

New species and combinations in *Machilus* and *Phoebe* (Lauraceae) in Thailand and Cambodia

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ABSTRACT

Three new species of *Machilus* and one new species of *Phoebe* in Thailand are described and illustrated. Three new combinations for species of *Machilus* in Thailand and Cambodia are made.

KEYWORDS: conservation assessments, lectotype, *Persea*.

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INTRODUCTION

The Flora of Thailand project is progressing towards completion within the next few years (Middleton *et al.*, 2019). One of the outstanding families is the Lauraceae with approximately 18 native genera and 140 native species (Chayamarit, 2006). Progress has been made on a number of Lauraceae genera for Thailand, such as *Actinodaphne* Nees (Tanaros *et al.*, 2010), *Litsea* Lam. (Ngernsaengsaruary *et al.*, 2012), *Cryptocarya* R.Br. (de Kok, 2015) and *Beilschmiedia* Nees (de Kok, 2021). Work on the remaining genera in Thailand is ongoing.

Kostermans (1975) published many new species of Lauraceae from Thailand but since then only a small number of new species has been described (e.g., Ngernsaengsaruary *et al.*, 2004; Mitsuyuki *et al.*, 2018; Zhang *et al.*, 2020). Recent collecting and taxonomic research in neighbouring Cambodia, however, has led to the description of many new species (Mase *et al.*, 2020 and further citations therein) and it is, therefore, to be expected that new Lauraceae diversity will also be found elsewhere as the wider region is further explored.

Taxonomic research on the genera *Machilus* Nees and *Phoebe* Nees for the Flora of Thailand has led to the discovery of three new species in the genus *Machilus* and one new species in the genus *Phoebe*. These species are described and illustrated here. In addition, due to the relatively recent resurrection of the genus *Machilus* from synonymy of *Persea* Mill. (Rohwer *et al.*, 2009; Li *et al.*, 2011; Mase *et al.*, 2020), some new combinations in *Machilus* are necessary.

MATERIALS AND METHODS

The new species are described after a study of the herbarium material from A, AAU, BKF, BM, C, CMUB, E, GH, K, L, QBG, P, PSU, SING (Thiers, continuously updated), additional original material available at JSTOR Global Plants (plants.jstor.org), and the study of relevant protologues and regional accounts (e.g., Hooker, 1886, 1890; Lecomte, 1914; Ridley, 1924; Kochummen, 1989). All specimens have been seen, some of the isolectotypes only through JSTOR Global Plants, unless otherwise noted. Many of the specimens, including types, lack barcodes at time of writing. Measurements of all but the floral parts were taken from dry specimens.

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Flower measurements are from rehydrated flowers. Measurements of the flowers were taken with a microruler and should be considered accurate to 0.05 mm.

Mase *et al.* (2020) described new species based on both morphological and molecular data. In their work, the species recognised mostly had rather restricted distributions in Cambodia and they conclude that names used for *Machilus* species in Cambodia that are typified by specimens from distant regions are not to be found in the country. Some *Machilus* species that have geographically restricted distributions in Thailand have also previously been labelled with names typified by specimens from regions often far from Thailand. Following the example of Mase *et al.* (2020), when the Thai material is similar to but nevertheless morphologically distinguishable from species from outside Thailand, I err on the side of recognition of new species to reflect likely distinct evolutionary lineages (e.g., *Machilus garrettii* D.J.Middleton from northern Thailand and *M. pierrei* (Lecomte) D.J.Middleton from Cambodia; *M. suddee* D.J.Middleton from northeastern Thailand and *M. rimosus* (Blume) Blume from Java).

Conservation assessments follow the guidelines laid out in IUCN Standards and Petitions Committee (2022).

NEW SPECIES

Machilus garrettii D.J.Middleton, *sp. nov.*

Similar to *Machilus pierrei* (Lecomte) D.J.Middleton from Cambodia in the long acuminate delicate leaves which are much paler beneath, the small bud scales, and the pubescence on the stems, but differs in the generally longer inflorescences (3.5–13 cm long in *M. garrettii* vs 3–4 cm long in *M. pierrei*), laxer inflorescences in *M. garrettii*, and longer pedicels (3.5–5 mm long in *M. garrettii* vs 2–3 mm long in *M. pierrei*). Type: Thailand, Chiang Mai, Doi Angka [Doi Inthanon], Doi Pa Mawn spur, ca 1,670 m, 26 June 1934, *H.B.G. Garrett 871* (holotype **K**; isotypes **A**, **L**, **SING**). Fig. 1.

Tree to 15 m tall, to 40 cm dbh; bark grey, thin, roughened. Twigs drying grey-brown to blackish, densely minutely puberulent, 2–3.5 mm diameter, bud scales small, densely pubescent, caducous,

leaving zones of few broad scars around stems. *Leaves* spirally arranged, clustered towards stem apices; petiole 0.7–1.3 cm long, densely puberulent, slightly grooved above; blade thinly coriaceous, dull dark green above, pale green to grey-green beneath, elliptic to slightly obovate, 4.7–13 × 1.5–3.8 cm, 2.6–4.8 times as long as wide, base cuneate, apex acuminate to caudate, midrib sunken above, prominent beneath, 6–9 secondary veins on each side of midrib, at a steep angle to midrib, rather obscure, slightly prominent above and beneath, tertiary venation reticulate, areolate, above minutely puberulent along midrib, sparsely on lamina, glabrescent, beneath minutely and sparsely puberulent all over, more densely so on midrib. *Inflorescences* axillary near stem apices, often several and clustered, 3.5–13 cm long, axes terete to slightly flattened, puberulent throughout; peduncle 1.2–8 cm long; pedicels 3.5–5 mm long; flowers fragrant. *Tepals* yellow-green to pale green; outer tepals ca 0.95 times as long as inner tepals; outer tepals elliptic, 3.5–4.3 × 1.2–1.5 mm, apex acute, outside and inside puberulent; inner tepals elliptic, 3.7–4.5 × 1.4–1.6 mm, apex acute, outside and inside puberulent. *Filaments* of outer stamens 2.2–2.3 mm long, sparsely pubescent, especially at base, anthers 0.9–1 × 0.6–0.7 mm, glabrous; filaments of inner stamens 2.3–2.6 mm long, sparsely pubescent, 2 short-stalked glands at base, anthers 1–1.2 × 0.5 mm, glabrous; staminodes 1.7–2 mm long, sparsely pubescent at base. *Ovary* globose to obovoid, 1–1.1 mm long, glabrous; style 1–2.5 mm long, glabrous. *Fruits* globose, black when ripe, ca 9 mm diameter, tepals reflexed.

