



## A Revision of the Genus *Machilus* Nees (Lauraceae) in the Indo-Burmese Region

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### Abstract

A taxonomic revision of the genus *Machilus* Nees is presented for the Indo-Burmese region including Sri Lanka, Pakistan, India, Nepal, Bhutan, Bangladesh and Myanmar. Twenty two species (one species with two varieties) are recognized, keyed out and treated with references, type citations, synonymy, flowering and fruiting periods, local names and uses, habitat, distribution and the specimens examined. *Machilus globosa* Das and *Persea upendrae* M.Gangop. are merged with *Machilus declinata* (Blume) de Kok, whereby the range of distribution of the species is extended to India. *Machilus macrantha* Nees and *M. glaucescens* (Nees) Wight, treated either as conspecific or distinct species by different authors, are recognized here as two distinct varieties of a single species, *M. macrantha*. A new combination, *Machilus hedgei* (M.Gangop. & A.Sarmah) Chakrab, P.P. Ghoshal, Anand Kumar & V.K. Rawat, based on *Phoebe hedgei* M.Gangop. & A.Sarmah is proposed. Eight accepted names (or their basionyms) and five synonyms have been lectotypified. Two species, *M. arunachalensis* (M.Gangop.) M.Gangop. and *M. thunbergii* Siebold & Zucc. are excluded from the treatment as doubtful or imperfectly known species.

**Keywords:** Taxonomy; lectotypification; new synonym; new combination; new status; Indian subcontinent.

### Introduction

The name *Machilus* was first used by Rumphius (1743). Desrousseau (1792) published the name with reference of Rumphius (1743) without naming any species. Later, the name *Machilus* was validated by Nees (1831), with four species. The genus is now known to be represented by about 100 species distributed in tropical and subtropical South and Southeast Asia (Wei & Werff, 2008). Kostermans (1962) transferred the Asian species of *Machilus* to *Persea* Mill. However, recent molecular evidences support the separation of Asian *Machilus* from *Persea* which is distributed in subtropical to tropical America and the Macaronesian Islands (Rohwer *et al.*, 2009, Li *et al.*, 2011). Thus all the Indo-Burmese species are now included within *Machilus*, and the only species

of *Persea* known from the area is the cultivated *P. americana* Mill.

The genus *Machilus*, as per its present circumscription, is characterized by the alternate to subopposite leaves, frequently crowded towards the apices of the twigs, entire and penninerved leaves, paniculate-cymose inflorescences, trimerous, bisexual flowers, nine stamens in three whorls, 4-locular anthers and the fruits enclosed at base by the persistent, spreading to reflexed tepals (Werff, 2001). Kostermans (1957) placed the genus *Persea* under subfamily Lauroideae Kosterm., tribe Perseae Mez, subtribe Perseneae Kosterm. along with the genus *Phoebe* Nees. The genus *Machilus* is indeed very closely related to *Phoebe*, and can be differentiated with certainty by the spreading

or reflexed tepals in the fruiting stage rather than clasping the base of the fruits (Werff 2001). Additionally, the tepals in *Machilus* are always thin (membranous to chartaceous) while those of *Phoebe* are leathery or fleshy and hard (de Kok, 2019). Hooker (1886, 1890) treated 20 species in erstwhile British India, including 8 new species. Kostermans (1978) recognized two species in Pakistan and only one species in Sri Lanka (Kostermans 1995). Long (1984) treated 12 species of *Persea* in Bhutan including the cultivated element *P. americana* while Pendry (2017) recognized the occurrence of 7 species of *Machilus* in Nepal. Kanjilal *et al.* (1940) treated 12 species of the genus in Assam. Kurz (1877) dealt with 4 species in Myanmar. Ara *et al.* (2007) enumerated one species of *Machilus* and 6 species of *Persea* in Bangladesh. Gangopadhyay (2006) described 9 new species of *Persea* from India, Bangladesh and Myanmar and also reported the occurrence of *Persea robusta* (W.W. Sm.) Kosterm and *P. thunbergii* (Siebold & Zucc.) Kosterm in India and of *Phoebe declinata* Nees [now *Machilus declinata* (Nees) de Kok] in Bangladesh. Subsequently he (Gangopadhyay,, 2009) described a new variety of *Persea macranta* (Nees) Kosterm. From Tamil Nadu, India. Finally, Gangopadhyay (2020) recognized the occurrence of 25 species (one species with two varieties) of *Machilus* in India. In the present revision, 22 species have been recognized in the Indo-Burmese region.

The species occurring in the Indo-Burmese region can be separated into two broad groups: some species have shoots subtended by a distinct ring of bud scale scars and the leaves in such cases are more or less clustered towards the tips of the twigs. In the other group, the species do not have such conspicuous ring of bud scale scars subtending the shoots and here the leaves are more or less evenly spaced and less clustered towards the apices of the branchlets. As the characters of the flowers are more or less uniform in the genus, some vegetative characters such as nature of indumentum and characters of leaves coupled with size and shape of fruits are among important

diagnostic characters useful for distinguishing the species.

Except for a few species such as *M. fruticosa*, *M. kingii* and *M. parviflora*, which are shrubs or trees 3–8 m high, the other species have been reported to be tall trees, 6–30 m in height. The species occur mainly in evergreen, tropical, subtropical and temperate forests and sholas (in peninsular India), reported up to an altitude of 2800 m above msl. The species in the area exhibit high degree of endemism with ten endemic species and they are mostly rare to very rare and represented by either type collections or a few old collections only.

It is hoped that the present revision will clarify most of the confusions so far encountered in the taxonomy of *Machilus* in the study area and will be helpful in identifying the taxa accurately.

## Materials and Methods

The present revision is based on the study of herbarium specimens and literature. The following herbaria were consulted (including digital images): ARUN, ASSAM, BM, BR, BSD, BSHC, BSI, CAL, E, FR, G, GZU, HBG, JCB, K, L, M, MEL, MH, NY, P, RHT, S, U and US. The systematic treatment contains generic nomenclature, citation of type and description. Key to the species is then presented. Detailed nomenclature, typifications and descriptions are provided for each species. The vernacular names and uses, if any, flowering and fruiting periods and distribution of each taxon treated are indicated. Selected specimens examined during the course of the present revision are also cited.

## Systematic Treatment

**Machilus** Nees in Wall., Pl. Asiat. Rar. 2: 61, 70. 1831; Dalzell & A.Gibson, Bombay Fl. 221. 1861; Brandis, Forest Fl. N.W. India 377. 1874; Kurz, Forest Fl. Burma 2: 291. 1877; Hook.f., Fl. Brit. India 5: 136. 1886; Prain, Bengal Pl. 2: 899. 1904; Duthie, Fl. Gangetic Plain 3(1): 50. 1915; Gamble, Fl. Madras 2(7): 1226. 1925; Kanjilal *et al.* Fl. Assam 4: 63. 1940.

*Lectotype* (designated by Kostermans 1952: 116): *Machilus odoratissima* Nees.

*Persea sensu auct. plur., non* Mill. 1754: Kosterm in Reinwardtia 4: 225. 1957; D.G. Long in Grierson & D.G. Long, Fl. Bhutan 1(2): 264. 1984; Kochummen, Tree Fl. Malaya 4: 172. 1989; Kosterm in Dassan. *et al.*, Rev. Handb. Fl. Ceylon 9: 129. 1995; Werff in Blumea 46(1): 138. 2001; Av. Bhattacharjee & A.A. Ansari in Lakshmin. *et al.*, Fl. West Bengal 4: 458. 2019.

Evergreen trees (usually large); perulate buds present or absent; indumentum simple. Leaves alternate or subopposite, evenly spaced along the twigs or somewhat clustered towards the tips of branchlets, entire, penninerved, mostly glaucous or glaucescent beneath; midrib usually incised on the upper surface, raised beneath; lateral nerves slender or stout; tertiary nerves scalariform to laxly

reticulate; minor nervules finely reticulate, often conspicuously raised on the upper surface; petioles usually channelled above. Inflorescences terminal, subterminal and axillary, paniculate-cymose, pedunculate, glabrous or variously pubescent. Flowers trimerous, bisexual; tepals 6, equal to subequal, half-erect at anthesis, persistent at the base of the fruit, spreading to reflexed, usually thin, rarely clasping the base of the fruits with tepals reflexed at apices only; stamens 9 in 3 series, often pubescent towards base of filaments, those of 1<sup>st</sup> and 2<sup>nd</sup> series eglangular, introrse, those of 3<sup>rd</sup> series glandular, extrorse; anthers 4-locular, linear-oblong; staminodes forming a 4<sup>th</sup> series, sagittate; ovary ovoid or globose, sessile; style short; stigmas small, capitate or discoid. Fruits fleshy, globose or ellipsoid-oblong; fruiting pedicel not or slightly enlarged.

### Key to the species

1a.	Shoots subtended by a ring of bud scale scars; leaves usually crowded towards tips of branchlets ..... 2
b.	Shoots not subtended by a ring of bud scale scars; leaves usually not crowded towards tips of branchlets but evenly spaced ..... 11
2a.	Panicle branches and perianth segments glabrous or sparsely puberulous ..... 3
b.	Panicle branchlets and perianth segments tomentose to villous or densely pubescent ... 5
3a.	Lateral nerves of leaves 14–20 pairs; pedicels 5–10 mm long; fruits globose, 2.5–3 cm in diameter ..... <b>2. M. clarkeana</b>
b.	Lateral nerves of leaves 8–15 pairs; pedicels 3–5 mm long; fruits ellipsoid to oblong-ellipsoid, 0.7–1.6 × 0.5–1 cm ..... 4
4a.	Tertiary nerves and minor nervules of leaves inconspicuous on both surfaces; panicles 3–5 cm long; fruits <i>ca</i> 7 × 5 mm ..... <b>10. M. kingii</b>
b.	Tertiary nerves of leaves prominent above, faint to prominent beneath; minor nervules finely reticulate-pitted and prominent on the upper surface, inconspicuous to somewhat prominent beneath; fruits 12–16 × 8–10 mm ..... <b>15. M. odoratissima</b>
5a.	Leaves mostly cuneate-obovate to oblanceolate; lateral nerves stout, strongly raised beneath; fruits 3.5–4.5 cm in diameter ..... <b>6. M. edulis</b>
b.	Leaves mostly oblong-elliptic or narrowly so or sometimes obovate to oblanceolate ( <i>M. gamblei</i> ); lateral nerves slender, faint to prominent but not strongly raised beneath; fruits (unknown in <i>M. dubia</i> ) up to 1.5 (–2.5) cm in diameter ..... 6
6a.	Lateral nerves of leaves 14–25 pairs ..... 7
b.	Lateral nerves of leaves 7–12 pairs ..... 8
7a.	Lateral nerves of leaves 14–20 pairs; fruits 0.8–1.2 cm in diameter; fruiting pedicels 5–6 mm long ..... <b>5. M. duthiei</b>
b.	Lateral nerves of leaves 18–25 pairs; fruits 2–2.5 cm in diameter; fruiting pedicels 8–12 mm long ..... <b>20. M. sharmae</b>
8a.	Mature leaves tomentellous beneath; minor nervules conspicuously and finely reticulate-areolate on the upper surface ..... <b>22. M. tomentosa</b>

