

## The Magnoliaceae of Thailand

HANS PETER NOOTEBOOM<sup>1</sup> & PIYA CHALERMGLIN<sup>2</sup>

**ABSTRACT.** The Flora of Thailand treatment in 1975 recognised eight genera and 13–16 species in Thailand. Morphological studies and research using DNA sequence data, including nuclear DNA, have shown that only one genus occurs in Thailand, *Magnolia* L. Since 1975 many more species have been found to occur in Thailand, both newly described taxa and new records. Thus a new treatment for Thailand is presented recognising 25 species in a single genus, *Magnolia*. Keys are given to flowering and fruiting material, and synonymy, descriptions and supporting information provided.

**KEY WORDS:** *Magnolia*, Magnoliaceae, Thailand, taxonomy, keys.

### MAGNOLIACEAE

A.Juss., Gen. Pl. : 280. 1789 (Magnoliaceae); Ridl., Fl. Malay Penins. 1: 12. 1922; Dandy, Bull. Misc. Inform. Kew 1927: 259. 1927; H.Keng in T.C. Whitmore, Tree Fl. Malaya 2: 281. 1973; Noot., Fl. Males., ser. I, 10: 561. 1988; in Kubitzki, Fam. Gen. Vasc. Pl. 2: 391. 1993.

Trees or shrubs, glabrous or with an indumentum of simple hairs. *Leaves* spirally arranged, simple, entire (or 2–10 lobed in *Liriodendron*, not in Thailand), penninerved, evergreen (or deciduous, not in Thailand); stipules present, at first enclosing and protecting the innovations, later caducous and leaving an annular scar around the node. *Flowers* terminal or pseudoaxillary on a short shoot (brachyblast) in the axils of the leaves, bisexual (rarely unisexual, 1 species in Thailand), on a peduncle which can be a brachyblast; peduncle bearing 1 or more caducous spathaceous bracts which leave annular scars; perianth spiral or spirocyclic, simple or more or less differentiated in calyx and corolla, perianth numbers (tepals) (6–)9–36, free, imbricate; stamens numerous, free, spirally arranged, filaments short, anthers linear, 2-locular, dehiscing introrsely or latrorsely, connective usually more or less produced into an appendage; gynoecium sessile or stipitate on a gynophore; carpels usually many, rarely 1 or few, spirally arranged (but in *Pachylarnax* Dandy seemingly not), free or (initially) conerescent; ovules 2 or more, biseriate on the ventral suture. *Fruit* apocarpous or syncarpous; fruiting carpels opening along the dorsal and/or ventral suture, or circumscissile; seeds 1 or more in each fruiting carpel, large, in dehiscent carpels hanging from the elongated spiral vessels of the funiculus, with arilloid testa, rarely, in some indehiscent fruits adherent to the endocarp; endosperm copious, oily; embryo minute.

<sup>1</sup> National Herbarium of the Netherlands, Leiden Branch, P. O. Box 9514, 2300 RA Leiden, The Netherlands.

<sup>2</sup> Thailand Institute of Scientific and Technological Research, 35 Mu 3, Khlong 5, Khlong Luang, Pathum Thani 12120 Thailand.

Distribution.— Two genera. *Liriodendron* in North America and China and *Magnolia* in temperate and tropical SE and E Asia and from North America southward through the West Indies and Central America to S Brazil.

Ecology.— Magnoliaceae, easily recognised from the spicy smell of broken parts and the prominent stipules and ring-shaped stipule scars, are nowhere common in Thailand. They occur in lowland and lower montane forest of different kinds to ca 2200 m elevation.

Uses.— The wood of Magnoliaceae, in general, is light and easily worked, but usually not very durable. The North American *Liriodendron tulipifera* L. yields an important timber and this has been used extensively for the interior finish of houses, and for door panels, etc. *Magnolia champaca* (L.) Baill. ex Pierre var. *pubinervia* (Blume) Figlar & Noot. and *M. montana* (Blume) Figlar & Noot. (from Peninsular Malaysia and Indonesia) are reported to have wood as durable as that of *Tectona grandis* L.f. (Heyne, 1950; Burkill, 1966). The bark of *Magnolia officinalis* Rehder & Wilson and of other species in China is used as a valuable drug. Many species of *Magnolia* and their hybrids are cultivated in temperate gardens. In Thailand, *Magnolia* x *alba* (DC) Figlar. and *M. champaca* (L.) Baill. ex Pierre are commonly planted since very long time as temple trees; their flowers are sold in the markets, and are used for decorating the hair or are strung into garlands. Also *Magnolia figo* (Lour.) DC. is a common garden plant, but a more recent introduction and therefore not in this treatment. Of our 25 or so Magnoliaceae, 2 taxa, *Magnolia champaca* (L.) Baill. ex Pierre var. *pubinervia* (Blume) Figlar & Noot. and *M. praecalva* (Dandy) Figlar & Noot. are truly enormous trees, with mighty grey, columnar boles, but they are too rare to be of any economic importance for timber.

### Magnoliaceae Taxonomy

The Magnoliaceae were once regarded by many botanists to be one of the most primitive families of all Angiosperms. The main reason is that in the Magnolia-type of flower, the floral parts (perianth-lobes, stamens, and carpels) are indefinite in number and are free and spirally arranged on an elongated axis thus conforming closely to the generally accepted putative ancestral form of Angiosperm flower. According APG II, however, they belong to the Angiospermae clade Magnoliids (close to the Monocots) and the order Magnoliales to which also belong the Annonaceae, Eupomatiaceae, Himantandraceae, and the Myristicaceae.

There are two subfamilies, Liriodendroideae with two species, one in North America and one in China, and Magnolioideae with ca 240 species.

In the subfamily Magnolioideae the taxonomy is rather chequered. In the past, two tribes, each with a few to several genera, were recognized. Careful morphological research and observations of living plants (Figlar, 2000; 2002a; 2002b) as well as DNA research (Kim et al., 2001; Azuma et al., 1999; 2000; 2001; Nie et al. 2008)) have led to the reduction all genera to *Magnolia*. This classification differs markedly from that of Keng (1975) who recognised eight genera of Magnoliaceae (*Magnolia* L., *Manglietia* Blume, *Talauma* A.Juss., *Kmeria* Dandy, *Pachylarnax*, *Aromadendron* Andrews ex Steud., *Michelia* T.Durand and *Paramichelia* Hu) and 13–16 species in Thailand.

Since 1975 many more species have been found to occur in Thailand, both newly described taxa and new records. This is reflected in the treatment presented below.

## Conservation Status

The Red List of Magnoliaceae (Cicuzza et al. 2007) indicates that 112 Magnoliaceae taxa are threatened with extinction in the wild according to the IUCN Red List categories and criteria; Critically Endangered (CR), Endangered (EN) and Vulnerable (VU). A further nine taxa are considered to be Near Threatened (NT) and 10 are recorded as Data Deficient (DD). These Data Deficient species have been so recorded because there is insufficient information to apply the IUCN Red List categories and criteria. Nevertheless, these taxa are considered to be threatened either in national Red Lists or based on suspected forest decline and so they are included in the list of globally threatened species. In total the results of the above evaluation indicated that 131 Magnoliaceae taxa are threatened with extinction at a global scale. This is over half the known taxa within the family. Approximately 100 species, however, are Not Evaluated (NE). The published conservation status assessments are given below for the Thai species of *Magnolia*, including some which have been shown to fulfil the criteria for Least Concern (LC).

## MAGNOLIA

L., Sp. Pl.: 535. 1753; Dandy, Bull. Misc. Inform. Kew 1927: 259. 1927; in Hutchinson, Gen. Fl. Pl. 1: 55. 1964; H.Keng in T.C. Whitmore, Tree Fl. Malaya 2: 285. 1973; Noot., Fl. Males., ser. I, 10: 568. 1988; Figlar & Noot., Blumea 49: 88. 2004.— *Michelia* L., Sp. Pl.: 536. 1753.— *Talauma* Jussieu, Gen. Pl.: 281. 1789.— *Manglietia* Blume, Verh. Batav. Genootsch. Kunsten 9: 149. 1823.— *Aromadendron* Blume, Bijdr.: 10. 1825.— *Pachylarnax* Dandy, Bull. Misc. Inform. Kew 1927: 260. 1927.— *Elmerrillia* Dandy, Bull. Misc. Inform. Kew 1927: 261. 1927.— *Kmeria* Dandy, Bull. Misc. Inform. Kew 1927: 262. 1927.— *Paramichelia* Hu, Sunyatsenia 4: 142. 1940.

### KEY TO THE SPECIES OF MAGNOLIA IN THAILAND (FLOWERING PLANTS)

- |   |   |
|---|---|
| 1. Flowers pseudoaxillary on a brachyblast  | 2   |
| Flowers terminal on the twig  | 12  |
| 2. Stipules free from the petiole   | 3   |
| Stipules adnate to petiole  | 6   |
| 3. Connective appendage 3–4 mm long, twigs pubescent, gynoecium silvery appressed- pubescent  |   |
|   | <b>18. <i>Magnolia mediocris</i></b>      |
| Connective appendage 0.5–1.5 mm long, twigs silky or puberulous, gynoecium greyish-puberulous, ferruginously silky or pubescent   | 4   |
| 4. Petiole 30–40 mm long, hairy, leaf blade obovate, base rounded, brachyblast puberulous   | <b>6. <i>Magnolia citrata</i></b>         |
| Petiole 10–25 mm long, glabrous, leaf blade elliptic or narrowly elliptic, base cuneate, attenuate, or attenuate-cuneate, brachyblast silky or pubescent  | 5   |
| 5. Leaf blade hairy beneath, twigs silky, stipules silky, brachyblast silky, stout, with 1 node, flower white, yellow or yellowish, connective appendage triangular, gynoecium ferruginously silky or pubescent           |   |
|   | <b>19. <i>Magnolia philippinensis</i></b> |
| Leaf blade glabrous beneath, twigs puberulous, stipules puberulous, brachyblast pubescent, slender, with 2 nodes, flower orange yellow, connective appendage very long, narrowly triangular, gynoecium greyish puberulous | <b>16. <i>Magnolia koordersiana</i></b>   |
| 6. Stipules adnate to the petiole for 0 to 5 %, leaf blade puberulous beneath, base attenuate, cultivated   |   |
|   | <b>1. <i>Magnolia x alba</i></b>          |
| Stipules adnate to the petiole for 15 to 100 %, leaf blade minutely (scattered) hairy, pubescent beneath, or tomentose beneath, base cuneate, broadly cuneate, or rounded   | 7   |

7. Leaf blade 11–14 cm broad, connective appendage 3–4 mm long **21. *Magnolia rajaniana*** 8  
 Leaf blade 2–10 cm broad, connective appendage 0–2.5 mm long
8. Flower yellow or orange yellow **5. *Magnolia champaca*** 9  
 Flower white
9. Leaf blade minutely (scattered) hairy beneath, petiole glabrous, gynoecium greyish puberulous **23. *Magnolia sirindhorniae*** 10  
 Leaf blade pubescent beneath, petiole hairy, gynoecium greyish or densely golden yellow silky
10. Connective appendage triangular, twigs pubescent or silky, hairs yellowish brown, (fruiting carpels connate, but becoming mostly free on dehiscence with some carpels splitting via the dorsal suture while apical parts of others with circumcissile dehiscence) **6. *Magnolia champaca x baillonii*** 11  
 Connective appendage very long, narrowly triangular, twigs villous or puberulous, hairs pale brown or yellowish (fruiting carpels at least finally free or connate)
11. Twigs puberulous, hairs yellowish, leaf blade glaucous below, apex acuminate, peduncle or brachyblast puberulous, gynoecium densely golden yellow silky (fruiting carpels at least finally free, dehiscing along the dorsal suture) **9. *Magnolia floribunda*** 11  
 Twigs villous, hairs pale brown, leaf blade not glaucous below, apex shortly acuminate, peduncle or brachyblast pubescent, gynoecium greyish silky, fruiting carpels connate **2. *Magnolia baillonii*** 11
12. Receptacle short, the carpels attached at about the same height (fruiting carpels connate into a loculicidal fruit, splitting into 2–4 valves, the carpels more or less separating from each other later; in the centre a columella persistent with the attached seeds, or becoming free, after dehiscence forming 2 lobes like 2 laterally recurved horns) 13  
 Receptacle cylindrical, much longer than wide, carpels attached around it (fruiting carpels at least finally free or connate) 15
13. Flowers bisexual, carpels 2–4, twigs glabrous, stipules free from the petiole, peduncle or brachyblast 0.5–20 mm long (fruiting carpels connate into a loculicidal fruit, splitting into 2–4 valves, the carpels more or less separating from each other later; in the centre a columella persistent with the attached seeds) **20. *Magnolia praecalva*** 14  
 Flowers unisexual, carpels 7–15
14. Petiole 25–45 mm long, carpels 10–15 **7. *Magnolia duperreana*** 14  
 Petiole 15–25 mm long, carpels 7–10 **24. *Magnolia thailandica*** 16
15. Stipules free from the petiole 16  
 Stipules adnate to petiole 18
16. Twigs hairy at least when young, leaf apex rounded or mucronate, flower yellow or yellowish, connective appendage triangular with a sharp pointed tip **4. *Magnolia carsonii* var. *drymifolia*** 17  
 Twigs glabrous, leaf apex shortly acuminate or acuminate, flower pink or white, connective appendage triangular or setaceous
17. Tepals 9, subequal, connective appendage triangular, 1–2 mm long (fruits cylindrical) **11. *Magnolia gustavii*** 17  
 Tepals 18–36, very unequal, connective appendage setaceous, 12–15 mm long (fruits subglobose, or ellipsoid) **8. *Magnolia elegans*** 19
18. Twigs glabrous 19  
 Twigs hairy or on stipule scars minutely hairy 22
19. Peduncle or brachyblast hairy **22. *Magnolia siamensis*** 20  
 Peduncle or brachyblast glabrous
20. Peduncle or brachyblast 3–4 mm thick, flower yellow or yellowish, connective appendage very long, narrowly triangular, number of ovules per carpel 4 or more, (fruits cylindrical) **25. *Magnolia utilis*** 21  
 Peduncle or brachyblast 6–16 mm thick, flower white, connective appendage triangular, number of ovules per carpel 2 (fruits ellipsoid)
21. Outer tepals tinged red or purple, twigs 6.5–10 mm diam., petiole 45–90 mm long, gynoecium conical **13. *Magnolia hodgsonii*** 21  
 Outer tepals greenish, twigs 6–7 mm diam., petiole 20–55 mm long, gynoecium ellipsoid **3. *Magnolia betongensis*** 23  
 Number of ovules per carpel 4 or more, midrib when dry not or slightly prominent above, intramarginal vein not close to the margin
- Number of ovules per carpel 2, midrib when dry prominent above, at least towards base, intramarginal vein close to the margin 25
23. Peduncle or brachyblast glabrous, with 2 nodes **4. *Magnolia hookeri*** 24  
 Peduncle or brachyblast hairy, with 1 node