Thailand.—NORTHERN: Mae Hong Son [Mueang, Ban Napapaek, 20 May 1987, *Pooma & Werner 3* (**BKF**)], Chiang Mai [Doi Inthanon, Doi Pa Mawn spur, ca 1,670 m, 26 June 1934, *Garrett 871* (**A**, **K**, **L**, **SING**); Chom Tong, Ban Ang Ka Noy, 900 m, 1 June 1979, *Vidal et al. 6278* (**AAU**); Doi Suthep, 1,010 m, 23 June 2002, *Chamchumroon et al. V.C.1650* (**BKF**); Doi Suthep, 13 July 1948, *Saradej 36* (**BKF**); Doi Suthep, 1,650 m, 7 June 1914, *Kerr 3242* (**C**, **K**); Doi Suthep, SE side, 1,100 m, 25 June 1988, *Maxwell 88-796* (**BKF**, **L**); Mae Wong, Ban Khoomuan, 1,000 m, 23 June 2007, *Wongprasert 076-62* (**BKF**)], Chiang Rai [Mae Fah Luang, Sahnpayapry, 1,050 m, 22 July 2006, *Maxwell 06-501* (**CMUB**); Wiang Pa Pao, Hui Nam

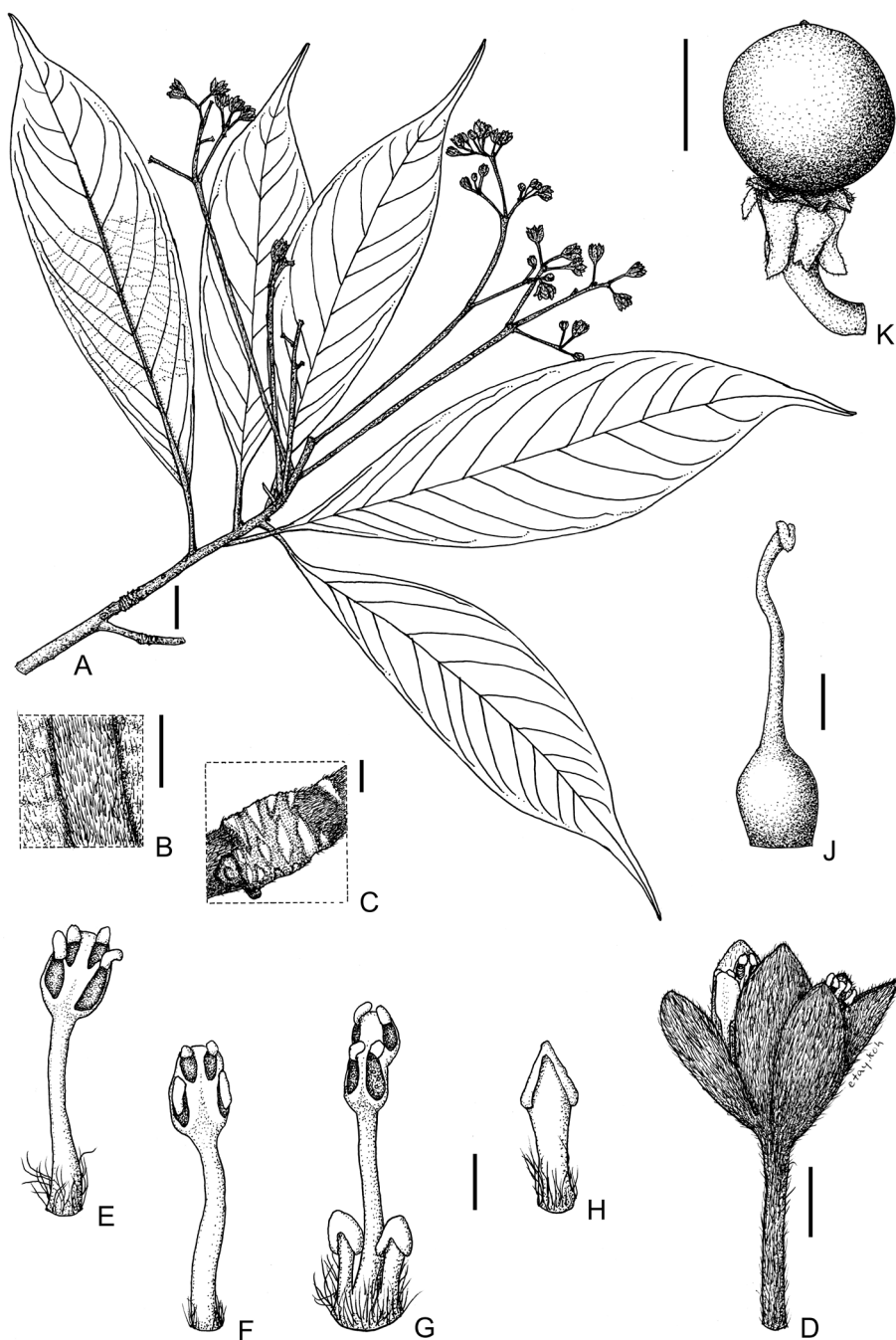


Figure 1. *Machilus garrettii* D.J.Middleton. A. Habit; B. Leaf undersurface pubescence; C. Zone of bud scale scars; D. Flower; E–G. Stamens from outer to inner whorls; H. Staminode; J. Pistil; K. Fruit. Scale bars: A, J = 1 cm; B = 0.5 mm; C, D, K = 1 mm; E–J = 0.5 mm. Drawn by Evonne Tay. A–J from Garrett 871 (K), K from Pooma & Werner 3 (BKF).

Lim Drainage, Doi Hua Mot, 2 June 1933, *Garrett 791* (A, BKF, K), Phayao [Phu Langka, Ban Kamnan, 27 June 1954, *Smitinand 1677* (BKF, C)].

Distribution.— Endemic to Thailand.

