

A synoptic account of the Fagaceae of Thailand

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ABSTRACT. As part of the taxonomic revision towards a treatment of the family Fagaceae for the Flora of Thailand, a preliminary account is provided with keys to the genera, species, subspecies and varieties, full synonymy, notes on geographical and ecological distributions, vernacular names and uses. The account comprises 4 genera, 119 species, 2 subspecies and 2 varieties indigenous to Thailand.

FAGACEAE

Monoecious evergreen or deciduous trees. Stipules caducous. Leaves simple, spirally arranged, rarely in whorls, pinnately nerved, margin entire or serrate. Inflorescences solitary or branched, male and female separate or androgynous (female flowers towards base, male towards apex) or mixed. Male inflorescences erect or pendulous, with flowers solitary or in clusters. Perianth 6-lobed. Stamens 10–12, anthers basifixed or dorsifixed; rudimentary ovary hairy where present. Female, androgynous and mixed inflorescences erect. Female flowers solitary or in clusters, each flower surrounded by a cupule. Ovary inferior, 3–(6) locular, each locule with 2 anatropous ovules, styles as many as locules; stigmas capitate or punctiform; staminodes 6(–12) or absent. Cupules saucer- or cup-shaped, solitary or in clusters, often woody to enclosing the nut; it variously muricate, scaly, spiny, tuberculate or with concentric or spiral lamellae, rarely almost smooth; indehiscent or dehiscent. Nuts ovoid, tubular, triangular or subdepressed, completely enclosed or enclosed at base only by the sessile or stalked cupule, bearing a flattened, concave or convex circular scar below.

A family of 8 genera and about 700 species widely distributed mainly in the northern hemisphere. Four genera with 119 species, 2 subspecies, and 2 varieties indigenous to Thailand.

KEY TO THE GENERA

(based on flowering specimens)

1. Male flowers with rudimentary ovary present. Stamens 10–12, anthers dorsifixed. Female flowers with 10–12 staminodes, stigmata punctiform. Male and female inflorescence always erect
2. Cupule-primordia already developed before anthesis, always solitary, with distinct vertical sutures, with 2–4(–8) separate growing points, enclosing 1–3(–7) flowers **1. *Castanopsis***

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2. Cupule-primordia not developed before anthesis, solitary or in dichasial clusters, ring-shaped without vertical suture and separate growing points, enclosing 1 flower only **2. Lithocarpus**
1. Male flowers without rudimentary ovary. Stamens 5–6(–9), anthers basifixed. Female flowers without staminodes (or rarely 5–6 staminodes), stigmata capitate. Male inflorescence pendulous (rarely suberect)
3. Inflorescence always unisexual, simple. Male inflorescence pendulous. Female flowers always solitary, staminodes sometimes present, Ovary round in outline. Terminal buds densely crowded, the scales with a tendency towards orthostichy. Stipules not interpetiolar **3. Quercus**
3. Inflorescence unisexual or bisexual, simple or much branched. Male inflorescence sub-erect. Female flowers in dichasial clusters 3–15, staminodes absent. Ovary trigonous in outline. Terminal buds not densely crowded, scales imbricate. Stipules interpetiolar **4. Trigonobalanus**

KEY TO THE GENERA

(based on acorns)

1. Margin of mature cupules entire, indehiscent (except 4 spp. of *Lithocarpus**)
 2. Stigmas punctiform (early acorn development), terminal buds solitary **2. Lithocarpus**
 2. Stigmas capitate (early acorn development), terminal buds crowded **3. Quercus**
1. Margin of mature cupules lobed or irregularly lobed at dehiscence
 3. Nut round in outline, cupules dehiscent, with up to 4 irregular lobes, wall of cupule mostly with spines **1. Castanopsis**
 3. Nut triangular in outline, Cupules broadly saucer-shaped, margin with not less than 7 irregular-undulate lobes, wall of cupule without spines **4. Trigonobalanus**

* *L. enclisacarpus*, *L. pattaniensis*, *L. falconeri* & *L. platycarpus*.

KEY TO THE GENERA

(based on vegetative and field characteristic)

1. Stipules extrapetiolar. Leaves not changing colour before falling off
 2. Petioles not geniculate. Inner bark with ridges strongly penetrating surface of sapwood
 3. Terminal buds crowded. Leaves mostly with serrate margin **3. Quercus**
 3. Terminal buds solitary. Leaves with entire margin **2. Lithocarpus**
 2. Petiole geniculate. Inner bark without ridges penetrating surface of sapwood **1. Castanopsis**
1. Stipules interpetiolar. Leaves turning yellowish before falling off **4. Trigonobalanus**

1. CASTANOPSIS*

(D.Don) Spach, Hist. Nat. Vâg. 2: 185. 1842; Miq., Ann. Mus. Bot. Lugduno-Batavi 1: 103. 1863; Benth. & Hook.f., Gen. Pl. 3: 409. 1880; King, Ann. Roy. Bot. Gard. (Calcutta) 2: 93. 1889; Schneider, Illust. Handb. Laubh. 1: 159. 1906; Rehder & E.H. Wilson in C.S. Sargent, Pl. Wilson 3: 97. 1916; A. Camus, Châtaigniers, Texte.: 243. 1929; Hickel & A. Camus in H. Lecomte, Fl. Indo-Chine 5: 1007. 1930; Soepadmo, Reinwardtia 7: 384. 1968; Soepadmo in Fl. Males. 7(2): 294. 1972.— *Callaeocarpus* Miq., Pl. Jungh.: 13. 1851.— *Chrysolepis* Hjelmq., Bot. Not. Suppl. 2, 1: 117. 1948; Forman, Kew Bull. 18, 1966: 425.

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Evergreen trees, rarely shrubs. Branchlets initially densely yellowish brown-pubescent. Terminal buds ovoid to ellipsoid, scales ovate to linear. Stipules extrapetiolar, caducous. *Leaves* spiral, entire or serrate, rarely lobed, glabrous or sparsely hairy unless along nerves on lower surface and then petioles much swollen near base and always geniculate. *Inflorescences* male and female separate or female below and male on the upper part in some erect spikes, occasionally mixed, densely stellate pubescent including bracts and bracteoles. *Male inflorescences* simple and axillary or much-branched and subterminal. Flowers solitary or in clusters of 3 or more, with one or more small bracts; perianth campanulate or cup-shaped, usually 6-lobed, free or minutely connate near base. Stamens 12, occasionally fewer, glabrous, anthers dorsifixed. Rudimentary ovary subglobose, villous or with several villous scales. *Female, androgynous or mixed inflorescences* solitary in the axil or in the upper part of a panicle cluster with males. Flowers solitary or in clusters of three or more, perianth bracts and bracteoles as in male but smaller. Staminodes 10-12. Styles 3, occasionally 4, cylindrical, hairy at the base; stigmas terminal and punctiform. Ripe cupule completely enclosing the one to four nuts, often dehiscent, covered by whorls of simple or branched spines or tubercles, or with entire rings when it is distinctly oblique. *Fruits* ovoid or rounded with the adjoining sides flattened; scar present.

A genus of about 120 species, widely distributed in the subtropical and tropical parts of South Asia, almost to Australia, and with a divergent distribution in the South-Western United States of America; 33 species are indigenous to Thailand.

KEY TO THE SPECIES

(based on vegetative characters and acorns)

1. Cupules covered with thin imbricate scales on outer part or smooth. Nuts simple, ovoid or occasionally depressed
 2. Cupules smooth, without scales, only 3-4 undulate lines on outer part, cupule enclosing nut completely except for the apical umbo. Acorns pyriform. Nuts ovoid **24. *C. piriformis***
 2. Cupules with thin imbricate scales, lamellate
 3. Leaves serrate
 4. Scales acute and erect at apex. Cupules enclosing up to half of the nut
 5. Fruit rachis up to 10 cm long. Petioles usually with one gland on the upper side **13. *C. fissa***
 5. Fruit rachis not less than 15 cm long. Petioles without gland **6. *C. calathiformis***
 4. Scales truncate at apex. Cupules enclosing three-quarters of the nut
 6. Scar at base of nut flat. Leaves glabrous **7. *C. cerebrina***
 6. Scar at base of nut curved. Leaves tomentose on lower surface, glabrescent **30. *C. siamensis***
 3. Leaves entire. Cupules enclosing nut completely except the apical umbo, skin of mature acorn with only 4-5 undulate lines **19. *C. lanceifolia***
1. Cupules covered with spines or tubercles. Nuts solitary or up to 4, ovoid or flattened to one longitudinal side, occasionally depressed
 7. Cupules with branched or branched and simple spines
 8. Cupules with both branched and simple spines, spines hairy, glabrescent
 9. Nut solitary in each cupule
 10. Nuts curved to one side, apex and base close together, but globose in outline **11. *C. echidnocarpa***
 10. Nuts ovoid, regular **3. *C. argyrophylla***
 9. Nuts (1-)2-4 in each cupule
 11. Cupule densely covered with brittle, straight and hairy spines. Cupule more or less indehiscent when dry **16. *C. hystrix***