24. Flower pink or white, petiole glabrous, leaf blade narrowly obovate, peduncle or brachyblast 4–5 mm thick  
 Flower purple or red, petiole hairy, leaf blade elliptic or obovate, peduncle or brachyblast 6–9 mm thick  
**15. *Magnolia insignis***  
**10. *Magnolia garrettii***
25. Carpels 5–15, leaf apex shortly acuminate or acuminate, peduncle or brachyblast slender  
**17. *Magnolia liliifera***  
 Carpels 40–100, leaf apex acute, rounded, or very shortly acuminate, peduncle or brachyblast stout 26  
 26. Twigs hairy at least when young, leaf blade hairy beneath, outer tepals white (fruiting carpels free, clustered close together)  
**12. *Magnolia henryi***  
 Twigs glabrous, leaf blade glabrous beneath, outer tepals greenish (fruiting carpels connate)  
**3. *Magnolia betongensis***

## KEY TO THE SPECIES OF MAGNOLIA IN THAILAND (FRUITING SPECIMENS)

1. Fruits pseudoaxillary on a brachyblast 2  
 Fruits terminal on the twig 11
2. Fruiting carpels connate **2. *Magnolia baillonii***  
 Fruiting carpels at least finally free or staying basally connate, but for the rest free 3
3. Stipules free from the petiole 4  
 Stipules adnate to petiole 7
4. Peduncle or brachyblast with 1 node (gynoecium ferruginously silky or pubescent) **19. *Magnolia philippinensis***  
 Peduncle or brachyblast with 2 or 3 nodes (gynoecium greyish puberulous or silvery appressed-pubescent) 5
5. Leaf blade obovate, 11–30 by 8–18 cm **6. *Magnolia citrata***  
 Leaf blade elliptic 6
6. Leaf blade pubescent beneath, 6–13 by 3–5 cm, twigs pubescent, stipules silky, apex of leaf blade acuminate (flower white, connective appendage 3–4 mm long) **18. *Magnolia mediocris***  
 Leaf blade glabrous beneath, 6–23 by 3–9 cm, twigs puberulous, stipules puberulous, apex of leaf blade very shortly acuminate (flower orange yellow, connective appendage 0.5 mm long) **16. *Magnolia koordersiana***
7. Leaf blade minutely (scattered) hairy beneath, 11–26 by 5.5–10 cm, stipules adnate for 30 to 60 %, apex of leaf blade rounded or shortly acuminate **23. *Magnolia sirindhorniae***  
 Leaf blade pubescent or tomentose beneath, stipules adnate for 15 to 100 %, apex of leaf blade acuminate. 8
8. Leaf blade 17–30 by 11–14 cm, tomentose beneath, twigs tomentose (connective appendage 3–4 mm long) **21. *Magnolia rajaniana***  
 Leaf blade 2–10 cm, pubescent beneath, twigs pubescent, silky, or puberulous (connective appendage 0–2 mm long) 9
9. Fruiting carpels connate, some dehiscent circumscissile, but for the rest becoming free and dorsally dehiscent; leaf blade 14–25 by 5–9 cm (gynoecium greyish silky) **5. *Magnolia champaca* x *baillonii***  
 Fruiting carpels free (gynoecium greyish puberulous, or densely golden yellow silky) 10
10. Leaf blade narrowly elliptic, narrowly ovate, or narrowly obovate, 7–14 by 2–4.5 cm, twigs puberulous, peduncle or brachyblast with 1 node (flower white, connective appendage 2 mm long) **9. *Magnolia floribunda***  
 Leaf blade elliptic or ovate, 10–30 by 4–10 cm, twigs pubescent, peduncle or brachyblast with 2 or 3 nodes (flower yellow or yellowish, or orange yellow, connective appendage 0–1 mm long) **4. *Magnolia champaca***
11. Receptacle short, the carpels attached at about the same height 12  
 Receptacle cylindrical, much longer than wide, carpels attached around it in a spiral 14
12. Carpels 2–4, stipules free from the petiole, fruiting carpels connate into a loculicidal fruit, splitting into 2–4 valves, the carpels more or less separating from each other later; in the centre a columella persistent with the attached seeds **20. *Magnolia praealva***  
 Carpels 7–15, stipules adnate to petiole, fruiting carpels becoming free, after dehiscence forming 2 lobes like 2 laterally recurved horns 13
13. Petiole 15–25 mm long, leaf blade 10–20 by 3–6 cm **24. *Magnolia thailandica***  
 Petiole 26–45 mm long. Leaf blade 11–30 by 5.5–10.7 cm **7. *Magnolia duperreana***
14. Fruiting carpels connate 15  
 Fruiting carpels at least finally free 20
15. Stipules free from the petiole, gynophore under fruit present **8. *Magnolia elegans***  
 Stipules adnate to petiole, gynophore under fruit absent. 16
16. Fruiting peduncles slender, leaf blade pubescent or glabrous beneath, 12–22 by 3.8–7 cm **17. *Magnolia liliifera***  
 Fruiting peduncles stout, leaf blade glabrous beneath 17

17. Peduncle with 4–18 nodes 18  
 Peduncle with 1–3 nodes 19
18. Stipules adnate to petiole for 100 %, leaf blade elliptic or obovate, 21–33 by 8.5–12 cm  
 Stipules adnate for 30 to 80 (to 100) %, s leaf blade obovate or narrowly obovate, 21–38 by 7–15 cm  
**22. Magnolia siamensis**  
**3. Magnolia betongensis**
19. Petiole 45–90 mm, stipules adnate for 90–100%, leaf blade elliptic to narrowly elliptic or obovate to narrowly, obovate 19–50 by 6.5–12 cm (outer tepals tinged red or purple) **13. Magnolia hodgsonii**  
 Petiole (20–)35–55 cm, stipules adnate for 30 to 80(to 100) %, leaf blade obovate or narrowly obovate, 21–38 by 7–15 cm (outer tepals greenish) **3. Magnolia betongensis**
20. Stipules free from the petiole, petiole 6–12 mm long **11. Magnolia gustavii**  
 Stipules adnate to petiole, petiole 15–110 mm long 21
21. Peduncle with 4–7 nodes, twigs appressedly long-pilose, stipules adnate for 90–100 %, midrib prominent above at least towards base **12. Magnolia henryi**  
 Peduncle or brachyblast with 1 or 2 nodes, twigs glabrous, or pubescent, stipules adnate for 30–75 %, midrib not or slightly prominent above 22
22. Leaf blade narrowly obovate 23  
 Blade elliptic or obovate 24
23. Peduncle 4–5 mm thick, with 1 node, leaf blade 10–26 by 4–10 cm, apex acuminate (outer tepals tinged red or purple, inner tepals creamy) **15. Magnolia insignis**  
 Peduncle 8–12 mm thick, with 2 nodes, leaf blade 20–30 by 5–8 cm, apex acute, or shortly acuminate (all tepals white) **14. Magnolia hookeri**
24. Fruits cylindrical, twigs glabrous, peduncle or brachyblast 3–4 mm thick, fruiting carpels beaked (flower yellow or yellowish) **25. Magnolia utilis**  
 Fruits ovoid, twigs pubescent, peduncle or brachyblast 6–9 mm thick, fruiting carpels not beaked (flower purple or red) **10. Magnolia garrettii**

**1. Magnolia x alba** (DC) Figlar, Proc. Int. Symp. Magnoliac.: 21. 2000.— *Michelia x alba* DC, Syst. 1: 449. 1817; H.Keng in T.C. Whitmore, Tree Fl. Malaya 2: 286. 1973; Fl. Thailand 2(3): 262. 1975. Type: the plate of *Sampaca domestica IV alba*, Rumphius, Herb. Amb. 2: 200. 1741.— *Michelia longifolia* Blume, Verh. Batav. Genootsch. Kunsten. 9: 155. 1823; Ridl., Fl. Malay Penins. 1:15. 1922. Type: *Blume* s.n. (L, sheet 908. 126-1242).

Tree to 30 m high, and 30–120 cm diam. *Twigs* greyish-pubescent or puberulous. *Stipules* with only the base adnate to petiole; pubescent or puberulous. *Leaves* evenly distributed, spirally arranged; petiole 15–50 mm, hairy, stipular scars 3–25 mm long (but mostly short); blade puberulous beneath, ovate, 15–35 by 5.5–11 cm; base with 2 ridges decurrent on the petiole, attenuate; apex acuminate, acumen 7–30 mm; pairs of lateral nerves 12–18, meeting in an intramarginal vein close to the margin; reticulation beneath distinct, densely netted. *Brachyblast* densely greyish-pubescent, 10–17 mm long, slender, with 2–3 nodes; pedicel very short or absent. *Flowers* many, pseudoaxillary on a brachyblast, white; tepals 10–14, subequal, 1.5–5 cm long; white; stamens 9–11 mm long, connective appendage 1 mm long, anthers latrorse or sublaturse; gynoecium stipitate, greyish puberulous; gynophore 4–7 mm long; carpels 8–12; styles black. Gynophore under fruit present.

Thailand.— Cultivated.

Distribution.— Cultivated.

Vernacular.— Champi (จําปี).

Notes.— Fruits are seldom seen because the plant often is sterile and probably a hybrid between *M. champaca* (L.) Baill. ex Pierre and *M. montana* (Blume) Figlar & Noot.

**2. *Magnolia baillonii*** Pierre, Fl. Forest Cochinch. 1: t. 2. 1879.— *Michelia baillonii* (Pierre) Finet & Gagnep., Mém. Soc. Bot. Fr. 1: 46. 1906; in H.Lecomte, Fl. Indo-Chine 1: 39. 1907.— *Aromadendron baillonii* (Pierre) Craib, Fl. Siam.: 26. 1925. — *Paramichelia baillonii* (Pierre) Hu, Sunyatsenia 4: 144. 1940; H.Keng, Fl. Thailand 2(3): 266. 1975. Type: Indo China, *Pierre* 750 (holotype **P**; isotype **A**).— *Talauma spongocarpa* King, Ann. Roy. Bot. Gard. (Calcutta) 3(2): 205, t. 47bis. Type: Assam, Sibsagar, *Calc. Bot. Gard. Collector* 102 (holotype **CAL**, isotype **L**).— *Talauma phellocarpa* King, Ann. Roy. Bot. Gard. (Calcutta) 3(2): 205, t. 47ter. 1891. Syntypes: Assam, Sibsagar, Peal s.n. (isosytype **L**) and Mann s.n. (non vidi).