Ecology.— Mixed evergreen and deciduous forest on granite bedrock at 900–1,700 m elevation.

Etymology.— This species is named after Henry Burton Guest Garrett (1871–1959), the collector of the type material.

Provisional IUCN conservation assessment.— VU B1ab(iii), B2ab(iii). The EOO is < 20,000 km² and the AOO is < 500 km². The known locations are about eight which places this species in the Vulnerable category due to habitat degradation from forest clearance for agriculture across much of northern Thailand.

Notes.— See note under *Machilus pierrei* below.

***Machilus suddee* D.J.Middleton, sp. nov.**

Similar to *Machilus rimosus* Blume in the glabrous twigs, coriaceous leaves and arrangement of inflorescences but differs in the thicker leaf blade texture, the shorter inflorescences (3–7.5 cm long in *M. suddee* vs 7.5–15 cm long in *M. rimosus*) and mostly shorter tepals (3.5–5.5 mm long in *M. suddee* vs 5–8 mm long in *M. rimosus*). Type: Thailand, Loei, Phu Ruea District, Phu Luang, Khok Nok Kra Ba, Trail to Pha Chang Phan, 1,500 m, 24 Feb. 2007, *S. Suddee, P. Trisarasri, M. Tanaros & N. Ritphet 3007* (holotype BKF). Figs. 2–3.

— *Persea kurzii* (King ex Hook.f.) Kosterm. var. *sericea* Kosterm., Nat. Hist. Bull. Siam Soc. 25: 42 (1975 [‘1974’]). Type: Thailand, Chaiyaphum, Pu Kio [Phu Khiao], 1,000 m, 22 Feb. 1931, *A.F.G. Kerr 20212* (lectotype K, designated here; isoelectotypes BM, C).

Shrub or tree to 15 m tall, to 13 cm dbh; bark characters not recorded. Twigs drying dark brown to blackish, glabrous, 2.5–5 mm diameter; bud scales present, glabrous to densely puberulent but then with glabrous margin except for ciliae, caducous, leaving dense narrow rings of scars around stems. Leaves spirally arranged, not only clustered at stem apices; petiole 0.7–2 cm long, glabrous, grooved above; blade thickly coriaceous, dull dark green above,

glaucous beneath, elliptic to slightly obovate, 6.5–14.5 × 3.6–5.8 cm, 1.8–4.2 times as long as wide, base cuneate to obtuse, apex short acuminate to rounded, midrib slightly sunken above, prominent beneath, 6–11 secondary veins on each side of midrib, curving upwards, slightly prominent above and beneath, tertiary venation obscurely percurrent and then reticulate, areolate, above glabrous, beneath minutely and very sparsely sericeous when young, glabrescent with age. *Inflorescences* axillary near stem apices, emerging from the axils of the bud scales or scars, often several and clustered, somewhat congested, 3–7.5 cm long, axes terete to slightly flattened, minutely and sparsely puberulent throughout; peduncle 1.5–4 cm long; pedicels 2–3.5 mm long; flowers slightly scented, reported as both fragrant and unpleasant. *Tepals* green or yellowish; outer tepals 0.8–0.84 times as long as inner tepals; outer tepals elliptic, 3.5–4.6 × 1.4–1.7 mm, apices obtuse, pubescent outside and inside; inner tepals elliptic, 4.3–5.5 × 1.8–2.5 mm, apices acute, pubescent outside and inside. *Filaments* of outer stamens 2–2.4 mm long, glabrous to sparsely pubescent only at base, anthers 1.3–1.4 × 0.5–1 mm, glabrous; filaments of inner stamens 1.7–2.9 mm long, glabrous to sparsely pubescent at base, 2 short-stalked glands at base, anthers 1.2–1.3 × 0.5–0.7 mm, glabrous; staminodes 1.7–2.5 mm long, with a short filament and a triangular head, glabrous or with few hairs at base. *Ovary* obovoid, 1.3–1.6 mm long, glabrous; style 2–2.1 mm long, glabrous. *Fruits* globose, black when mature, 7.5–9 mm diameter, tepals very slightly thickened at base, reflexed, infructescence axes red.

Thailand.— NORTH-EASTERN: Loei [Phu Kradung, 1,040 m, 4 June 1946, *Amphorn 113* (BKF); *ibid.*, 1,200 m, 13 Mar. 1924, *Kerr 8709* (K); *ibid.*, 1,200 m, 19 Dec. 1982, *Koyama et al. T-31375* (BKF); *ibid.*, 13 Mar. 1952, *Bunpheng 514* (C); *ibid.*, 1,300 m, 8 Mar. 1952, *Dee 499* (BKF, C); *ibid.*, 1,300 m, 8 Mar. 1979, *Niyomdham & O’Connor 15706* (AAU); *ibid.*, 19 Mar. 1948, *Suvatabundha 155* (K); *ibid.*, 19 Mar. 1948, *Suvatabundha 156* (K); *ibid.*, 21 Apr. 1954, *Bunpheng 704* (C); *ibid.*, 22 Feb. 1946, *Premrasami s.n.* (BKF); Phu Ruea District, Phu Luang, 1,300 m, 13 Mar. 2023, *Smitinand s.n.* (BKF); *ibid.*, 1,350 m, 13 May 1998, *Wongprasert s.n.* (BKF); *ibid.*, 1,410 m, 13 May 1998, *Chayamarit et al. 1335* (BKF);

