



Elsholtzia (Lamiaceae) in Thailand

B. Bongcheewin¹, P. Chantaranothai², A. Paton³

Key words

Elsholtzia
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Abstract The genus *Elsholtzia* (Lamiaceae) in Thailand is revised in preparation for the Flora of Thailand treatment. Eight species are found in Thailand, three of which, *E. blanda*, *E. kachinensis* and *E. pilosa*, are lectotypified. *Elsholtzia griffithii* and *E. penduliflora* are recorded for Thailand for the first time.

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INTRODUCTION

Elsholtzia Willd. belongs to the tribe *Elsholtzieae* of the subfamily *Nepetoideae* (Harley et al. 2004). There are c. 40 species in the genus distributed predominantly in temperate and tropical Asia, cultivated in Europe and North America. In South East Asia, seven species from Vietnam (Phuong 1995, 2000, Budantsev 1999), five species from Indo-China (Doan 1936) and three species from Malesia (Keng 1969) have been published.

There have been few published works which cover *Elsholtzia* in Thailand. In 1971, Murata (1971) published a precursor account for Thai *Lamiaceae*, including *E. blanda* (Benth.) Benth. and *E. winitiana* Craib. Later on, Murata (1976) updated the account by adding three species, *E. communis* (Collett & Hemsl.) Diels, *E. kachinensis* Prain and *E. pilosa* (Benth.) Benth. Bongcheewin & Chantaranothai (2008) reported two new records for Thailand including *E. beddomei* C.B. Clarke ex Hook.f. and *E. stachyodes* (Link) Raizada & Saxena. This present account also adds two new records for Thailand, *E. griffithii* Hook.f. and *E. penduliflora* W.W.Sm. *Elsholtzia communis* is reduced as a synonym of *E. griffithii*.

The most recent taxonomic overview of *Elsholtzia* was published by Press (1982). Three sections were recognised, namely sections *Elsholtzia*, *Aphanochilus* (Benth.) Benth. and *Platyelasma* (Briq.) Press, which were based on fruiting calyx characters, size of bracts, and presence or absence of bracteoles. In Thailand, two sections are found: section *Elsholtzia* with bracts as broad as long including only *E. kachinensis* and section *Aphanochilus* with bracteoles and bracts longer than broad including the remaining species.

This genus is revised in order to provide a complete taxonomic treatment of the family for the Flora of Thailand. The present work is based on herbarium material from the following herbaria ABD, BCU, BK, BKF, BM, C, CAL, E, G-DC, K, KGU, K-W, P and QBG (herbarium acronyms follow Thiers (2014)) and field observations. Floral materials were rehydrated in water for measurement.

DISTRIBUTION AND ECOLOGY

Elsholtzia is mostly found in northern Thailand in open dry woodland or forest margins, mostly above 600 m altitude. Several species are found in cultivated areas. *Elsholtzia blanda* is a widespread species distributed from the Himalaya, South East Asian mainland and Sumatra. *Elsholtzia beddomei* is restricted to limestone in Tenasserim range and Doi Chiang Dao. Four species, i.e. *E. griffithii*, *E. kachinensis*, *E. penduliflora* and *E. stachyodes* seem to be introduced from southern China by ethnic groups as most collections are collected from home gardens, morning markets or areas disturbed by human activity. *Elsholtzia pilosa* has only been collected once since 1922 and it seems to have disappeared from natural habitats in Thailand.

ETHNOBOTANICAL USES

Leaves of *E. griffithii*, *E. kachinensis* and *E. stachyodes* are used for cooking in northern Thailand (Bongcheewin 2013). Inta et al. (2008) reported the medicinal plants used by Akha's practitioners in Chiang Rai, Thailand and Xishuangbanna, China which included the leaves of *E. blanda* being used to relieve sprains and leaves of *E. winitiana* used for treatment of cancer, food poisoning and dog bites. *Elsholtzia penduliflora* is grown for medicinal uses by hill tribes in Chiang Mai (*Umpai* 564, BK).