11. Cupule sparsely covered with woody, curved and glabrous spines. Cupule dehiscent into (3–)4 parts when dry **29. *C. schefferiana***
8. Cupules with branched spines only
 12. Spines partially covering the skin of the cupule
 13. Cupules to 2.5 cm in diam. (including spines), spines sparsely hairy
 14. Nut urceolate. Cupule with 1–3 nuts, dehiscent into 3–5 parts. Leaf lower surface covered with dense, short, simple hairs **31. *C. thaiensis***
 14. Nut ovoid. Cupule with 1 nut, indehiscent. Leaves sparsely hairy and glabrescent or lower surface possessing dense, short, simple hairs.
 15. Leaf lower surface possessing dense, short hairs, not glabrescent **14. *C. fordii***
 15. Leaf lower surface possessing sparse, short hairs, glabrescent
 16. Spines erect, squarrose, with 3–5 branches. Cupules equal in dimensions. Leaves serrate on upper-half **25. *C. pseudo-hystrix***
 16. Spines always 2–3 branched, reclinate from the base. Cupules always with an unequal side when young. Leaves entire **22. *C. nephelioides***
 13. Cupules not less than 4 cm in diam. (including spines), spines densely hairy
 17. Cupules entire, inner part with soft, silky white hairs. Fruit stalk 2–5 mm long **26. *C. purpurea***
 17. Cupules usually 2-lobed, inner part sparsely hairy. Fruit stalk sessile **23. *C. pierrei***
 12. Spines entirely covered the skin of cupules
 18. Spines strongly squarrose, with 3–7 branches **33. *C. wallichii***
 18. Spines erect, pointed
 19. Nuts up to 2.5 by 1.5 cm. Petiole up to 1.5 cm long **2. *C. argentea***
 19. Nuts not less than 4 by 2.5 cm. Petiole not less than 1.5 cm. long **21. *C. megacarpa***
7. Cupules with simple spines only
 20. Spines curved, not dense, the cupule skin easily visible
 21. Spines irregularly arranged on the skin of the cupule
 22. Spines straight at base, towards apex recurved away from the cupule. Cupules always dehiscent. Nuts ovoid, glabrous. Leaves serrate on the upper half **1. *C. acuminatissima***
 22. Spines straight at base, towards apex curved inward towards the cupule. Cupules rarely dehiscent. Nuts depressed at base, silvery hairy. Leaves entire **8. *C. costata***
 21. Spines regularly arranged in crossed or twisted lines on the skin of the cupule
 23. Cupules globular, spines arranged in crossed lines. Leaves obovate or oblong **18. *C. inermis***
 23. Cupules ellipsoid, rarely ovoid, spines arranged in twisted lines. Leaves lanceolate or oblong **32. *C. tribuloides***
 20. Spines straight, dense and completely covering the skin of the cupule
 24. Cupules (including spines) not less than 4 cm in diam. (usually 4.5–6.5 cm)
 25. Cupules in clusters of 2–3 on the rachis
 26. Nuts solitary in each cupule, scar more than half the length of the nut and fused with the cupule skin **4. *C. armata***
 26. Nuts (1–)2–4 in each cupule, scar only on the base of nut and only partially fused with cupule skin **28. *C. rockii***
 25. Cupules solitary
 27. Nuts ovoid or globose, with orbicular indumentum around the umbo **10. *C. diversifolia***
 27. Nuts flattened on one longitudinal side, with stellate indumentum around the umbo **20. *C. malaccensis***
 24. Cupules (including spines) not exceeding 4 cm. in diam. (usually 2.5–4 cm)
28. Nuts broader than long, depressed at both apex and base
 29. Nuts solitary, cupule completely enclosing the nut. Leaves shortly cuspidate at apex, slightly cuneate at base **15. *C. javanica***

29. Nuts (2–)3 per cupule, the latter enclosing two-thirds to three-quarters of the nut. Leaves obtuse at base and apex **5. *C. brevispinula***
28. Nuts longer than broad
30. Leaves oblong, elliptic, ovate or obovate.
31. Leaves serrate. Nuts conical or ovoid, usually curved to one longitudinal side. Cupules usually in cluster 2-3 **17. *C. indica***
31. Leaves entire. Nuts globular or conical, slightly flattened on adaxial side. Cupules always solitary **27. *C. rhamnifolia***
30. Leaves lanceolate or lanceolate-oblong, rarely elliptic or ovate
32. Adaxial side of young cupules with one glabrous, narrow stripe from apex to the base **9. *C. crassifolia***
32. Adaxial and the opposite sides of young cupules with irregularly diffuse hairs throughout **12. *C. ferox***

1. *Castanopsis acuminatissima* (Blume) A.DC., J. Bot. 1: 182. 1863; Hickel & A. Camus in H. Lecomte, Fl. Indo-Chine 5: 1012. 1930; Barnett, Quer. Rel. Fag. Asia: 162. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 336. 1944; Soepadmo in Fl. Males. 7(2): 307. 1972; Soepadmo, Julia & Go, Fl. Sabah, 3: 7. 2000.—*Castanea acuminatissima* Blume, Mus. Bot. 1: 283. 1850.—*C. sessilifolia* Blume, Mus. Bot. 1: 284. 1850.—*Quercus lineata* Miq. (*non* Blume), Pl. Jungh. 1: 10. 1851.—*Q. junghuhnii* Miq., Fl. Ned. Ind. 1(1): 853. 1856; Craib, Bull. Misc. Inform. Kew 1911: 471; Craib, Con. Fl. Siam, Aberd. Univ.: 199. 1912.—*Q. fargiformis* Jungh., Bonplandia (Hannover) 6: 83. 1858.—*Q. acuminatissima* (Blume) A.DC. in A.P. de Candolle, Prodr. 16(2): 102. 1864; Backer & Bakh.f., Fl. Java 2: 6. 1965.—*Pasania acuminatissima* (A.DC.) Oerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1866: 83. 1866; Ridley, Fl. Malay Penins. 3: 386. 1924.—*Synaedrys fargiformis* (Jungh.) Koidz., Bot. Mag. (Tokyo) 30: 187. 1916.—*Castanopsis bejaudii* A. Camus, Bull. Mus. Natl. Hist. Nat., II, 13: 479. 1942.

Thailand.—NORTHERN: Chiang Mai, Chiang Rai, Tak, Phitsanulok; NORTHEASTERN: Phetchabun, Loei; EASTERN: Chaiyaphum, Nakhon Ratchasima; SOUTHWESTERN: Kanchanaburi; CENTRAL: Nakhon Nayok; SOUTHEASTERN: Chanthaburi. PENINSULAR: Yala.

Distribution.—India, Myanma, Indo-China, Malaysia, Indonesia (type), Taiwan, Japan, New Guinea.

Ecology.—Lowland evergreen forest, lower montane forest, and mixed deciduous forest, on granite and limestone bedrock.

Vernacular.—Ko dueai (ก่อเดือย), ko nam (ก่อหนาม), ko laem (ก่อแหลม) (Northern); ko it (ก่ออิด), ko mad (ก่อหมัด), ko daeng (ก่อแดง), (North-eastern); ko kin nuai (ก่อกินน่วย) (Eastern).

U s e s.—Nuts edible, a pioneer species suitable for forest rehabilitation.