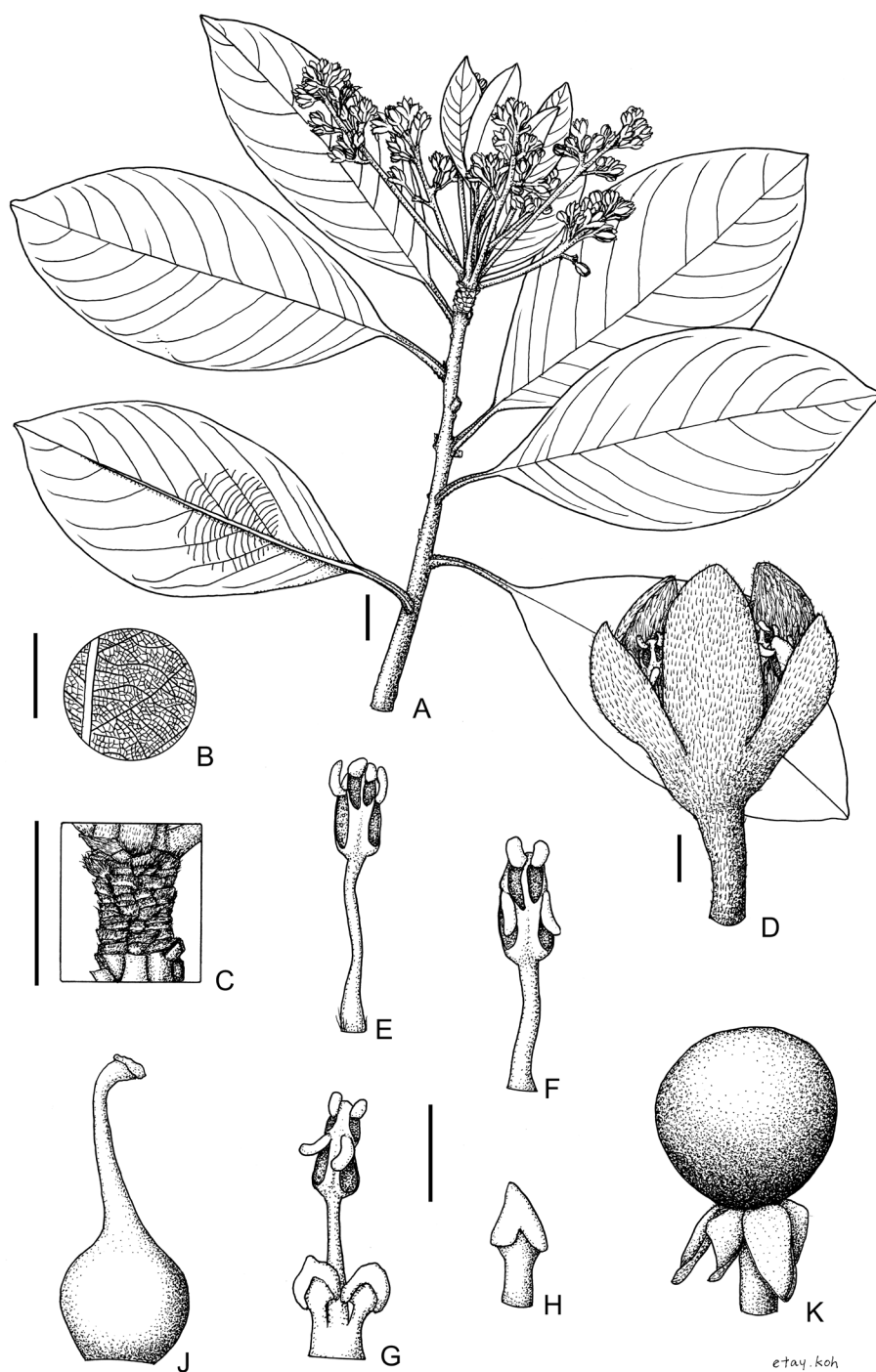


Figure 2. *Machilus suddee* D.J.Middleton. A. Habit; B. Leaf venation; C. Zone of bud scale scars; D. Flower; E–G. Stamens from outer to inner whorls; H. Staminode; J. Pistil; K. Fruit. Scale bars: A–C, K = 1 cm; D–J = 1 mm. Drawn by Evonne Tay. A–J from Suddee *et al.* 3007 (BKF), K from Smitinand *s.n.* (BKF).



Figure 3. *Machilus suddee* D.J.Middleton. A. Habit; B. Inflorescence; C. Flower; D. Fruit. Photos by Montri Tanaros (A), Naiyana Tetsana (B), Preecha Karaket (C) and Sukid Rueangruea (D).

ibid., 1,500 m, 4 Feb. 1983, *Niyomdham et al.* 515 (BKF); ibid., 19 Feb. 1983, *Koyama et al.* T-33653 (BKF); ibid., Khok Nok Kra Ba, Trail to Pha Chang Phan, 1,500 m, 24 Feb. 2007, *Suddee et al.* 3007 (BKF); ibid., Ko Nokraba, Trail to Pha Somdet, 1,400 m, *Chamchumroon & Puff* V.C.1394 (BKF); Phu Ruea District, Phu Ruea National Park, 1,300 m, 4 May 1997, *Pooma* 1549 (BKF); ibid., 19 Feb. 1983, *Koyama et al.* T-33696 (BKF)]. EASTERN: Chaiyaphum [Phu Kio, 1,000 m, 22 Feb. 1931, *Kerr* 20212 (BM, C, K)].

Distribution.— Endemic to North-Eastern and Eastern Thailand.

Ecology.— Lower montane forest, pine forest and on sandy soil in open areas at 1,000–1,500 m elevation.

Etymology.— This species is named after Dr Somran Suddee (1962–), the principal collector of the type material.

Provisional IUCN conservation assessment.— Least Concern. Although currently known from relatively few locations, this species is best known

from the relatively undisturbed higher altitude habitats of Phu Kradung, Phu Luang and Phu Reua. It is also possible it occurs in similar habitats in Laos.

Notes.—Specimens of this plant were often previously labelled as *Machilus rimosus* Blume and combinations based on it, the type of which is from Java. *Machilus rimosus* differs particularly in the thinner leaf texture and the longer inflorescences.

The variety *Persea kurzii* var. *sericea* is included in synonymy. At the rank of species, the epithet '*sericea*' is not available in *Machilus* to make a new combination and I have chosen to publish it as a new species rather than as a **nom. et stat. nov.** Kostermans (1975) cited the type of *P. kurzii* (King ex Hook.f.) Kosterm. var. *sericea* Kosterm. as '*Kerr 29212* (BM, K)'. From the locality, other information given in the protologue, and the itinerary provided by Jacobs (1962) it is clear that the number given is a typographical error for 20212. As two specimens were cited as the type, which in 1975 did not affect valid publication of the name (Turland *et al.* 2018, Art. 40.2), the name is lectotypified here.

Machilus suddee can be distinguished from *M. kurzii* particularly in the thickly coriaceous leaves, the stouter petioles, and shorter inflorescences. In addition, many of the collections are described as shrubs and the largest tree is recorded at 15 m tall whereas *M. kurzii* is described as 'a large tree' in the protologue (Hooker, 1890). *Machilus kurzii* has also been applied to specimens of a number of other species in Thailand but does not occur in the country.

