Tropical Natural History 14(1): 1-6, April 2014


# Studies on Thai Pteleocarpaceae

**KANOKORN RUEANGSAWANG[1] AND PRANOM CHANTARANOTHAI[2,*]**

[1] *Department of Biology, Faculty of Science, Ramkhamhaeng University, Bangkapi, Bangkok 10240, THAILAND*
[2] *Applied Taxonomic Research Center, Department of Biology, Faculty of Science, Khon Kaen University, Khon Kaen 40002, THAILAND*
* Corresponding Author: Pranom Chantaranothai (pranom@kku.ac.th)
Received: 25 December 2013; Accepted: 27 February 2014

**Abstract.–** The taxonomy of Pteleocarpaceae in Thailand is presented. The family has a single species, *Pteleocarpa lamponga* (Miq.) K. Heyne that is similar to Boraginaceae, but differs by its fruit characteristics. A description and illustration of *P. lamponga* from Thailand is provided. The pollen is monad, radially symmetrical, isopolar, prolate spheroidal, 3-colporate and with reticulate sculpturing. The epidermal cells are rectangular to polygonal and square on both leaf surfaces and the anomocytic stomata are restricted to the lower surface.

**KEY WORDS: Boraginaceae, epidermis, Pteleocarpaceae, pollen**

## INTRODUCTION

The family Pteleocarpaceae is a monotypic tree genus that is narrowly distributed in southern Thailand, Peninsular Malaysia, Sumatra, Java and Borneo. The genus *Pteleocarpa* Oliv. has been formerly placed in various other families, such as Boraginaceae, Icacinaceae, Olacaceae, Cardiopteridaceae, Lophopyxidaceae and Sapindaceae (Veldkamp, 1988). Recent molecular evidence, however, has placed the genus in the Gentianales and is perhaps closely related to the Gelsemiaceae (Olmstead and Ferguson, 2001; APG II, 2003). Heywood et al. (2007) and Brummitt (2011) have made valuable contributions to the resolution of these taxonomic problems and a summary of the family's characteristics. This study was designed to support the taxonomic treatment of the family Pteleocarpaceae for the Flora of Thailand.

## MATERIALS AND METHODS

Morphological data was collected from herbarium material at AAU, BCU, BK, BKF, BM, C, K, KKU, L, PSU and SING (acronyms according to Thiers, 2013), as well as from the available literature. The pollen was prepared according to the acetolysis method (Erdtman, 1960), and measured and studied under both light and scanning electron microscopes. The terminology used follows Punt et al. (2007). Leaf surface preparations were made from herbarium material following rehydration in boiling water. Epidermal scrapes of both leaf surfaces were made with a razor blade and then stained with 1% (w/v) safranin O in alcohol for 10–20 min. The epidermal samples were mounted in DePeX artificial mounting medium, observed and photographed with an Olympus $BH_2$ light microscope.

## TAXONOMIC TREATMENT

## PTELEOCARPA

Oliv., Trans. Linn. Soc. London 28: 515. 1873; Riedl, Fl. Males. 13: 141. 1997.

Trees. *Leaves* simple, alternate. *Inflorescences:* terminal, paniculate. *Flowers:* actinomorphic, bisexual. *Calyx:* deeply 5-lobed, pale yellow-green. *Corolla:* 5-lobed, pale yellow with darker yellow line towards centre, campanulate; tube shorter than lobes. *Stamens:* 5, exserted from above middle of corolla tube. *Ovary:* superior, with 2 carpels. *Fruits:* samara.

One species in Thailand, Peninsular Malaysia, Sumatra, Java and Borneo.

***Pteleocarpa lamponga*** (Miq.) Bakh. ex K. Heyne, Nutt. Pl. Ned. Ind. ed. 2: 1309. 1927; Veldkamp, Fl. Males. Bull. 10(1): 47. 1988; Ng, Tree Fl. Mal. 4: 64. 1989; Dayang Awa in Tree Fl. Sabah & Sarawak 2: 103, f. 4. 1996; Riedl, Fl. Males. 13: 142. 1997; Brummitt, Kew Bull. 66: 1. 2011. (Fig. 3).