2. *Castanopsis argentea* (Blume) A.DC., J. Bot. 1: 182. 1863; Backer & Bakh.f., Fl. Java 2: 4. 1965; Barnett, Quer. Rel. Fag. Asia: 179. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 336. 1944; Soepadmo in Fl. Males. 7(2): 311. 1972.—*Fagus argentea* Blume, Flora 7:

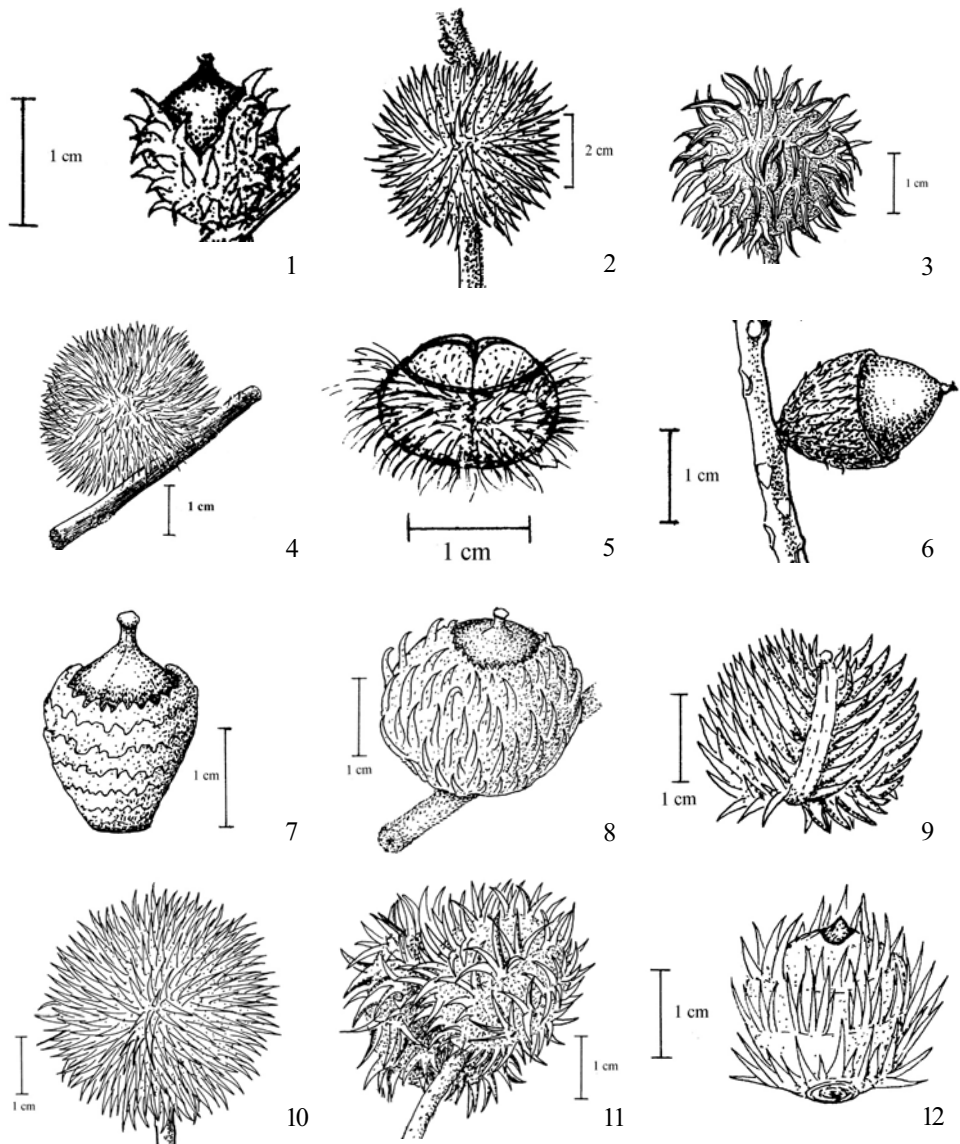


Figure 1. Various fruits of the genus *Castanopsis*: 1) ถ่อเคือย *Castanopsis acuminatissima*; 2) ถ่อขาว *C. argentea*; 3) ถ่อหุม *C. argyrophylla*; 4) ถ่อหรั่ง *C. armata*; 5) ถ่อกัณ *C. brevispinula*; 6) ถ่อหุมดอย *C. calathiformis*; 7) ถ่อคาหุม *C. cerebrina*; 8) ถ่อริ้ว *C. costata*; 9) ถ่อแห้ง *C. crassifolia*; 10) ถ่อแป้น *C. diversifolia*; 11) ถ่อแป้น *C. echidnocarpa*; 12) ถ่อแหลม *C. ferox*.

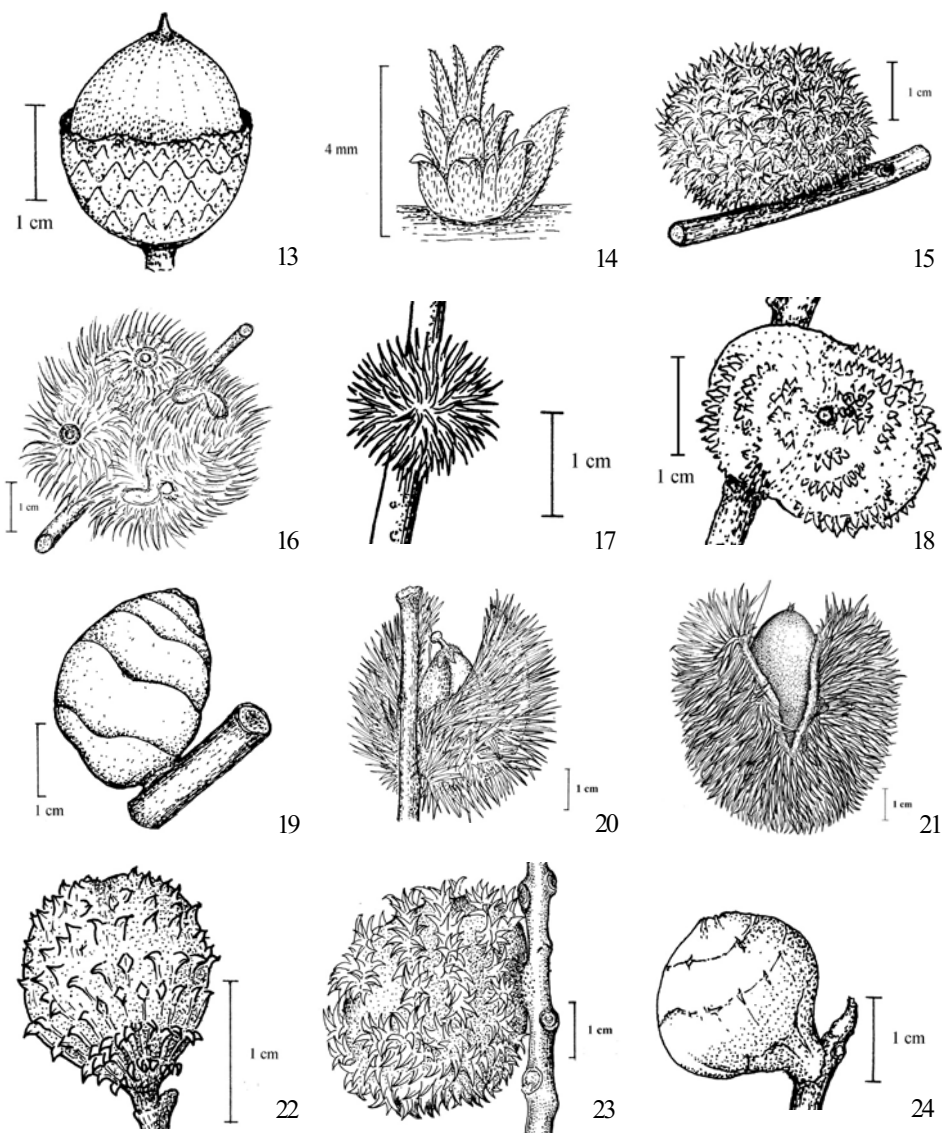


Figure 2. Various fruits and flowers of the genus *Castanopsis*: 13) ก่อคาหนู *Castanopsis fissa*; 14) ก่อ่นาน female flower of *C. fordii*; 15) ก่อหนู *C. javanica*; 16) ก่อแดง *C. hystrix*; 17) ก่อลิ้ม *C. indica*; 18) ก่อข้าว *C. inermis*; 19) ก่อเตี้ย *C. lanceifolia*; 20) ก่อดาน *C. malaccensis*; 21) ก่อเม่น *C. megacarpa*; 22) ก่อหนู *C. nephelioides*; 23) ก่อขี้หนู *C. pierrei*; 24) ก่อหิน *C. piriformis*.