b.	Mature leaves sparsely pubescent to glabrous beneath; minor nervules inconspicuous and obscure on the upper surface ..... 9
9a.	Leaves 5–6 cm broad, apiculate at apex; panicles up to 16 cm long ..... <b>4. M. dubia</b>
b.	Leaves 2–4 cm broad, apiculate to acuminate at apex; panicles 3–10 cm long ..... 10
10a.	Fruits 10–15 mm in diameter; fruiting pedicels 5–10 mm long; leaves often turning dark reddish brown on both surfaces on drying ..... <b>11. M. kurzii</b>
b.	Fruits 8–10 mm in diameter; fruiting pedicels 4–5 mm long; leaves turning pale brown or greenish-brown on both surfaces on drying ..... <b>8. M. gamblei</b>
11a.	Panicle branchlets and perianth segments tomentose to villous or densely pubescent.. 12
b.	Panicle branches and perianth segments glabrous or sparsely puberulous ..... 15
12a.	Leaves stiffly coriaceous; lateral nerves faint above; panicles 4–6 cm long ..... <b>18. M. russellii</b>
b.	Leaves thinly coriaceous; lateral nerves prominent above; panicles 7–28 cm long .... 13
13a.	Leaves usually unequal and rounded to obtuse at base, rounded to obtuse at apex; fruits 1–1.6 (–2) cm in diameter ..... <b>14.1. M. macrantha var. macrantha</b>
b.	Leaves equal and cuneate to acute at base, acute, apiculate to acuminate at apex; fruits 0.6–1 (–1.2) cm in diameter ..... 14
14a.	Leaves apiculate to acuminate at apex; lateral nerves 5–9 pairs; panicle branches tomentose to villous ..... <b>14.2. M. macrantha var. glaucescens</b>
b.	Leaves acute to apiculate at apex; lateral nerves 8–12 pairs; panicle branches sericeous ..... <b>19. M. sericea</b>
15a.	Leaves unequal and rounded to obtuse at base ..... 16
b.	Leaves more or less equal and cuneate to acute at base ..... 17
16a.	Leaves 2.5–5.5 cm broad, glossy above, curved downwards along margins, acute to apiculate at apex; panicles sparsely branched ..... <b>7. M. fruticosa, p.p.</b>
b.	Leaves 5.5–10.5 cm broad, not glossy above, flat along margins, apiculate to acuminate at apex; panicles profusely branched ..... <b>21. M. sikkimensis</b>
17a.	Leaves predominantly obovate, obovate-oblong to obovate-elliptic ..... <b>12. M. listeri</b>
b.	Leaves predominantly oblong-elliptic to lanceolate-oblong ..... 18
18a.	Leaves 14–35 × 4–10 cm; minor nervules conspicuously foveolate-reticulate on the upper surface ..... <b>17. M. robusta</b>
b.	Leaves 6–17 × 2–5.5 cm; minor nervules inconspicuous to faint or if prominent then not foveolate-reticulate on the upper surface ..... 19
19a.	Leaves flat along margins ..... 20
b.	Leaves curved downwards along margins ..... 22
20a.	Fruiting tepals reflexed ..... <b>13. M. lohitisensis</b>
b.	Fruiting tepals clasping the base of fruits, reflexed at apex only ..... 21
21a.	Trees, 10–30 m high; leaves thinly to thickly coriaceous, glabrous on the undersurface ..... <b>3.M. declinata</b>
b.	Trees, 4–5 m high; leaves chartaceous, sparsely appressed puberulous on the undersurface ..... <b>9. M. hedgei</b>
22a.	Leaves apiculate to acuminate at apex; fruits ellipsoid, 1.5–2 × 1–1.3 cm ..... <b>16. M. parviflora</b>
b.	Leaves obtuse, acute to apiculate at apex; fruits globose, 0.8–1 cm in diameter ..... 23
23a.	Leaves 2–2.5 cm broad, cuneate at base; lateral nerves 10–14 pairs ... <b>1. M. bhaskarii</b>
b.	Leaves 2.5–5.5 cm broad, obtuse to rounded or acute at base; lateral nerves 6–12 pairs ..... <b>7. M. fruticosa, p.p.</b>

**Enumeration of Taxa**

**1. *Machilus bhaskarii*** (M.Gangop.) Anand Kumar in Int. J. Adv. Res. Biol. Sci. 7(12): 29. 2020. – *Persea bhaskarii* M.Gangop. in Bull. Bot. Surv. India 48: 131. 2006.

*Type*: Myanmar, Tavoy, Feb. 1918, A.T. Gage 52 (holotype CAL0000024885!).

. Stature unknown; shoots not subtended with a ring of bud scale scars, young ones sparsely puberulous; branchlets glabrous when mature. Leaves alternate, not or slightly clustered at branch ends, narrowly oblong-elliptic to lanceolate-oblong, 6–13 × 2–2.5 cm, cuneate at base, curved downwards along margins, acute to subacute at apex, coriaceous, glabrous, pale green above when dry, glaucous beneath; lateral nerves slender, ascending, arcuate, 10–14 pairs, somewhat prominent above, faint beneath; tertiary nerves inconspicuous above, faint beneath; nervules faint above, obscure to faint beneath; petioles 10–13 mm long, glabrous. Panicles 8–16 cm long; branches glabrous; Flowers not seen. Fruit globose, 9–10 mm in diameter, blackish, smooth, glabrous; fruiting pedicels 5–6 mm long, ca 2 mm thick, slightly swollen; fruiting tepals spreading or reflexed, ovate to oblong, 2.5–3 × 1.2–1.5 mm.

*Fruiting*: February.

*Habitat*: No ecological data available.

*Distribution*: Myanmar – endemic.

*Specimens examined* (paratypes): **MYANMAR**. Tavoy, s.d., P.T. Russell 52 (CAL0000024886, CAL0000024887)

**2. *Machilus clarkeana*** King ex Hook.f., Fl. Brit. India 5: 137. 1886; M.Gangop. in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. Dicots 2: 443. 2020. – *Persea clarkeana* (King ex Hook.f.) Kosterm. in Reinwardtia 6: 191. 1962; D.G. Long in Notes Roy. Bot. Gard. Edinburgh 41: 521. 1984 & in Grierson & D.G. Long, Fl. Bhutan 1(2): 265. 1984; Av. Bhattacharjee & A.A. Ansari in Lakshmin. et al., Fl. West Bengal 4: 459. 2019

*Lectotype* (designated by Long 1984: 521): India, Sikkim, locality not indicated, 12 May

1874, W.J. Treutler 96 (K000228459, image!). *Additional syntypes*: India, Sikkim, 5–8000 ft., locality and date not indicated, J.D. Hooker s.n. (K000228455, K000228456, K000228457, K000821641, L0036941, images!). India, Sikkim, locality and date not indicated, King s.n. (K000228458, image!).

= *Machilus gammieana* King ex Hook.f., Fl. Brit. India 5: 137. 1886; M. Gangop. in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. Dicots 2: 444. 2020. – *Persea gammieana* (King) Kosterm. in Enum. Fl. Pl. Nepal 3: 186. 1982.

*Lectotype* (designated by Long 1984: 521): India, West Bengal, Darjeeling, date not indicated, J.D. Hooker s.n. (K000228455, image!). *Additional syntypes*: India, Sikkim, locality not indicated, 1874, King s.n. (K000228454, image!). India, West Bengal, Darjeeling dist., Tonglu, Mayong, 11 Oct. 1876, King 3105 (E00393307, image!).

Trees, 8–15 m high; GBH up to 80 cm; shoots subtended by a ring of bud scale scars, young ones glabrous; branchlets glabrous. Leaves alternate but clustered towards apices of branchlets, lanceolate-oblong to narrowly oblong or occasionally oblanceolate or suborbate, 9–19 (–27) × 1.5–3.5 (–4.5) cm, cuneate to cuneate-attenuate or acute at base, often slightly decurrent, acuminate (acumen 5–15 mm long, acute) at apex, thinly coriaceous, glabrous, greenish-brown, brown, dark reddish brown or blackish brown above when dry, paler and often coppery beneath, sometimes glaucescent; lateral nerves slender, 14–20 pairs, faint above, prominent to faint beneath; tertiary nerves obscure to faint above, faint to prominent beneath; nervules inconspicuous to faint above, obscure beneath; petioles (5–) 8–15 (–20) mm long, glabrous. Panicles 2–6 (up to 10 cm in fruiting) cm long; branches glabrous. Flowers: pedicels 5–10 mm long; tepals ovate-triangular to oblong, 4–6 × 1.8–3 mm, acute, sparsely puberulous to glabrous outside; stamens 3–4 mm long; anthers ca 1 mm long; ovary ca 1.5 mm long; style flat; stigma discoid. Fruits globose, 2.5–3 cm in diameter, occasionally ellipsoid, ca 2.5 × 1.8 cm

(possibly immature), glabrous; fruiting pedicels (6-) 10-15 mm long, stout.

*Flowering & fruiting:* March - September.

*Local names:* Nepali: *Kawla*, *Chipli kawla*, *Seto kawla*.

*Habitat:* Scattered in subtropical to temperate forests between 1600-2900 m altitudes.

*Distribution:* India (West Bengal, Sikkim), Nepal and Bhutan; also reported from northeast India and Myanmar.

*Specimens examined:* **NEPAL.** Chiqli, 18 Apr. 1954, V.Puri 152 (CAL). Without locality and date, no collector 32 (L.1812898); *ibid.*, Wallich s.n. (L.1812899); *ibid.*, 1821, Wallich s.n. (CAL herb. acc. no. 384524). **INDIA.** Sikkim: Little Rangeet, 10 Sept. 1918, No collector 1 (CAL).

*Notes:* Gangopadhyay (2020) treated *M. gammieana* as a distinct species without pinpointing the distinctive features

**3. *Machilus declinata*** (Blume) de Kok in Gard. Bull. Singapore 71(1): 150. 2019. - *Laurus declinata* Blume, Catalogus 66: 1823. - *Ocotea declinata* (Blume) Blume, Bijdr. Fl. Ned. Ind. 11: 572. 1826. - *Persea declinata* (Blume) Kosterm. in Reinwardtia 9: 111. 1974; Kochummen, Tree Fl. Malaya 4: 173. 1989. - *Phoebe declinata* (Blume) Nees, Syst. Laur. 114. 1836; Meisn. in DC., Prodr. 15(1): 34. 1864; Hook.f., Fl. Brit. India 5: 142. 1886; Ridl., Fl. Malay Penins. 3: 104. 1924; M.Gangop. in Bull. Bot. Surv. India 48: 155. 2006.

*Lectotype* (designated by de Kok 2019: 150): Indonesia, Java, Mt. Salak, Dec. 1822, No collector [possibly Blume] s.n. (L0036918, image!). *Additional original material:* Indonesia, Java, Blume s.n. (L0036919, L0036920, L0036921, L0036922, L0036923, L0036924, images!).

= *Machilus globosa* Das in Assam Forest Rec., Bot. 2: 9, t. 10. 1937; Kanjilal et al., Fl. Assam 4: 68. 1940; M.Gangop.in A.A.Mao & S.S.Dash, Fl. Pl. India Annot. Checkl. Dicots 2: 444. 2020. - *Persea globularia* Kosterm. in Reinwardtia 6: 192. 1962, syn. nov

*Lectotype* (designated here): India, Assam, Darrang dist., Charduar reserve, 9 May 1933, A.Das 10640 (ASSAM0000000127!; isolectotypes ASSAM0000000122!, ASSAM0000000123!, ASSAM0000000124!, ASSAM0000000125!, ASSAM0000000126!).

= *Persea upendrae* M.Gangop. in Bull. Bot. Surv. India 48: 146. 2006. - *Machilus upendrae* (M.Gangop.) Anand Kumar in Int. J. Adv. Res. Biol. Sci. 7(12): 30. 2020, **syn. nov.**

*Type:* Bangladesh, Sylhet district, Bashi hills, 28 Apr. 1915, U.N. Kanjilal 6895 (holotype ASSAM0000000110!).

Trees, 10-30 m high, GBH up to 1.5 m; shoots not subtended by a ring of bud scale scars, young ones sparsely pubescent to glabrous; branchlets glabrous. Leaves alternate (usually not clustered at branch ends), oblong to oblong-elliptic or narrowly so or sometimes lanceolate-oblong, 7-16 × 2-5 cm, acute or occasionally subacute at base, apiculate to acuminate (acumen 5-15 mm long, acute) at apex, coriaceous or thinly so, glabrous, pale green, greenish-brown, brown to dark reddish brown or occasionally blackish above when dry, brown or coppery and often glaucous or glaucescent beneath; lateral nerves slender, (6-) 8-12 pairs, prominent above, faint to distinct beneath, arcuate; tertiary nerves faint to prominent above, obscure to prominent beneath; nervules obscure to very prominent above, obscure to prominent beneath; petioles 5-12 (-20) mm long, glabrous. Panicles 5-14 cm long, slender; branches sparsely puberulous to glabrous. Flowers: pedicels 3-5.5 mm long, slender, glabrous; tepals subequal, ovate-triangular to oblong-elliptic, 2.5-4 × 1.5-1.8 mm, greyish tomentellous to glabrous outside, glabrous inside; stamens 3-4 mm long; anthers ca 1 mm long; ovary ca 1.5 mm long; styles ca 0.8 mm long; stigma peltate. Fruits globose, 7-10 mm in diameter; fruiting pedicels 3-6 mm long, slender; tepals clasping the base of fruits, reflexed at apex.

*Flowering & fruiting:* January - December (peak November - April).

*Local name:* Bengali (Chittagong): *Kongnal*; Burmese: *Ondon*.

*Habitat:* Rare in India but common on the Chittagong hill tracts of Bangladesh and also in Myanmar in primary evergreen forests up to 1100 m altitude.