Tree to 35 m high, and 30–100 cm diam. *Twigs* pale brown, appressed-villous. *Stipules* adnate to petiole for 30–50%. *Leaves* evenly distributed, spirally arranged; petiole 15–35 mm, hairy, stipular scars 7–17 mm long; blade appressed-pubescent beneath, hairs straight (wavy), elliptic or narrowly elliptic to ovate or narrowly ovate, 6–25 by 3.5–8 cm; base cuneate to broadly cuneate; apex faintly shortly acuminate; pairs of lateral nerves 9–22, meeting in an intramarginal vein; reticulation beneath distinct, prominent, densely netted. *Brachyblast* appressed-pubescent, 10–15 mm long, slender, 1.5–2.5 mm thick, 1 node; pedicel present, 0.1–0.5 mm. *Flowers* pseudoaxillary on a brachyblast; fragrant; white; tepals 8–21, subequal; 2.5–3.2 by 0.4–0.6 cm, very narrow, nearly linear; stamens 6–7 mm long, connective appendage narrowly triangular, 1–2.5 mm long, filaments 1–1.2 mm long, anthers latrorse or sublatorse, 4–5.5 mm long; gynoecium stipitate, greyish silky, narrowly ovoid, 5–8 mm high; gynophore 3–5 mm long; styles red, 0.8–1.2 mm long. *Fruiting peduncles* 20–25 by 3–5 mm. *Fruits* obovoid or cylindrical, 6–10 by 3–5 cm, fruiting carpels connate, when mature the apical parts of the carpels circumcissile and falling, dehiscing along the dorsal suture or not, the basal parts remaining adnate to the torus (midribs of carpels persistent on the fruiting axis after carpels dehisce); fruiting carpels glabrous; gynophore under fruit present.

Thailand.— NORTHERN: Chiang Mai (Doi Suthep, Doi Inthanon, Doi Non Ngao), Chiang Rai (Doi Luang National Park); EASTERN: Nakhon Ratchasima (Khao Yai National Park), Chaiyaphum (Ban Nam Phrom); SOUTH-WESTERN: Kanchanaburi (Thong Pha Phum National Park), Phetchaburi (Kaeng Krachan National Park).

Distribution.— China (Yunnan), Assam, Burma, Vietnam.

Ecology.— Hill evergreen forest, tropical rain forest, dry evergreen forest. Altitude 500–1,300 m.

Vernacular.— Champi pa (จាំป้า).

Conservation status.— NE.

**3. *Magnolia betongensis*** (Craib) H.Keng, Gard. Bull. Singapore 31: 129. 1978.— *Talauma betongensis* Craib, Bull. Misc. Inform. Kew 1925: 7. 1925; H.Keng, Fl. Thailand 2(3): 258. 1975. Type: Thailand, Peninsular, Pattani, Betong, *Kerr* 7449 (holotype **K**; isotype **BM**).— *Talauma obovata* Korthals, Ned. Kruidk. Arch. 2(2): 98. 1851 non *Magnolia obovata* Thunb. 1794.— *Magnolia candollii* (Blume) H.Keng var. *obovata* (Korthals) Noot., Blumea 32: 374. 1987; Fl. Males., ser. I, 10: 585. 1988.— *M. liliifera* (L.) Baill. var. *obovata* D.G. Frodin & R.H.A.Govaerts, World Checklist Bibliogr. Magnoliaceae: 71. 1996. Type: G. Pamatton, *Korthals* s.n. (lectotype **L**; isolectotype **BO**).— *Talauma*

*oblanceolata* Ridl., Fl. Malay Penins. 5: 286. 1925, emend. Dandy, Bull. Misc. Inform. Kew 1928: 192. 1928; H.Keng in T.C. Whitmore, Tree Fl. Malaya 2: 294. 1973. Type: Singapore, Fraser's Hill, *Ridley* 155590 (holotype **SING**; isotype **K**).— *Magnolia sclerophylla* Dandy, J. Bot. 66: 47. 1928. Type: Malaysia (Borneo), Sarawak, Sarekas Paku, *Haviland* 3148 (holotype **BM**; isotype **K**).— *Talauma levissima* Dandy, Bull. Misc. Inform. Kew 1928: 191. 1928. Type: Malaysia, North Borneo, *Ridley* 9047 (holotype **K**; isotype **SING**).

Small tree to 12 m high and 30–40 cm diam., glabrous (except sometimes between the upper bracts). *Twigs* 6–7 mm thick in innovations. Stipules adnate to petiole for 30–80(–100) %. *Leaves* evenly distributed, spirally arranged; petiole (20–)35–55 mm, often conspicuously dilated at base, black when dry, stipular scars 12–50 mm long; blade glabrous beneath, obovate or narrowly obovate (or sometimes elliptic), 21–38 by 7–15 cm; base cuneate or attenuate-cuneate; apex rounded or very shortly acuminate, acumen 0–10 mm; pairs of lateral nerves (10–)14–20; midrib when dry prominent above, at least towards base; often meeting in an intramarginal vein close to the margin; reticulation beneath distinct, laxly netted. Peduncle stout, 20–40 mm long, at top (6–)8–12 mm thick, 2–18 nodes; pedicel present or absent, 0–2 mm. *Flowers* terminal on the twig, white; tepals 9; outer tepals 3, greenish; inner tepals erect 6; stamens 12–30 mm long, connective appendage triangular, anthers introrse; gynoecium not stipitate, glabrous, narrowly ellipsoid; carpels 40–100, number of ovules per carpel 2. *Fruits* ellipsoid, 6.5–12(–15) by 4.5–7 cm, fruiting carpels connate, when mature the apical parts of the carpels circumscissile and falling, while also dehiscing partially along the ventral suture, the basal parts remaining adnate to the torus; fruiting carpels glabrous, 2–4 cm long, beaked (beak falling off); scars of perianth and stamens along torus under fruit 8–12 mm long.

Thailand.— PENINSULAR: Phatthalung, Songkhla, Yala.

Distribution.— Peninsular Malaysia, Borneo.

Ecology.— Tropical rain forest, usually at low altitude, rarely up to 1,700 m. Flowering April–May; fruiting June–September.

Vernacular.— Leng keng (เล็งเค็ง).

Conservation status.— NE.

**4. *Magnolia champaca* (L.) Baill.** ex Pierre, Fl. Forest. Cochinch. : t. 3. 1879.— *Michelia champaca* L., Sp. Pl.: 536. 1753; Ridl., Fl. Malay Penins. 1: 15. 1922; H.Keng in T.C. Whitmore, Tree Fl. Malaya 2: 286. 1973; Fl. Thailand 2(3): 258. 1975; Noot., Fl. Males., ser. I, 10: 601. 1988. Type: Sri Lanka (Ceylon), *Hermann Fl. Zeyl.* 144 (**BM**).

Tree to 50 m high and 80–180 cm diam. *Twigs* pubescent. Stipules pubescent, adnate to petiole for 50–100 %. *Leaves*: evenly distributed, spirally arranged; petiole 14–35(–40) mm, hairy, stipular scars 7–39 mm long; blade, especially on midrib and nerves, pubescent beneath, elliptic or ovate, 10–30 by 4–10 cm; base decurrent with 2 ridges on the apical half of the petiole, cuneate to rounded; apex acuminate (acumen often obliquely folded when dry), acumen 7–13(–25) mm; pairs of lateral nerves 14–23, meeting in an intramarginal vein close to the margin; reticulation beneath distinct, densely netted. *Brachyblast* densely pubescent, (5–)10–18(–25) mm long, slender, 2(–3) nodes; pedicel



present or absent, 0–1 mm. *Flowers* pseudoaxillary on a brachyblast, yellow or yellowish to orange yellow; tepals 15, in several inconspicuous whorls, subequal; stamens 6–8 mm long, connective appendage 0–1 mm long, anthers latrorse or sublatorse; gynoecium stipitate, greyish puberulous; gynophore 2–5 mm long; carpels 25–35, number of ovules per carpel (3–)4 or more. Fruiting peduncles slender, hairy. *Fruits* cylindrical, fruiting carpels free, dehiscing along the dorsal suture (carpels basally adnate to the axis to shortly stipitate); gynophore under fruit present.

## KEY TO THE VARIETIES

Leaves more or less elliptic with cuneate to rounded base, the acumen often rather short. Petiole with a stipular scar from 0.3 of its length up to 0.7 of its length. Tree to 50 m high and ca 180 cm diam. **4b. var. pubinervia**  
 Leaves ovate with cuneate-attenuate base; the acumen often quite long. Petiole with a stipular scar up to shortly below its middle to up to the apex. Tree 2–5 (to ca 30 m) high and 50 cm diam. Cultivated **4a. var. champaca**

**4a. *Magnolia champaca* (L.) Baill. ex Pierre var. *champaca***

Vernacular — Champa.

Notes — Widely cultivated.

**4b. *Magnolia champaca* (L.) Baill. ex Pierre var. *pubinervia* (Blume) Figlar & Noot., Blumea 49: 10. 2004.— *Michelia champaca* L. var. *pubinervia* Blume, Ann. Mus. Bot. Lugduno-Batavi 4: 72. 1868; Noot., Fl. Males., ser. I, 10: 603. 1988.— *Michelia pubinervia* Blume, Fl. Java Magnoliaceae 14, t. 4. 1829. Type: Indonesia, *Blume* 670 (holotype **L**; isotype **BO**).**

Thailand.— PENINSULAR: Nakhon Si Thammarat, Phatthalung, Songkhla.

Distribution.— Laos, Cambodia, Vietnam, Peninsular Malaysia.

Vernacular.— Champa pa (จាំปำป๋า).

Ecology.— Tropical rain forest. Altitude 20–1,000 m. Flowering March–April; fruiting May–June.

Conservation status.— NE.

**5. *Magnolia champaca* x *baillonii* (undescribed hybrid).**

Tree to 20 m high and at base 50–200 cm diam. *Twigs* 2–5 mm thick in innovations, appressed-pubescent to silky; hairs yellowish brown. Stipules adnate to petiole for 40–75 %, appressed-pubescent to silky. *Leaves* with petiole 20–35 mm, hairy; blade silky appressed-pubescent beneath, hairs straight, yellowish brown, ovate, 14–25 by 5–9 cm; base cuneate; apex slightly acuminate, acumen 5–20 mm; pairs of lateral nerves 9–14, meeting in an intramarginal vein close to the margin (4–5 mm); reticulation beneath distinct, densely netted. *Brachyblast* with appressed hairs, pubescent to silky, 10–20 mm long, slender, 1.5–3 mm thick, 1–2 nodes; pedicel present or absent, 0–2 mm. *Flowers* pseudoaxillary on a brachyblast, creamy white; tepals 12–15, subequal; outer tepals 3–4, 4–5.5 by 0.9–1.1 cm, spatulate; inner tepals 8–12, narrowly obovate, 4–5 by 6–8 mm broad; stamens 8–10 mm long, connective appendage narrowly triangular, 1–1.5 mm

long, anthers latrorse or sublаторse; gynoecium stipitate, greyish silky; gynophore 5–7 mm long; carpels 25–43. Fruiting peduncles glabrous, 2.2–3.8 cm long by 3–4 mm thick. *Fruits* cylindrical, 5–15 by 3–5 cm, fruiting carpels connate, but becoming mostly free on dehiscence with some carpels splitting via the dorsal suture while apical parts of others falling away circumscissile; carpels lenticelled, glabrous, 1.5–2.2 cm long; gynophore under fruit present, 15–20 mm long.

Thailand.— NORTHERN: Phitsanulok, Chiang Rai; SOUTH-EASTERN: Prachin Buri; SOUTHWESTERN: Kanchanaburi.

Distribution.— Endemic.

Ecology.— Single tree in preserved area, and cultivated as temple tree. Dry evergreen forest. Altitude 100–500 m.

Vernacular.— Champa khao (จำปาทวาร).

Conservation status.— NE.

Notes.— The fruit looks exactly intermediate between the fruits of *M. champaca* and *M. baillonii*. The hybrid has the same chloroplast DNA sequences as *M. champaca*, which is the mother plant. (H. Azuma, pers. comm.).

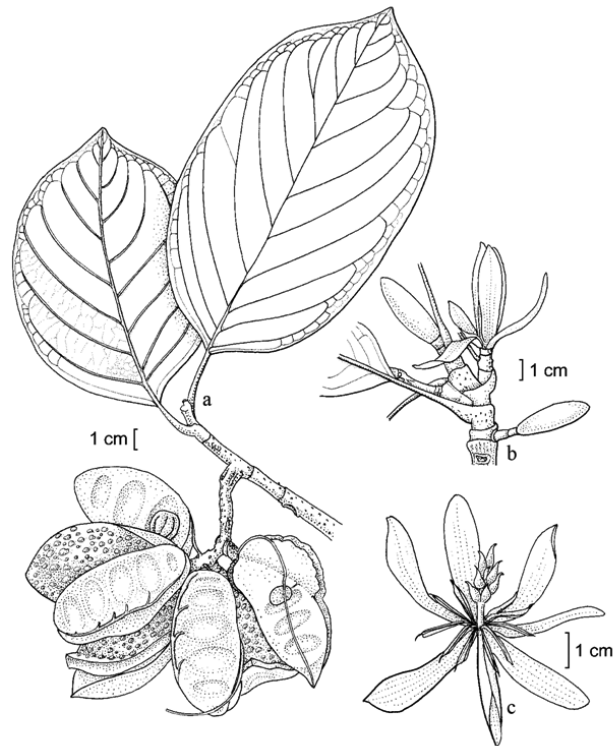


Figure 1. *Magnolia citrata* Noot. & Chalermglin: A. habit with ripening fruit (Smitinand 90-269); B. flower buds (Chalermglin 420410); C. flower (Chalermglin 420410).