In some flowers, glands are also present on more than one whorl of stamens.

***Machilus thailandicus* D.J.Middleton, sp. nov.**

Similar to *Machilus dumicola* (W.W.Sm.) H.W.Li and *M. edulis* King ex Hook.f. in the densely tomentose twigs and leaves and the somewhat flattened peduncles but differs from both species in lacking bud scales (present in *M. dumicola* and *M. edulis*) and in having longer and laxer inflorescences. Type: Thailand, Phetchaburi, Kaeng Krachan National Park, Khao Phanoen Thung Ranger Substation, 950 m, 15 Dec. 2002, D.J. Middleton, S. Suddee & C. Hemrat 1667 (holotype BKF; isotypes A, AAU, E). Figs. 4–5.

Tree to 24 m tall, to 44 cm dbh; bark grey-brown to mid brown, smooth to rough, inner bark pink or cream. Twigs drying mid brown, densely brown tomentose when young, glabrescent with age, 3.5–7 mm diameter; terminal bud densely brown tomentose, perulate bracts absent. Leaves spirally arranged, clustered towards stem apices; petiole 1.8–2.8 cm long, densely tomentose, grooved above; blade coriaceous, dark green above, grey-green or slightly glaucous beneath, young leaves pink, elliptic to obovate, (4.8–)7.5–20.5 × (2.5–)4–9.9 cm, 1.9–2.7 times as long as wide, base cuneate to acute, apex shortly acuminate to rounded and apiculate, midrib sunken above, 8–12 secondary veins on each side of midrib, curving upwards, tertiary venation percurrent or alternate percurrent and then reticulate, above slightly prominent, more distinctly prominent beneath, areolate, above densely tomentose along midrib and secondary veins, with few scattered hairs elsewhere, beneath densely brown tomentose on midrib and secondary venation, paler pubescent throughout on tertiary venation. Inflorescences axillary, lax, 9.5–18 cm long, axes somewhat flattened, densely tomentose throughout; peduncle 4.8–11.5 cm long; pedicels 5–6.5 mm long. Tepals yellowish green; outer tepals ca 0.8 times as long as inner tepals; outer tepals elliptic, 3.7–5 × 1.5–3 mm, apices acute, outside and inside densely pale brown tomentose; inner tepals elliptic, 4.2–6.2 × 1.4–3.1 mm, apices acute, outside and inside densely pale brown tomentose. Filaments of outer stamens 2.5–3 mm long, with a few hairs, anthers 1–1.4 × 0.6–0.7 mm, glabrous; filaments of inner stamens 3–3.7 mm long, glabrous to sparsely pubescent, more densely so at base, 2 short-stalked glands at base, anthers 1–1.5 × 0.5–0.6 mm, glabrous or sparsely pubescent dorsally; staminodes 1.8–2 mm long, with a short filament and a triangular head. Ovary globose, 1–1.8 mm long, glabrous; style 2.7–2.8 mm long, glabrous. Fruits globose, black when mature, 13–20 mm diameter, tepals not thickened at base, reflexed.

Thailand.—SOUTH-WESTERN: Phetchaburi [Kaeng Krachan National Park, Khao Phanoen Thung Ranger Substation, 950 m, 15 Dec. 2002, Middleton *et al.* 1667 (A, AAU, BKF, E); *ibid.*, 1,000 m, 28 Mar. 2003, Middleton *et al.* 1752 (A, BKF, E); *ibid.*, 1,000 m, 24 Jan. 2005, Williams *et al.* 1053 (E, K). PENINSULAR: Ranong [Suksamran, Khlong Na Kha Wildlife Sanctuary, Kam Puan