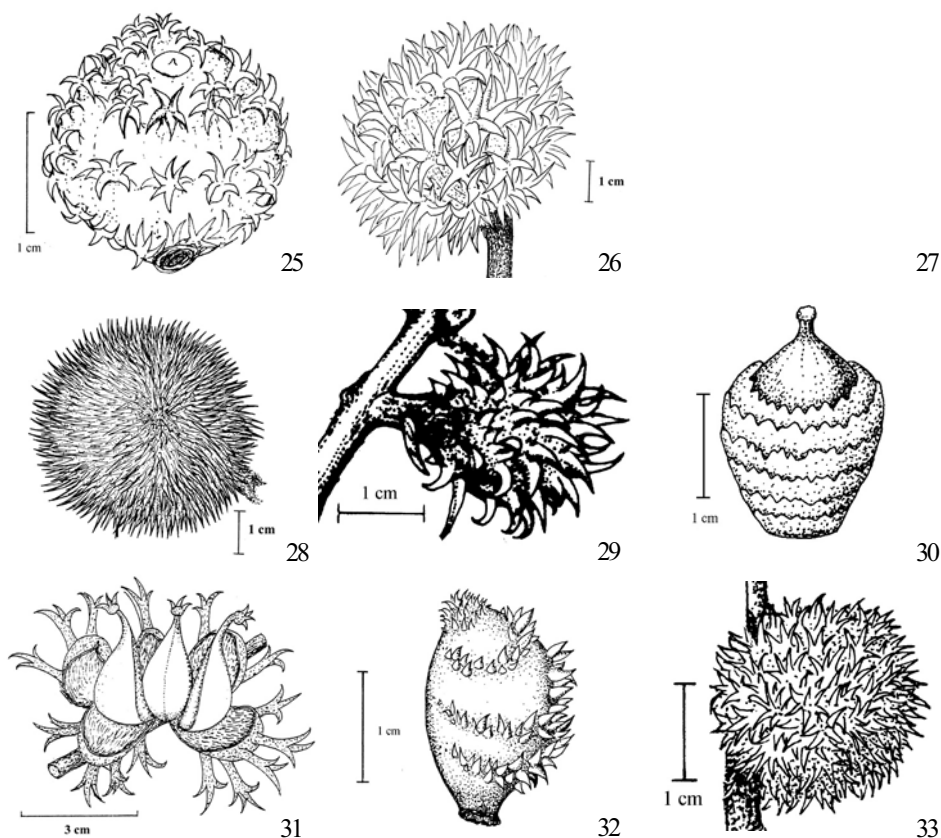


Figure 3. Various fruits of the genus *Castanopsis*: 25) ก่อแดง *Castanopsis pseudo-hystrix*; 26) ก่อदान *C. purpurea*; 27) ก่อขี้หนู *C. rhamnifolia*; 28) ก่อโรค *C. rockii*; 29) ก่อเขี้ยวหนู *C. schefferiana*; 31) ก่อไทย *C. thaiensis*; 32) ก่อใบเลื่อม *C. tribuloides*; 33) ก่อบ้าน *C. wallichii*.

291. 1824.—*Castanea argentea* (Blume) Blume, Bijdr.: 525. 1826; Blume, Fl. Javae Cupul.: 40, t. 21. 1829; Kurz, Forest Fl. Burma 2: 479. 1877.—*C. martabanica* Wall., Pl. Asiat. Rar. 2: 5., t. 107. 1830; Wall. ex Hook.f. in Fl. Brit. India 5: 621. 1888; King, Ann. Roy. Bot. Gard. (Calcutta) 2: 98, t. 89. 1889.

Thailand.—NORTHERN: Chiang Mai, Chiang Rai, Lampang, Tak; NORTHEASTERN: Phetchabun; PENINSULAR: Surat Thani, Nakhon Si Thammarat.

Distribution.—Myanma, Malaysia, Indonesia (type).

Ecology.—Hill evergreen forest, pine-dipterocarp forest, mixed deciduous forest, savannah, alt. 50–1680 m. (usually 900–1100 m). Flowering Jan.–Dec. (usually March–April), fruiting Feb.–Nov. (usually May–July).

Vernacular.—Ko paen (ก่อแป้น) (Northern); ko rang (ก่อรัง) (North-eastern); ko khao

(ก่อขาว); ko krang (ก่อกรัง), ko paen (ก่อแป้น), ko khao (ก่อเขา) (Peninsular).

Uses.— Nuts edible.

3. *Castanopsis argyrophylla* King ex Hook.f., Fl. Brit. India 5: 622. 1888; Craib, Bull. Misc. Inform. Kew 1911: 473. 1911; Craib, Con. Fl. Siam., Aberd. Univ.: 202. 1912; Hickel & A. Camus in H. Lecomte, Fl. Indo-Chine 5: 1014. 1930; Barnett, Quer. Rel. Fag. Asia: 170. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 236. 1944; Hjelmq., Dansk Bot. Ark. 23: 497. 1968; C.C. Huang, Y.T. Chang & B.M. Bartol. in C.Y. Wu & P.H. Raven, Fl. China, 4: 324. 1999.— *Castanea tribuloides* (non Lindl.) Smith var. *ferox* Kurz, Forest Fl. Burma 2: 481. 1877.

Thailand.— NORTHERN: Chiang Mai, Chiang Rai, Nan, Lamphun, Lampang, Tak, Sukhothai; NORTHEASTERN: Loei, Mukdahan; EASTERN: Chaiyaphum; SOUTHWESTERN: Kanchanaburi; PENINSULAR: Trang.

Distribution.— China, India, Myanma (type), Vietnam.

Ecology.— Lower montane evergreen forest, dry evergreen forest, oak-pine forest, alt. 350–1300 m. (usually 500–900 m). Flowering Feb.–Nov. (usually June–July), fruiting March–Dec. (usually Aug.–Nov.).

Vernacular.— Ko yum (ก่อหุยม), ko hua lok (ก่อหัวลอก), ko ti (ก่อติ), ko nam bai lek (ก่อหนามใบเล็ก), ko kang dang (ก่อกางด้าง), ko ta mu luang (ก่อคาหมูลวง) (Northern).

4. *Castanopsis armata* (Roxb.) Spach., Hist. Nat. Vég. 11: 185. 1842; Miq., Ann. Mus. Bot. Lugduno-Batavi 1: 119. 1863; King ex Hook.f., Fl. Brit. India 5: 622. 1888; Paulsen, Fl. Koh Chang, 24.3: 255. 1902; Hickel & A. Camus in H. Lecomte, Fl. Indo-Chine 5: 1031. 1930; Barnett, Quer. Rel. Fag. Asia: 175. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 366. 1944.— *Quercus armata* Roxb. (non D. Don), Pl. Coromandel 3: 92, t. 296. 1819; Roxb., Fl. Ind. ed. 1832, 3: 640. 1832; King ex Hook.f., Fl. Brit. India 5: 640. 1888.— *Castanopsis tribuloides* (Sm.) A. DC. var. *armata* (Roxb.) Kurz, Forest Fl. Burma 2: 481. 1877.

Thailand.— NORTHERN: Chiang Mai, Chiang Rai, Lampang, Phrae, Tak; NORTHEASTERN: Loei; SOUTHWESTERN: Kanchanaburi; PENINSULAR: Trang.

Distribution.— India, Nepal, Myanma (type)

Ecology.— Lower montane forest, lowland evergreen forest, pine-mixed deciduous forest, oak-pine forest, alt. 100–1850 m. (usually 800–1100 m. Flowering Jan.–Sept. (usually Feb.–April), fruiting Jan.–Dec. (usually March–July).

Vernacular.— Ko rang (ก่อหรั่ง), ko ti bai lueam (ก่อดีใบเลื่อม), ko nam (ก่อน้ำ), ko soi (ก่อสร้อย), ko paen (ก่อแป้น), mamun (มะมูน) (Northern); ko hin (ก่อหิน) (Northeastern); ko khao (ก่อขาว), ko lang khao (ก่อหลังขาว) (Peninsular).

Uses.— Nuts edible.

5. *Castanopsis brevispinula* Hickel & A. Camus, Bull. Soc. Bot. France 68: 395. 1922; Hickel & A. Camus in H. Lecomte, Fl. Indo-Chine 5: 1015. 1930. Fig. 4.