TAXONOMIC TREATMENT

Elsholtzia

Elsholtzia Willd. (1790) 3; Benth. (1833) 160; (1848) 159; Hook.f. (1885) 642; Doan (1936) 976; Mukerjee (1940) 87; Keng (1969) 73; Murata (1971) 497; (1976) 183; Press (1982) 69; X.W.Li & Hedge (1994) 246; Phuong (1995) 35; (2000) 225; A.L. Budantzev (1999) 20. — Type: *Elsholtzia cristata* Willd. *Aphanochilus* Benth. (1829) sub t. 1282; (1830) 29. — Type: *Aphanochilus blanda* Benth.

Erect or prostrate, annual or perennial herbs in open or cultivated areas. *Stems* obtusely quadrangular with longitudinal grooves. *Leaves* opposite, simple, petiolate or sessile, aromatic. *Inflorescence* a terminal and axillary thyrse, spike-like, lax or compact, cylindrical or secund; leafy bracts present or absent. *Calyx* 2-lipped; tube ventricose or slightly ventricose, campanulate or tubular, 10-nerved; lobes subequal, usually thick-edged; upper lip 3-lobed, slightly shorter or equal to the lower lip; fruiting

¹ Department of Pharmaceutical Botany, Faculty of Pharmacy, Mahidol University, Bangkok, 10400 Thailand; corresponding author e-mail: bhanubong.boc@mahidol.ac.th.

² Applied Taxonomic Research Center, Department of Biology, Faculty of Science, Khon Kaen University, Khon Kaen, 40002 Thailand.

³ Royal Botanic Gardens, Kew, Richmond, Surrey, TW9 3AB, United Kingdom.

calyx more or less larger, usually enclosed. *Corolla* 2-lipped; tube glabrescent or glabrous outside, with or without an annulus of simple hairs inside; lobes pubescent, sometimes with translucent dots outside, pubescent or glabrous inside, entire or undulate; upper lip 3-lobed; lower lip 1-lobed. *Stamens* 4 or 2, exserted or included, each pair inserted at different levels; filaments glabrous or puberulous; anthers 2-celled, kidney-shaped, longitudinally dehiscent, basifixed. *Style* ascending under upper corolla lip, exserted or included, fleshy, glabrous; stigma bifid with lobes subequal or unequal. *Disc* 4-lobed with an anterior tumescent lobe. *Nutlets* obovate, oblong or ovate, 4 rarely 1 by abortion, glabrous.

TAXONOMIC KEY TO THAI ELSHOLTZIA

1. Inflorescence secund 2. *E. blanda*
1. Inflorescence cylindrical 2
2. Bracts as broad as long, broadly ovate; bracteoles absent; aquatic prostrate herb 4. *E. kachinensis*
2. Bracts longer than broad, linear, narrowly lanceolate or narrowly elliptic; bracteoles present; terrestrial erect herb up to 2 m tall 3
3. Inflorescence hanging down 5. *E. penduliflora*
3. Inflorescence erect 4
4. Inflorescence lax, adjacent verticils 3–8 mm apart 5
4. Inflorescence compact, adjacent verticils overlapping. . . 7
5. Stamens 2; leaves rhomboid-ovate 7. *E. stachyodes*
5. Stamens 4; leaves narrowly elliptic-ovate or elliptic 6
6. Corolla 3.3–3.6 mm long; leaves villous . . 1. *E. beddomei*
6. Corolla 1.5–2 mm long; leaves pubescent . 8. *E. winitiana*
7. Bracts equal to or exceeding calyx and corolla, ciliate; stems pilose 6. *E. pilosa*
7. Bracts shorter than calyx and corolla, pubescent; stems pubescent or glabrescent 8
8. Corolla lilac; stems dark purple, shiny at base; annual herb up to 0.4 m tall 3. *E. griffithii*
8. Corolla white; stems pale green, not shiny; shrubby perennial herb up to 1.5 m tall 8. *E. winitiana*

1. *Elsholtzia beddomei* C.B. Clarke ex Hook.f.

