836453, P00836454, P00836455, P00836456 & P00836457), and *Henry 11923 KFTA* (0000967 & 0000968) and LECB (0001557). The specimen P00836456 has more leaves and in flowering stage, therefore, it is designated here as the lectotype.

*Webera henryi* was described based on Henry's collection which has 2 sheets, the specimen E00327830 is selected as the lectotype because it has more plant material.

Koorders & Valeton (1902) proposed *Tarenna incerta* as a new species from Java, Indonesia, based on their collections. The specimen, *Koorders & Valeton 6752-β* at K (K000265524), has more fruits and is well-preserved, therefore, it is designated here as the lectotype.

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