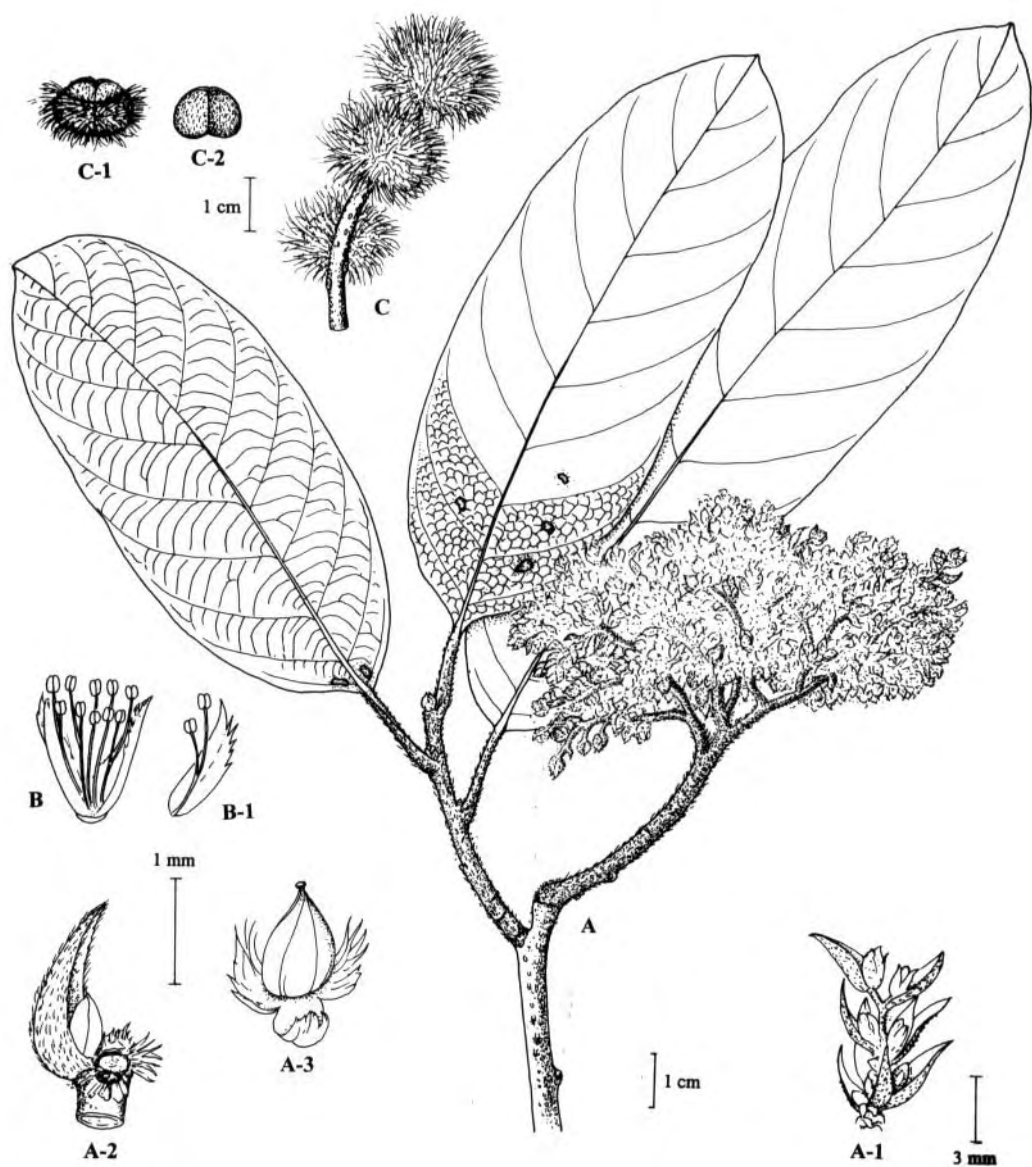


Figure 4. *Castanopsis brevispinula* Hickel & A. Camus: A. twig, leaves and inflorescences (Suvanasudhi 112), A-1 parts of female inflorescence, A-2 bud, A-3 ovary; B. male flower, B-1 part of male flower; C. parts of infructescence, C-1 acorn, C-2 nut.

Thailand.— NORTHERN: Chiang Mai, Tak; NORTHEASTERN: Loei; SOUTHWESTERN: Kanchanaburi.

Distribution.— Laos (type).

Ecology.— Lower montane evergreen forest, oak-pine forest, alt. 650–1600 m. (usually 1000–1400 m). Flowering March–June, fruiting March–Nov.

Vernacular.— Ko kan (ก่อกัน) (Northern).

6. *Castanopsis calathiformis* (Skan) Rehder & Wilson in C.S.Sargent, Pl. Wilson 3: 204. 1916; Barnett, Quer. Rel. Fag. Asia: 191a. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 336. 1944; C.C.Huang, Y.T.Chang & B.M.Bartol. in C.Y.Wu & P.H.Raven, Fl. China 4: 320. 1999.— *Quercus calathiformis* Skan, J. Linn. Soc., Bot. 26: 508. 1899.— *Synaedrys calathiformis* (Skan) Koidz., Bot. Mag. (Tokyo) 30: 188. 1916.— *Pasania calathiformis* (Skan) Hickel & A.Camus, Ann. Sci. Nat., Bot., X, 3: 408. 1921; Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine 5: 1004. 1930.— *Lithocarpus calathiformis* (Skan) A.Camus, Rivista Sci. 18: 40. 1931.

Thailand.— NORTHERN: Chiang Mai, Lampang.

Distribution.— China (Yunnan, type), Laos, Vietnam.

Ecology.— In moist upper mixed deciduous forest, hill evergreen forest, to lower and upper montane forests, on granite bedrock, alt. 700–2000 m. (usually 1800–2000 m). Flowering Jan.–May (usually April–May), fruiting April–Dec. (usually July–Oct.).

Vernacular.— Ko mu doi (ก่อหมูดอย), ko khi mu (ก่อขี้หมู), ko nam (ก่อน้ำ), ko ta mu (ก่อตาหมู) (Northern).

Uses.— Nuts edible

7. *Castanopsis cerebrina* (Hickel & A.Camus) Barnett, Quer. Rel. Fag. Asia: 405. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 183. 1944.— *Pasania cerebrina* Hickel & A.Camus, Ann. Nat. Bot. 3: 408. 1921; Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine 5: 1004. 1930.— *Lithocarpus cerebinus* (Hickel & A.Camus) A.Camus, Rev. Bot. Appl. Agric. Trop. 15: 25. 1935. Fig. 5.

Thailand.— NORTHERN: Mae Hong Son, Chiang Mai, Chiang Rai, Lampang.

Distribution.— Vietnam (type).

Ecology.— On ridge of hill evergreen forest and mixed deciduous forest, alt. 900–1800 m. (usually 900–1500 m) Flowering March–June (usually March–April), fruiting March–Dec. (usually March–April).

Vernacular.— Ko ta mu (ก่อตาหมู) (Northern).

8. *Castanopsis costata* (Blume) A.DC., J. Bot. 1: 182. 1863; A.DC. in A.P. de Candolle, Prodr. 16(2): 110. 1864; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75: 456. 1915; Ridley, Fl. Malay Penins. 3: 390. 1924; Barnett, Quer. Rel. Fag. Asia: 168. 1940; Barnett, Trans. &