Elsholtzia beddomei C.B. Clarke ex Hook.f. (1885) 643; Mukerjee (1940) 90; Press (1982) 69; B. Bongcheewin & Chantar. (2008) 1. — Type: *Beddome* 113 (holotype K (<http://specimens.kew.org/herbarium/K000192611>, last acc. 16 Feb. 2015)), Myanmar, Tenasserim, Thungyeen forest.

Shrubby perennial herb up to 1.7 m tall. *Stems* erect, densely tomentose with white hairs and brownish glands. *Leaves* narrowly elliptic-ovate or elliptic, 5–10 by 1–2 cm, base attenuate, margin serrate; upper surface villous, with translucent dark yellow dots; lower surface densely villous; petioles 6–15 mm long. *Inflorescence* terminal and axillary, lax, verticils from adjacent nodes not overlapping, 4–8 mm apart, cylindrical, 5–16 cm long, densely tomentose; bracts narrowly lanceolate, 2–3 mm long, densely pubescent outside, glabrescent, with translucent brown dots inside; bracteoles narrowly triangular. *Calyx* campanulate, 2–3 mm long at anthesis; tube ventricose, 1.5–2 mm long, densely villous with yellow sessile glands outside, glabrescent inside; lobes subequal, ovate-triangular, 0.8–1 mm long. *Corolla* white, campanulate, 3.3–3.6 mm long; tube densely pubescent with sparsely translucent yellow dots outside, glabrous with an annulus inside; lobes densely pubescent with sparsely translucent yellow dots outside, glabrescent inside; median lobe obovate, apex emarginate, margin undulate; lateral lobes ovate-triangular or ovate, 0.4–0.5 by 1–1.1 mm; lower lip broadly elliptic, 1.1–1.2 by 1.7–1.8 mm, apex obtuse,

margin undulate. *Stamens* 4, exserted, glabrous. *Style* slightly exserted. *Nutlets* 4, ovate-oblong, 0.8–1 mm long.

Distribution — Myanmar and Thailand (N: Chiang Mai, Tak, Kamphaeng Phet).

Ecology — Open dry forest, on limestone, 800–1100 m altitude. Flowering and fruiting: November to March (June).

Specimens examined. Bongcheewin 518, 638; Paisooksantivatana 2048-87; Smitinand et al. 7867; Suddee & Puudja 1108.

Additional specimen seen. Beddome 147.

Note — There are two Beddome collections from Tenasserim, Thungyeen forest, i.e. *Beddome* 113 (K) & 147 (BM) but only the specimen at Kew has Hooker's handwriting on it.

2. *Elsholtzia blanda* (Benth.) Benth.

Elsholtzia blanda (Benth.) Benth. (1833) 162; (1848) 160; Hook.f. (1885) 643; Doan (1936) 978; Mukerjee (1940) 89; Keng (1969) 73; Murata (1971) 497; (1976) 183; Press (1982) 69; X.W. Li & Hedge (1994) 250; Phuong (1995) 35; A.L. Budantzev (1999) 20; Phuong (2000) 227.

Aphanochilus blandus Benth. (1829) sub t. 1282; (1830) 29. — Type: *Wall. Cat.* 1550.1 (K (Herb. Benthamianum) (<http://specimens.kew.org/herbarium/K000881696>, last acc. 16 Feb. 2015), lectotype chosen here; isolectotypes G-DC, K (Herb. Hookerianum) (<http://specimens.kew.org/herbarium/K000881698>, last acc. 16 Feb. 2015), K-W), Nepal, 1821.

Perilla elata D. Don (1825) 115. — Type: *Buchanan-Hamilton s.n.* (BM not found), Nepal. (Press & Shrestha (2000) enumerated Buchanan-Hamilton's collections from Nepal during 1802–1803 of which several were recognised as types of taxa in Don (1825), but the type of *Perilla elata* has not been found at BM, LINN-SM and LIV where the collections are mainly deposited.)