**6. *Magnolia citrata*** Noot. & Chalermglin, *Blumea* 52: 559. 2007. Type: Thailand, Chiang Mai, Mae Taeng distr., Mon Angket, *Smitinand* 90-269 (BKF 96932) (holotype **BKF**). Fig. 1.

Tree to 35 m high and 100–150 cm diam. *Twigs* 5–7(–10) mm thick in innovations, conspicuously elliptic, lenticellate, the youngest parts minutely appressed-puberulous, hairs yellowish. Stipules free from the petiole, the margins yellowish puberulous. *Leaves* evenly distributed, spirally arranged; petiole 30–40 mm long (and 3–4 mm thick), blade minutely yellowish hairy; obovate, 11–30 by 8–18 cm; base rounded (but narrowed near the petiole); apex shortly acuminate; pairs of lateral nerves 9–11, meeting in an intramarginal vein close to the margin; reticulation beneath distinct, densely netted. *Brachyblast* minutely yellowish appressed-puberulous, 15–35 mm long, slender, 3–4 mm thick, 2–3 nodes; pedicel minute or absent. *Flowers* pseudoaxillary on a brachyblast; strongly fragrant; white; tepals 9, subequal; 4–4.5 by 0.8–1.5 cm, thick fleshy, narrowly obovate or spatulate; stamens 9–12 mm long, connective appendage narrowly triangular (to subulate), 1–1.5 mm long, filaments 2–3 mm long, anthers latrorse or sublatorse; 6–7 mm long; gynoecium stipitate, brownish greyish puberulous, 8–14 mm high; gynophore 6–8 mm long; carpels 6–10, number of ovules per carpel (3–)4 or more. Fruiting carpels at least finally free, dehiscing along the dorsal suture; glabrous, 5–7.5 by 3.5–5 cm, gynophore under fruit present, 30–40 mm long.

Thailand.— NORTHERN: Chiang Mai, Nan; NORTH-EASTERN: Loei.

Distribution. — Endemic.

Ecology. — Hill evergreen forest (tropical rain forest). Altitude 1,200–1,400 m. Flowering: April–May; fruiting May–October.

Vernacular. — Champi chang (จ๋มปีช้าง).

Conservation status.— NE.

Notes.— The leaves when crushed give a licorice smell, the outer seed coat smells like *Cymbopogon citrata* (lemon grass/ta kra).

**7. *Magnolia duperreana*** Pierre, *Fl. Forest Cochinch.*: 1: t. 1. 1879.— *Kmeria duperreana* (Pierre) Dandy, *Bull. Misc. Inform. Kew* 1927: 262. 1927; H.Keng, *Fl. Thailand* 2(3): 2260. 1975. Type: Cambodia, Knang Repœu, *Pierre* 749 (holotype **P**).

Small or medium sized tree to 20(–30) m high and 25–30 cm diam., sparsely minutely hairy at least on stipule margins, glabrescent. *Twigs* glabrous, vegetative buds finely short-pubescent; stipules adnate to petiole for 75–100 %, puberulous. *Leaves* with 25–45 mm long petiole; blade glabrous beneath except midrib which bears some scattered hairs, elliptic or obovate, 11–30 by 5.5–10.5 cm; base cuneate, or attenuate; apex rounded or acuminate; pairs of lateral nerves 12–14, meeting in an intramarginal vein not close to the margin; reticulation beneath distinct, densely netted. 30–50 mm long; *Brachyblast* 30–50 mm long in male flowers; stout or slender, 1 node; pedicel absent. *Flowers* terminal on the twig; unisexual; white; in male flowers tepals subequal, 8–13; in female flowers outer tepals 3–4, 2.5–3 by 1–1.2 cm; inner tepals 6–9; stamens 12 mm long, connective appendage triangular with a sharp pointed tip, anthers subintrorse. Receptacle short, the

carpels attached at about the same height. Gynoecium not stipitate, glabrous; carpels 10–15, number of ovules per carpel 2. *Fruits* when young subglobose, 2–3 by 2–3 cm, fruiting carpels when young connate, but becoming free, after dehiscence forming 2 lobes like 2 laterally recurved horns, glabrous, 2.5–3.5 cm long.

Thailand.— SOUTH-EASTERN: Trat (Khao Kuap).

Distribution.— Cambodia

Ecology.— Hill evergreen forest. Altitude 900–1,300 m. Flowering April–May; fruiting June–October.

Vernacular.— Matum khao (มะตุมขาว).

Conservation status.— NE.

**8. *Magnolia elegans*** (Blume) H.Keng, Gard. Bull. Singapore 31: 129. 1978; Noot., Fl. Males., ser. I, 10: 577. 1988; Gardner et al., Thai Forest Bull. (Bot.) 35: 70. 2007.— *Aromadendron elegans* Blume, Bijdr.: 10. 1825; H.Keng in T.C. Whitmore, Tree Fl. Malaya 2: 283. 1973); Fl. Thailand 2(3): 259. 1975.— *Talauma elegans* (Blume) Miquel, Ann. Mus. Bot. Lugduno-Batavi 4: 70. 1868; Ridl., J. Straits Br. Roy. Asiat. Soc. 33: 38. 1900. Type: Java, *Blume* (holotype **L**; isotype **BO**).

Tree to 55 m high and 80–115 cm diam., nearly glabrous (only stipules with hairs at the apex). Stipules free from the petiole. *Leaves* evenly distributed, spirally arranged; petiole 8–20(–25) mm; blade glabrous beneath, glaucous below or not, elliptic or narrowly elliptic, 7.5–22(–27) by 3–6(–8) cm; base attenuate-cuneate, or sometimes rounded; apex (very) shortly acuminate, acumen 3–20 mm; pairs of lateral nerves 11–16, meeting in an intramarginal vein close to the margin; reticulation beneath distinct, very densely netted. Peduncle or brachyblast 30–50(–60) mm long, slender; pedicel present, 1–6 mm. *Flowers* terminal on the twig, white; tepals 18–36, very unequal; outer tepals 4, light yellowish green, narrowly obovate or elliptic; 4–7 cm long by 1.5–1.8 mm broad; white; stamens 60–70, without the appendage 8.5–9.5 mm long, connective appendage setaceous, 12–15 mm long, filaments 0.4–0.6 mm long, anthers introrse; gynoecium shortly stipitate, glabrous; number of ovules per carpel 2. Fruiting peduncles glabrous. *Fruits* subglobose or ellipsoid, 5–7 by 3–5 cm, fruiting carpels connate into a fleshy syncarp, when ripe falling off in irregular masses, glabrous; gynophore under fruit 4–6 mm long; scars of perianth and stamens along torus under fruit 4–6 mm long.

Thailand.— PENINSULAR: Nakhon Si Thammarat (Thung Song), Phangnga (Ton Pariwat Wildlife Sanctuary).

Distribution.— Sumatra, Peninsular Malaysia, Java.

Ecology.— Lowland rainforest. Altitude: 50–300 m. Flowering February–March; fruiting April–August.

Vernacular.— Thang ke (ถังเก).

Conservation status.— NE.

**9. *Magnolia floribunda*** (Finet & Gagnep.) Figlar, Proc. Int. Symp. Magnoliac.: 21. 2000.— *Michelia floribunda* Finet & Gagnep., Mém. Soc. Bot. Fr. 52 (Mém. 4(1)):

46. 1906 [1905 publ. March 1906]; Gagnep. in P.H.Lecomte, Fl. Indo-Chine, Suppl. 1: 48. 1938; H.Keng, Fl. Thailand 2(3): 259. 1975. Type: China, Yunnan, *Bons d'ant* s.n. (holotype **P**).— *Michelia microtricha* Handel-Mazzetti, Anz. Kaiserl. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 58: 145. 1921. Type: China, Yunnan, Dali, *Ten* 339 (holotype **C**, isotype **W**).— *Michelia kerrii* Craib, Bull. Misc. Inform. Kew 1922: 166. 1922; Fl. Siam. 1: 26. 1925. Type: Thailand, Chiang Mai, Doi Suthep, *Kerr* 4679 (**K**).— *M. microtricha* (Handel-Mazzetti) Figlar, Proc. Int. Symp. Magnoliac.: 23. 2000.— *Michelia manipurensis* auct. non Watt ex Brandis: Craib, Fl. Siam. 1: 27. 1925.

Tree to 20 m high and 30–60 cm diam. *Twigs* 2–3 mm thick in innovations, appressed-puberulous; hairs yellowish. Stipules adnate to petiole for 15–70 %, appressedly puberulous. *Leaves* evenly distributed, spirally arranged; petiole 10–20 mm, hairy; blade appressed-pubescent beneath (when young also above), often glaucous below, hairs straight, yellowish, narrowly elliptic or narrowly ovate to narrowly obovate, 7–14 by 2–4.5 cm; base broadly cuneate or rounded; apex acuminate, acumen 5–15 mm long; pairs of lateral nerves 8–13, meeting in an intramarginal vein not close to the margin; reticulation beneath distinct, densely netted. *Brachyblast* appressed-puberulous, 3–7 mm long, 3 mm thick, 1(–2) nodes. *Flowers* pseudoaxillary on a brachyblast, white (or yellowish white); tepals 10–13, subequal; 2.5–5 by 0.4–1 cm (inner tepals narrower); stamens 6–9 mm long, connective narrowly triangular, 2 mm long, anthers latrorse or sublatorse; gynoeceum stipitate, densely golden yellow silky; gynophore 5–8 mm long; number of ovules per carpel (3–)4 or more. Fruiting peduncles hairy. *Fruits* cylindrical, 2–8 cm long; fruiting carpels free, dehiscent along the dorsal suture; gynophore under fruit present.

Thailand.— NORTHERN: Chiang Mai (Doi Khun Huai Pong, Doi Suthep, Doi Inthanon, Doi Ang Khang), Nan (Doi Phu Kha); NORTH-EASTERN: Loei (Phu Kradueng).

Distribution.— South China, Burma, Laos, Vietnam

Ecology.— In or along the edge of lower montane forest, in open savannah or mossy forest at medium altitudes. Altitude 1,100–2,200 m. Flowering February–March; fruiting April–November.

Vernacular.— Kaeo mahawan (แก้วมหาวัน).

Conservation status.— NE.

**10. *Magnolia garrettii*** (Craib) V.S.Kumar, Kew Bull. 61: 184. 2006.— *Manglietia garrettii* Craib, Bull. Misc. Inform. Kew 1922: 166. 1922; Fl. Siam. 1: 26. 1925; Gagnep. in P.H.Lecomte, Fl. Indo-Chine, Suppl. 1: 37. 1938. Fig. 38; H.Keng, Fl. Thailand 2(3): 252. 1975. Type: Thailand, Doi Inthanon, Doi Pha Kao, *Garrett* 119 (holotype **K**).

Tree to 30 m high and 60–120 cm diam. *Twigs* 5–8 mm thick in innovations, densely brown-pubescent. Stipules adnate to petiole for 50–75 %, pubescent. *Leaves* crowded at the end of the branchlets; petiole 30–50 mm, hairy, dilated at base; blade with minute, scattered, appressed hairs or glabrous beneath, hairs brown or red, elliptic to obovate, 18–35 by 7–12 cm; base cuneate or broadly cuneate; apex shortly acuminate; pairs of lateral nerves 12–25, meeting in an intramarginal vein not close to the margin; reticulation beneath distinct. *Peduncle* densely brown-pubescent, 15–50 mm long, stout,

6–9 mm thick, 1 node; pedicel present or absent, 0–2 mm long. *Flowers* terminal on the twig, purple or red; tepals 9, subequal; outer tepals 3, 5–6.5 by 2.5–3.5 cm, thick fleshy; inner tepals 6, slightly smaller; stamens 11–15 mm long, connective appendage triangular, 1–3 mm long, anthers introrse; gynoecium not stipitate, glabrous, ovoid, 25–35 mm high; carpels 60–80, number of ovules per carpel (3–)4 or more; styles black, 2–3 mm long. Fruiting peduncles stout, lenticelled, glabrous, 1.5–5 cm long by 6–9 mm thick. *Fruits* broadly ovoid, 4–9 by 3.5–6 cm, fruiting carpels fused, clustered close together, becoming free at dehiscence which is along the dorsal suture and sometimes also along the ventral suture; fruiting carpels glabrous, dorsal faces of ripe carpels 1–3.2 cm long, shortly beaked; scars of perianth and stamens along torus under fruit 11–12 mm long; seeds 9–14 mm long.

Thailand.— NORTHERN: Chiang Mai, Chiang Rai, Mae Hong Son, Tak, Nan, Phitsanulok.

Distribution.— SW China, Vietnam.

Ecology.— Hill evergreen forest. Altitude 1,000–1,850 m. Flowering April–May; fruiting June–October.

Vernacular.— Montha pa (มณฑาป่า).

Conservation status.— NE.