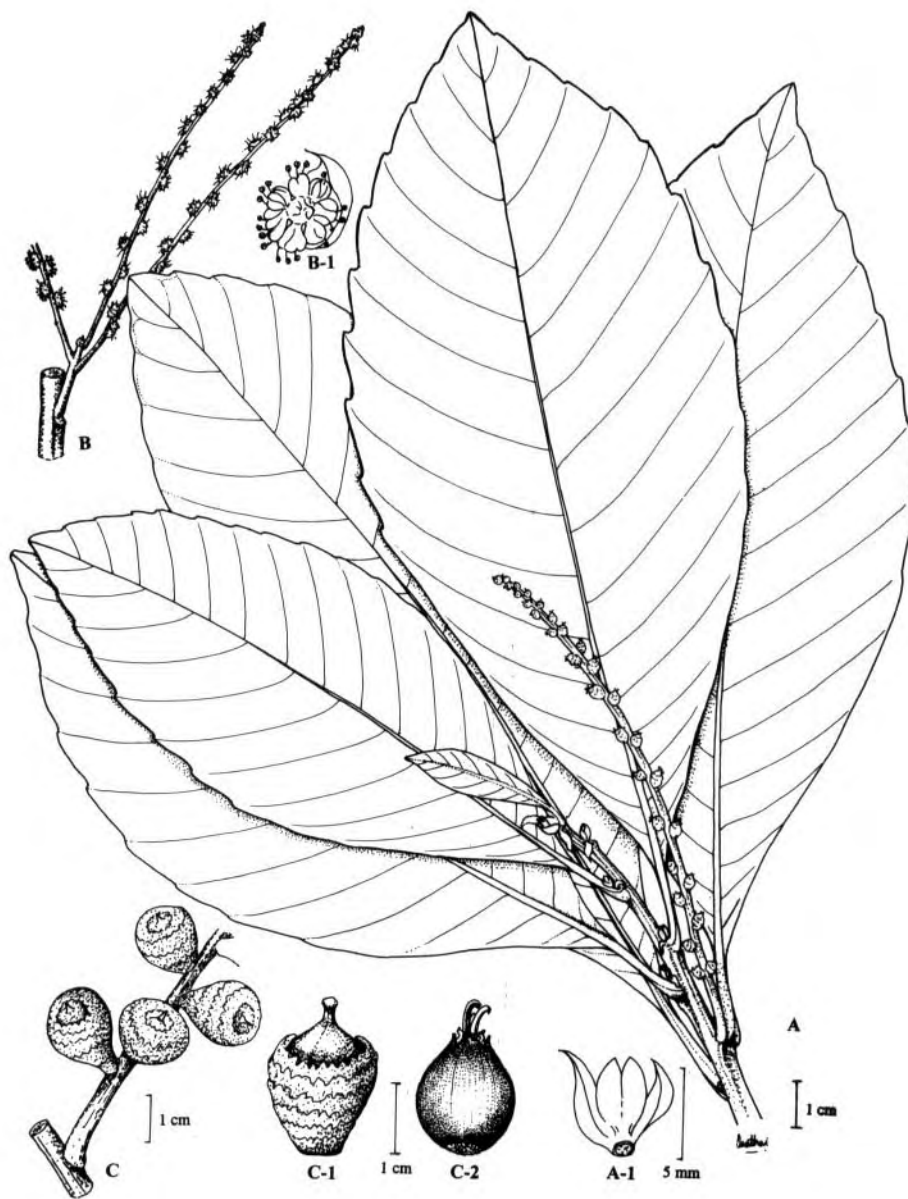


Figure 5. *Castanopsis cerebrina* (Hickel & A. Camus) Barnett: A. twig, leaves and female inflorescences (Smitinand 1781), A-1 bud; B. male inflorescences (Maxwell 96-582), B-1 male flower; C. infructescence (Maxwell 97-1455), C-1 acorn, C-2 nut (germinating).

Bot. Soc. Edinburgh 34: 336. 1944. Soepadmo in Fl. Males. 7(2): 312. 1972; Soepadmo, Julia & Go, Fl. Sabah, 3: 12. 2000.— *Castanea costata* Blume, Mus. Bot. 1: 284. 1851.— *C. brevicuspis* Miq., Fl. Ned. Ind. 1(1): 866. 1856.— *C. costa* Blume var. *bancana* Scheff., Natuurw. Tijdschr. Ned.-Indië 31: 362. 1870; Barnett, Quer. Rel. Fag. Asia: 168. 1940.

Thailand.— NORTHERN: Chiang Mai; PENINSULAR: Ranong, Phatthalung, Trang.

Distribution.— Malaysia, Indonesia (type),

Ecology.— Lowland evergreen forest, lower montane forest, by stream, on granite and limestone bedrock, alt. 75–1700 m. (usually 200–300 m). Flowering Feb.–June, fruiting April–Oct.

Vernacular.— Ko (ก่อ), ko rio (ก่อริ้ว), ko mu (ก่อหมู) (Peninsular).

Uses.— Nuts edible.

9. *Castanopsis crassifolia* Hickel & A. Camus, Notul. Syst. (Paris) 4: 122. 1928; Hickel & A. Camus in H. Lecomte, Fl. Indo-Chine 5: 1027. 1930; Barnett, Quer. Rel. Fag. Asia: 437. 1940; C.C. Huang, Y.T. Chang & B.M. Bartol. in C.Y. Wu & P.H. Raven, Fl. China 4: 332. 1999.

Thailand.— NORTHERN: Chiang Mai, Chiang Rai, Nan; NORTHEASTERN: Loei. SOUTHWESTERN: Kanchanaburi; SOUTHEASTERN: Chanthaburi, Trat; PENINSULAR: Ranong, Krabi, Pattani.

Distribution.— China, Vietnam (type).

Ecology.— Lowland evergreen forest, oak-pine forest, lower montane evergreen forest, often by streams alt. 200–1600 m (usually 1050–1300 m). Flowering Jan.–Nov. (usually July–Dec.), fruiting Jan.–Dec. (usually March–Aug.).

Vernacular.— Ko mu (ก่อหมู), ko laem (ก่อแหลม), ko nam laem (ก่อหนามแหลม), ko nam (ก่อหนาม) (Northern); ko (ก่อ), ko khao (ก่อข้าว), ko haeng (ก่อแห้ง) (North-eastern); ko dueai (ก่อเดื่อ) (South-eastern); ko rio (ก่อริ้ว), ko mu (ก่อหมู) (Peninsular).

Uses.— Nuts edible.

10. *Castanopsis diversifolia* (Kurz) King ex Hook.f., Fl. Brit. India 5: 620. 1888; King, Ann. Roy. Bot. Gard. (Calcutta) 2: 96, t. 85a. 1889; Craib, Bull. Misc. Inform. Kew 1911: 473. 1911; Craib, Con. Fl. Siam. Aber. Univ.: 202. 1912; Brandis, Indian Trees: 634. 1921; Hickel & A. Camus in H. Lecomte, Fl. Indo-Chine 5: 1022. 1930; Barnett, Quer. Rel. Fag. Asia: 165. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 366. 1944.— *Castanea diversifolia* Kurz, J. Asiat. Soc. Bengal, Pt. 2, 44(2): 198. 1875; Kurz, Forest Fl. Burma 2: 479. 1877.

Thailand.— NORTHERN: Mae Hongson, Chiang Mai, Chiang Rai, Nan, Lampang, Tak; CENTRAL: Lop Buri.

Distribution.— Myanma (type), Laos

Ecology.— Lower and upper montane evergreen forests, scrub vegetation, mixed deciduous forest, on granite bedrock, alt. 700–2200 m (usually 1000–1500 m). Flowering Feb.–Nov. (usually Feb.–Aug.).

Vernacular.— Ko paen (ก่อแป้น), ko rang (ก่อหรั่ง), ko (ก่อ), kao kwang (ก่อวากวาง), ko ti (ก่อตี), ma ko (มะก่อ), ko nam (ก่อหนาม) (Northeastern).

Uses.— Nuts edible.

11. *Castanopsis echidnocarpa* Miq., Ann. Mus. Bot. Lugduno-Batavi 1: 119. 1863; A.DC., J. Bot. 1: 182. 1864; A.DC. in A.P. de Candolle, Prodr. 16(2): 112. 1864; C.C.Huang, Y.T.Chang & B.M.Bartol. in C.Y.Wu & P.H.Raven, Fl. China, 4: 330. 1999.— *Castanea echidnocarpa* Hook.f. & Thomson ex A.DC., in A.P. de Candolle, Prodr. 16(2): 112. 1864.— *Castanopsis tribuloides* (Smith.) A.DC. var. *echidnocarpa* (A.DC.) King ex Hook.f., Fl. Brit. India 5: 623. 1888; Brandis, Indian Trees, ed 3: 635. 1906.

Thailand.— NORTHERN: Chiang Mai, Nan, Lampang, Lamphun; NORTHEASTERN: Loei; EASTERN: Si Sa Ket; SOUTHWESTERN: Kanchanaburi; PENINSULAR: Chumphon, Surat Thani, Nakhon Si Thammarat, Satun, Songkhla.

Distribution.— Bangladesh, Bhutan, India (Khasi, type), Nepal, Myanma, China.

Ecology.— Lower montane forest, oak-pine forest, dry evergreen forest, mixed deciduous and deciduous dipterocarp forest, often by streams, alt. 50–1600 m (usually 700–1200 m). Flowering April–Jan. (usually April–Sept.), fruiting March–Dec. (usually Aug.–Oct.).

Vernacular.— Ko paen (ก่อแป้น), ko dueai (ก่อเดื่อ), ko kao (ก่อก่อ) (Northern); ko khao (ก่อข้าว) (Northeastern); ko khao (ก่อขาว), ko mu (ก่อหมู), ko nam (ก่อหนาม) (Peninsular).

Uses.— Nuts edible (often mixed with *C. tribuloides* nuts).

12. *Castanopsis ferox* (Roxb.) Spach, Hist. Nat. Vég. 11: 185. 1842; C.C.Huang, Y.T.Chang & B.M.Bartol. in C.Y.Wu & P.H.Raven, Fl. China 4: 327. 1999.— *Quercus ferox* Roxb., Fl. Ind. ed. 1832, 3: 638. 1832. Fig. 6.