Shrubby perennial herb up to 2 m tall. *Stems* erect, tomentose with recurved hairs and yellowish sessile glands. *Leaves* ovate or elliptic-ovate, 4–16 by 2–6 cm, base attenuate, margin shallowly serrate; upper surface sparsely pubescent; lower surface densely pubescent on venation with translucent yellow dots; petioles 8–15 mm long. *Inflorescence* terminal and axillary, lax, verticils from adjacent nodes not overlapping, 3–5 mm apart, secund, 8–13 cm long; bracts narrowly lanceolate, curving upwards at apex, 2–5 by 1–1.7 mm; bracteoles linear. *Calyx* tubular, 2.2–2.5 mm long at anthesis; tube ventricose, densely hispidulous with translucent dots outside, pubescent inside; lobes unequal, narrowly or broadly triangular, 6–9 mm long. *Corolla* white, dilate-tubular; tube 1.2–1.5 mm long, glabrous outside, glabrous with an annulus inside; lobes densely hispidulous on both sides, margin undulate; lateral lobes ovate, apex truncate; median lobe broadly ovate; lower lip obovate, 0.5 mm, apex slightly emarginate, c. 0.5 mm long. *Stamens* 4, exserted, puberulous. *Style* slightly exserted, slightly swelling at base. *Nutlets* 4, oblong, 1.5 mm long.

Distribution — India, China, Myanmar, Thailand (N: Mae Hong Son, Chiang Rai, Chiang Mai, Nan, Lampang, Phitsanulok), Vietnam, Sumatra.

Ecology — Paddy field or open places in hill evergreen or pine-dipterocarp forest, 1000–2300 m altitude. Flowering and fruiting: October to February (March).

Specimens examined. Bongcheewin 233, 475, 762; Chamchumroon et al. 1674; Chermisirivathana 545; Fukuoka T-4352; Garrett 92, 842; Geesink et al. 7996; Hansen & Smitinand 12660, 12771; Hosseus 232, 239; Iwatsuki & Fukuoka T-3498; Kerr 1588, 1588B, 6562; Konta et al. 4665, 4702, 4959; Koyama & Phengklai T-44205; Koyama et al. T-32790, T-39628, T-39845; Larsen et al. 44339; Maxwell 87-1552, 95-1307, 01-676; Paisooksantivatana 1641-85; Put 4428; Sadakorn 241, 636; Santisuk 1151, 8646; Shimizu et al. T-11570, T-18886; Smitinand & Alsterlund 6728; S.P. et al. 16; Srisanga 1127; Suddee et al. 1083; Van Beusekom & Phengklai 2389; Yahara T-50284.

Note — The Wallich's Catalogue no. 1550 stamped with Herb. Benthamianum includes two collections mounted on the same sheet, i.e. *Wall. Cat.* 1550.1 (mounted on the left-hand side) and 1550.2. *Wall. Cat.* 1550.1 is in better condition and is selected as a lectotype.

3. *Elsholtzia griffithii* Hook.f. — Fig. 1a

Elsholtzia griffithii Hook.f. (1885) 644; Mukerjee (1940) 90; Press (1982) 70. — Type: *Griffith 3975* (holotype K (Herb. Hookerianum) (<http://specimens.kew.org/herbarium/K000192608>), last acc. 16 Feb. 2015)), India, Upper Assam, Mishmi Hills.

Dysophylla communis Collett & Hemsl. (1891) 114. — *Elsholtzia communis* (Collett & Hemsl.) Diels, *syn. nov.*, (1912) 47; Mukerjee (1940) 90; Press (1982) 69. — Type: *Collett 56* (holotype K (<http://specimens.kew.org/herbarium/K000881719>, last acc. 30 Apr. 2015)), Myanmar, Shan Hills, 1200 m, Nov. 1887.