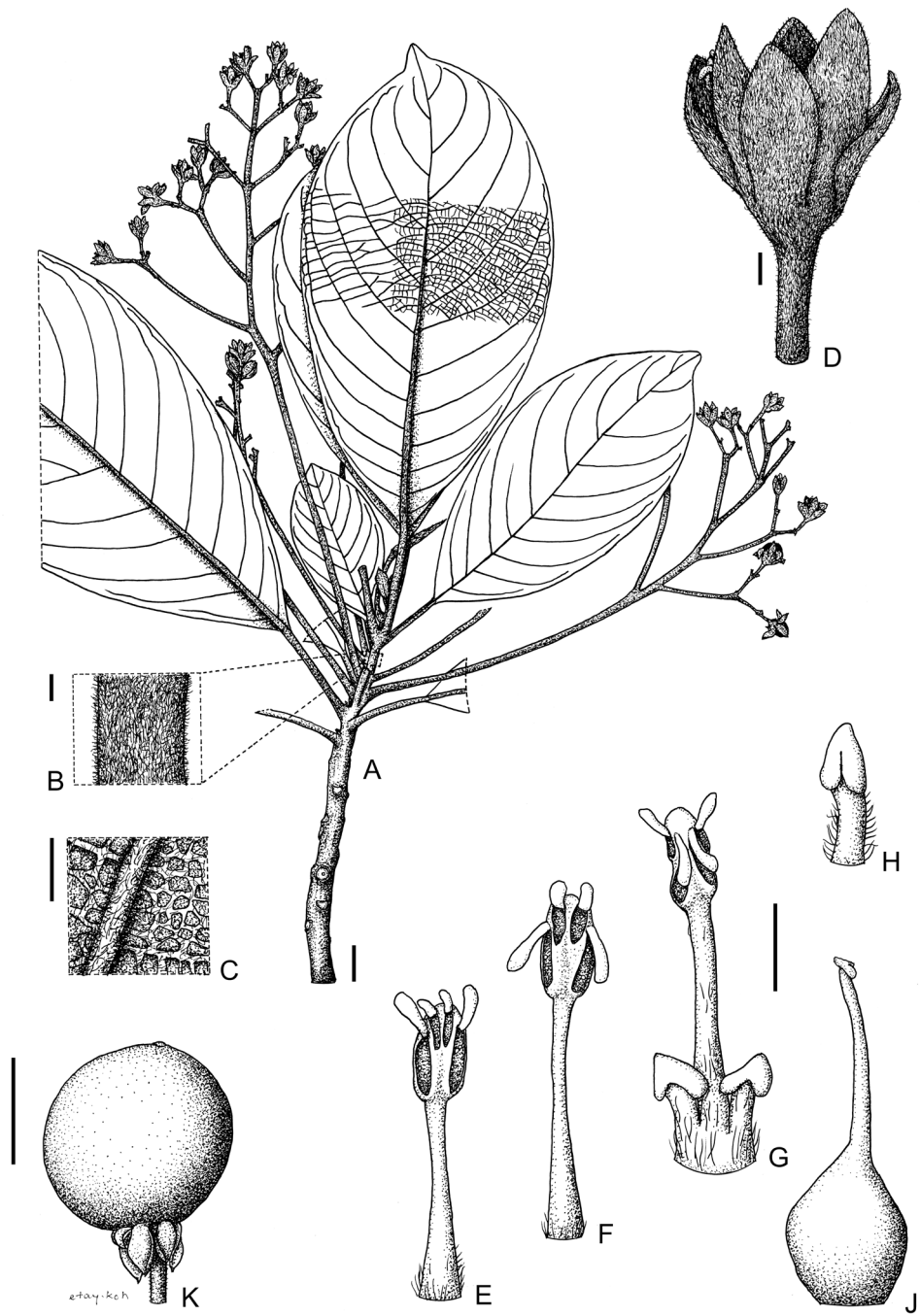


Figure 4. *Machilus thailandicus* D.J.Middleton. A. Habit; B. Stem pubescence; C. Leaf venation; D. Flower; E–G. Stamens from outer to inner whorls; H. Staminode; J. Pistil; K. Fruit. Scale bars: A, K = 1 cm; B–J = 1 mm. Drawn by Evonne Tay. A–J from Middleton et al. 1667 (AAU), K from Middleton et al. 1752 (BKF).



Figure 5. *Machilus thailandicus* D.J.Middleton. Photo by Walaiporn Wisawachaiwat.

substation, 100 m, 15 Jan. 2005, *Gardner & Tippayasri ST1328 (SING)*], Surat Thani [Phanom, Khao Sok National Park, Nature Trail north of headquarters, 80 m, 29 Nov. 2005, *Gardner & Khumchompoo ST1987 (E)*].

Distribution.— Endemic to South-Western and Peninsular Thailand. From its known distribution, it could also be found in neighbouring Myanmar.

Ecology.— In primary evergreen forest at 80–1,000 m elevation.

Etymology.— Named after Thailand.

Provisional IUCN conservation assessment.— Least Concern. Although currently known from relatively few locations, this species is known from National Parks and Wildlife Sanctuaries which have extensive suitable habitats with little human impact even though the actual collection localities are somewhat disturbed.

Notes.— This new species is particularly distinctive amongst Thai *Machilus* species in the pubescence of the stems and leaves, the lack of bud scales, and the relatively large flowers.

***Phoebe smitinandii* D.J.Middleton, sp. nov.**

Similar to *Phoebe attenuata* Miq. ex Meisn. in the sunken midrib above and the pubescent ovary (a rare character state in the genus) but differs in the minutely pubescent stems and inflorescence axes (tomentose in *P. attenuata*) and longer tepals (4.7–6.3 mm long in *P. smitinandii* vs 2.4–4 mm long in *P. attenuata*). Type: Thailand, Tak, Thung Yai Naresuan Wildlife Sanctuary, Huay Tae In, *Smitinand & Santisuk et al. 488* (holotype **BKF**). Fig. 6.

Tree to 40 m tall, dbh not recorded; bark colour not recorded, shallowly fissured. *Twigs* drying dark brown, minutely puberulent, ca 4 mm diameter, bud scales absent. *Leaves* spirally arranged, clustered towards stem apices; petiole 0.8–2.5 cm long, minutely puberulent, grooved above; blade coriaceous, colour not recorded, elliptic to slightly obovate, 7–18.7 × 2.8–5.8 cm, 2.4–3.6 times as long as wide, base cuneate, apex acuminate, midrib sunken above, prominent beneath, 9–12 secondary veins on each side of midrib, curving upwards, slightly prominent above and beneath, tertiary venation reticulate, areolate, above minutely puberulent on midrib, beneath minutely puberulent all over, hairs so small blade appears glabrous. *Inflorescences* arising in the axils of upper leaves, 5.5–17 cm long, axes terete; peduncle 2.3–11.5 cm long, minutely and sparsely puberulent; pedicels 4–6 mm long, densely puberulent. *Tepals* pale; outer tepals ca 0.76 times as long as inner tepals; outer tepals ovate, 4.7–4.8 × 2.9 mm, apex acute, densely pubescent outside and inside; inner tepals elliptic, 6.3 × 2.3 mm, apex acute, densely pubescent outside and inside. *Filaments* of outer stamens 2.4 mm long, densely pubescent, anthers 1.4 × 0.7 mm, pubescent dorsally; filaments of inner stamens 3 mm long, densely pubescent, 2 short-stalked glands at base, anthers 1.3 × 0.5 mm, pubescent dorsally; staminodes 2.7 mm long, pubescent. *Ovary* globose, 1.5 mm long, pubescent; style 3 mm long, pubescent. *Fruits* unknown.

Thailand.— **NORTHERN:** Tak [Thung Yai Naresuan Wildlife Sanctuary, Huay Tae In, *Smitinand & Santisuk et al. 488 (BKF)*].

Distribution.— Endemic to Northern Thailand.

Ecology.— Unknown but the Wildlife Sanctuary is primarily mixed deciduous and dry evergreen forest with montane forest at the higher altitudes.