*Distribution:* India (Assam), Bangladesh, Myanmar, Malaysia and Indonesia (Java and Sumatra).

*Specimens examined:* **BANGLADESH.** Chittagong dist., Hill tracts, Feb. 1940, S.K. Mukerjee 9 (CAL); *ibid.*, s.d., King's collector 262 & 386 (CAL). *ibid.*, Kasaluy area, 18 Feb. 1876, Lister 34 (CAL). **INDIA.** Assam: Nowgong dist., Dhansiri, 2 May 1934, A.Das 10635 (CAL0000021522! - top and right hand side specimens); *ibid.*, 12 July 1933, A.Das 10635 (CAL0000021522! - left hand side specimen). **MYANMAR.** Amherst dist., Dawua range, Near Lampa chaung, 21 Mar. 1909, Lace 4744 (CAL). Insein dist., Pymmadaw reserve, 7 Feb. 1915, C.E. Parkinson 10 (CAL). Tavoy dist., Kaloynaung, 16 Jan. 1919, Rogers 386 (CAL). Tavoy, Jan. 1901, Shaik Mokim 329 (CAL); *ibid.*, Sept. 1901, F.B. Manson 83 (CAL). Kowpon, 1912, A. Meebold 17015 (CAL). Rangoon hills, 1 Feb. 1919, A.Roger 799 (CAL).

*Notes:* Like *Phoebe*, here the tepals are clasping the base of the fruits but they are thin and reflexed at the apex, pointing to *Machilus*. The type of *M. globosa* (the most profusely flowering specimen is selected here as the lectotype) is a good match with specimens of *M. declinata*. However, the type of *M. upendrae* at first appeared distinct by the very prominent minor venation on the upper surface of the leaves but some original materials of *M. declinata* from Java also possess such prominent minor venation of leaves. The range of distribution of the species is herein extended to India.

**4. *Machilus dubia*** Das & P.C. Kanjilal in Assam Forest Rec., Bot. 2: 11. 1937 & in Kanjilal *et al.*, Fl. Assam 4: 69. 1940; M.Gangop. in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. Dicots 2: 443. 2020. - *Persea dubia* (Das & P.C. Kanjilal) Kosterm. in Reinwardtia 6: 191. 1962.

*Type:* India, Assam, Sibsagar dist., locality not indicated, 15 Sept. 1934, collector not indicated 10778 (holotype ASSAM0000000118!).

Trees, height unknown; shoots subtended by a ring of bud scale scars, young ones tomentellous; branchlets glabrous. Leaves alternate, clustered at branch ends, oblong-elliptic, 10–15 (–20) × 4.5–6 cm, acute at base, apiculate at apex, thinly coriaceous, glabrous, greenish above when dry, pale brown and glaucous beneath; lateral nerves slender, 8–10 pairs, prominent above and beneath; tertiary nerves inconspicuous to faint above and beneath; nervules inconspicuous; petioles 12–18 mm long, glabrous. Panicles *ca* 16 cm long, profusely branched; branches greyish tomentellous. Flowers: pedicels 3–4 mm long; tepals ovate-triangular, 3.5–4 × 1.5–2 mm, greyish tomentellous outside, glabrous inside; stamens 3.2–3.8 mm long; ovary *ca* 1.5 mm long; style *ca* 0.7 mm long; stigma peltate. Fruits not seen.

*Flowering:* September.

*Habitat:* Rare in primary forests.

*Distribution:* India (Assam) - endemic.

*Specimens examined:* Known from the type collection only.

*Notes:* Closely related to *M. gamblei*, but the leaves are broader and the panicles are larger and profusely branched.

**5. *Machilus duthiei*** King ex Hook.f., Fl. Brit. India 5: 861. 1890; Duthie, Fl. Gangetic Plain 3(1): 50. 1915; M.Gangop. in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. Dicots 2: 444. 2020. - *Persea duthiei* (King ex Hook.f.) Kosterm. in Reinwardtia 6: 191. 1962 & in Nasir & Ali, Fl. W. Pakistan 118: 7. 1978; D.G.Long in Grierson & D.G. Long, Fl. Bhutan 1(2): 266. 1984; Av. Bhattacharjee & A.A. Ansari in Lakshmin, *et al.*, Fl. West Bengal 4: 459. 2019, **Fig. 1 A-B**

*Lectotype* (designated by Kostermans 1978: 7): India, Uttarakhand, Kumaon, 1848, *Strachy & Winterbottom* 1 (K000228447, image!). *Additional syntypes:* India, Uttarakhand, Kumaon, Barmdeo (Bhabar), s.d., *Strachy &*

*Winterbottom* 3 (K000228448, image!). India, Uttarakhand, Jaunsaur, May 1881, *Brandis s.n.* (K000228451, image!). India, Himachal Pradesh, Kinnaur [Kunawur], June 1881, *Brandis s.n.* (HBG509878 - lower specimen, image!). India, Himachal Pradesh, Near Shimla, s.d., *Madden s.n.* (K000228446, image!); Shimla, Oct. 1880, *Brandis s.n.* (HBG509879, K000228449, images!). India, Himachal Pradesh, Bussahir, May 1881, *Brandis s.n.* (K000228452, image!). India, Himachal Pradesh, Chamba, s.d., *T.Thomson s.n.* (K000228450, image!).

Trees, 8–25 m high; GBH up to 90 cm; shoots subtended by a ring of bud scale scars, young ones tomentellous or villous, glabrous in age; branchlets glabrous. Leaves alternate, clustered at branch ends, narrowly oblong to oblong-elliptic, 10–24 (–26) × 2.5–5.5 cm, cuneate or acute at base, acuminate (acumen 5–15 mm long, slender) at apex, thinly coriaceous, glabrous, brown to greenish-brown or yellowish-brown above when dry, paler beneath, not or strongly glaucous; lateral nerves slender, 14–20 pairs, arching, prominent above, raised beneath; tertiary nerves prominent above, prominent to faint beneath; minor nervules conspicuously and finely reticulate above, faint or obscure beneath; petioles 8–18 mm long, glabrous. Panicles 5–15 cm long; branches greyish or fulvous tomentellous or sericeous. Flowers: pedicels 4–6 mm long, tomentellous; tepals oblong to ovate, 4–6.5 mm long, greyish sericeous outside; stamens 4–5 mm long; ovary 1–1.5 mm long; style *ca* 1 mm long; stigma peltate. Fruits globose, 8–12 (–15) mm in diameter; fruiting pedicels 5–6 mm long, slender.

*Flowering & fruiting:* March – August.

*Habitat:* Common in tropical to temperate forests or warm broad-leaved or oak forests between 600–2400 (–3200) m altitudes.

*Distribution:* Pakistan, India (Uttarakhand, Himachal Pradesh, West Bengal, Sikkim, Assam, Manipur, Meghalaya and Nagaland), Nepal, Bhutan and China.

*Specimens examined:* **INDIA.** Himachal Pradesh: Shimla, 1883, *Wallich s.n.* (CAL herb. acc. nos. 384453, 384461). Nagaland: Naga hills, May 1935, *N.L.Bor* 21057 (ASSAM0000000113) – paratype of *M. sharmae*. Uttarakhand: Dehra Dun dist., Mussourie, 1869, *King s.n.* (CAL herb. acc. nos. 384455, 384551); *ibid.*, 19 July 1897, *Duthie s.n.* (CAL herb. acc. no. 384464). Garhwal dist., Near Deota, 16 May 1897, *Duthie* 19823 (CAL); Jaunsar, Near Lokar, 7 May 1894, *Duthie* 14487 (CAL). *ibid.*, below Mandali, 28 Apr. 1898, *Duthie* 21018 (CAL). Nainital, s.d., *Brandis* 1712 (CAL). Sikkim: Chung thang to Lachen, 16 May 1945, *K.Biswas* 6673 (CAL). **NEPAL.** East Nepal, Sankhuwa Sabha dist., Num to Chichila, 16 Aug. 1990, *M.Minaki & 7 al.* 9049703 (L.3888050).

**6. *Machilus edulis*** King ex Hook.f., Fl. Brit. India 5: 138. 1886; Kanjilal *et al.*, Fl. Assam 4: 66. 1940; M.Gangop. in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. Dicots 2: 444. 2020; Dorji *et al.* in Korean J. Pl. Taxon. 52(3): 178. 2022. – *Persea fructifera* Kosterm. in Reinwardtia 6: 192. 1962, *nom. illegit.*; D.G. Long in Grierson & D.G. Long, Fl. Bhutan 1(2): 266. 1984; Av. Bhattacharjee & A.A. Ansari in Lakshmin. *et al.*, Fl. West Bengal 4: 459. 2019.

*Lectotype* (designated here): India, West Bengal, Darjeeling, Sept. 1877, *King* 5210 (K000639252, image!). *Additional syntypes:* India, West Bengal, Darjeeling dist., without precise locality, Sept. 1877, *King* 5212 (CAL0000021516!, CAL herb. acc. no. 384491!). India, West Bengal, Darjeeling dist., Runglee, 20 Apr. 1876, *King s.n.* (K000639251, image!). India, West Bengal, Darjeeling dist., Serill, Apr. 1878, *Lister s.n.* (K000639250, image!). India, West Bengal, Darjeeling dist., locality illegible, 11 Feb. 1875, *Lister* 319 (CAL0000021515!). East Himalaya, without precise locality, s.d., *Griffith* Kew Distrib.No. 4269 (CAL0000021517!).

Trees, 8–12 m high; shoots subtended by a ring of bud scale scars, young ones ochraceous villous; branchlets glabrous. Leaves alternate, clustered at branch ends, cuneate-obovate, obovate-oblong, lanceolate-

oblong to oblanceolate, (8-)11-16 × (2.5-) 3-5.5 cm, cuneate to acute at base, subacute, apiculate to acuminate (acumen 5-7 mm long) at apex, thinly coriaceous, glabrous above, ochraceous villous beneath but scattered pilose or often subglabrous (mainly on nerves) in age, greenish-brown, reddish-brown or blackish above when dry, pale brown or coppery beneath, not glaucous; lateral nerves stout, 8-10 (-12) pairs, prominent above, prominently raised beneath; tertiary nerves faint above, prominent beneath; petioles 10-20 (-25) mm long, ochraceous pilose to glabrous. Panicles 5-14 cm long, lax-flowered; branches ochraceous villous to sericeous. Flowers: pedicels 3-5 mm long, slender; tepals ovate-triangular to oblong, 4-5 × 2-2.5 mm, tomentellous to sericeous outside; stamens 3.5-4 mm long; ovary *ca* 1.5 mm long; style *ca* 0.8 mm long; stigma discoid. Fruits globose, 3.5-4.5 cm in diameter; fruiting pedicels *ca* 10 mm long, stout.

*Flowering & fruiting:* March - September.

*Local names:* Nepali: *Lapche kawla*, *Lapchi*, *Lepchaphul*.

*Uses:* Reported to be a timber tree. The fruits are edible.

*Habitat:* Scarce in warm broad-leaved forest and subtropical forests between 900-2400 m altitudes.

*Distribution:* India (Sikkim, West Bengal and northeast India) and Bhutan.

*Specimens examined:* **INDIA.** Assam: Donfing forest, 5 Nov. 1938, *K.Biswas* 4147 (CAL). Sikkim: Without locality, May 1882, *Gamble s.n.* (CAL). West Bengal: Darjeeling Dist., Ging, *T.Anderson* 229 (CAL). Darjeeling, Mar. 1887, *Gamble* 10320 (CAL); *ibid.*, *Kurz s.n.* (CAL); *ibid.*, 20 Apr. 1876, *C.B. Clarke* 27621 D (CAL); *ibid.*, July 1915, *Modder* 74 D (CAL). Sonada, 19 June 1912, *No collector s.n.* (CAL). Lebong, 13 July 1876, *No collector* 819 A (CAL).

*Notes:* The large fruits are sufficient to identify the species. Hence a fruiting material at K is selected here as the lectotype. The inflorescences arise precociously.

**7. *Machilus fruticosa*** Kurz in J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 42(2): 101. 1873 & Forest Fl. Burma 2: 292. 1877; Hook.f., Fl. Brit. India 5: 140. 1886 & 861. 1890. - *Persea fruticosa* (Kurz) Kosterm. in Reinwardtia 6: 192. 1962; Kochummen, Tree Fl. Malaya 4: 173. 1989.