Thailand.— NORTHERN: Chiang Mai, Chiang Rai, Nan, Phrae; SOUTHWESTERN: Kanchanaburi.

Distribution.— India, Bangladesh, Myanma (type), Laos, Vietnam.

Ecology.— Lower montane forest, alt. 820–1650 m (usually 1200–1400 m). Flowering March–Dec. (usually Dec.), fruiting Feb.–Dec. (frequently Dec.).

Vernacular.— Ko laem (ก่อเหลม), ko dueai (ก่อเดื่อ), ma ko mu (มะก่อหมู).

13. *Castanopsis fissa* (Champ. ex Benth) Rehder & E.H.Wilson in C.S. Sargent, Pl. Wilson 3: 203. 1916; Barnett, Quer. Rel. Fag. Asia: 191d. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 336. 1944; C.C.Huang, Y.T.Chang & B.M.Bartol. in C.Y.Wu & P.H.Raven, Fl. China, 4: 320. 1999.— *Quercus fissa* Champ. ex Benth., Hook., J. Bot. 6: 114. 1854; A.DC., in A.P. de Candolle, Prodr. 16(2): 104. 1864.— *Pasania fissa* (Champ. ex Benth.) Oerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1866: 76. 1866; Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine 5: 1005. 1930.— *Castanea regia* Hance, Ann. Sci. Nat., Bot., IV, 18: 231. 1862.— *Synaedrys fissa* (Champ. ex Benth.) Koidz., Bot. Mag. (Tokyo), 30: 187. 1916.—

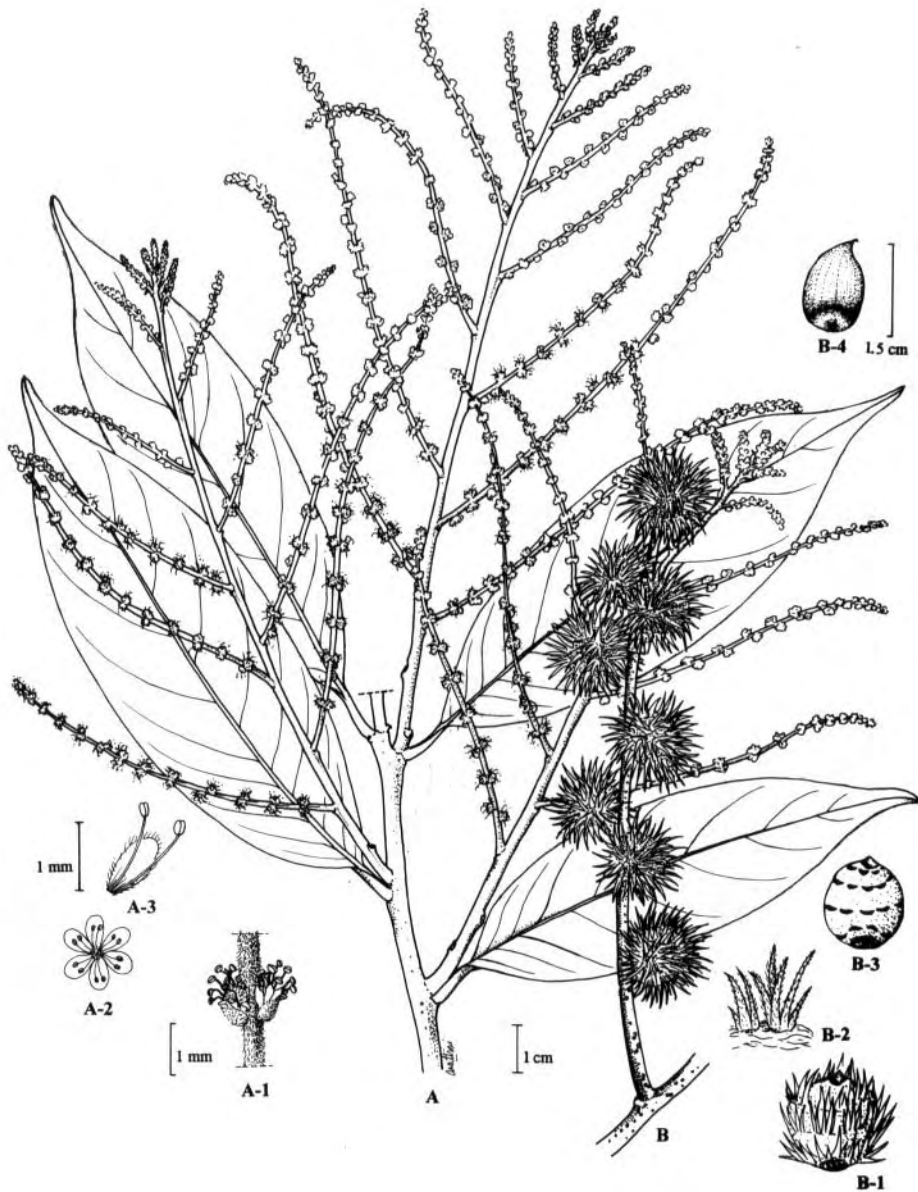


Figure 6. *Castanopsis ferox* (Roxb.) Spach: A. twig, leaves and male inflorescences; A-1 male flower cluster, A-2 male flower, A-3 sepal and stamens; B. infructescence (van Beusekom & Phengklai 2343), B-1 young acorn, B-2 spines, B-3 insertion of spines, B-4 nut.

Proc. *Lithocarpus fissus* (Champ. ex Benth.) A.Camus, Rev. Bot. Appl. Agric. Trop. 15: 24. 1935.

Thailand.— NORTHERN: Chiang Mai, Lamphun, Lampang.

Distribution.— China (Hong Kong, type), Myanma.

Ecology.— Lower montane evergreen forest, alt. 1200–1300 m. Flowering Feb.–April, fruiting Nov.–Jan.

Vernacular.— Ko ta mu (ก่อตาหมู) (Northern).

14. *Castanopsis fordii* Hance, J. Bot. 22: 230. 1884; Skan, J. Linn. Soc., Bot. 26: 523. 1884; Barnett, Quer. Rel. Fag. Asia: 440. 1940; C.C.Huang, Y.T.Chang & B.M.Bartol. in C.Y.Wu & P.H.Raven, Fl. China 4: 323. 1999. Fig. 7.

Thailand.— NORTHERN: Nan.

Distribution.— China (Kwangtung, type).

Ecology.— Evergreen forest, alt. 900 m. Flowering July.

Vernacular.— Ko nan (ก่อนาน) (Northern).

15. *Castanopsis javanica* (Blume) A.DC., J. Bot. 1: 182. 1863; A.DC. in A.P. de Candolle, Prodr. 16(2): 111. 1864; King ex Hook.f., Fl. Brit. India 5: 602. 1888; King, Ann. Roy. Bot. Gard. (Calcutta) 2: 97, t. 88. 1889; Barnett, Quer. Rel. Fag. Asia: 424. 1940; Backer & Bakh.f., Fl. Java 2: 4. 1965; Soepadmo in Fl. Males. 7(2): 306. 1972.— *Fagus javanica* Blume, Flora 7: 295. 1824.— *Castanea javanica* Blume, Bijdr.: 525. 1826.— *C. montana* Blume, Bijdr.: 526. 1826.— *Quercus discocarpa* Hance, J. Bot. 12: 242. 1874; King ex Hook.f., Fl. Brit. India 5: 616. 1888; Corner, Wayside Trees: 302. 1940.— *Pasania discocarpa* (Hance) Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75: 447. 1915.— *Synaedrys discocarpa* (Hance) Koidz, Bot. Mag. (Tokyo) 30: 186. 1916. Fig. 8.

Thailand.— SOUTHEASTERN: Chanthaburi; PENINSULAR: Ranong, Nakhon Si Thammarat.

Distribution.— Vietnam, Malaysia, Singapore, Indonesia (type).

Ecology.— Lowland tropical evergreen forest, alt. ca. 100 m. Flowering Jan., fruiting Nov.–Jan.

Vernacular.— Ko mu (ก่อหมู) (Peninsular).

Uses.— Nuts edible.

16. *Castanopsis hystrix* A.DC., J. Bot. 1: 128. 1863; A.DC. in A.P. de Candolle, Prodr. 16(2): 111. 1864; King ex Hook.f., Fl. Brit. India 5: 620. 1888; Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine 5: 1025. 1930; Barnett, Quer. Rel. Fag. Asia: 416. 1940.— *Castanea hystrix* Hook.f. & Thomson ex Miq., Ann. Mus. Bot. Lugduno-Batavi 1: 119. 1863.— *Quercus rufescens* Hook.f. & Thomson, Fl. Brit. India 5: 620. 1888. Fig. 9.