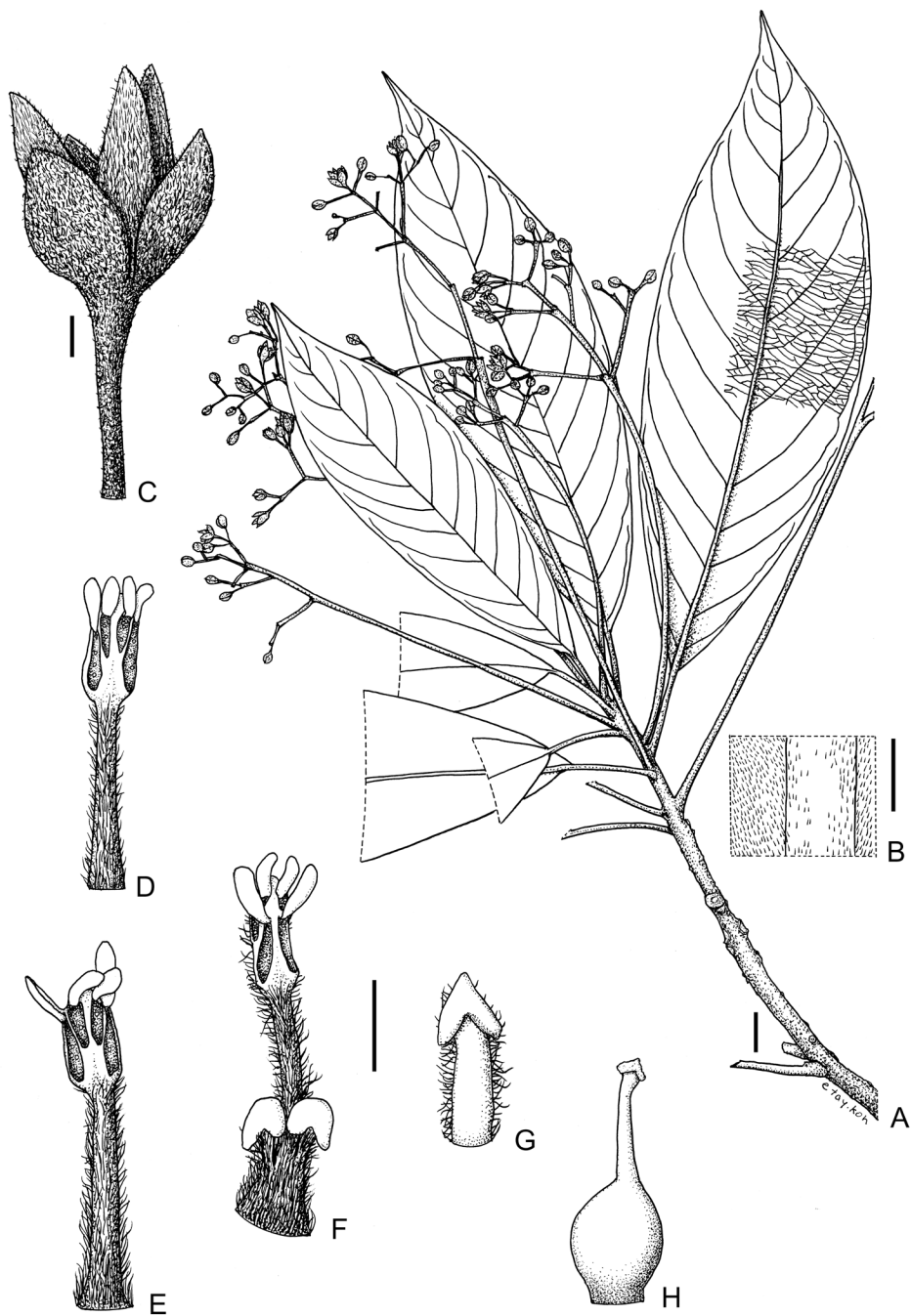


Figure 6. *Phoebe smitinandii* D.J.Middleton. A. Habit; B. Underside of lamina showing hairs; C. Flower; D–F. Stamens from outer to inner whorls; G. Staminode; H. Pistil. Scale bars: A = 1 cm; B–H = 1 mm. Drawn by Evonne Tay. All parts from Smitinand & Santisuk et al. 488 (BKF).

Etymology.—Named after Dr Tem Smitinand, co-founder of the Flora of Thailand project and one of the collectors of the type.

Provisional IUCN conservation assessment.—Data Deficient.

Notes.—Although this species is distinctive it is only known from one specimen and is consequently very poorly known.

NEW COMBINATIONS

Machilus chartaceus (Kosterm.) D.J.Middleton, **comb. nov.**—*Persea chartacea* Kosterm., Nat. Hist. Bull. Siam Soc. 25(3–4): 42. 1975. Type: Thailand, [Nakhon Nayok, Khao Yai National Park], Khao Khieo, 1,200 m, 20 June 1963, *Larsen 10144* (holotype C; isotype AAU).

Thailand.—NORTHERN: Phitsanulok [Phu Rom Rot, 1200 m, 3 Oct. 1967, *Shimizu et al. T-11479* (BKF, SING)], Kamphaeng Phet [Me Lamung, 500 m, 7 June 1922, *Kerr 6082* (K, L)]; NORTH-EASTERN: Loei [Na Haeo, Mae Nam Huaeng, 640 m, 9 Dec. 1996, *Nanakorn et al. 8016* (QBG); Na Haeo, Nam Hueang, 8 Nov. 1995, *Nanakorn et al. 5187* (QBG); Na Haeo, Phu Suan Sai National Park, 14 May 2008, *Maknoi & Srisanga 2230* (BKF); *ibid.*, 9 July 2008, *Maknoi 2495* (QBG); Na Haeo, Tad Hueng Fall, 650 m, 10 Dec. 1994, *Santisuk et al. s.n.* (BKF); Nang Saphung, 16 June 1948, *Nakkarn 59* (BKF)]; EASTERN: Chaiyaphum [Nam Phrom, 600 m, 10 Dec. 1971, *van Beusekom et al. 4078* (BKF, C, K, L); Tunkamang, 800 m, 16 Dec. 1971, *van Beusekom et al. 4367* (C, K, L); Tunkamang, 850 m, 2 June 1974, *Geesink et al. 7165* (AAU, BKF, C, K); Mueang, Na Fai, Ban Huay Markdang, 400 m, 13 Jan. 1970, *Lekagul 63* (BKF)], Nakhon Ratchasima [Katok, 200 m, 1 Jan. 1923, *Kerr 8200* (C, K); Khao Yai National Park, Haew Suwat Falls, 650 m, 3 Dec. 1983, *Fukuoka & Ito T-35039* (A, BKF, L); Khao Yai National Park, Haew Suwat Falls, 700 m, 19 Nov. 1982, *Koyama et al. T-30109* (A, BKF); Khao Yai National Park, Haew Suwat Falls, 865 m, 12 Dec. 2002, *Koonkhunthod et al. 351* (BKF)], Si Sa Ket [Khun Han, Huai Chan Falls, 200 m, 22 Dec. 2005, *Pooma et al. 6096* (BKF)], Surin [Sangka, 200 m, 13 Jan. 1924, *Kerr 8274* (C, K, L)], Ubon Ratchathani [Chiat, 100 m, 22 May 1932, *Kerr 21558* (C, K); Dong Phahuan, 4 Mar. 1996, *Niyomdham*