*Lectotype* (designated here): Myanmar, Martaban, Doyakyee pap, s.d., *Brandis s.n.* (CAL0000021519!). *Additional syntype:* Myanmar, Martaban, Doyakyee pap, n.d., *Brandis* 928 (CAL0000021518!).

Shrubs or trees 3-8 m high; shoots not subtended by a ring of bud scale scars, young ones greyish tomentellous; branchlets sparsely puberulous when young, soon glabrous. Leaves alternate, not clustered at branch ends, oblong to oblong-elliptic, 6-12 (-17) × 2.5-5.5 cm, obtuse to rounded (on type) or acute at base, curved downwards along margins, obtuse, subacute, acute to apiculate or subacuminate at apex, thickly coriaceous, glabrous, often glossy, pale greenish brown above when dry, pale brown and often glaucescent beneath; lateral nerves 6-12 pairs, prominent above, faint to prominent beneath; tertiary nerves obscure to faint above and beneath; nervules obscure; petioles 7-15 (-25) mm long, glabrous when mature. Panicles 7-16 cm long, lax-flowered; branches sparsely puberulous. Flowers: pedicels 2-3 mm long, slender, sparsely puberulous; tepals triangular to oblong, 2.5-3 × 1-1.3 mm, puberulous outside; stamens 2.5-3 mm long; anthers 2.5-3 mm long; ovary *ca* 0.5 mm long; style minute; stigma discoid. Fruits globose, 6-8 mm in diameter, glabrous; fruiting pedicels 3-7 mm long, slender.

*Flowering & fruiting:* April - May.

*Habitat:* Scarce in evergreen forests at about 1200 m altitude.

*Distribution:* Bangladesh, Myanmar, Thailand and Malaysia.

*Specimens examined:* **MYANMAR.** Tenasserim [and Andamans], *Helper* Kew Distrib. No. 4268 (K000639249, P00752512). Birma (and Malay peninsula), *Griffith* 473 [Kew Distrib. No. 4262] (K000939248).

*Notes:* The better specimen out of the two is selected here as the lectotype. Specimens other than type have relatively longer leaves with more number of lateral nerves. Additionally the leaves tend to be more acute to short acuminate at apex. The midrib and lateral nerves of leaves are not incised above on the type material.

**8. *Machilus gamblei*** King ex Hook.f., Fl. Brit. India 5: 138. 1886 & 860. 1890; Prain, Bengal Pl. 2: 900. 1904; Kanjilal *et al.*, Fl. Assam 4: 67. 1940; M. Gangop. in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. Dicots 2: 444. 2020. – *Persea gamblei* (King ex Hook.f.) Kosterm. in Reinwardtia 6: 192. 1962; D.G. Long in Notes Roy. Bot. Gard. Edinburgh 41: 521. 1984 & in Grierson & D.G. Long, Fl. Bhutan 1(2): 267. 1984; Av. Bhattacharjee & A.A. Ansari in Lakshmin. *et al.*, Fl. West Bengal 4: 460. 2019, **Fig. 1 C**

*Lectotype* (designated by Long 1984: 521): India, West Bengal, Cooch Behar, 1881, King *s.n.* (K000778803, image!; isolectotypes CAL0000021520!, CAL0000021521!). *Additional syntypes*: India, Assam, 23 Feb. 1875, Jenkins *s.n.* (CAL0000021505!, HBG509880, K000778802, images!). India, Assam, s.d., Griffith *s.n.* (L.1804383, image!).

= *Machilus bombycina* King ex Hook.f., Fl. Brit. India 5: 861. 1890; Prain, Bengal Pl. 2: 900. 1904; Kanjilal *et al.*, Fl. Assam 4: 66. 1940. – *Persea bombycina* (King ex Hook.f.) Kosterm. in Reinwardtia 6: 191. 1962.

*Lectotype* (designated by Long 1984: 521): India, Assam, Goalpara, 23 May 1808, Buchanan-Hamilton 989 (E00393304, image!). *Additional syntypes*: India, Assam, Goalpara, 23 May 1808, Buchanan-Hamilton in Wallich Numer. List No. 2607 D (K001116554, image!). India, Assam, Kamrup, 30 March 1809, Buchanan-Hamilton 982 (E00393308, image!).

Trees, 10–25 m high; GBH up to 80 cm; shoots subtended by a ring of bud scale scars, young ones greyish villous; branchlets villous to glabrous. Leaves alternate, clustered at branch ends, narrowly oblong, narrowly oblong-elliptic to lanceolate-oblong or obovate to

oblong-oblongate or broadly elliptic-obovate, 7–13 (–20) × 2–4 (–5) cm, cuneate to acute at base, acuminate (acumen 5–15 mm long, acute) at apex, thinly coriaceous, glabrous above, scattered puberulous on major nerves to glabrous beneath, pale brown to greenish-brown above when dry, pale brown and usually glaucous to glaucescent beneath; lateral nerves slender, 7–10 (–12) pairs, arcuate, faint or sometimes prominent above, faint to prominent beneath; tertiary nerves obscure or sometimes faint or occasionally prominent above, inconspicuous beneath; nervules obscure or occasionally faint above, inconspicuous beneath; petioles 5–15 mm long, greyish tomentellous to scattered puberulous or finally glabrous. Panicles 3–10 cm long, lax-flowered; branches greyish tomentellous at least in the axils of branches. Flowers: pedicels 3–5 mm long, tomentellous; tepals ovate-triangular to oblong (or narrowly so), 3–5 × 1.2–2.5 mm, greyish tomentellous outside; stamens 4–5 mm long; anthers *ca* 1 mm long; ovary subglobose, *ca* 1 mm across; style *ca* 1 mm long; stigma peltate. Fruits globose, 7–10 mm in diameter; fruiting pedicels 4–5 mm long, slender.

*Flowering & fruiting*: November – July.

*Local name*: Assamese: *Mojli, Som*; Mikir: *Artucheknan*; Nepali: *Kawla*.

*Habitat*: Fairly common in tropical to temperate forests or evergreen forests between 700–2400 m altitudes.

*Distribution*: India (West Bengal, Sikkim and northeast), Nepal, Bhutan, China, Bangladesh, Myanmar, Thailand and Vietnam.

*Specimens examined*: **INDIA**. Arunachal Pradesh: Pashighat, 3 Mar. 1912, *Burkill* 36749 (CAL). Daphla hills, Narainpore, 23 Feb. 1875, *Lister s.n.* (CAL). Assam: Golaghat, Mar. 1896, *King's collector s.n.* (CAL). Sibsagar, 1891, *S. Peal* 368 (CAL). Manipur: Kakching hill, 15 Nov. 1953, *S.C. Sinha* 1269 (CAL). Sikkim: Without locality, s.d., *J.D. Hooker s.n.* (L.1804381). West Bengal: Alipurduar dist., 21 miles from Rajabhatkhawa, 13 May 1949, *Narayanaswami* 2330 (CAL). Darjeeling dist.,

Tista, 22 Feb. 1910, *Ribu & Rhomoo* 3682 (CAL). Sevoke, 27 Feb. 1935, *K.Biswas* 3191 (CAL). **NEPAL**. Churia, 14 Mar. 1966, *T.B. Shreshtha* 3935 (L.1812897). **MYANMAR**. Southern Shan States, Kalaw, 22 Feb. 1915, *A.Rodger* 337 (CAL).

**9. *Machilus hedgei*** (M.Gangop. & A.Sarmah) Chakrab., P.P. Ghoshal, Anand Kumar & V.K. Rawat, **comb. nov.** – *Phoebe hedgei* M.Gangop. & A.Sarmah in *Bangladesh J. Pl. Taxon.* 14(2): 163. 2007.

*Type*: India, Arunachal Pradesh, West Kameng dist., Saddle - Sessa, 23 Sept. 1997, *A.Sarmah* 4180 (holotype Herbarium of State Forest Research Institute, Arunachal Pradesh, Itanagar) – not traceable. *Lectotype* (designated here): India, Arunachal Pradesh, Lohit dist., Twueng village, 23 Dec. 1993, *A.S. Chauhan* 99495 (ASSAM0000000116!).

Trees, 4–5 m high; shoots not subtended by a ring of bud scale scars, young ones sparsely pubescent to glabrous; branchlets glabrous. Leaves alternate, somewhat clustered at branch ends, oblong to oblong-elliptic, 12–20 × 3.5–5.5 cm, acute to obtuse at base, acuminate (acumen 5–10 mm long, acute) at apex, chartaceous, glabrous above, sparsely appressed puberulous on major nerves beneath, green when dry, non-glaucous; lateral nerves slender, 18–12 pairs, prominent above and beneath, arcuate; tertiary nerves prominent above and beneath, nervules prominent above and beneath; petioles 10–20 mm long, glabrous. Panicles 9–15 cm long, slender, sparsely branched; branches glabrous. Flowers not seen. Fruits globose, 6–8 mm in diameter; fruiting pedicels 5–6 mm long, slender; tepals clasping the base of fruits, reflexed at apex.

*Fruiting*: September – December.

*Habitat*: Rare in the temperate forests at about 3600 m altitude.

*Distribution*: India (Arunachal Pradesh) – endemic.

*Specimens examined*: Know from the type collections only.

*Notes*: *Phoebe hedgei* was originally compared with *P. declinata* and was found to be differing from that by the thinly chartaceous broad oblong, elliptic-oblong or rarely elliptic to obovate-elliptic leaves, puberulous beneath and simple paniculate infructescences. However, the present studies revealed that *P. hedgei* is indeed closely related to *M. declinata*, but differing in the much smaller habit and the chartaceous leaves, puberulous on the undersurface. The holotype of *P. hedgei* has been misplaced. Hence, the paratype material is designated here as the lectotype of the name as per Art. 9.12 (Turland *et al.*, 2018).

**10. *Machilus kingii*** Hook.f., *Fl. Brit. India* 5: 861. 1890; *Kanjilal et al.*, *Fl. Assam* 4: 68. 1940; M.Gangop. in A.A. Mao & S.S. Dash, *Fl. Pl. India Annot. Checkl. Dicots* 2: 444. 2020. – *Persea kingii* (Hook.f.) Kosterm. in *Reinwardtia* 6: 192. 1962.

*Lectotype* (designated here): India, Meghalaya, Khasi hills, March 1850, *J.D. Hooker & T. Thomson* 161 (K000778805, image!). *Additional syntypes*: India, Meghalaya, Khasi hills, June 1850, *J.D. Hooker & T. Thomson s.n.* (K000778804, K000778806, images!).

Trees, *ca* 5 m high; shoots subtended by a ring of bud scale scars, young ones sparsely pubescent to glabrous; branchlets glabrous. Leaves alternate, clustered at branch ends, narrowly oblong, narrowly oblong-elliptic, lanceolate-oblong, cuneate-oblong to oblong-oblong, 6–12 × 1–3 cm, cuneate to acute at base, apiculate to acuminate (acumen 5–7 mm long) at apex, thinly coriaceous, glabrous, blackish brown to brown above when dry, glaucous beneath; lateral nerves slender, 8–12 pairs, faint to somewhat prominent above, inconspicuous of very faint beneath; tertiary nerves and nervules obscure; petioles 5–15 mm long, glabrous. Panicles 3–5 cm long, lax-flowered; branchlets sparsely puberulous. Flowers: pedicels 3–5 mm long, slender; tepals ovate, ovate-triangular to oblong, 3.5–4 × 1.7–2.2 mm; stamens 3–3.3 mm long; anthers 0.6–0.8 mm long; ovary *ca* 0.6 mm long; styles minute; stigma peltate. Fruits ellipsoid, *ca* 7 ×

5 mm, glabrous; fruiting pedicels 4–5 mm long, slender.

*Flowering & fruiting:* March – May.

*Habitat:* Rare in edges of forests between 1200–1800 m altitudes.

*Distribution:* India (Meghalaya) – endemic.

*Specimen examined:* **INDIA.** Meghalaya: Khasi hills, Mawphlang, 18 Mar. 1954, *Thakur Rup Chand* 7392 (L.1812724); *ibid.*, 5 Apr. 1894, *Gammie* 406 (CAL). Shillong-Jowai road, 26 Mar. 1892, *Prain's collector* 113 (CAL).

*Notes:* Of the three available specimens, the flowering specimen has been selected here as the lectotype. The flowers were reported to be fragrant by one collector.

**11. *Machilus kurzii*** King ex Hook.f., Fl. Brit. India 5: 860. 1890; M.Gangop.in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. Dicots 2: 444. 2020. – *Persea kurzii* (King ex Hook.f.) Kosterm. in Reinwardtia 6: 192. 1962; D.G. Long in Grierson & D.G. Long, Fl. Bhutan 1(2): 267. 1984; Av. Bhattacharjee & A.A. Ansari in Lakshmin. et al., Fl. West Bengal 4: 461. 2019.