**—*Dodonaea lamponga* Miq., Fl. Ind. Bat. Suppl. 1: 511. 1861. Type: Indonesia, Sumatra, Lampong Prov., *Teysmann H.B.* 4447 (holotype** L**!; isotype** BO**).**
**—*Pteleocarpa malaccensis* Oliv., Trans. Linn. Soc., London 28: 515. 1873; Ridl., Fl. Malay Penins. 2: 464. 1923. Type: Malaysia, Malacca, *Maingay* s.n. (holotype** A**; isotype** K**!).**


**FIGURE 1.** Distribution of *Pteleocarpa lamponga* in Thailand. Closed circles (●) indicate the collection localities.

**—*Pteleocarpa longistyla* Becc., Malesia 1: 130. 1877. Type: Malaysia, Sarawak, 1st Division, Mt. Mattang, 300 m, November 1865, *Beccari P.B.* 1611 (holotype** FI**).**

Trees. 10–40 m tall; bark fissured, yellowish to greenish grey; branchlets terete, reddish brown, glabrous. *Leaves:* with petioles 0.8–1.7 cm long, glabrous, coriaceous, elliptic, obovate, obovate-lanceolate or lanceolate, 5–10 by 2–4.5 cm; apex acute to acuminate; base attenuate; margin entire or undulate; upper surface glabrescent, lustrous; lower surface glabrescent; midrib impressed; lateral veins in 5–7 pairs, impressed on upper surface, conspicuous on lower surface. *Inflorescences:* many-flowered panicle, 5–14.5 by 3.8–7.5 cm. *Flowers:* with pedicels 3–5.5 mm long, densely pubescent. *Calyx:* 1–1.2 by 0.9–1 mm; tube 0.4–0.6 mm long; lobes ovate-triangular, 0.8–1.2 by 1–1.2 mm, pubescent on both sides; apex acute; margin ciliate. *Corolla:* 4–6 mm long; tube 1.5–2 mm long; lobes oblong, 3.5–4 by 2–3 mm, sparsely pubescent on both sides; apex rounded; margin entire. *Stamens:* free, 4–6 mm long; filaments 3.5–4 mm long, glabrous; anther oblong, versatile or basifixed, 1.8–2 mm long. *Ovary:* ellipsoid, 1–2 mm long, glabrous; style divided into 2 almost to the base, 2–3 mm long, glabrous; stigmas 2, capitate. *Fruits:* yellowish, suborbicular, broadly winged, 1–2.2 by 1–

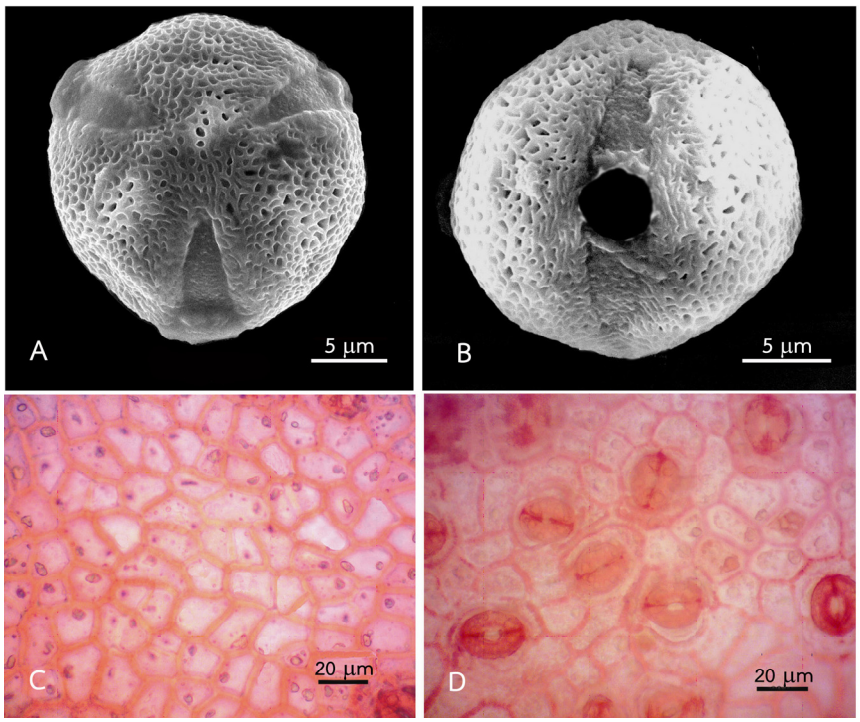


**FIGURE 2.** *Pteleocarpa lamponga*: **A**, **B**. SEM micrographs (3,500 x magnification) of the pollen showing: **A**. The polar view and **B**. The equatorial view. **C**, **D** The leaf epidermis showing: **C**. The upper epidermis; **D**. The lower epidermis with anomocytic stomata. (A-D from *B. Sangkhachand 207*).