Annual herb up to 40 cm tall. *Stems* erect, dark purple, shiny, white pubescent, glabrescent at base. *Leaves* ovate or ovate-elliptic, 3–6 by 1–2 cm, base attenuate, margin serrate or deeply serrate, pubescent with translucent yellow dots on both sides; petioles 8–10 mm long. *Inflorescence* terminal and axillary, compact, adjacent verticils overlapping, cylindrical, 3–8 cm long; bracts narrowly lanceolate, 2–3 by 0.2–0.3 mm, pubescent on both sides; bracteoles linear, pubescent. *Calyx* tubular, 2–2.5 mm long at anthesis; tube slightly ventricose, 1.5–1.8 mm long, densely pubescent outside, glabrous inside; lobes unequal, ovate, apex acute, margin ciliate, puberulous outside, glabrous inside; lower lip shorter than the upper. *Corolla* lilac, funnel-shaped; tube c. 2.5 mm long, hispidulous outside, glabrescent with an annulus inside; lobes slightly undulate; lateral lobes ovate; median lobe slightly emarginate; lower lip elliptic-ovate. *Stamens* 4, slightly exserted, glabrous. *Style* slightly exserted. *Nutlets* 4, oblong, 0.6 mm long.

Distribution — India, Myanmar, Thailand (N: Mae Hong Son, Chiang Mai; possibly introduced).

Vernacular name — Phak loom poom.

Ecology — Cultivated in home gardens, in disturbed forest or mountain valleys, 400–600 m altitude. Flowering and fruiting: November to February.

Specimens examined. Bongcheewin 506, 940; Budsara & Suriya 1; Lakshnakara 1520.

Note — *Elsholtzia griffithii* is morphologically similar to *E. communis* in leaf size, inflorescence, floral characters and the distribution range. Both species are inseparable based on specimen examination of a broader range from India, China, Myanmar and Vietnam and *E. communis* is thus reduced to a synonym under *E. griffithii*, the earlier name.

4. *Elsholtzia kachinensis* Prain — Fig. 1b, c

Elsholtzia kachinensis Prain (1904) 206; Mukerjee (1940) 92; Murata (1976) 184; Press (1982) 69; X.W.Li & Hedge (1994) 253. — Type: *Muqim 81* (CAL photo, lectotype chosen here; isoelectotype K (<http://specimens.kew.org/herbarium/K000881721>, last acc. 16 Feb. 2015)), Myanmar, Sima, Kachin Hills, 1950 m, Dec. 1899 (not 1898 as labelled at K).

Aquatic herb. *Stems* prostrate, green or purple at base, pilose. *Leaves* ovate, 1–3 by 0.8–2 cm, apex slightly acute, base broadly cuneate, margin serrate; upper surface sparsely pubescent on venation; lower surface glabrous with translucent dots; petioles c. 5 mm long. *Inflorescence* terminal, compact, adjacent verticils overlapping, or lax, verticils from adjacent nodes not overlapping, 3–8 mm apart, cylindrical, 2–8 cm long; bracts opposite-decussate, green, purplish at tip, broadly ovate, 3–5 by 4–5 mm, apex cuspidate, margin ciliate, glabrous on both sides; bracteoles absent. *Calyx* campanulate, 1.5–2 mm long at anthesis; tube slightly ventricose, 1–1.5 mm long, pubescent outside, glabrous inside; lobes subequal, triangular, densely glandular punctate outside, glabrous inside. *Corolla* lilac, dilate-tubular, 4–5 mm long; tube 3–4 mm long, slightly curving downwards, glabrous on both sides; lobes ovate, 1 mm long, margin slightly undulate, sparsely pubescent outside, glabrous inside; upper lip with ovate lobes, 1 mm long, margin slightly undulate; lower lip broadly ovate, 1.5 mm long. *Stamens* 4,

exserted, glabrous. *Style* exserted. *Nutlet* 1–4, obovate, 2 mm long.

Distribution — China, Myanmar, Thailand (N: Chiang Mai; possibly introduced).

Vernacular names — Phak lern, Phak luean.

Ecology — Cultivated in home gardens or found by streams in disturbed forest, 500–1400 m altitude. Flowering and fruiting: October to December.

Specimens examined. Bongcheewin et al. 1017, 1020; Maxwell 96-1468; Put 3478, 3881; Umpai 506.