**11. *Magnolia gustavii*** King, Ann. Roy. Bot. Gard. (Calcutta) 3(2): 209. 1891. Type: India, Assam, Makum Forest, *Mann* s.n. (holotype **CAL**; isotypes **K**, **L** 0038355).

Tree to 15 m high and 50 cm diam., glabrous (buds rarely pubescent at apex). Terminal buds 7–9 mm long, ca 2 mm wide; stipules free from the petiole. *Leaves* with 6–12 mm long petiole; blade glabrous beneath, elliptic or narrowly elliptic, 13–30 by 3.5–9.5 cm; base cuneate; apex shortly acuminate or acuminate, acumen 5–20 mm; pairs of lateral nerves 15–18, meeting in an intramarginal vein not close to the margin; reticulation beneath distinct, densely netted. *Peduncle* glabrous, 30–40 mm long, slender, 1.5–2 mm thick, 1 node; pedicel absent. *Flowers* terminal on the twig (often overtopped by the terminal bud and the flower seemingly axillary), pink or white; tepals 9, subequal; outer tepals 3, 3–4 by 7–10 cm; inner tepals 6; stamens 7–12 mm long, connective appendage triangular, 1–2 mm long, anthers introrse; gynoecium stipitate or not, glabrous, cylindrical, 13–19 mm high; gynophore 0–4 mm long; carpels 25–35, number of ovules per carpel 2. Fruiting peduncles stout, 4–5 cm long by 3–5 mm thick. *Fruits* cylindrical, 8–12 by 2–4 cm, fruiting carpels connate in developing fruit, at least finally free, dehiscing along the dorsal suture; glabrous; gynophore under fruit absent or present, 0–4 mm long; scars of perianth and stamens along torus under fruit 10–16 mm long.

Thailand.— NORTHERN: Tak; SOUTH-WESTERN: Phetchaburi.

Distribution.— India (Assam), Burma.

Ecology.— Hill evergreen forest. Altitude 1200–1300 m. Flowering September–October; fruiting November–February.

Vernacular.— Champi doi (จําปี้ดอย).

Conservation status.— EN.

**12. *Magnolia henryi*** Dunn, J. Linn. Soc., Bot. 35: 484. 1903; Gagnep. in P.H.Lecomte, Fl. Indo-Chine, Suppl. 1: 41. 1938; H.Keng, Fl. Thailand 2(3): 253. 1975. Type: China: Yunnan: near Simao, *Henry* 12782 (holotype **K**; isotypes **A**, **E**, **MO**, **NY**).— *Talauma kerrii* Craib, Bull. Misc. Inform. Kew 1922: 226. 1922; Fl. Siam.: 1: 25. 1925. Fig. 39. Type: Thailand, Nan, Doi Tiu, *Kerr* 5860 (holotype **K**).

Tree to 10 m high and 20–40 cm diam. *Twigs* 4–6 mm thick in innovations, long appressed-pilose; hairs yellowish. Stipules adnate to petiole for 90–100%. *Leaves* evenly distributed, spirally arranged; petiole 40–110 mm, hairy when young, soon glabrescent; blade sparsely appressed-pubescent beneath, hairs straight, elliptic to obovate, 20–130 by 7–30 cm; base cuneate; apex acute or rounded; midrib when dry prominent above, at least towards base; pairs of lateral nerves 14–20, meeting in an intramarginal vein close to the margin; reticulation beneath distinct, laxly netted. *Peduncle* long appressed-pubescent, 50–80 mm long, stout, 4–7 mm thick, 4–7 nodes; pedicel absent. *Flowers* hanging, terminal on the twig; sweet scented; white; tepals 9, subequal; outer tepals 3, reflexed, greenish outside, 4.5–6.5 by 2.5–3.5 cm, white, obovate or elliptic; inner tepals 6, obovate, 4.5–6 cm long; white or creamy; stamens 12–15 mm long, connective appendage triangular, 0.5–1.5 mm long, anthers introrse; gynoecium not stipitate, glabrous, narrowly ovoid, 25–40 mm high; carpels narrowly long-ellipsoid, 85–95, number of ovules per carpel 2; styles brown, 4–9 mm long. Fruiting peduncles stout, glabrous, 5–8 cm long. *Fruits* narrowly ellipsoid, 10–15 by 3–5 cm, fruiting carpels fused, clustered close together, becoming free at dehiscence which is along the dorsal suture and sometimes also along the ventral suture; glabrous; gynophore under fruit absent.

Thailand.— NORTHERN: Chiang Rai, Phayao, Nan, Uttaradit, Phitsanulok.

Distribution.— SW China, Burma, Laos.

Ecology.— Evergreen forest. Altitude 660–900 m. Flowering April–May; fruiting June–August.

Vernacular.— Montha phu (มณฑพู่).

Conservation status.— NT.

**13. *Magnolia hodgsonii*** (Hook.f. & Thomson) H.Keng, Gard. Bull. Singapore 31: 129. 1976.— *Talauma hodgsonii* Hook.f. & Thomson, Fl. Ind. 1: 74. 1855; Gagnep. in P.H.Lecomte, Fl. Indo-Chine, Suppl. 1: 31. 1938; H.Keng, Fl. Thailand 2(3): 258. 1975.— *Magnolia candollii* var. *obovata* (Korth.) Noot., Blumea 32: 374. 1987, pro parte. Type: India, Sikkim, *Hooker* s.n. (holotype **K**; isotype **L**).

Small tree to 15 m high and 20–50 cm diam. *Twigs* 6.5–10 mm thick in innovations, glabrous. Youngest twigs and peduncles glaucous. Stipules adnate to petiole for 90–100%. *Leaves* evenly distributed, spirally arranged; petiole 45–90 mm, dilated at base; blade glabrous beneath, elliptic to narrowly elliptic or obovate to narrowly obovate, 19–50 by 6. 5–12(–20) cm; base cuneate or attenuate; apex with obtuse tip rounded or shortly acuminate, acumen 0–20 mm; midrib when dry prominent above, at least towards base, pairs of lateral nerves 9–20, meeting in an intramarginal vein close to the margin;

reticulation beneath distinct. *Peduncle* glabrous, 15–25 mm long, stout, often glaucous, directly under fruit, 6–16 mm thick, 1–3 nodes; pedicel present, 1–8 mm long. *Flowers* terminal on the twig; sweet scented; white; tepals 9, subequal; outer tepals 3, recurved, 5–9 by 2.5–4 cm, tinged red or purple, obovate; inner tepals 6, obovate, thick, fleshy, smaller than outer tepals; white or creamy; stamens very many, 15–20 mm long, connective appendage triangular, 1–2 mm long, anthers introrse; gynoecium not stipitate, glabrous, conical, 25–35 mm high; carpels 80–100 (or more), number of ovules per carpel 2, 1.5–2 mm long. Fruiting peduncles stout, glabrous, 1.5–2.5 cm long by 8–14 mm thick (at the top). *Fruits* ellipsoid, 10–15 by 3.5–5 cm, fruiting carpels connate, when mature the apical parts of the carpels circumscissile and falling, dehiscing partially along the ventral suture or not, the basal parts remaining adnate to the torus; glabrous, 2–4 cm long, shortly beaked, beak 2–10 mm long; scars of perianth and stamens along torus under fruit 8–20 mm long.

Thailand.— NORTHERN: Chiang Mai, Mae Hong Son, Tak, Lamphun; SOUTH-WESTERN: Kanchanaburi.

Distribution.— India (Assam), Nepal, Bhutan, Burma.

Ecology.— Shaded understory tree of primary evergreen rainforest. Altitude 250–1,300 m. Flowering April; fruiting June–October.

Vernacular.— Montha doi (มณฑาดอย).

Conservation status.— LC.

Notes.— This species is very close to *Magnolia rabaniana* (Hook.f. & Thomson) H.J.Chowdhery & P.Daniel, Indian J. Forest. 4: 64. 1981. Basionym: *Talauma rabaniana* Hook.f. & Thomson, Fl. Ind. 1: 75. 1855. It differs in the longer petioles (usually more than 4 cm versus less than 4 cm, but there is an overlap), in the leaves being generally bigger, and in the peduncles being glabrous versus often appressed-hairy when young in *Magnolia rabaniana* Hook.f. & Thomson. Moreover, the peduncles and the twigs beneath them are often glaucous (but not always so!) in *M. hodgsonii*. Both species occur in Assam, *M. hodgsonii* was described from Sikkim.

**14. *Magnolia hookeri*** (Cubitt & W.W.Sm.) D.C.S.Raju & M.P.Nayar, Indian J. Bot. 3: 171. 1980.— *Manglietia hookeri* Cubitt & W.W.Sm., Rec. Bot. Surv. India 4: 273. 1911. Type: Burma, *Cubitt* 20, 302A, 327 (syntypes **K**).

Tree to 25 m high and 30–70 cm diam. glabrous or hairy at least in innovations. *Twigs* in innovations greyish-pubescent. Stipules adnate to petiole for 30–40 %. *Leaves* with petiole 20–30 mm long; blade underside paler than upper side, glabrous, narrowly obovate, 20–30 by 5–8 cm; base cuneate; apex acute or shortly acuminate, acumen 0–15 mm; pairs of lateral nerves 16–28, meeting in an intramarginal vein not close to the margin; reticulation beneath distinct, laxly netted. *Peduncle* glabrous, 23–35 mm long, stout, 8–12 mm thick, without pedicel with 2 nodes; pedicel present, 2–4 mm. *Flowers* terminal on the twig, white; tepals 9, subequal; outer tepals 3, 6–8 by 2.5–3 cm, green at base, upper part milky white, obovate; inner tepals 6, ovate, 6–8 cm by 40–50 mm broad; white; stamens 10–12 mm long, anthers introrse; gynoecium not stipitate, glabrous; carpels 90–110, number of ovules per carpel (3–)4 or more. Fruiting peduncles stout,



2.5–3.5 cm long by 8–12 mm thick. *Fruits* ovoid to subglobose, 7–10 by 5.5–6.5 cm, fruiting carpels fused, clustered close together, becoming free at dehiscence which is along the dorsal suture and sometimes also along the ventral suture, glabrous, shortly beaked; gynophore under fruit absent.

Thailand.— NORTHERN: Chiang Mai (Doi Ang Khang).

Distribution.— SW China, Burma.

Ecology.— Hill evergreen forest. Altitude 1,300–1,400 m. Flowering March–April; fruiting May–October.

Vernacular.— Montha khao ang khang (มณฑาทิวอ่างทอง).

Conservation status.— NE.

Notes.— This species was already known for some time as “White Ang Khang *Magnolia* or *Manglietia*” without proper identification. In April 2007 we could assess its identity with the help of Dick Figlar.

**15. *Magnolia insignis*** Wall., Tent. Fl. Nepal.: 5, t. 1. 1824.— *Manglietia insignis* (Wall.) Bl. Fl. Javæ 19–20: 22, in obs. 1828; Hook. in Hook. & Thoms., Fl. Indica 1: 76. 1855; Hook. f & Thomson in J.D. Hooker, Fl. Brit. India 1: 42. 1872, incl. var. *angustifolia* (nom. inval.) and var. *latifolia*. Type: Nepal, *Wallich* 873 (holotype **K**).

Tree to 30 m high and 60–120 cm diam. *Twigs* 3.5–6 mm thick in innovations, when young on the nodes ferruginous- or yellowish brown-pubescent. Stipules adnate to petiole for 30–60 %, with appressed reddish pubescence. *Leaves* with 18–35 mm long petiole, not or only slightly dilated at base; blade, except the midrib which may be hairy, glabrous beneath, narrowly obovate, 10–26 by 4–10 cm; base cuneate or broadly cuneate; apex acuminate, acumen 15–25 mm; pairs of lateral nerves 15–21, meeting in an intramarginal vein not close to the margin; reticulation beneath distinct, laxly netted. *Peduncle*, especially the pedicel, minutely appressed-puberulous, 10–20(–25) mm long, stout, 4–5 mm thick, without pedicel 1 node; pedicel present, 1–20(–25) mm long. *Flowers* terminal on the twig; erect, fragrant; pink to white; tepals 9–12, subequal; outer tepals reflexed, 3,4–7 cm long, outside dark purple, inside tinged red or purple, obovate; inner tepals 6, obovate, 5–7 cm long; creamy (depending on age often tinged pink); stamens red, 8–12 mm long, connective appendage triangular, 0.8–1.2 mm long, anthers introrse; gynoecium not stipitate, glabrous, ovoid or ellipsoid, 15–25 mm high; number of ovules per carpel (3–)4 or more. *Fruits* ovoid to ellipsoid, 7–12 cm long, fruiting carpels fused clustered close together, becoming free at dehiscence which is along the dorsal suture.

Thailand.— NORTHERN: Phitsanulok (Phu Hin Rongkla National Park).

Distribution.— SW China, India, Nepal, Assam, Burma, Vietnam.

Ecology.— Hill evergreen forest. Altitude 1,300–1,650 m. Flowering April; fruiting May–October.

Vernacular.— Mon thi ra (มณฑาทิว).

Conservation status.— LC.