*Lectotype* (designated here): India, West Bengal, Darjeeling, 7000 ft., s.d., *Kurz s.n.* (K000639253, image!). *Additional syntypes:* India, West Bengal, Darjeeling dist., Lebung, 17 June 1884, *C.B. Clarke* 35225B (BM000950967, image!), *ibid.*, *C.B. Clarke* 35225 K (BM000950968, image!); *ibid.*, *C.B. Clarke* 35225 J (CAL0000021514!). India, West Bengal, Darjeeling dist., without precise locality, May 1873, *Gamble* 2890 C (K000639254, image!).

Trees, 8–10 m high; shoots subtended by a ring of bud scale scars, young ones sparsely puberulous to soon glabrous; branchlets glabrous. Leaves alternate, clustered at branch ends, narrowly oblong, narrowly oblong-elliptic, lanceolate-oblong to oblanceolate, 6–13 × 1.5–3 cm, cuneate to acute at base, apiculate to acuminate (acumen 5–10 mm long) at apex, thinly coriaceous, glabrous, brown, blackish-brown or greenish-brown above when dry, pale brown beneath, often both surfaces dark reddish-brown, often

glaucescent beneath; lateral nerves slender, 8–10 pairs, faint to somewhat prominent above and beneath, arching; tertiary nerves obscure to faint above, obscure beneath; nervules obscure to faint above, obscure beneath, finely reticulate; petioles 8–20 mm long, glabrous. Panicles 4–9 cm long, lax-flowered, branches tawny tomentellous (discoloured). Flowers: pedicels 3–6 mm long, slender, tomentellous; tepals ovate to oblong, 3.5–5 × 1.5–3 mm, tawny tomentellous outside; stamens 2.8–3.8 mm long; ovary subglobose, ca 1.2 mm across; style small; stigma discoid. Fruits globose, 10–15 mm in diameter; fruiting pedicels 5–10 mm long, slender.

*Flowering & fruiting:* January – June.

*Local name:* Nepali: *Kowlo*; *Seto kawla*.

*Habitat:* Scattered in subtropical or evergreen forests between 1000–2100 m altitudes.

*Distribution:* India (West Bengal and Sikkim), China, Myanmar, Thailand and Vietnam.

*Specimens examined:* **INDIA.** Sikkim: Rungbee, May 1900, *Prain's collector s.n.* (CAL). West Bengal: Darjeeling dist., Gorumara, March 1873, *Gamble* 2886A (CAL). Darjeeling, May 1873, *Gamble* 2890A (CAL). Darjeeling, May 1879, *Gamble* 6903 (CAL). Darjeeling, May 1878, *Lister s.n.* (CAL). **MYANMAR.** Tenasserim, Taepo, 16 Apr. 1877, *G.Gallatly* 801 (CAL). Maymyo, 5 May 1917, *J.H. Lace* 5796 (CAL).

*Notes:* Very close to *M. gamblei*, but possibly distinct by the larger fruits with longer pedicels and the leaves often turning dark reddish brown on both surfaces on drying.

**12. *Machilus listeri*** King ex Hook.f., Fl. Brit. India 5: 138. 1886 & 860. 1890; Kanjilal et al., Fl. Assam 4: 68. 1940; M.Gangop.in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. Dicots 2: 444. 2020. – *Persea listeri* (King ex Hook.f.) Kosterm.in Reinwardtia 6: 193. 1962.

*Lectotype* (designated here): India, Arunachal Pradesh, Parum Pare district, Dukrung valley, 1874, *Lister* 241 (K000778807, image!); isolectotypes CAL0000021500!, CAL0000021501!, CAL0000021502!,

CAL0000021503!, CAL0000021504!,  
CAL0000021507!).

Trees, stature unknown; shoots not subtended by a ring of bud scale scars, young ones pubescent, glabrous in age; branchlets glabrous. Leaves alternate, not clustered at branch ends, obovate, obovate-oblong to obovate-elliptic or rarely oblong-elliptic, 8–15 × 2.5–6.5 cm, acute at base, rounded, obtuse, acute to apiculate or sometimes shortly acuminate (acumen *ca* 5 mm long) at apex, thinly coriaceous, glabrous, pale brown to greenish brown above when dry, pale brown and glaucescent beneath; lateral nerves slender, 8–12 pairs, straight, arching towards margins, faint to somewhat prominent above and beneath; tertiary nerves obscure above, faint to obscure beneath; nervules obscure; petioles 10–15 mm long, glabrous. Panicles 7–10 cm long (in fruiting); branches glabrous. Flowers: not seen. Fruits: globose, 2.3–3 cm in diameter; fruiting pedicels 4–8 mm long, stout (2–3 mm thick).

*Flowering & fruiting*: Period unknown.

*Uses*: Reported to be a timber tree.

*Habitat*: Reported at about 900 m altitude in the type locality.

*Distribution*: India (?Assam, ?Meghalaya and Arunachal Pradesh) – endemic.

*Specimens examined*: Known from the type collections only.

**13. *Machilus lohitis*** (M.Gangop.) M.Gangop. in A.A. Mao & S.S. Dash, Fl. Pl. India, Annot. Checkl. Dicot.2: 444. 2020. – *Machilus lohitis* (M.Gangop.) Anand Kumar in Int. J. Adv. Res. Biol. Sci. 7(12): 30. 2020, *isonym*. – *Persea lohitis* M.Gangop. in Bull. Bot. Surv. India 48: 138. 2006 (as *lobitis*)

*Type*: India, Arunachal Pradesh. Lohit district, Melinja, 10 Oct. 1984, K.Hartdasan1693 (holotype Herbarium of Arunachal Pradesh State Forest Research Institute, Itanagar!).

Trees, height unknown; shoots not subtended by a ring of bud scale scars, young ones sparsely puberulous; branchlets glabrous when mature. Leaves alternate, not or slightly

clustered at branch ends, narrowly oblong to lanceolate-oblong, 8.5–15.5 × 2–2.5 cm, cuneate or acute at base, acuminate (acumen 10–25 mm long, acute) at apex, chartaceous, glabrous, greenish or dark brown above when dry, glaucous beneath; lateral nerves 10–12 pairs, prominent above and beneath, arching; tertiary nerves more or less prominent above, inconspicuous or faint beneath; nervules more or less prominent above, inconspicuous beneath, finely reticulate; petioles 8–15 mm long, glabrous. Panicles *ca* 6 cm long; branches glabrous. Flowers: not seen. Fruits not seen intact (reported to be globose, *ca* 15 mm in diameter); fruiting pedicels *ca* 6 mm long, *ca* 2 mm thick; fruiting tepals oblong, *ca* 3 × 2 mm, reflexed.

*Fruiting*: October.

*Habitat*: Reported to be fairly common in temperate forests.

*Distribution*: India (Arunachal Pradesh) – endemic.

*Specimens examined*: Known from the type collection only.

**14. *Machilus macrantha*** Nees in Wall., Pl. Asiat. Rar. 2: 70.1831 (as *macranthus*) & Syst. Laur. 174. 1836; Wight, Icon. Pl. Ind. Orient. 5: 12, t. 1824. 1852; Thwaites, Enum. Pl. Zeyl. 254. 1861; Dalzell & A.Gibson, Bombay Fl. 221. 1861; Bedd., Trees Madras 49. 1863; Meisn. in DC., Prod. 15(1): 40. 1864; Brandis, Forest Fl. N.W. India 378. 1874; Hook.f., Fl. Brit. India 5: 140. 1886 & 861. 1890; Gamble, Fl. Madras 2(7): 1227. 1925; M.Gangop. in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. Dicots 2: 444. 2020. – *Persea macrantha* (Nees) Kosterm. in Reinwardtia 6: 193. 1962 & in Dassan. *et al.*, Rev. Handb. Fl. Ceylon 9: 130. 1995; C.N. Mohanan, Fl. Quilon Dist. 348. 1984; C.J. Saldanha & S.R. Ramesh in C.J. Saldanha, Fl. Karnataka 1: 71. 1984; V. Chandras.in A.N. Henry *et al.*, Fl. Tamil Nadu 2: 212. 1987; V.S. Ramach. & V.J. Nair, Fl. Cannanore Dist. 397. 1988; Vajr., Fl. Palghat Dist. 407. 1990; M. Mohanan & A.N. Henry Fl. Thiruvanthapuram 397. 1994; Pullaiah & Ali Moulavi, Fl. Andhra Pradesh 2: 827. 1997.

*Lectotype* (designated here): India, Tamil Nadu, Nilgiri dist, Nilgiri hills, *s.d.*, *E. Noton* in *Wallich*, Numer. List No. 2587 [A] (K001116510, image!).

= *Machilus glaucescens* (Nees) Wight var. *metzii* Meisn. in DC., Prodr. 15(1): 40. 1864.

*Type*: India, Tamil Nadu, Nilgiri dist., 1854, Metz in Pl. Hohenacker No. 1458 (holotype G00693578, image!; isotypes FR0007263, HBG509881, U.1400820, images!).

= *Machilus glaucescens* (Nees) Wight var. *zeylanica* Meisn. in DC., Prodr. 15(1): 40. 1864.

*Type*: Sri Lanka, 1855, *Thwaites* CP 2270 (holotype G00693535, image!). *Additional syntypes*: Sri Lanka, *s.d.*, *no collector* in CP 2270 (BR0000005187119, image!, CAL herb. acc. nos. 384689!, 384717!, 384742!, 384743!, 384744!, GZU000254228, MEL2389973, P02116991, US00624188, images!).

= *Persea macrantha* var. *brevifolia* M.Gangop. in Bangladesh J. Pl. Taxon. 16(2): 144. 2009. – *Machilus macrantha* var. *brevifolia* (M.Gangop.) Kottiam. in Int. J. Curr. Res. Biosci. Pl. Biol. 6(10): 40. 2019. – *Machilus macrantha* var. *brevifolia* (M.Gangop.) M.Gangop. in A.A. Mao & S.S. Dash, Fl. Pl. India, Annot. Checkl. Dicot.2: 445.2020, *isonym*. – *Machilus macrantha* var. *brevifolia* (M.Gangop.) Anand Kumar in Int. J. Adv. Res. Biol. Sci. 7(12): 30. 2020, *isonym*.

*Type*: India, Tamil Nadu, Coimbatore dist., Anamalais, June 1859, *Beddome* 120 (holotype CAL0000021557!).

Trees, 6–30 m high; GBH 40–150 cm; shoots not subtended by a ring of bud scale scars, young ones tomentose to villous; branchlets

glabrous when mature. Leaves alternate, not or slightly clustered at branch ends or distant, oblong or broadly so to broadly oblong-elliptic (oblong to oblong-elliptic or narrowly so or lanceolate-oblong or rarely obovate-oblong in var. *glaucescens*), 8–21 × 4–8.5 cm (7–21 × 2–6 cm in var. *glaucescens*), usually unequal and rounded to obtuse or sometimes acute (cuneate to acute or rarely subacute in var. *glaucescens*) at base, rounded to obtuse or sometimes apiculate (apiculate to acuminate with 5–15 mm long acumen in var. *glaucescens*) at apex, coriaceous, glabrous above, yellowish to brown tomentellous (especially on major nerves), scattered pubescent or sometimes glabrous beneath; blackish or brown or greenish brown above when dry, paler (often coppery or dark reddish brown) and usually glaucous to glaucescent beneath; lateral nerves slender, 5–10 pairs, prominent above, raised beneath; tertiary nerves faint to prominent above, faint to prominent beneath; nervules faint to prominent above, obscure to prominent beneath, finely reticulate; petioles 15–35 mm (8–30 mm in var. *glaucescens*) long, glabrous. Panicles 7–28 cm long, profusely or laxly flowering; branches fulvous, greyish, tawny, rusty or reddish tomentose to villous. Flowers: pedicels 3–6 mm long, tomentellous; tepals ovate to oblong, 3–6 × 1.5–2.5 mm, greyish or yellowish or brown villous to tomentellous outside; stamens 2.5–3 mm long; ovary subglobose, 1.2–1.5 mm across; style ca 2 mm long; stigma discoid. Fruits globose, 10–16 (–20) mm (6–12 mm in var. *glaucescens*) in diameter; fruiting pedicels 3–7 mm long, slender.