Additional specimen seen. Muquim 48.

Notes — In 1898–1905, Prain was a superintendent at Royal Botanic Garden, Calcutta (Stafleu & Cowan 1983), therefore a collection housed at CAL is chosen as lectotype.

There are two inflorescence forms, compact and lax. At early anthesis, the inflorescence is short, 2–3 cm long, and compact. Later on, the central axis elongates rendering inflorescence lax. The compact inflorescence may appear secund on herbarium sheets because of pressed opposite-decussate broad bracts.

5. *Elsholtzia penduliflora* W.W.Sm.

Elsholtzia penduliflora W.W.Sm. (1918) 176; Press (1982) 70; X.W.Li & Hedge (1994) 250; Phuong (1995) 35; A.L.Budantzev (1999) 21; Phuong (2000) 231. — Type: *Forrest 11686* (holotype E), China, Western flank of the Tali Range, open scrub in side valleys, 25 40' N, 3000 m, July 1913. *Aphanochilus penduliflorus* (W.W.Sm.) Kudo (1929) 64.

Shrubby perennial herb up to 2 m tall. *Stems* erect, curving more or less downwards, pubescent with whitish hairs. *Leaves* ovate, 9–15 by 2–4 cm, base cuneate, margin serrate; upper surface pubescent; lower surface pubescent on venation with brownish glands; petioles 5–10 mm long. *Inflorescence* terminal and axillary, lax, verticils from adjacent nodes not overlapping, 10–15 mm apart, hanging down, cylindrical, 8–15 cm long; bracts linear, 3–5 by 0.8–1 mm; bracteoles linear, 1–2 mm long. *Calyx* tubular, 3–5 mm long at anthesis; tube slightly ventricose, 2–3 mm long, glabrous with translucent dots outside, glabrous inside; lobes subequal triangular, glabrous on both sides. *Corolla* campanulate, 3–4 mm long; tube 2.5 mm long, glabrous on both sides; lobes glabrous on both sides; lateral lobes ovate; median lobe emarginate; lower lip broadly ovate, 1 mm long, apex emarginate. *Stamens* 4, slightly exserted, glabrous. *Style* exserted. *Nutlets* 4, ovate-oblong, 1.5 mm long.

Distribution — China, Thailand (N: Chiang Mai, Phitsanulok; possibly introduced), Vietnam.

Ecology — Cultivated in medicinal gardens, disturbed areas around habitation, 800–1100 m altitude. Flowering and fruiting: October to January.

Specimens examined. Jatupol 07-033; Maxwell 88-1255; S.P. et al. 49; Umpai 564.

Note — *Elsholtzia penduliflora* is likely to be cultivated because most collections collected are from areas around dwellings and medicinal gardens. We have not observed this species in natural habitats.

6. *Elsholtzia pilosa* (Benth.) Benth.

Elsholtzia pilosa (Benth.) Benth. (1833) 163; Hook.f. (1885) 644; Doan (1936) 979; Mukerjee (1940) 88; Murata (1976) 184; Press (1982) 70; X.W.Li & Hedge (1994) 250; Phuong (1995) 35; A.L.Budantzev (1999) 21; Phuong (2000) 229.

Aphanochilus pilosus Benth. (1829) sub t. 1282; (1830) 30. — Type: *Wall. Cat. 1556* (K (Herb. Benthamianum) (<http://specimens.kew.org/herbarium/K000881687>, last acc. 16 Feb. 2015), lectotype chosen here; isoelectotypes G-DC, K (Herb. Hookerianum) (<http://specimens.kew.org/herbarium/K000881689>, last acc. 16 Feb. 2015), K-W), Nepal, 1821.

Dysophylla mairei H.Lév. (1912) 236. — Type: *Maire s.n.* (holotype E; isotype E), China, Yunnan, Tong-Tchouan, 2500 m, Sept. 1911.