4596 (AAU, BKF); Khong Chiam, Pha Taem National Park, Dong Na Tham Forest, 400 m, 1 Mar. 2007, *Suddee et al. 3095* (BKF)]; CENTRAL: Nakhon Nayok [Khao Yai National Park, 800 m, 27 Apr. 1970, *Smitinand & Phengklai 10862* (K); *ibid.*, 760 m, 28 May 2003, *Promchua 10* (CMU); Khao Kieo, 1,200 m, 20 June 1963, *Larsen 10144* (AAU, C); Khao Yai National Park, Khao Khieo, 1,000 m, 13 Dec. 2002, *Koonkhunthod et al. 354* (BKF, SING); *ibid.*, 680 m, 16 Jan. 1985, *Konta et al. T-49083* (A, BKF); *ibid.*, 850 m, 11 Dec. 2002, *Koonkhunthod et al. 340* (BKF); Khao Yai National Park, Pha Kluaimai-Heao Suwat Falls Nature Trail, 700 m, 7 Feb. 2006, *Poopath et al. RP6123* (BKF)]; SOUTH-EASTERN: Prachin Buri [Krabin, 50 m, 30 Dec. 1924, *Kerr 9800* (C, K, L)], Chon Buri [Sriracha, Khao Pi, 15 Nov. 1926, *Collins 1361* (C, K); Sriracha, Chak Nai, 10 Nov. 1927, *Collins 1705* (C, K); Sriracha, near Khao Din, 12 m, 10 Dec. 1927, *Collins 1809* (C, K); near Sriracha, 20 m, 25 Nov. 1927, *Collins 1979* (K)], Chanthaburi [50 m, 6 Dec. 1924, *Kerr 9567* (C, K); Klung, 50 m, 2 Jan. 1930, *Kerr 17928* (C, K, L)], Trat [Klong Yai, 18 Mar. 2000, *Chayamarit et al. 1901* (BKF)].

Distribution.—Widespread in Thailand except for the South-West and Peninsula.

Machilus magniperulatus (Kosterm.) D.J.Middleton, **comb. nov.**—*Persea magniperulata* Kosterm., Nat. Hist. Bull. Siam Soc. 25(3–4): 42 (1975). Type: Thailand, Chumphon, Langsuan, Tako, 50 m, 7 Feb. 1927, *A.F.G. Kerr 11868* (holotype BM; isotypes A, K).

Thailand.—PENINSULAR: Chumphon [Bang Son, 14 Mar. 1928, *Put 1565* (C, K); Bang Son, 14 Mar. 1928, *Put 1568* (K); Langsuan, Tako, 50 m, *Kerr 11868* (A, BM, K)], Phangnga [Khura Buri: Ko Phra Thong, 50 m, 5 Apr. 2004, *Phengklai et al. 14297* (BKF)], Nakhon Sri Thammarat [Sichon: Klong Bake: Ban Yan, 25 m, 25 Feb. 1987, *Maxwell 87-208* (A, AAU, BKF, L); Ta Samet, 50 m, 29 Jan. 1928, *Kerr 14314* (C, K)], Trang [30 m, 1 Dec. 1915, *Vanpruk 835* (BKF, K); Ton The Waterfall, 100 m, 14 Nov. 1990, *Larsen et al. 41368* (AAU)], Songkhla [25 Feb. 1951, *Premrasami 119* (BKF); Hat Yai, Kho Hong Hill, 23 Feb. 1986, *Maxwell 86-91* (A, AAU, BKF, L); Hat Yai, Prince of Songkhla University, 7 Apr. 1986, *Maxwell 86-228* (A, AAU, BKF, L); Tepa, 50 m, 24 Mar. 1928, *Kerr 14755*

(C, K, L)], Narathiwat [Kok Mairuea, 5 m, 12 July 1983, *Niyomdham* 665 (BKF); *ibid.*, 12 Jan. 1986, *Niyomdham et al.* 1133 (AAU, BKF, E); *ibid.*, 25 Apr. 1986, *Niyomdham et al.* 1223 (A, AAU, BKF, K, L); Tak Bai, Phru Kok Ku, 26 Mar. 1985, *Niyomdham* 879 (AAU, BKF, C, K, L).

Distribution.— Endemic to Peninsular Thailand.

Machilus pierrei (Lecomte) D.J.Middleton, **comb. nov.**— *Phoebe pierrei* Lecomte, *Nouv. Arch. Mus. Hist. Nat.* sér. 5, 5: 102. 1913.— *Persea pierrei* (Lecomte) Kosterm., *Reinwardtia* 7: 355. 1968. Type: Cambodia, Tpong Province, Mt Knang-Krepeuh [Phnom Aural], 1,200 m, May 1870, *L. Pierre* 619 (lectotype **P** [P00740060], designated here; isoelectotypes **B** [B_10_0277499], **C** [C1001-3801], **F** [F0061792F], **K** [K000575989], **L** [L0036946], **MO** [MO-1295128], **P** [P00752536, P00752537, P04463479, P04463482], **SP** [SP000865], **VEN** [VEN60293]).

Distribution.— Endemic to Cambodia.

Notes.— Although *Machilus pierrei* does not occur in Thailand and the name is not, therefore, needed for the Flora of Thailand account, I make the combination here due to its similarities to *M. chartaceus*. Mase *et al.* (2020) noted that *M. pierrei* had been placed in both *Phoebe* and *Persea* but declined to make a combination in *Machilus* in their treatment of the genus in Cambodia due to the lack of fruiting material or DNA sequence data to ensure the correct placement of the species. It remains the case that these data are lacking but I make the combination here due to its similarity in many characters and hence likely congeneric status to *M. garrettii* for which fruiting material is known.

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