**16. *Magnolia koordersiana*** (Noot.) Figlar, Proc. Int. Symp. Magnoliac.: 22. 2000; Blumea 49: 96. 2004; Gardner et al., Thai Forest Bull. (Bot.) 35: 69. 2007.— *Michelia koordersiana* Noot., Blumea 31: 111. 1985. Type: Sumatra, Palembang, Lematang ilir, *van der Zwaan voor Thorenaar* E 997, (holotype **L**; isotypes **BM**, **BO**, **K**).

Tree to 30 m high and 60–100 cm diam. Twigs finely appressedly puberulous (or only so directly under the terminal bud), often zigzag. Stipules free from the petiole, puberulous (to nearly glabrous). Leaves distichous; petiole 10–20 mm long; blade glabrous beneath, elliptic, 6–23 by 3–9 cm; base with 2 ridges decurrent on the petiole, cuneate or attenuate-cuneate; apex very shortly acuminate (often obliquely folded when dry), acumen (0–)3–8 mm; pairs of lateral nerves 7–13, meeting in an intramarginal vein not close to the margin; reticulation beneath distinct, densely netted. Brachyblast appressed-pubescent, 9–17 mm long, slender, 2 nodes; pedicel present, 0.5–1 mm. Flowers pseudoaxillary on a brachyblast, orange yellow; tepals 9, subequal; outer tepals 3, 1.2–2.2 by 0.2–0.3 cm, membranous; inner tepals 6, coriaceous, 1.2–2.2 cm long by up to 4 mm broad; orange yellowish; stamens 5–7 mm long, connective appendage narrowly triangular, 0.5 mm long, anthers latrorse or sublatorse; gynoecium stipitate, greyish-puberulous; gynophore 4–6 mm long; carpels 8–12, number of ovules per carpel (3–)4 or more. Fruiting peduncles slender, hairy, puberulous. Fruits cylindrical, fruiting carpels free, dehiscent along the dorsal suture, glabrous, 1.5–2.5 cm long; gynophore under fruit present.

Thailand.— PENINSULAR: Chumphon (Nam Tok Ngao National Park), Phangnga (Sri Phangnga National Park, Ton Pariwat Wildlife Sanctuary), Songkhla (Khao Nam Khang National Park).

Distribution.— Sumatra, Peninsular Malaysia.

Ecology.— Primary evergreen forest, usually in well-drained areas along ridges or on sloping ground. Altitude: 130–650 m. Flowering November–February; fruiting April.

Vernacular.— Champi thin thai (จําปี้ถีนไทย).

Conservation status.— NE.

**17. *Magnolia liliifera*** (L.) Baill., Hist. Pl. 1:141. 1868.— *Liriodendron liliiferum* L., Sp. Pl. ed. 2: 755. 1762.— *Talauma liliifera* (L.) Kuntze, Revis. Gen. Pl.: 6. 1891. Type: Rumphius, Herb. Amb. t. 69. 1755.— *Talauma candollii* Blume, Verh. Batav. Genootsch. Kunstn 9: 147. 1823; H.Keng in T.C. Whitmore, Tree Fl. Malaya 2: 293. 1973; Fl. Thailand 2(3): 256. 1975. Type: Indonesia, Java, Salak, Blume s.n. (lectotype **L**, sheet nr. 908. 126–1939).— *Talauma mutabilis* Blume, Fl. Javae 19–20: 35: t. 10, 11, 12B. 1829; Ridl., Fl. Malay Penins. 1: 16. 1922. Type: Indonesia, Bantam, Blume, (lectotype **L**, sheet nr. 908. 126–1903).— *Talauma mutabilis* var. *longifolia* Blume, Fl. Javae 19–20: 37. 1829.— *Talauma longifolia* (Blume) Ridl., J. Fed. Malay States Mus. 17: 38. 1916; Fl. Malay Penins. 1: 16. 1922. Type: Indonesia, Java, Blume s.n. (lectotype **L**, sheet 908. 126–1918).— *Talauma kunstleri* King, J. Asiat. Soc. Bengal 58(2): 373. 1889; Ridl., Fl. Malay Penins. 1: 16. 1922. Type: Malaysia, Perak, King's collector 6383 (holotype **BM**; isotype **K**).— *Magnolia craibiana* Dandy, Bull. Misc. Inform. Kew 1929: 105. 1929. Type: Thailand, Khao Luang, Kerr 15537 (holotype **BM**; isotype **K**).

Usually a small tree, 4–20 m high and 2–60 cm diam. *Twigs* 3–5(–7) mm thick in innovations, when young often appressedly long pilose. Stipules adnate to petiole for 100 %. *Leaves*: Evenly distributed, spirally arranged; petiole 5–30 mm, with same indument as twigs or glabrous, often conspicuously dilated at base; blade (finely) appressed-pubescent or glabrous beneath, hairs straight or circular-curved or straight as well as circular-curved at base, more or less elliptic to narrowly elliptic, 12–22(–27) by 3. 8–7(–9. 5) cm; base cuneate to attenuate-cuneate; margin running down on petiole until top of stipular scar; apex shortly acuminate or acuminate (rarely acute), acumen (0–)10–25(–35) mm; midrib when dry prominent above, at least towards base; pairs of lateral nerves (7–)10–15(–20); usually meeting in an intramarginal vein close to the margin; reticulation beneath distinct, laxly netted to densely netted. *Peduncle* with long brown appressed pubescence or glabrous, 20–40(–50) mm long, usually slender, at the top 2–6 mm thick, 1–7 nodes (sometimes a reduced leaf at a node, rarely with a second flower in the axil); pedicel present, 1–3 mm. *Flowers* terminal on the twig, white to cream, often red tinged or violet at base, sometimes light red or purplish; tepals 9, subequal; outer tepals 3, 1.5–3.5 by 1–2 cm, tinged red or purple or greenish, oblong; inner tepals in 2 whorls, 6, shorter than to as long as outer tepals, linear to spatulate; white; stamens 8–13 mm long, connective appendage triangular, 1.5–2 mm long, anthers introrse; gynoecium not stipitate, glabrous, narrowly ellipsoid; carpels 5–15, number of ovules per carpel 2. Fruiting peduncles rather slender. *Fruits* ellipsoid, 4–7.5 by 2.5–6 cm, fruiting carpels connate, when mature the apical parts of the carpels circumcissile and falling, dehiscing partially along the ventral suture or not, the basal parts remaining adnate to the torus, glabrous, 1.5–2.5 cm long; scars of perianth and stamens along torus under fruit 3–7 mm long; seeds 6–20 mm long.

Thailand.— Recorded from all regions.

Distribution.— China (Hainan), India (Andaman Islands), Laos, Cambodia, Vietnam, Sumatra, Peninsular Malaysia, Borneo, Java, Philippines, Sulawesi, Lesser Sunda Islands.

Ecology.— In all kinds of forest and on different types of soil, from 0–1,700 m. Flowering March–July; fruiting June–September.

Vernacular.— Montha (มอนทา).

Conservation status.— LC.

Notes.— All varieties other than the type variety are now placed in synonymy with it.

**18. *Magnolia mediocris*** (Dandy) Figlar, Proc. Int. Symp. Magnoliac.: 23. 2000.— *Michelia mediocris* Dandy, J. Bot. 66: 47. 1928. Type: China, Hainan, Five Finger Mountains, *Mcclure* in CCC 8593 (holotype **BM**).— *M. subulifera* Dandy, J. Bot. 68: 212, 1930. Type: Vietnam (Annam), Nhathrang, *Poilane* 6497 (holotype **P**; isotype **K**).— *M. rubriflora* Y.W.Law & R.Z.Zhou, Pakistan J. Bot. 37: 559 (–562; Fig. 1). 2005. Type: China, *Rhenzhang Zhou* 0265 (holotype **IBSC**).

Tree to 35 m high, and 80–150 cm diam. *Twigs* with greyish to reddish appressed pubescence. Stipules free from the petiole, hairs reddish brown, pubescent or silky. *Leaves* with petiole 15–30 mm long; blade with very fine reddish brown appressed pubescence

beneath, elliptic, 6–13 by 3–5 cm; base cuneate to broadly cuneate; apex (shortly) acuminate, acumen 7–20 mm; pairs of lateral nerves 9–15 (inconspicuous), meeting in an intramarginal vein close to the margin; reticulation beneath distinct, densely netted. *Brachyblast* densely finely brownish-yellowish appressedly puberulous, 6–8 mm long, (2–)3 nodes. *Flowers* pseudoaxillary on a brachyblast, white; tepals 9, subequal; outer tepals 3, 1.8–2.2 by 0.5–0.8 cm; inner tepals 6; stamens 10–15 mm long, connective appendage 3–4 mm long, anthers 8–14 mm long; gynoecium stipitate, greyish silvery appressed-pubescent (to silky), cylindrical, 9–11 mm high; gynophore 3–5 mm long; carpels 7–14, number of ovules per carpel (3–)4 or more. Fruiting peduncles hairy, finely greyish appressedly puberulous. *Fruits* cylindrical, 2–5 cm long; fruiting carpels free, dehiscing along the dorsal suture, glabrous, 1–2 cm long; gynophore under fruit present; seeds 5–8 mm long.

Thailand.— SOUTH-WESTERN: Phetchaburi (Kaeng Krachan National Park).

Distribution.— China, Laos, Cambodia, Vietnam.

Ecology.— Evergreen forests. Altitude 400–1000 m. Flowering September–October; fruiting November–February.

Vernacular.— Champi phet (จําปีเพชร).

Conservation status.— NE.

**19. *Magnolia philippinensis*** P.Parm., Bull. Sc. France Belgique 27: 206, 270. 1896.— *Michelia philippinensis* (P.Parm.) Dandy, Bull. Misc. Inform. Kew 1927: 263. 1927; Noot., Blumea 31: 118. 1985.; Fl. Males. ser. I, 10: 604. 1988.— *Michelia* sp. H.Keng, Fl. Thailand 2(3): 265. 1975. Type: Philippines, Luzon, San Cristofal, *Cuming* 783 (holotype MEL; isotypes A, BM, K, L, NY).

Tree to 20 m high and 20–30 cm diam. *Twigs* 1–2 mm thick in innovations, silky, hairs dark ferruginous. Stipules (nearly) free from the petiole, with dark ferruginous appressed silky hairs. *Leaves* evenly distributed, spirally arranged; petiole 10–25 mm long; blade appressed-pubescent beneath (glabrescent); above when young often with same indument as beneath; hairs straight, brown or red, elliptic or narrowly elliptic, 6.5–11 by 2–4 cm; base cuneate or attenuate; apex acuminate or shortly caudate, acumen 4–11 mm (with blunt tip); pairs of lateral nerves 7–13, meeting in an intramarginal vein not close to the margin; reticulation beneath distinct, densely netted. *Brachyblast* dark ferruginously silky, 6–7 mm long, stout, ca 2 mm thick, 1 node (near the top). *Flowers* pseudoaxillary on a brachyblast, white to yellow or yellowish; tepals (6–)9–17, subequal; outer tepals 3, 1.5–3 by 0.7–1.2 cm; inner tepals 3–14, narrower than outer ones; stamens 6–10 mm long, connective appendage triangular, 0.5–1 mm long, anthers latrorse or sublatorse; gynoecium stipitate, hairs appressed, ferruginous, silky or pubescent, narrowly ellipsoid, 5–8 mm high; gynophore 3–5 mm long; carpels 12–16; ca 2 mm long. Fruiting peduncles stout, hairy, 2–3 mm thick. *Fruits* cylindrical, 4–6 by 2–2.5 cm, fruiting carpels free, dehiscing along the dorsal suture, glabrous, 1.2–1.5 cm long; gynophore under fruit present.

Thailand.— NORTHERN: Phitsanulok (Phu Miang Wildlife Sanctuary); NORTH-EASTERN: Loei (Phu Kradueng National Park, Phu Luang Wildlife Sanctuary).

Distribution.— Philippines.

Ecology.— (Edge of) hill evergreen forest. Altitude 1,200–1,300 m. Flowering August–September; fruiting October–June.

Vernacular.— Champi nu (จำปีหนู).

Conservation status.— NE.

Notes.— The Thai material is similar to that of the Philippines. The flowers, however are bigger.

**20. *Magnolia praecalva*** (Dandy) Figlar & Noot., *Blumea* 49: 95. 2004.— *Pachylarnax praecalva* Dandy, *Bull. Misc. Inform. Kew* 1927: 260. 1927; H.Keng in T.C. Whitmore, *Tree Fl. Malaya* 2: 291. 1973; Noot., *Fl. Males.*, ser. I, 10: 593. 1988; Gardner et al., *Thai Forest Bull. (Bot.)* 35: 70. 2007. Type: Malaysia, Penang, *Haniff* 4067 (holotype **K**; isotype **SING**).