#### Key to the varieties:

1a.	Leaves usually unequal and rounded to obtuse at base, rounded to obtuse at apex; fruits 1–1.6 (–2) cm in diameter ..... <b>14.1. var. macrantha</b>
b.	Leaves equal and cuneate to acute at base, apiculate to acuminate at apex; fruits 6–10 (–12) mm in diameter ..... <b>14.2. var. glaucescens</b>

#### 14.1. var. *macrantha*, Fig. 1 D

*Flowering & fruiting*: November – June.

*Habitat*: Common in evergreen to mixed evergreen forests or shola forests between 200–2000 m altitudes.

**Distribution:** India (Andhra Pradesh, Karnataka, Maharashtra, Kerala and Tamil Nadu) and Sri Lanka.

**Specimens examined:** **INDIA.** Andhra Pradesh: Visakhapatnam dist., Dharakonda, 20 Feb. 1947, V.Narayanaswami 435 (CAL). Karnataka: Hassan dist., Bisle ghat, 13 Apr. 1969, C.J. Saldanha 13306 (JCB, L.1812718). Kerala: Kottayam dist., Devicolam, 29 Jan. 1961, Sebastine 18523 (MH). Maharashtra: Bombay, without precise locality, Dalzell s.n. (CAL herb. acc. no. 384706). Tamil Nadu: Nilgiri dist., Kathatti - Masinagudi road, 20 Apr. 1971, N.C. Rathakrishnan 38006 (MH). Madanad RF, 3 May 1971, Vajravelu 38215 (MH); Without locality, Wight Kew Distrib. No. 2524 (CAL). **SRI LANKA.** Knuckle mountains, Madulkelle area, May 1979, Kostermans 27553 (L.1813242). Weddegala, Sinharaja forest, Nov. 1978, Kostermans 27152 (L.1812716). Matala dist., Lagalla estate, 19 Feb. 1985, A.H.M. Jayasuriya & S.Balasubramaniam 3105 (CAL).

**Intermediate specimens:** **INDIA.** Tamil Nadu: Salem dist., Yercaud, Loop road, 21 Mar. 1979, N. Venugopal & T.S. Jayaseelan 22460 (L.3912902, RHT). Karnataka, Hassan dist., Shiradi ghat, 4 Feb. 1970, C.J.Saldanha 16191 (JCB, L.1812719).

**14.2. var. glaucescens** (Nees) Chakrab, P.P. Ghoshal, Anand Kumar & V.K. Rawat, **comb. & stat. nov.** - *Ocotea glaucescens* Nees in Wall., Pl. Asiat. Rar. 2: 71. 1831. - *Phoebe glaucescens* (Nees) Nees, Syst. Laur. 100. 1836. - *Machilus glaucescens* (Nees) Wight, Icon. Pl. Ind. Orient. 5(2): 12, t. 1825. 1852 (as *glaucescens*); Dalzell & A.Gibson, Bombay Fl. 221. 1861; X.W. Li et al. in C.Y.Wu, et al. Fl. China 7: 218. 2008; Luis & de Morais in Pl. Ecol. Evol. 146(3): 368. 2013. - *Persea glaucescens* (Nees) D.G. Long in Notes Roy. Bot. Gard. Edinburgh 41: 521. 1984 & in Grierson & D.G.Long, Fl. Bhutan 1(2): 267. 1984; Av. Bhattacharjee & A.A. Ansari in Lakshminet al., Fl. West Bengal 4: 460. 2019.

**Lectotype** (designated by Long 1984: 522): Bangladesh, Sylhet, May 1829, de Silva in Wallich Numer. List No. 2592 (K000674243, image!; isolectotypes BM000888196, image!,

CAL0000021546!, E00393302, E00393303, K000228481, L.1813014, L.1813021, M0147192, MEL2390466, images!).

= *Laurus villosa* Roxb., Fl. Ind., ed. 1832, 2: 310. 1832. - *Phoebe villosa* (Roxb.) Wight, Icon. Pl. Ind. Orient. 5(2): 11, t. 1822. 1852; Kurz, Forest Fl. Burma 2: 290. 1877. - *Machilus villosa* (Roxb.) Hook.f., Fl. Brit. India 5: 140. 1886 & 860. 1890; Prain, Bengal Pl. 2: 900. 1904. - *Persea villosa* (Roxb.) Kosterm.in Reinwardtia 6: 194. 1962.

**Lectotype** (designated here): [unpubl. icon] Icones Roxburghianae, No. 2235 (CAL!, copy at K, image!).

**Flowering & fruiting:** December - June.

**Local names:** Assamese: *Bondai-sum*; Burmese: *Mana*; Mizo: *Mosapama*. Nepali: *Bhale kaulo*, *Kawia*.

**Habitat:** Common in mixed deciduous forests, evergreen forests and subtropical to temperate forests up to 2400 m altitude.

**Distribution:** India (peninsular and northeast India), Nepal, Bhutan, China, Bangladesh and Myanmar.

**Specimens examined:** **BANGLADESH.** Rangamati dist., Surta hill, 40-44 miles from Chittagong, Dec. 1885, King's collector [Badal Khan] 300, 309 & 310 (CAL); Chittagong, Mar. 1879, Gamble 6805 C & 6805 E (CAL). **INDIA.** Assam: Darrang dist., Nanduar reserve, 9 Apr. 1914, U.Kanjilal 3773 (CAL). Sibsagar, Feb. 1888, G.Mann s.n. (CAL herb. acc. no. 384622); *ibid.*, Feb. 1891, G.Mann s.n. (CAL) Sibsagar, 1891, S.E. Peal 348 (CAL) Manipur: Nungba, Feb. 1906, Meebold 5438 (CAL). Meghalaya: Garo hills, Dalamgiri, 15 Feb. 1886, C.B. Clarke 43116 C (CAL); *ibid.*, Machang pani, 27 Feb. 1915, U.Kanjilal 5174 (CAL). Mizoram: Darlak, 27 Feb. 1984, D.B. Deb 3409 (CAL). Nagaland: Jabocka, Near Naga hills, Dec. 1898, Prain's collector 517 (CAL); *ibid.*, Mar. 1899, Prain's collector 93 (CAL). Odisha: Mayurbhanj dist., Bhanjubasa, 13 Feb. 1958, Panigrahi 12274 (CAL). Tamil Nadu: Nilgiri dist., Karumpalam road, 16 Feb. 1973, Vajravelu 43590 (MH). Tripura: Ambasha, 22 Feb. 1966, D.B. Deb 2369 (CAL);

Julaibari, 1 Mar. 1961, D.B. Deb 2858 (CAL). West Bengal: Alipurduar dist., Rajabhatkhawa, 28 Feb. 1934, K.Biswas 1572 (CAL). Darjeeling dist., Kurseong, May 1915, E.A.C. Modder 6 (CAL). Chilauni, 7 Mar. 1910, Ribu & Rhomoo 3916 (CAL). Jalpaiguri dist.: Chapraman WLS, n.d., J.Bhattacharya & party 32345 (CAL); *ibid.*, Buxa national park, East Damanpur range, 30 Mar. 2012, G.Krishna 50642 (CAL). **MYANMAR.** Kachin hills, May 1898, Shaik Mokim s.n. (CAL herb. acc. nos. 384636, 384637, 384638). Ruby mines Div., Shweli valley, Feb. 1909, A. Rodger 20 (CAL). Myitkyina dist., Lamaing hills, Mar. 1909, I.M. Buchanan 69/B (CAL).

*Notes:* Beddome (1863) was the first to unite *M. glaucescens* and *M. macrantha* and he adopted the name *M. macrantha* for the combined species. So, as per Art. 11.5 Ex. 22 (Turland *et al.*, 2018), the name *M. macrantha* should be treated as having priority. Several authors treated these species as distinct but during the present studies it was found that the two species are clearly connected to each another through intermediates. However, as most of the available specimens can be divided into two groups on the basis of some characters (as keyed out above), *M. glaucescens* is recognized here as a distinct variety of *M. macrantha*.

In absence of any original specimen, the *Flora Indica* drawing by Roxburgh at CAL is designated here as the lectotype of *M. villosa*, which was treated as a distinct species by Gangopadhyay (2020), without mention of the distinctive features. The fruits were once reported to be blue when ripe.

**15. *Machilus odoratissima*** Nees in Wall., Pl. Asiat. Rar.2: 70.1831; Brandis, Forest Fl. N.W. India 378. 1874; Hook.f., Fl. Brit. India 5: 139. 1886 & 859. 1890. – *Persea odoratissima* (Nees) Kosterm. in J. Sci. Res. (Jakarta) 1: 116. 1952 & in Nasir & Ali, Fl. W. Pakistan 118: 9. 1978; D.G. Long in Grierson & D.G. Long, Fl. Bhutan 1(2): 266. 1984; Av. Bhattacharjee & A.A. Ansari in Lakshmin. *et al.*, Fl. West Bengal 4: 461. 2019; Anand Kumar in Phytotaxa 420(1): 92. 2019; M.Gangop.in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl.

Dicots 2: 445. 2020. – *Persea himalayensis* M.Gangop. in Phytotaxa 92(2): 59. 2013 (as *himalayaensis*), *nom. illegit. superfl.* – *Machilus himalayensis* M.Gangop. in A.A. Mao & S.S. Dash, Fl. Pl. India, Annot. Checkl.Dicot.2: 444.2020, *nom. illegit. superfl.*, **Fig. 1 E-F**

*Lectotype* (first-step, designated by Kostermans 1978: 9; second-step designated by Kumar 2019: 92): India, Uttarakhand, “Deyra Dhoon” (Dehra Dun), “Chercoolie Hill”, “16 April”, Wallich 2607B (K001116552, image!; isolectotypes BM000950969 image!, CAL0000073561!, GZU000254242, K000228478, images!). *Additional syntypes:* Nepal, without locality, 1821, Wallich 2607A (CAL0000073560!, E00680973, GZU000254235, K000228477, NY00355177, NY00355178, images!).

= *Machilus odoratissima* Nees var. *glabrata* Meisn. in DC., Prodr. 15: 41 1864; de Kok in Gard. Bull. Singapore 71(1): 157. 2019.

*Lectotype* (designated by de Kok (2019: 157): Singapore, 1822, Wallich 2607 F (K001116557, image!; isolectotypes BM000888194, image!, CAL0000073554!, E00393297, E00393298, GZU000254243, K000228480, K000778834, MEL2389975, images!).

Trees, 6–25 m high; GBH up to 1 m; shoots subtended by a ring of bud scale scars, young ones glabrous; branchlets glabrous. Leaves alternate, somewhat clustered at branch ends or evenly spaced, oblong to oblong-elliptic (often broadly so) to lanceolate-oblong, 7–20 × 2–8 cm, acute or sometimes subacute or unequal and rounded or obtuse at base, apiculate to acuminate (acumen 5–15 mm long, acute) at apex, thinly coriaceous, glabrous, greenish brown to brown above when dry, paler and often glaucescent beneath; lateral nerves slender, 8–10 (–14) pairs, prominent above, conspicuous beneath, arching; tertiary nerves somewhat prominent above, faint to prominent beneath; nervules finely reticulate-pitted above (at least under lens), inconspicuous to somewhat prominent beneath; petioles 8–20 (–25) mm long, glabrous. Panicles 5–12 cm long, slender, lax- or dense-flowered; branches glabrous, pinkish

red when fresh. Flowers: pedicels 4–6 mm long, glabrous; tepals unequal, narrowly oblong, 4–6 × 1.8–3 mm, glabrous outside; stamens 3.5–4.5 mm long; ovary ovoid ca 1.5 mm long; style ca 1.2 mm long; stigma peltate. Fruits oblong-ellipsoid to ellipsoid, 12–16 × 7–10 mm; fruiting pedicels 4–7 mm long, slender.

*Flowering & fruiting*: January – August.

*Local names*: Nepali: *Kathe kaulo*, *Lali kawla*.

*Uses*: The leaves are used for silkworm cultivation.

*Habitat*: Common in evergreen and tropical to subtropical and temperate forests between 300–2200 m altitudes.

*Distribution*: Pakistan, India (Uttarakhand, Himachal Pradesh, West Bengal, Sikkim and northeast), Nepal, Bhutan, Bangladesh, Myanmar, Laos, Vietnam and Malaysia.