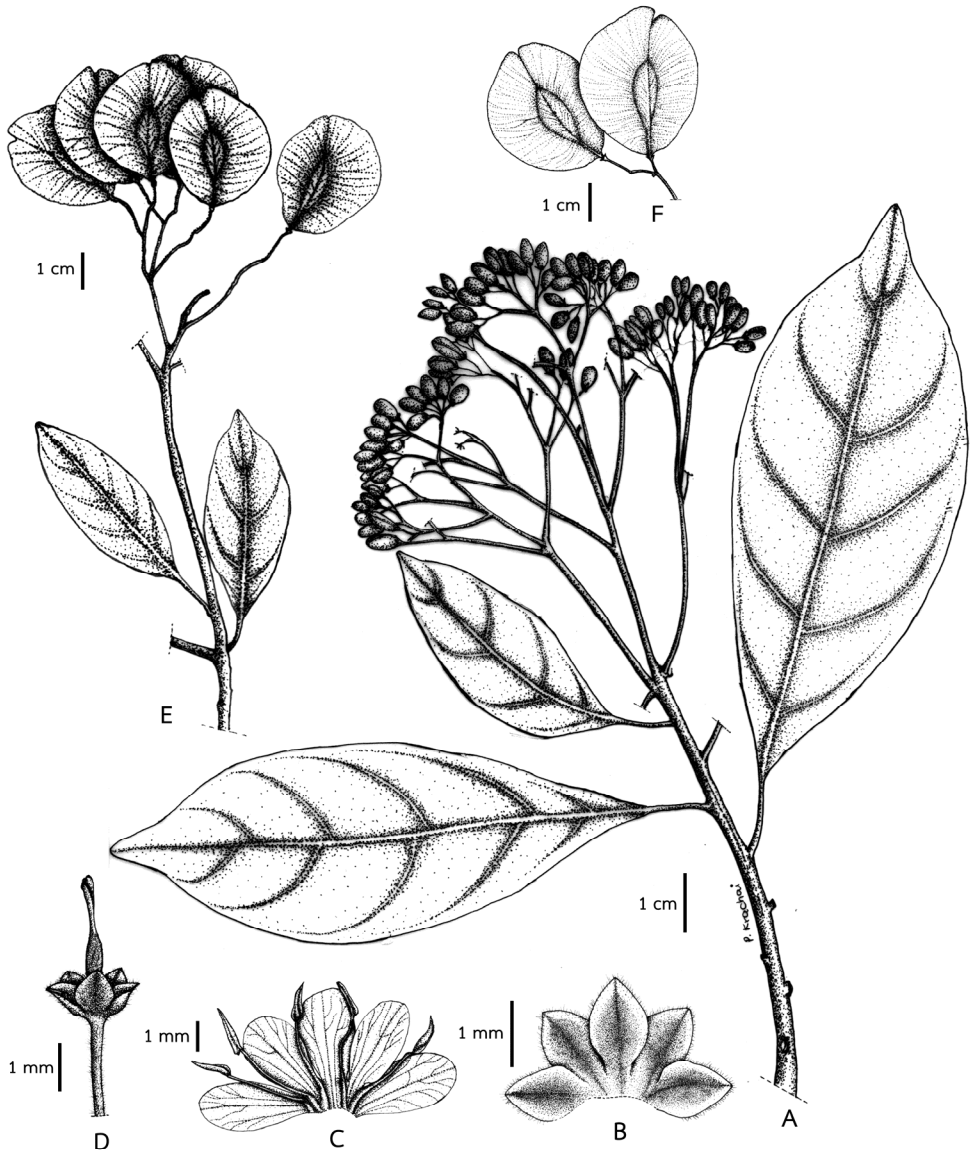


**FIGURE 3.** *Pteleocarpa lamponga*. **A**. Part of an inflorescence; **B**. Opened calyx; **C**. Flower with opened corolla showing the stamens; **D**. Calyx and pistil; **E**. Part of an infructescence; **F**. Fruits (A-F from *B. Sangkhachand 207*). Drawn by P. Krachai.

1.6 cm, 1-seeded.

**Thailand.**— PENINSULAR: Trang [Khao Pab Paa, Jul. 1981, *T. Santisuk* s.n. (**BKF**)]; Satun [Tarutao National Park, La-ngu, 30 Mar. 2006, *S. Gardner & P. Sidisunthorn*, ST2526 (**BKF**)]; Songkhla [Pa Gard Non-Hunting Area, Na Thawi, 8 Oct. 2004, *S. Gardner & P. Sidisunthorn*, ST0971 (**BKF**);

Khao Nam Khang National Park, Na Thawi, 18 May 2004, *S. Gardner & P. Sidisunthorn*, ST0557 (**BKF**); Kho Hong Hill, Haad Yai, 27 Jul. 1985, *J.F. Maxwell* 85-752 (**BKF**)]; Narathiwat [Bacho, 17 Jun. 1961, *B. Sangkhachand* 207 (**BKF, K**); 10 Jun. 1930, *Kiah* 24207 (**BK**)]. (Fig. 1).