Tree to 50 m high and 100–150 cm diam., glabrous. *Twigs* 2.5–4 mm thick in innovations. Stipules free from the petiole. *Leaves* evenly distributed, spirally arranged; petiole 15–30 mm, dilated at base; blade glossy above, less so beneath; elliptic or obovate, 7–20 by 3–5.5 cm; base cuneate or attenuate-cuneate; margin recurved; apex rounded or acute; pairs of lateral nerves 12–15, meeting in an intramarginal vein not close to the margin; reticulation beneath distinct, laxly netted. *Peduncle* glabrous, 0.5–20 mm long (sometimes much longer), stout, 1–3 nodes (rarely many); pedicel present, 1–3 mm. *Flowers* terminal on the twig; tepals 9(–10), subequal; 2.5–3 cm long; stamens 17–20 mm long, connective appendage, narrowly triangular, 2–3 mm long, anthers introrse; receptacle short, the carpels attached at about the same height; gynoecium not stipitate, elongate obovoid, entirely hidden within androecium; carpels 2–4, number of ovules per carpel 4–8. Fruiting peduncles stout, glabrous, 4–6 mm thick. *Fruits* subglobose (before opening), 3.5–6 by 3.5–6 cm, fruiting carpels connate into a loculicidal fruit, splitting into 2–4 valves, the carpels more or less separating from each other later; in the centre a columella persistent with the attached seeds; scars of perianth and stamens along torus under fruit 3–6 mm long.

Thailand.— PENINSULAR: Phangnga (Ton Pariwat Wildlife Sanctuary), Songkhla, Satun (Taleban National Park).

Distribution.— Vietnam, Sumatra, Peninsular Malaysia.

Ecology.— Tropical rain forest. Altitude: 500–650 m. Flowering January–March, fruiting April–June.

Vernacular.— Cham la (จำลา).

Conservation status.— NE.

**21. *Magnolia rajaniana*** (Craib) Figlar, *Proc. Int. Symp. Magnoliac.*: 2000: 23.— *Michelia rajaniana* Craib, *Bull. Misc. Inform. Kew* 1922: 225. 1922; Gagnep. in P.H.Lecomte, *Fl. Indo-Chine*, Suppl. 1: 52. 1938; H.Keng, *Fl. Thailand* 2(3): 262. 1975. Type: Thailand, Chiang Mai, Doi Inthanon, *Kerr* 5342 (holotype **K**).

Tree to 35 m high and 100–150 cm diam. *Twigs* 3–4 mm thick in innovations, tomentose; hairs brown-ferruginous. *Stipules* adnate to petiole for 50–70 %, tomentose. *Leaves* evenly distributed, spirally arranged; petiole 20–50 mm long, hairy; blade greyish tomentose beneath, elliptic to ovate, 17–30 by 11–14 cm; base broadly cuneate to rounded (sometimes slightly attenuate); apex hardly acuminate (with obtuse tip); pairs of lateral nerves 15–22, meeting in an intramarginal vein not close to the margin. *Brachyblast* appressed reddish silky, 10–15 mm long, 1–2 nodes; pedicel present, 0.5–1.5 mm. *Flowers* pseudoaxillary on a brachyblast, white or yellow or yellowish; tepals 12, outer tepals 3, 2.5–5 by 1.2–1.6 cm, inner tepals 6, much narrower than outer tepals; stamens including the appendage 7–8 mm long, connective appendage narrowly triangular, 3–4 mm long, anthers latrorse or sublatrorse; gynoecium stipitate, densely golden yellow silky, 8–12 mm high; gynophore 4–6 mm long; carpels 25–30. Fruiting peduncles stout, hairy, 1.2–2.5 cm long. *Fruits* cylindrical, 4–10 cm long; fruiting carpels free, dehiscing along the dorsal suture, lenticelled, glabrous, 1–3 cm long; gynophore under fruit present, 10–30 mm long.

Thailand.— NORTHERN: Chiang Mai (Doi Suthep, Doi Chiang Dao, Doi Non Long, Pang Bo, Doi Inthanon), Nan (Doi Phukha National Park), Lamphun (Doi Khun Tan National Park), Lampang (Chae Son National Park), Phrae.

Distribution.— Endemic.

Ecology.— In lower montane forest, or at edge of hill slope. Altitude 1,000–1,300 m. Flowering April–May; fruiting June–August.

Vernacular.— Champi ratchani (จําปี้รัชณี).

Conservation status.— NE.

**22. *Magnolia siamensis*** (Dandy) H.Keng, Gard. Bull. Singapore 31: 129. 1976. — *Talauma siamensis* Dandy, Bull. Misc. Inform. Kew 1929: 105. 1929; H.Keng in T.C. Whitmore, Tree Fl. Malaya 2: 293. 1973; Fl. Thailand 2(3): 257. 1975. Type: Thailand (Siam), Put 936 (holotype **BM**; isotype **K**).— *Magnolia candollii* (Blume) H.Keng var. *candollii* for the synonym *Talauma siamensis*, Noot., Blumea 32: 371. 1987.

Small tree to 15 m high and 20–40 cm diam. *Twigs* 4–8 mm thick in innovations, glabrous. *Stipules* adnate to petiole for 100 %. *Leaves* evenly distributed, spirally arranged; petiole 23–60 mm, often conspicuously dilated at base; blade glabrous beneath, elliptic or obovate, 21–33 by 8.5–12 cm; apex acute to rounded or shortly acuminate; midrib when dry prominent above, at least towards base; pairs of lateral nerves 10–19, meeting in an intramarginal vein; reticulation beneath distinct. *Peduncle* pubescent, 30–35 mm long, stout, 8–12 mm thick, 5–7 nodes; pedicel present. *Flowers* terminal on the twig, white; outer tepals 3, 3.5–5 by 1–1.5 cm; inner tepals 6, smaller and narrower; stamens 12–30 mm long, anthers introrse; gynoecium not stipitate, glabrous, ellipsoid; carpels 7–25, number of ovules per carpel 2. Fruiting peduncles stout. *Fruits* ellipsoid, 6–10 by 4–5 cm, fruiting carpels connate, when mature the apical parts of the carpels circumcissile and falling, dehiscing partially along the ventral suture or not, the basal parts remaining adnate to the torus, glabrous (when ripe), 4–7 cm long, 5–10 mm long (recurved) beaked; scars of perianth and stamens along torus under fruit 4–7 mm long.

Thailand.— SOUTH-EASTERN: Chanthaburi, Trat; SOUTH-WESTERN: Kanchanaburi; PENINSULAR: Chumphon.

Distribution.— Peninsular Malaysia.

Ecology.— Tropical rain forest. Altitude 50–800 m. Flowering August–October; fruiting November–February.

Vernacular.— Yi hup pli (ยี่หุบปลี).

Conservation status.— NE.

**23. *Magnolia sirindhorniae*** Noot. & Chalermglin, *Blumea* 45: 245. 2000.— *Michelia sirindhorniae* (Noot. & Chalermglin) N.H.Xia & X.H.Zhang, *J. Trop. Subtrop. Bot.* 13: 518. 2005. Type: Thailand, Lop Buri Province 220 Km N of Bangkok, *Chalermglin* 420621 (holotype **BKF**; isotype **L**).

Tree to 25 m high and 70–150 cm diam. *Twigs* 2–5 mm thick in innovations, appressedly puberulous (glabrescent). Stipules adnate to petiole for 30–60 %, pubescent to puberulous. *Leaves* evenly distributed, spirally arranged; petiole 25–40 mm, yellow to brown when dry, stipular scars 14–25 mm long; blade minutely (scattered) hairy beneath; sparsely short hairy, glabrescent above; hairs brown or red, elliptic, 11–26 by 5. 5–10 cm; base cuneate to rounded; margin not recurved; apex rounded to shortly acuminate; pairs of lateral nerves 10–15, meeting in an intramarginal vein close to the margin; reticulation beneath distinct, densely netted. *Brachyblast* appressed-puberulous, 13–22 mm long, slender, 1.5–3 mm thick, 2–3 nodes; pedicel present, 0.5–3(–4) mm. *Flowers* pseudoaxillary on a brachyblast, (greenish) white; tepals 12–15, subequal; outer tepals 3–4, 4.5–5 by 1.2–1.5 cm, thick, fleshy, spatulate; inner tepals 8–12, spatulate; stamens 6–12 mm long, connective appendage triangular, 1 mm long, filaments 3.5–4.5 mm long, anthers latrorse or sublatrorse; gynoecium stipitate, greyish appressed-puberulous, ovoid to narrowly ovoid, 10–12 mm high; gynophore 8–10 mm long; carpels 25–35, number of ovules per carpel (3–)4 or more. Fruiting peduncles slender, 2–2.5 cm long. Fruiting carpels free, dehiscing along the dorsal suture; glabrous, 1–1.4 cm long; gynophore under fruit present; scars of perianth and stamens along torus under fruit 3–6 mm long.

Thailand.— NORTH-EASTERN: Loei; EASTERN: Chaiyaphum; CENTRAL: Lop Buri.

Distribution.— Endemic.

Ecology.— Primary rain forest in fresh water swamp. Altitude 60–170 m. Flowering April–May; fruiting June–September.

Vernacular.— Champi sirindhorn (จ่าปีสิรินธร).

Conservation status.— NE.

**24. *Magnolia thailandica*** Noot. & Chalermglin, *Blumea* 47: 541. 2002. Type: Thailand, Phetchabun, Nam Nao, *Smitinand* 559 (BKF 4848) (holotype **BKF**; isotypes **P**, **US**). Fig. 2.

Tree to 30 m high and 40–100 cm diam., glabrous or sparsely minutely hairy on stipule margins and scars, glabrescent. *Twigs* 2.5–3.5 mm thick in innovations, on stipule scars often minutely hairy; hairs yellowish. Stipules adnate to petiole for 95–100 %, hairy at the apex only. *Leaves* evenly distributed, spirally arranged; petiole 15–25 mm, stipular scars 14–25 mm long; blade glabrous and glaucous below, elliptic, 10–20 by 3–6 cm; base attenuate-cuneate; apex rounded or shortly acuminate; pairs of lateral nerves

12–15, meeting in an intramarginal vein; reticulation beneath distinct, densely netted. *Peduncle* glabrous, 25–32 mm long (in male flowers 20–30 mm long); 1.5–2.5 mm thick, 1 node; pedicel absent. *Flowers* terminal on the twig; unisexual; strongly fragrant; (greenish) white; in female flowers tepals 8–13, very unequal, outer tepals 4–5, 2.5–3.5 by 0.5–1.5 cm, thick, fleshy, obovate; inner tepals 4–8, linear, terete; in male flowers tepals 5–7, subequal, inner tepals obovate; stamens 15–18 mm long, anthers introrse; receptacle short, the carpels attached at about the same height; gynoecium not stipitate, glabrous, 13–15 mm high; carpels 7–10, number of ovules per carpel 2; styles yellow, 2.5–4 mm long. Fruiting peduncles slender. *Fruits* when young subglobose, 2.5–3.5 cm long; fruiting carpels when young connate, but becoming free, after dehiscence forming 2 lobes like 2 laterally recurved horns, thick, woody, glabrous, 1.7–2.7 cm long; seeds red, 15–17 mm long.



Figure 2. *Magnolia thailandica* Noot. & Chalermglin: a. habit (*Chalermglin* 410530); b. female flower (*Chalermglin* 450417-2); c. male flower (*Chalermglin* 450417-2); d. young fruit (*P. Chalermglin* 410719); e. ripe fruit (*Chalermglin* 411203).



Thailand.— NORTH-EASTERN: Phetchabun; Loei; EASTERN: Chaiyaphum; SOUTH-WESTERN: Kanchanaburi.

Distribution.— Endemic.

Ecology.— Hill evergreen forest, tropical rain forest. Altitude 600–1,150 m. Flowering April–May; fruiting June–October.

Vernacular.— Champi si mueang thai (จำปีศรีเมืองไทย).

Conservation status.— NE.

**25. *Magnolia utilis*** (Dandy) V.S.Kumar, Kew Bull. 61: 185. 2006.— *Manglietia utilis* Dandy, Bull. Misc. Inform. Kew 1927: 310. 1927. Type: Burma, Southern, *Parker* 2320 (holotype **K**).— *Manglietia dolichogyna* Dandy ex Noot., Blumea 31: 95. 1985.— *Magnolia dolichogyna* (Dandy ex Noot.) Figlar & Noot., Blumea 49: 95. 2004. Type: Malaysia, Sabah, Ranau, Hot Spring, SAN 41051 (holotype **L**; isotype **SAN**).