Fig. 1 a. *Elsholtzia griffithii* Hook.f. b. *E. kachinensis* Prain, compact inflorescence form; c. lax inflorescence form; d. *E. stachyodes* (Link) Raizada & Saxena.

Annual herb up to 15 cm tall. *Stems* erect, pilose. *Leaves* ovate or ovate-elliptic, 1–3 by 0.8–1.5 cm, base cuneate, margin serrate; upper surface pubescent; lower surface pubescent with translucent dots; petioles 7–8 mm long. *Inflorescence* terminal and axillary, compact, adjacent verticils overlapping, cylindrical, 1–2 cm long; bracts narrowly elliptic, 2–4 mm long, margin ciliate; bracteoles linear. *Calyx* infundibular-tubular, 2–4 mm long at anthesis; tube slightly ventricose, 1–2 mm long, pilose on throat outside, glabrous inside; lobes equal, triangular. *Corolla* tubular, 2–3 mm long; tube 1.8 mm long, pubescent outside, glabrous inside; lobes pilose outside, glabrous inside; median lobe with emarginate apex; lower lip broadly elliptic, 0.6 mm long. *Stamens* 4, slightly exserted, glabrous. *Style* slightly exserted. *Nutlets* 4, oblong-ovate, 0.75 mm long.

Distribution — India, Nepal, China, Thailand (N: Chiang Mai), Vietnam.

Ecology — Hill evergreen forest, 1600–2000 m altitude. Flowering and fruiting: November.

Specimen examined. Kerr 6618.

7. *Elsholtzia stachyodes* (Link) Raizada & Saxena — Fig. 1d

Elsholtzia stachyodes (Link) Raizada & Saxena (1966) 309; Press (1982) 70; X.W.Li & Hedge (1994) 251 as *E. stachyodes* (Link) C.Y.Wu (1974) 340; B.Bongcheewin & Chantar. (2008) 3.

Hyptis stachyodes Link (1822) 106. — Type: unknown. (Link's herbarium is at B, probably destroyed.)

Aphanochilus incisus Benth. (1829) sub t. 1282. — Type: Wall. Cat. 1552 (syntype K (Herb. Benthamianum)), Myanmar, Taong Dong, 1826.

Elsholtzia incisa (Benth.) Benth. (1833) 162; Hook.f. (1885) 644; Mukerjee (1940) 89.

Perennial herb up to 1 m tall. *Stems* erect, yellow-brown, much branched, puberulent with densely pale yellow hairs curving downwards, glabrescent at base. *Leaves* rhomboid-ovate, 1.5–4 by 1–3 cm, base attenuate, margin deeply serrate; upper surface glabrous with short pale yellow recurved hairs on venation; lower surface glabrous with densely translucent dots and recurved hairs on venation; petioles 30–50 mm long. *Inflorescence* terminal and axillary, lax, verticils from adjacent nodes not overlapping, c. 3 mm apart, cylindrical, 4–10 cm long; bracts linear, 1–2 by 0.1–0.2 mm; bracteoles linear. *Calyx* campanulate, 1–1.5 mm long at anthesis; tube slightly ventricose, 0.5–1 mm long, densely whitish pubescent with translucent dots outside, glabrescent inside; lobes subequal, triangular-subulate, 0.7–1 mm long. *Corolla* white or lilac, campanulate, 1.5–2 mm long; tube 1–1.2 mm long, sparsely hispidulous outside, glabrous without an annulus inside; lobes hispid outside, glabrescent inside; median lobe slightly emarginate; lower lip emarginate. *Stamens* 2, slightly exserted, glabrous. *Style* included. *Nutlets* 4, oblong-ovate, 0.8 mm long.

Distribution — India, Nepal, China, Myanmar, Thailand (N: Mae Hong Son, Chiang Mai; SW: Prachuap Khiri Khan; possibly introduced).

Vernacular name — Phak haan.

Ecology — Cultivated in home gardens, disturbed areas or open slopes in hill evergreen forest, 1000–1800 m altitude. Flowering and fruiting: November to February.