*Specimens examined*: **BANGLADESH**. East Bengal, Griffith Kew Distrib. No. 4266 (U.1400825). **BHUTAN**. Without locality, Griffith s.n. (CAL herb. acc. no. 384521). **INDIA**. Arunachal Pradesh: Kameng dist., River bank left of Rupa IB, 8 Apr. 1957, Panigrahi 6631 (ASSAM, CAL). Himachal Pradesh: Shimla, 12 May 1878, Gamble 5994 C (CAL). Chamba to Khajiar, 23 Apr. 1896, J.H. Lace 1339 (CAL). Meghalaya: Khasi hills, Cherrapunjee, 27 May 1952, W.N.Koelz 30106 (L.1813239); *ibid.*, 5 June 1952, W.N.Koelz 30189 (L.1813240). Sikkim: Without locality, J.D.Hooker s.n. (U.1400824). Locality illegible, Lister s.n. (CAL). Toong, 6 July 1909, Smith & Cave 876 (CAL). Uttarakhand: Dehra Dun dist., Mussourie, July 1897, P.W. Mackinnon s.n. (CAL herb. acc. nos. 384539, 384562); *ibid.*, Dick road, 8 June 1967, P.Pradhan 151 (CAL). Kumaon dist., Reia, 11 July 1913, N.Gill 572 (CAL). Nainital, Bhowali road, 31 May 1967, P.Pradhan 82 (CAL). West Bengal, Darjeeling dist., Mungpo, 8 May 1909, Kari 1298 (CAL). Rishap, Mar. 1878, Lister s.n. (CAL herb. acc. nos. 384588, 384589). **NEPAL**. Sankhu, 14 Mar. 1975, D.P. Josui & K.R. Rajbhandari 75/611 (L.1813229). Juinge pani, Phulchokti, 19 Jan. 1924, R.K. Mauaudha &

party 6865 (CAL). Nagarjun, 10 Apr. 1961, A.B. Shrudha & party 155 (CAL). Pasupati, 27 Mar. 1915, Banerjee & Shreshtha 3828 (CAL). **PAKISTAN**. Hazara, s.d., J.L. Steward 310 (CAL herb. acc. no. 384549).

**16. *Machilus parviflora*** Meisn. in DC., Prodr. 15(1): 505. 1864; Hook.f., Fl. Brit. India 5: 137. 1886 & 860. 1890; Kanjilal et al., Fl. Assam 4: 65. 1940; M.Gangop. in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. Dicots 2: 446. 2020. – *Persea minutiflora* Kosterm. in Reinwardtia 6: 193. 1962; D.G. Long in Grierson & D.G. Long, Fl. Bhutan 1(2): 266. 1984. – *Persea parviflora* (Meisn.) Harid. & R.R. Rao, Forest Fl. Meghalaya 2: 739. 1987, *nom. illegit., non* (Sw.) Spreng., 1825.

*Lectotype* (designated here): India, Meghalaya, Khasi hills [In Khasya], Chunna, 4–5000 ft., Aug. 1850, J.D. Hooker & T.Thomon s.n. [Machilus 9] (K000778808, image!; isolectotypes CAL0000021506!, CAL0000021508!, CAL0000021509!, E00393301, GH00041133, L0036943, L0036944, NY00355325, P02004552, S11-23978, images!). *Additional syntypes*: India, Meghalaya, Khasi hills [In Khasya], Kullong, 4–5000 ft., 8 July 1850, J.D. Hooker & T.Thomon s.n. [Machilus 9] (K000778810, image!). India, Meghalaya, Khasi hills [In Khasya], 4000 ft., 15 July 1850, J.D. Hooker & T.Thomon 1698 [Machilus 1] (K000778809, image!); *ibid.*, J.D. Hooker & T.Thomon s.n. (CAL0000021523!, L.1813245, P01748299, U.1400823, images!).

= *Machilus parviflora* Meisn. var. *scrobiculata* Meisn. in DC., Prodr. 15(1): 505. 1864.

*Lectotype* (designated here): India [India orientali], without precise locality, s.d., Griffith s.n. (M0147201, image!).

Trees, up to 8 m high; shoots not subtended by a ring of bud scale scars, young ones sparsely puberulous to soon glabrous; branchlets glabrous. Leaves alternate, not clustered at the apices of twigs, narrowly oblong to lanceolate-oblong or sometimes narrowly oblong-elliptic, 8–16 × 2.5–4 cm, acute to cuneate (often slightly unequal) at base, flat or curved downwards along margins, apiculate to acuminate (acumen 10–

15 mm long) at apex, coriaceous or thinly so, glabrous, greenish or blackish above when dry, usually glaucous beneath; lateral nerves slender, 8–12 pairs, prominent above, faint to prominent beneath, arcuate, tertiary nerves faint to obscure above, obscure beneath; nervules finely reticulate, faint to obscure above, obscure beneath; petioles 5–20 mm long. Panicles 3–12 (–24 in fruiting) cm long, lax-flowered; branches sparsely puberulous, glabrous in age; Flowers: pedicels 3–5 mm long; tepals broadly ovate-oblong, 2.5–3.5 × 1.5–2.5 mm, sparsely puberulous to glabrous outside; stamens 2–2.7 mm long; ovary ovoid, *ca* 1.3 mm long; style *ca* 0.7 mm long; stigma peltate. Fruits ellipsoid to oblong-ellipsoid, 15–20 × 10–13 mm, glabrous; fruiting pedicels *ca* 5 mm long, slender.

*Flowering & fruiting*: November – April.

*Local names*: Khasi: *Dieng-rang*, *Dieng-kanyar*, *Dieng-niar-urn*, *Dieng-sat-ler*, *La-nier-iong*. Naga: *Teu-ma-ching*.

*Habitat*: Scarce in tropical and evergreen to subtropical forests between 700–2400 m altitudes.

*Distribution*: India (Sikkim, West Bengal and Meghalaya), Bangladesh, Myanmar, Laos and Vietnam.

*Specimens examined*: **BANGLADESH**. East Bengal, *Griffith s.n.*, Kew Distrib.No. 4263 (U.1400821). **INDIA**. Meghalaya, Khasi hills, Mar. 1952, *Koelz* 33610 (L.1813253). Cherrapunjee, 8 Aug. 1952, *Koelz* 31049 (L.1813255). West Bengal, Darjeeling, June–July 1855, *no collector s.n.* (P00476634). **MYANMAR**. Southern Shan States, Keng Tung, Dec. 1909, *R.W. MacGregor* 1235 (CAL, E00901669, E00901670).

*Notes*: For *M. parviflora*, the most profusely flowering specimen is selected here as the lectotype while for var. *scrobiculata*, the only specimen which could be traced out is designated as the lectotype.

**17. *Machilus robusta*** W.W. Sm. in Notes Roy. Bot. Gard. Edinburgh 13: 169. 1921; M.Gangop.in A.A. Mao & S.S. Dash, Fl. Pl. India, Annot. Checkl. Dicot.2: 445. 2020;

Chakrab. et al. in Phytotaxa 571(1): 99. 2022. – *Persea robusta* (W.W. Sm.) Kosterm. in Reinwardtia 6: 193. 1962; D.G. Long in Grierson & D.G. Long, Fl. Bhutan 1(2): 265. 1984; M.Gangop.in Bull. Bot. Surv. India 48: 155. 2006.

*Lectotype* (designated by Chakrabarty. et al. 2022: 99): China, Yunnan, Hills to the northeast of Tengywh, March 1913, *G.Forrest* 9716 (E00123812, image!; isolectotypes A00041882, K000778788, digital images!). *Additional syntypes*: China, Yunnan, Shurli valley, February 1913, *G.Forrest* 9594 (A00112551, E00123816, K000778789, images!). China, Yunnan, Shewli-Salween divide, Feb. 1914, *G.Forrest* 12216 (E00123817, K000778787, images!). China, Yunnan, Shewli-Salween divide, August 1917, *G.Forrest* 15753 (E00123814 [wrongly databased as 15758], K000778790, images!).

= *Persea haridasanii* M. Gangop. in Bull. Bot. Surv. India 48: 133. 2006. – *Machilus haridasanii* (M.Gangop.) M.Gangop. in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. Dicot.2: 444. 2020. – *Machilus haridasanii* (M. Gangop.) Anand Kumar in Int. J. Adv. Res. Biol. Sci. 7(12): 30. 2020, *isonym*.

*Type*: India, Arunachal Pradesh, Dibang valley district, Anini, 30 March 1984, *K.Haridasan* 601 (holotype, Herbarium of State Forest Research Institute, Arunachal Pradesh, Itanagar!). *Paratype*: India, Arunachal Pradesh, Kameng dist., Saiden to Jirigoon, 4 Feb. 1995, *K.P. Singh* BSI-99369 (ASSAM0000000115!).

Trees, 10–15 m high; shoots not subtended by a ring of bud scale scars, young ones pubescent, glabrous in age; branchlets glabrous. Leaves alternate, not clustered at branch ends, oblong-elliptic (or narrowly so) to oblong-oblongate or sometimes elliptic-obovate, (10–) 14–35 × (3–) 4–10 cm, cuneate to cuneate-attenuate or acute (occasionally subobtuse) at base, decurrent into petioles, apiculate to acuminate (acumen 5–15 mm long, acute) or sometimes subacute to obtuse at apex, coriaceous, glabrous, pale green above when dry, glaucous to glaucescent (rarely not so) beneath; lateral nerves 6–9 (–

11) pairs, ascending, straight to arcuate, prominent above, raised beneath; tertiary nerves prominent above and beneath; minor nervules prominent above, conspicuous or sometimes faint beneath, finely foveolate-reticulate; petioles (15-) 20-45 (-50) mm long, ribbed, glabrous. Panicles 6-15 cm long; branches scattered greyish (discoloured) puberulous to glabrous, dark reddish when fresh, blackish when dry. Flowers: pedicels 4-10 mm long, slender, puberulous; tepals ovate to oblong or narrowly so, often narrowly oblong-elliptic, 4-7 × 2-3.5 mm, scattered puberulous to glabrous outside; stamens 5-7 mm long, anthers oblong, 0.8-1.2 mm long; ovary subglobose, 1.5-2 mm across; style *ca* 1.5 mm long; stigma peltate. Fruits globose, 2-3 cm in diameter; fruiting pedicels 7-10 (-12) mm long, slender to stout (slightly thickened).

*Flowering & fruiting*: February - June.

*Local names*: Burmese: *Mai-hkan-kagyi*.

*Habitat*: Scarce in warm broad-leaved or evergreen forests between 1200-1900 m altitudes.

*Distribution*: India (Sikkim, Nagaland and Arunachal Pradesh), China, Myanmar, Laos and Vietnam.

*Specimens examined*: India, Nagaland, Naga hills, June 1935, *Bor* 21058 (ASSAM). Myanmar. Bhamo dist., Panghok - Lehpye kha, 8 Mar. 1927, *Maung Mya* 4987 (E00901671). Bhamo, Kachin hills, Mar. 1909, *Cubitt* 397 (CAL, E00901672).

**18. *Machilus russellii*** (M.Gangop.) Anand Kumar in Int. J. Adv. Res. Biol. Sci. 7(12): 30. 2020. - *Persea russellii* M.Gangop. in Bull. Bot. Surv. India 48: 138. 206.

*Type*: Myanmar, Tavoy, Head waters of Sedichaung, 17 May 1920, *P.T.Russell* 1815 (holotype CAL0000021547!; isotypes CAL0000021548!, CAL0000021549!, CAL0000021550!).

Large trees; shoots not subtended by a ring of bud scale scars, young ones tomentellous; branchlets glabrous when mature. Leaves alternate, not clustered at branch ends,

oblong-elliptic or narrowly so, 7-15 × 1.5-4.5 cm, cuneate or acute at base, acuminate (acumen 5-15 mm long, acute) at apex, stiffly coriaceous, glabrous, blackish above when dry, paler and glaucous beneath; lateral nerves 8-12 pairs, faint and flat or incised above, raised beneath; tertiary nerves and nervules obscure above and beneath; petioles 10-20 mm long, glabrous, Panicles 4-6 cm long; branches greyish tomentose. Flowers: pedicels 4-6 mm long, tomentellous; tepals oblong to ovate-oblong, 4-4.8 × 1.3-2 mm, greyish tomentellous outside, puberulous inside; stamens 3.5-4 mm long; ovary ovoid, *ca* 1.5 mm long, glabrous; style *ca* 0.5 mm long, stigma discoid. Fruits not seen (reported to be subglobose when immature).

*Flowering*: May.

*Habitat*: Occurring at about 1000 m altitude.

*Distribution*: Myanmar - endemic.

*Specimens examined*: Known from the type collections only.