Tree to 30 m high and 40–150 cm diam. *Twigs* 3.5–6 mm thick in innovations, glabrous. *Stipules* adnate to petiole for 30–60 %. *Leaves* crowded at the end of the branchlets; petiole 15–45 mm, stipular scars 10–16 mm long; blade minutely (scattered) hairy or glabrous, glaucous or not beneath, elliptic or obovate, 15–35 by 5–12 cm; base cuneate or attenuate-cuneate; apex shortly acuminate, acumen 3–15 mm; pairs of lateral nerves 10–15; inconspicuously meeting in an intramarginal vein not close to the margin; reticulation beneath distinct, laxly netted. *Peduncle* glabrous, 20–40 mm long, stout, 3–4 mm thick, 1–2 nodes; pedicel present or absent, 0–12 mm. *Flowers* terminal on the twig; strongly fragrant; yellow or yellowish (when older base of tepals becoming reddish); tepals 9, subequal (becoming smaller from outer to inner whorl); outer tepals 3, (3–)5–8 by 2–4 cm, greenish, obovate; inner tepals 6, spatulate, 4–6 by 15–20 mm broad; yellow; stamens including the appendage 12–20 mm long, connective appendage narrowly triangular, 2.5–4 mm long, anthers introrse; gynoecium not stipitate, glabrous, cylindrical or conical; carpels 50–70, number of ovules per carpel 4 or more; 1.8–2.2 mm long. *Fruiting peduncles* stout, glabrous, 2–4 cm long. *Fruits* cylindrical, 4–13 by 2–4 cm, fruiting carpels fused, clustered close together, becoming free at dehiscence which is along the dorsal suture; fruiting carpels glabrous, 1.2–1.8 cm long; scars of perianth and stamens along torus under fruit 10–20 mm long; seeds 2–11 in each carpel, 4–6 mm long.

Thailand.— NORTHERN: Mae Hong Son, Tak; SOUTH-WESTERN: Kanchanaburi, Phetchaburi, Prachuap Khiri Khan; PENINSULAR: Chumphon, Ranong, Phangnga.

Distribution.— Burma, Peninsular Malaysia, Borneo.

Ecology.— Tropical lower montane forest. Altitude 600–1,100 m.

Vernacular.— Champa luang (จำปาหลวง).

Conservation status.— NE.

Notes.— In continental Asia the flowers are larger than in Borneo.

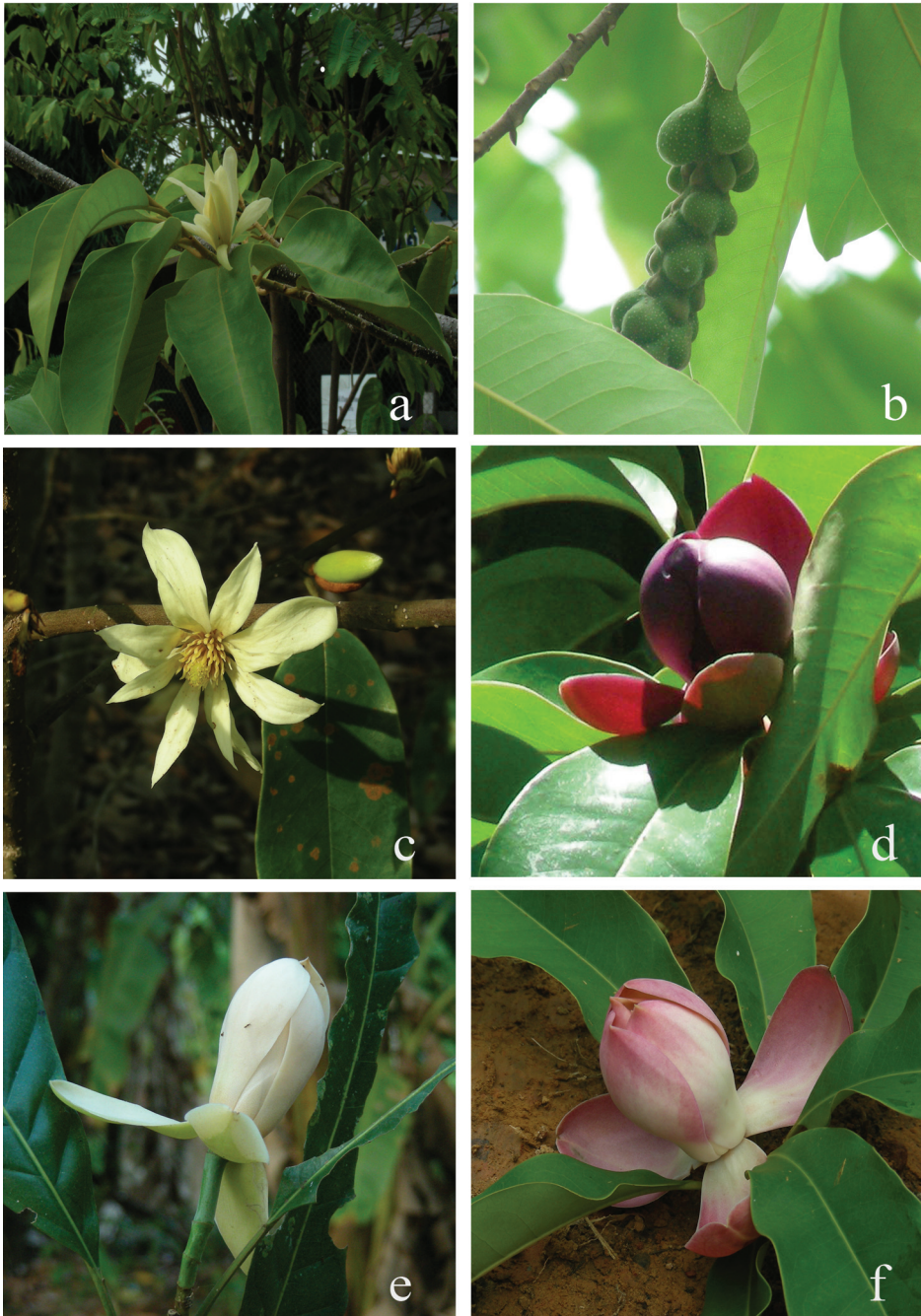


Figure 3. *Magnolia baillonii* x *champaca*: a. flower; b. fruit; *M. floribunda*: c. flower; *M. garretti*: d. flower; *M. henryi*: e. flower; *M. insignis*: f. flower. Photographs H.P. Nooteboom.

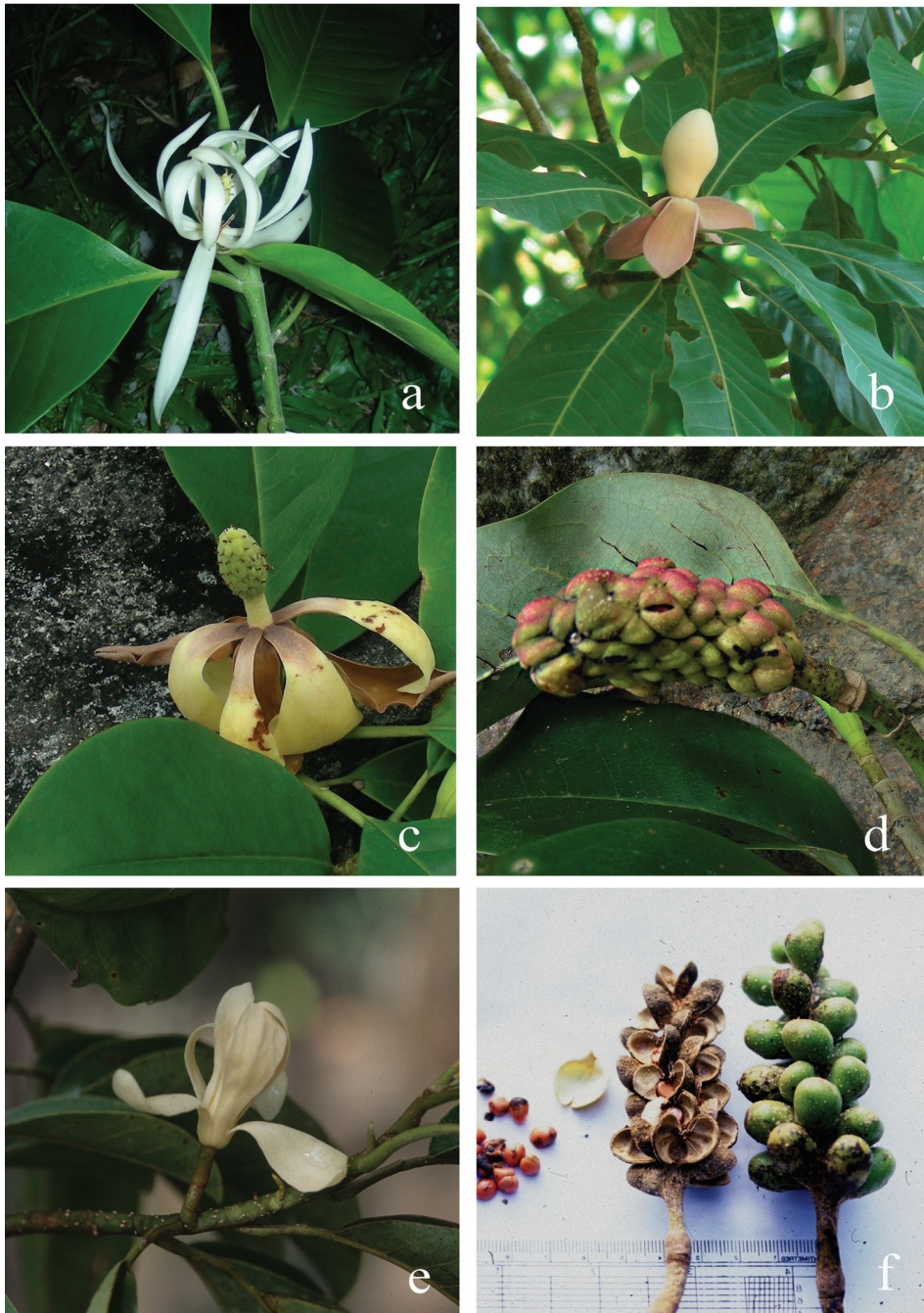


Figure 4. *Magnolia x alba*: a. flower; *M. hodgsonii*: b. flower; *M. utilis*: c. flower; d. fruit; *M. sirindhorniae*: e. flower; f. fruit. Photographs a–d. H.P. Nootboom; photographs e–f. P. Chalermglin.

## ACKNOWLEDGEMENTS

The first author thanks Mr. Thinakorn Komkris for inviting him, together with a small group of members of the Magnolia Society, to study many species of *Magnolia* in the field in many areas of Thailand north of Bangkok. Also the species cultivated by him and several other Thai amateurs of Magnolia proved to be very useful. Furthermore I thank the two reviewers for their valuable comments.

## REFERENCES

- Azuma, H., Thien, L.B. & Kawano, S. (1999). Molecular phylogeny of *Magnolia* (Magnoliaceae) inferred from cpDNA sequences and evolutionary divergence of the floral scents. *Journal of Plant Research* 112: 291–306.
- \_\_\_\_\_. (2000). In: Y. Liu, H. Fan, Z. Chen, Q. Wu & Q. Zeng (eds), *Proceedings of the International Symposium on the Family Magnoliaceae*, pp 219–227. Beijing, China, Science Press.
- Azuma, H., José G. García-Franco, J.G., Rico-Gray, V. & Thien, L.B. (2001). Molecular phylogeny of the Magnoliaceae: the biogeography of tropical and temperate disjunctions. *American Journal of Botany* 88: 2275–2285.
- Burkill, I.H. (1966). *A Dictionary of the Economic Products of the Malay Peninsula* (London). ed. 2: 1491. Kuala Lumpur, Ministry of Agriculture and Co-operatives.
- Cicuzza, D., Newton, A. & Oldfield, S. (2007). *The Red List of Magnoliaceae*. Cambridge, Fauna and Flora International. Pp52. Available online at <http://www.globaltrees.org/downloads/FFI-Magnolia%20Red%20List%20lo-res.pdf>.
- Figlar, R.B. (2000). Proleptic branch initiation in *Michelia* and *Magnolia* subgenus *Yulania* provides basis for combinations in subfamily Magnolioideae. In: Y. Liu, H. Fan, Z. Chen, Q. Wu & Q. Zeng (eds), *Proceedings of the International Symposium on the Family Magnoliaceae*: 14–25. Beijing, China, Science Press.
- \_\_\_\_\_. (2002a). Those amazing *Magnolia* fruits. *Journal of the Magnolia Society* 37: 7–15.
- \_\_\_\_\_. (2002b). Phyllotaxis in *Magnolia* fruits. *Journal of the Magnolia Society* 37: 26–28.
- Heyne, K. (1950). *De nuttige planten van Nederlandsch-Indië*, Ed. 3: 622, 625. 'S-Gravenhage & Bandung, W. van Hoeve.
- Keng, H. (1975). Magnoliaceae. In: T. Smitinand & K. Larsen (eds) *Flora of Thailand* 2: 251–267. Bangkok, Applied Scientific Research Corporation of Thailand.
- Kim, S., Park, C.-W., Kim, Y.-D. & Suh, Y. (2001). Phylogenetic relationships in family Magnoliaceae inferred from *ndhF* sequences. *American Journal of Botany* 88: 717–728.
- Nie, Z.-L., Wen, J., Azuma, H., Qiu, Y.-L., Sun, H., Meng, Y., Sun, W.-B., & Zimmer, E. A. (2008). Phylogeny and biogeographic complexity of Magnoliaceae in the Northern Hemisphere inferred from three nuclear data sets. *Molecular Phylogenetics & Evolution* 48: 1027–1040.