Specimens examined. Bongcheewin 939; Neamsuvan 87; Paisooksantivatana 2578–89; Sadakorn 364; Suddee et al. 2123; Tanaka et al. HN 8381; Thaithong 1157.

Note — All types of Link were at B and were largely destroyed. No material is present in B-W. Neotypification may be necessary.

8. *Elsholtzia winitiana* Craib

Elsholtzia winitiana Craib (1918) 368; Doan (1936) 980; Murata (1971) 497; (1976) 184; Press (1982) 70; X.W.Li & Hedge (1994) 249; Phuong (1995) 35; A.L.Budantzev (1999) 21; Phuong (2000) 235. — Type: Kerr 1607B (holotype K (<http://specimens.kew.org/herbarium/K000929591>), last acc. 5 Mar. 2015); isotypes E, 2 sheets K (<http://specimens.kew.org/herbarium/K000192605> & <http://specimens.kew.org/herbarium/K000929592>), last acc. 5 Mar. 2015), Thailand, Chiang Mai, Doi Sutep, mixed jungle, 660 m, 3 Dec. 1911.

Shrubby perennial herb up to 1.5 m tall. *Stems* erect, pale green, not shiny, densely pubescent. *Leaves* elliptic-ovate or elliptic, 4–12 by 1.5–3 cm, base cuneate, margin shallowly serrate; upper surface densely pubescent on venation; lower surface densely pubescent with translucent pale yellow dots; petioles 10–30 mm long. *Inflorescence* terminal and axillary, much branched, compact, adjacent verticils overlapping, or lax, verticils from adjacent nodes not overlapping, 5–8 mm apart, cylindrical, 4–9 cm long; bracts narrowly lanceolate, 0.5–1 by 2.5–3 mm, pubescent on both sides; bracteoles linear, 2 mm long. *Calyx* campanulate, 1.8–2.3 mm long at anthesis, densely pubescent with translucent brown dots outside, glabrous inside; tube ventricose, 1–1.5 mm long; lobes unequal, triangular or triangular-ovate. *Corolla* white, 1.5–2 mm long; tube glabrescent outside, glabrous with an annulus inside; lateral lobes ovate, apex truncate; median lobe broader than lateral lobes; lower lip elliptic-ovate, hispidulous with translucent brown dots outside, glabrescent inside. *Stamens* 4, slightly exserted, glabrous. *Style* slightly exserted. *Nutlets* 4, oblong, 0.8 mm long.

Distribution — China, Myanmar, Thailand (N: Chiang Rai, Chiang Mai, Nan, Uttaradit), Vietnam.

Ecology — Open places in hill evergreen, deciduous, pine or dipterocarp forests, 600–2000 m altitude. Flowering and fruiting: October to March.

Specimens examined. Bongcheewin 234, 480, 595, 934; Chayamarit et al. 2360, 3251; Chermisrivathana 317, 749; Chueachom 497; Hansen et al. 10789; Jatupol 08-456; Kerr 1607, 1607B; Koyama & Phengklai T-40034; Koyama et al. T-31975, T-32237, T-32279, T-32281; Maxwell 97-1492, 98-1426, 04-777; Nanakorn et al. 10302; Paisooksantivatana 590-81; Phengklai et al. 6271; Ploenchit 971; Sadakorn 636; Sangkhachand 126; Sankamethawe 381; Santisuk 6648; Smitinand & Alsterlund 6729; Smitinand et al. 10282; Sørensen et al. 1297, 2746; S.P. 45; Suddee et al. 2910; Tagawa & Yamada T-79.

Note — *Elsholtzia winitiana* is morphologically similar to *E. pubescens* Benth., by having a compact inflorescence, membranaceous leaf texture and shrubby habit. However, *E. winitiana* has a smaller corolla, 1.5–2 mm long and is found from China and Indo-China, whereas *E. pubescens* has a larger corolla, c. 4 mm long and found in Java, Lesser Sunda Island and SW Sulawesi (Govaerts et al. 2015). Some materials from Java have been incorrectly identified as *E. winitiana*.

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