**19. *Machilus sericea*** Blume, Mus. Bot. 1: 330. 1851; Hook.f., Fl. Brit. India 5: 139. 1886 & 861.1890; M.Gangop.in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. Dicots 2: 445. 2020.

*Type*: Nepal, Vallis Deyra, 1825, *Wallich* Numer. List No. 2606 B (holotype L0036903, image!; isotypes K000778814, K001116549, images!).

= *Ocotea sericea* Nees in Wall., Pl. Asiat. Rar. 2: 71. 1831, *p.p.*, *excl. syn. Cinnamomum tomentosum* D.Don, *nom. illegit.*, non Kunth, 1817. - *Phoebe sericea* (Nees) Nees, Syst. Laur. 99. 1836. - *Persea sericea* (Nees) Raizada & R.L. Sinha in Indian J. Forest. 2: 369. 1979.

*Lectotype* (designated here): Nepal, without precise locality, 1821, *Wallich* Numer. List No. 2606 A (K001116548, image!; isolectotypes E00393299, E00393300, K000778813, L.1813234, images!).

= *Persea wallichii* D.G. Long in Notes Roy. Bot. Gard. Edinburgh 41: 518. 1984.

*Type*: Nepal, without precise locality, 1821, *Wallich* Numer. List No. 2606 A (holotype

E00393300, image!; isotypes E00393299, K000778813, K001116548, L.1813234, images!).

*Laurus sericea* Wall. [Numer. List No. 2606.1831, *nom. nud.*].

Trees, up to 15 m high; shoots not subtended by a ring of bud scale scars, young ones greyish sericeous; branchlets, glabrous when mature. Leaves alternate, not or slightly clustered at branch ends or distant, oblong (or narrowly so) to oblong-elliptic, (7-) 11-26 × 2.5-6 cm, acute to subacute at base, acute to apiculate at apex, thinly coriaceous, glabrous above, greyish sericeous on midrib to glabrous beneath, brown to greenish brown above and rarely glaucous above, paler and sometimes glaucescent beneath; lateral nerves 7-12 pairs, prominent above, raised beneath; tertiary nerves prominent or sometimes faint above, prominent to faint beneath; minor nervules more or less prominent or sometimes inconspicuous above and beneath; petioles 15-35 mm long, glabrous. Panicles 8-23 cm long, lax-flowered; branches greyish sericeous. Flowers: pedicels 3-4 mm long, appressed sericeous; tepals ovate to oblong-elliptic, 3-5 × 1.4-2.5 mm long; appressed greyish tomentellous outside; stamens 2.2-3.5 mm long; ovary subglobose, *ca* 1.3 mm in diameter; style *ca* 0.6 mm long; stigma discoid. Fruits globose, 8-10 mm in diameter; fruiting pedicels *ca* 5 mm long, stout.

*Flowering & fruiting*: March - August.

*Habitat*: Rare in tropical, subtropical and mixed temperate forests between 200-2500 m altitudes. *Distribution*: Nepal - endemic.

*Specimens examined*: **NEPAL**. North of Pokhara, N. Bakri kharka, 23 Apr. 1954, V.Puri 213 (CAL).

*Notes*: *Octotea sericea* was described based on Wallich's collections 2606 A and 2606 B. Under *Machilus*, the earliest available legitimate name is *M. sericea* Blume which was described based on Wallich 2606 B available at L. Next, *Persea wallichii* D.G. Long was described based on Wallich 2606 A at E and K. With the present lectotypification, the names *O. sericea* and *P. wallichii* become homotypic synonyms. Long

(1984) cited a specimen from Kumaon at E which could not be examined by us.

**20. *Machilus sharmae*** (M. Gangop.) M.Gangop. in A.A. Mao & S.S. Dash, Fl. Pl. India, Annot. Checkl. Dicot.2: 445. 2020. - *Machilus sharmae* (M. Gangop.) Anand Kumar in Int. J. Adv. Res. Biol. Sci. 7(12): 30. 2020, *isonym*. - *Persea sharmae* M.Gangop. in Bull. Bot. Surv. India 48: 142. 2006.

*Type*: India, Meghalaya, Khasi hill dist., Shillong peak, 7 June 1931 S.R. Sharma 9202 (holotype ASSAM0000000114!).

Small trees; shoots subtended by a ring of bud scale scars, young ones tomentellous; branchlets glabrous. Leaves alternate, clustered at branch ends, narrowly oblong-elliptic, lanceolate-oblong to elliptic-oblong or oblong-oblong, 10-18 × 2-4 cm, acute to cuneate at base, apiculate to acuminate (acumen 5-10 mm long, acute) at apex, thinly coriaceous, glabrous; greenish brown to yellowish brown above when dry, glaucous beneath; lateral nerves slender, 18-25 pairs, prominent above and beneath; tertiary nerves prominent above, faint to prominent beneath; nervules prominent above, faint to prominent beneath, finely reticulate; petioles 10-20 mm long, glabrous. Panicles 4-7 cm long; branches greyish tomentose. Flowers: pedicels 3-4 mm long, tomentellous; tepals ovate, 3.5-5 × 1.5-2 mm, greyish tomentellous outside; stamens 3.5-4 mm long; ovary *ca* 1.5 mm long; style *ca* 1 mm long; stigma peltate. Fruits globose, 2-2.5 cm in diameter; fruiting pedicels 8-12 mm long.

*Flowering & fruiting*: October - June.

*Habitat*: Rare on hill forests.

*Distribution*: India (Meghalaya) and ?Myanmar.

*Specimens examined*: **INDIA**. Meghalaya, Dawki forests, 25 Oct. 1934, S.R. Sharma 10853 (ASSAM0000000112).

*Notes*: The paratype specimen, Bor 21057 from Nagaland represents *M. duthiei*. Two more paratypes were cited from Myanmar but these

specimens could not be traced out at CAL during the present studies.

**21. *Machilus sikkimensis*** (M. Gangop.) M.Gangop. in A.A. Mao & S.S. Dash, Fl. Pl. India, Annot. Checkl. Dicot. 2: 445. 2020. – *Machilus sikkimensis* (M. Gangop.) Anand Kumar in Int. J. Adv. Res. Biol. Sci. 7(12): 30. 2020, *isonym.* – *Persea sikkimensis* M. Gangop. in Bull. Bot. Surv. India 48. 144. 2006.

*Type:* India, Sikkim, without precise locality, s.d., *T.Thomson* s.n. (holotype CAL0000021553!; isotypes CAL0000021554!, CAL0000021555!, L.1804387, image!)

Stature unknown; shoots subtended by a ring of bud scale scars, young ones pubescent, glabrous in age; branchlets glabrous. Leaves alternate and clustered at branch ends, oblong to oblong-elliptic to broadly obovate-elliptic, 12–25 × (4–) 5.5–10.5 cm, unequal and rounded, obtuse or occasionally acute at base, rounded, apiculate to acuminate (acumen 10–15 mm long, blunt or acute) at apex, coriaceous, glabrous, brown to pale greenish brown above when dry, often subglauous beneath; lateral nerves slender, 8–12 pairs, prominent above, raised beneath; tertiary nerves prominent to obscure above, faint to obscure beneath, nervules prominent to obscure above, inconspicuous beneath; petioles 10–30 mm long, stout, glabrous. Panicles (in fruiting) 9–15 cm long, profusely branched; branches glabrous. Flowers: not seen. Fruits (immature) ellipsoid-oblong, 10–12 × 6–7 mm; fruiting pedicels 7–10 mm long, slender; fruiting tepals spreading or reflexed, oblong, 4–5 × ca 2 mm, glabrous outside.

*Fruiting:* March – April.

*Habitat:* Scarce in tropical forests at about 300 m altitude.

*Distribution:* India (West Bengal and Sikkim) – endemic.

Specimens examined: **INDIA.** West Bengal, Darjeeling dist., Tista, 20 Mar. 1913, *Cave* s.n. (CAL0000021556!) – paratype.

**22. *Machilus tomentosa*** (D.Don) M.Gangop. in A.A. Mao & S.S. Dash, Fl. Pl. India Annot.

Checkl. Dicot. 2: 446. 2020. – *Cinnamomum tomentosum* D.Don, Prodr. Fl. Nepal. 66. 1825. – *Persea tomentosa* (D.Don) Spreng., Syst. Veg. ed. 16, 4(2): 156. 1827; D.G. Long in Notes Roy. Bot. Gard. Edinburgh 41: 522. 1984.

*Type:* Nepal, Near Suemba, 19 April 1802, *Buchanan-Hamilton* s.n. (holotype BM000888114, image!).

= *Machilus pubescens* Blume, Mus. Bot. 1: 330. 1851; Hook.f., Fl. Brit. India 5: 862. 1890; M.Gangop. in A.A. Mao & S.S. Dash, Fl. Pl. India, Annot. Checkl. Dicot.2: 445. 2020. – *Persea blumei* Kosterm. in Reinwardtia 9: 110. 1974.

*Type:* Nepal, without details (holotype L0036902, image!).

Trees, up to 20 m high; shoots subtended by a ring of bud scale scars, young ones tawny villous; branchlets initially tomentellous, glabrescent in age. Leaves alternate, clustered at branch ends, narrowly oblong to oblong-elliptic or occasionally ovate-oblong or obovate-elliptic, (6–) 9–20 × 2–6 cm, acute to cuneate at base, apiculate to acuminate (acumen 5–15 mm long, acute) at apex, thinly coriaceous, glabrous above, brownish tomentellous to villous on major nerves beneath, greenish brown to brown above when dry, paler and often glaucous beneath; lateral nerves 8–12 pairs, slender, prominent above, raised beneath, arching; tertiary nerves prominent above, prominent to faint beneath; minor nervules finely areolate-reticulate above, faint beneath; petioles 5–15 mm long, glabrous. Panicles 4–10 cm long; branches ochraceous or tawny or often dark reddish villous. Flowers: pedicels 3–4 mm long, tomentellous; tepals oblong or ovate, 3–5 × 1.5–2.5 mm, tomentellous outside, sericeous inside; stamens 2.5–4 mm long; ovary subglobose, ca 1.5 mm across; style short; stigma discoid. Fruits not seen (reported to be globose, ca 10 mm in diameter).

*Flowering & fruiting:* March – June.

*Habitat:* Scarce in tropical, subtropical and temperate forests between 100–2500 m altitudes.

*Distribution:* Nepal – endemic.

*Specimens examined:* NEPAL. Without locality, 1821, Wallich s.n. (K000228453).

*Notes:* Occurrence of the species in Uttar Pradesh, India as cited by Gangopadhyay (2020) could not be confirmed. He treated *M. pubescens* as a distinct species and reported its occurrence from Himachal Pradesh.

#### Doubtful/Imperfectly Known/Excluded Species

***Machilus arunachalensis*** (M.Gangop.) M.Gangop. in A.A. Mao & S.S. Dash, Fl. Pl. India, Annot. Checkl. Dicot.2: 443. 2020. – *Machilus arunachalensis* (M.Gangop.) Anand Kumar in Int. J. Adv. Res. Biol. Sci. 7(12): 29. 2020, *isonym.* – *Persea arunachalensis* M.Gangop. in Bull. Bot. Surv. India 48: 129. 2006.

*Type:* India, Arunachal Pradesh, Karko south east forests, 23 Feb. 1988, K.Haridasan 4529 (holotype, Herbarium of State Forest Research

Institute, Arunachal Pradesh, Itanaga) – not traceable.

*Notes:* The tepals in *Machilus* are always thin (membranous to chartaceous) while those of *Phoebe* are leathery or fleshy and hard (de Kok, 2019). Hence *P. arunachalensis* is best placed under *Phoebe*, because of its thick coriaceous tepals. However, as the holotype of the name is misplaced, we refrain from transferring the species to *Phoebe*.

***Machilus thunbergii*** Siebold & Zucc., Abh. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. 4(3): 202. 1846; M. Gangop. in A.A. Mao & S.S. Dash, Fl. Pl. India, Annot. Checkl. Dicot.2: 445. 2020. – *Persea thunbergii* (Siebold & Zucc.) Kosterm. in Pengum. Balai Besar Penjel. Kehut. Indonesia 57: 35.1957; M.Gangop. in Bull. Bot. Surv. India 48: 155. 2006.

*Notes:* Gangopadhyay (2006) reported the occurrence of the species from Arunachal Pradesh, India based on a sterile material collected by Burkill available at CAL. It needs confirmation through further gatherings.



**Figure 1:** Field images of *Machilus* species. A-B. *M. duchiei*; C. *M. gamblei*; D. *M. macrantha* var. *macrantha*; E-F. *M. odoratissima*

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