**Distribution.**— Peninsular Malaysia, Sumatra, Java and Borneo (Sarawak).

**Ecology.**— Lowland evergreen forest adjacent to swampy area or open margins of secondary forest along the road, alt. 100–375 m amsl.

**Vernacular.**— Pik kom (ปีกก้อม).

**Uses.**— Ornamental tree, timber is used for house construction.

**Notes.**— The remarkable character of *Pteleocarpa lamponga* is a single-seeded samara with suborbicular, radially veined wings.

**Additional information** for *Pteleocarpa lamponga*

**Pollen data**

The pollen grains are isopolar, 3-colporate, prolate spheroidal (P/E = 1.09) and relatively small (polar axis (P) = 20.3–22.5 µm, equatorial diameter (E) = 18.0–20.5 µm). In polar view, the pollen grains vary in shape from circular to slightly trilobate, the colpi are situated at the edges and slightly or more predominantly sunken (Fig. 2A). In equatorial view, they are more or less circular (Fig. 2B). The colpus is *ca*. 16.67 µm diameter while the pore is more or less rounded and *ca*. 4.33 µm in diameter. The exine sculpturing is reticulate and slightly striato-reticulate along the pores.

**Leaf surface data**

The epidermis is present on both surfaces and very from rectangular to polygonal and square in shape (Fig. 2C). The stomata are restricted to the lower surface of the lamina (hypostomatic), and are of the anomocytic type, ranging from 20.4–26.7 µm in length (Fig. 2D).

## ACKNOWLEDGEMENTS

We wish to thank the directors, curators and staff of AAU, BCU, BK, BKF, BM, C, K, KKU, L, PSU and SING for providing access to herbarium collections. Thanks also to Khanit Wangwasit for technical assistance in preparing the SEM pollen micrograph and Puntiwa Krachai for the line drawing. This work was supported by the TRF/BIOTEC Special Programme for Biodiversity Research and Training grant (BRT R_151001).

## LITERATURE CITED

APG. II 2003. An update of the angiosperm phylogeny group classification for the order and families of flowering plants: APG II. Botanical Journal of the Linnean Society, 141: 399-436.

Beccari, O. 1877. *Pteleocarpa*. In: O. Beccari (Ed.), Malesia 1, f. 8, pp. 130-131. R. Instituto Sordo Muti, Genoa.

Brummitt, R.K. 2011. Valid publication of the family name Pteleocarpaceae. Kew Bulletin, 66: 1-3.

Dayang Awa. 1996. Boraginaceae. In: E. Soepadmo, K.M. Wong and L.G. Saw (Eds.), Tree Flora of Sabah and Sarawak, vol. 2, pp. 93-104. Kuala Lumpor, Malaysia.

Erdtman, G. 1960. The acetolysis method. Svensk Botanisk Tidskrift, 54: 561-564.

Heyne, K. 1927. De Nuttige Planten van Nederlandsch Indie, ed. 2, Gedrukt bij Ruygrok & Co., Batavia.

Heywood, V.H., Brummit, R.K., Culham, A. and Seberg, O. 2007. Flowering Plant Families of the World. Royal Botanic Gardens, Kew, UK.

Miquel, F.A.G. 1861. Flora Indiae Bataviae, Supplementum 1. Van der Post, Amsterdam & Utrecht.

Ng, F.S.P. 1989. Boraginaceae. In: F.S.P. Ng and D. Phil (Eds.), Tree Flora of Malaya, vol. 4, pp. 58-66. Malaysia.

Olmstead, R.G. and Ferguson, D. 2001. A molecular phylogeny of the Boraginaceae Hydrophyllaceae. In: Botany 2001: Abstracts. Columbus, Ohio: Botanical Society of America.

Punt, W., Hoen, P.P, Blackmore, S., Nilsson, S. and Le Thomas, A. 2007. Glossary of pollen and spore terminology. Review of Palaeobotany and Palynology, 143: 1-81.

Riedl, H.N. 1923. The Flora of the Malay Peninsula. vol. 2, Reeve, London.

Riedl, H.N. 1997. Boraginaceae. In: P. Baas, R.W.J.M. van der Ham, R. Hegnauer and N. Spitteler (Eds.), Flora Malesiana Series I-seed Plants. vol. 13, pp. 43-144. Leiden, The Nathelands.

Thiers, B. 2013. Index herbariorum: A global directory of public herbaria and associated staff. New York botanical garden's virtual herbarium. The New York Botanical Garden. Available from: http://www. weetgum. nybg. org./ (accessed: 1 December 2013).

Veldkamp, J.F. 1988. Notes on *Pteleocarpa*, incertae sedis. Flora Malesiana Bulletin, 10(1): 47-50.