Figure 7. *Castanopsis fordii* Hance: A. twig, leaves and female inflorescences (Larsen *et al.* 43548), A-1 female flower.



Figure 8. *Castanopsis javanica* (Blume) A. DC.: A. twig, leaves and female inflorescence (Abbe 9743), A-1 base of leaf, A-2 bud, A-3 female flower, A-4 ovary, A-5 cross section of ovary; B. male flower cluster, B-1 male flower; C. acorn with cupule partially removed (Santisuk s.n.), C-1. spines.

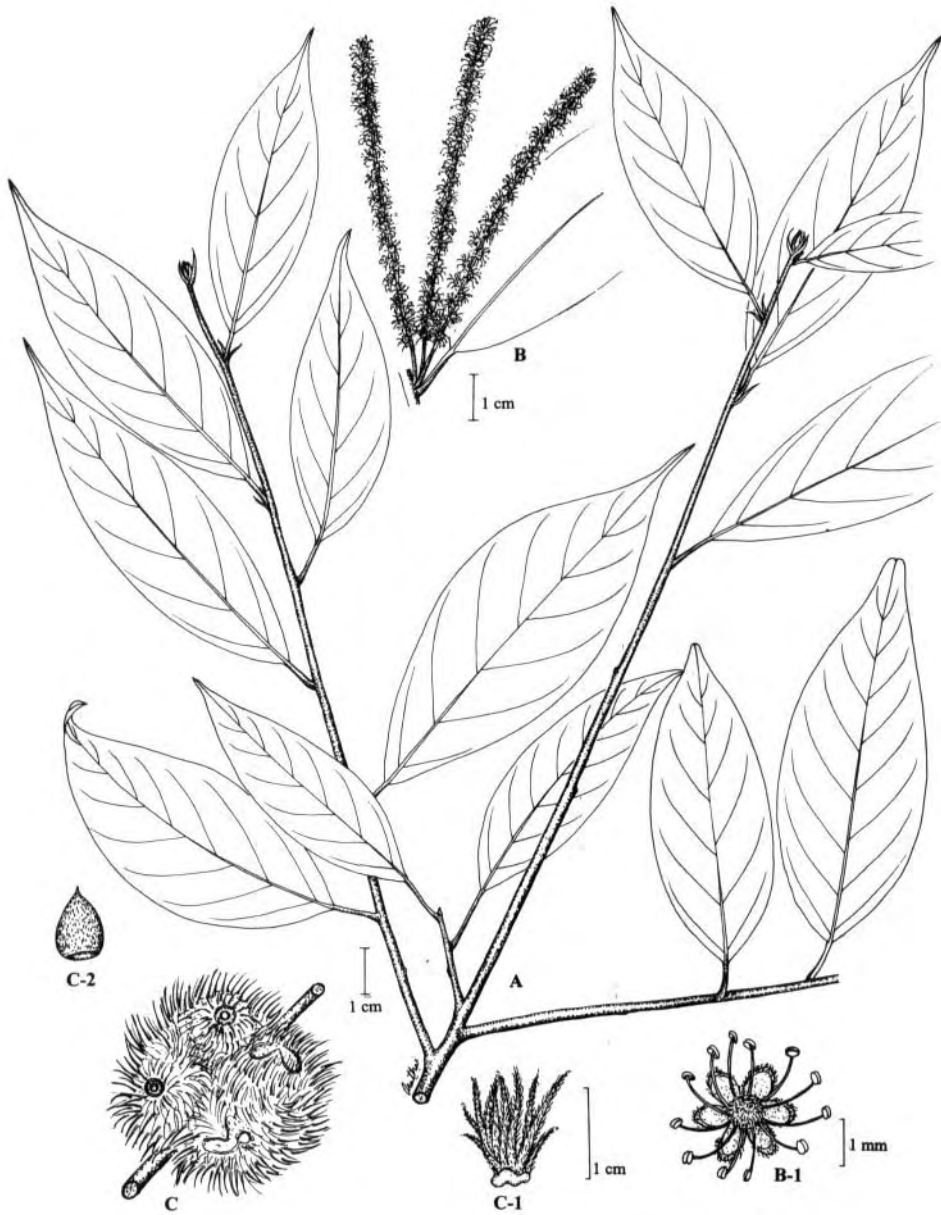


Figure 9. *Castanopsis hystrix* (Hook.f. & Thoms. ex Miq.) A. DC.: A. twig and leaves; B. male inflorescences (Mazzetti 309), B-1 male flower; C. part of infructescence (Thomson s.n.), C-1 spines, C-2 nut.

Distribution.— India (type), Myanma, Laos, Vietnam, China, Taiwan.

Ecology.— Lower montane forest.

Vernacular.— Ko daeng (ก่อแดง) (Northern).

17. *Castanopsis indica* (Roxb. ex Lindl.) A.DC., J. Bot. 1: 182. 1863; A.DC. in A.P. de Candolle, Prodr. 16(2): 109. 1864; King ex Hook.f. Fl. Brit. India 5: 620. 1888; Craib, Bull. Misc. Inform. Kew 1911: 473. 1911; Craib, Cont. Fl. Siam, Aber. Univ.: 202. 1912; Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine 5: 1027. 1930; Barnett, Quer. Rel. Fag. Asia: 159. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 366. 1944; Hjelmq., Dansk Bot. Ark. 23: 495. 1968; C.C.Huang, Y.T.Chang & B.M.Bartol. in C.Y.Wu & P.H.Raven, Fl. China 4: 323. 1999.— *Castanea indica* Roxb. ex Lindl. In N.Wallich, Pl. Asiat. Rar. 2: 5. 1830; Roxb., Fl. Ind. 3: 643. 1832; Kurz, Forest Fl. Burma 2: 478. 1877.— *Quercus indica* (Roxb. ex Lindl.) Drake, J. Bot. (Morot): 153. 1890.

Thailand.— NORTHERN: Chiang Mai, Chiang Rai, Nan, Lampang, Phitsanulok; NORTHEASTERN: Phetchabun, Loei, Khon Kaen; EASTERN: Chaiyaphum.

Distribution.— India, Nepal (type), Myanma, China, Taiwan, Laos, Vietnam.

Ecology.— Lower montane forest, deciduous dipterocarp forest, moist upper mixed deciduous forest, opened grassland; alt. 500–2000 m. (usually 500–900 m). Flowering Feb.–Dec. (usually Feb.–May), fruiting Feb.–Dec. (usually May–July), usually producing flowers and fruits at the same time.

Vernacular.— Ko lim (ก่อลิ้ม), ko rang (ก่อหรั่ง), ko yum (ก่อหยม), ko nam (ก่อหนาม), ko paen (ก่อแป้น) (Northeastern); ko khao (ก่อข้าว), ko ti (ก่อตี), ko daeng (ก่อแดง) (Northeastern).

Uses.— Nuts edible.

18. *Castanopsis inermis* (Lindl.) Benth. & Hook.f., Gen. Pl. 3: 409. 1880; A.Camus, Châtaigniers, Texte: 447; Atlas: t. 63. 1929; Corner, Wayside Trees: 292, f. 93, pl. 219. 1940; Barnett, Quer. Rel. Fag. Asia: 185. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 366. 1944; Soepadmo in Fl. Males. 7(2): 315. 1972.— *Castanea inermis* Lindl. in N.Wallich, Pl. Asiat. Rar. 2: 6. 1831; A.DC. in A.P. de Candolle, Prodr. 16(2): 116. 1864.— *C. glomerata* Blume (*non* Roxb.), Mus. Bot. 1: 283. 1850.— *Callaeocarpus sumatrana* Miq., Pl. Jungh.: 14. 1851; Miq., Fl. Ned. Ind. 1(1): 868. 1856.— *Castanopsis sumatrana* (Miq.) Oerst., Skr. Vidensk-Selsk. Christiana, Math.-Naturvidensk. Kl. 5(9): 378. 1873; King ex Hook.f., Fl. Brit. India 5: 623. 1888; Brandis, Indian Trees.: 635. 1921; Ridl., Fl. Malay Penins. 3: 390. 1924.

Thailand.— NORTHERN: Chiang Mai, Nan; NORTHEASTERN: Nakhon Phanom; EASTERN: Nakhon Ratchasima; PENINSULAR: Surat Thani, Krabi, Phatthalung, Trang, Songkhla, Narathiwat.

Distribution.— Myanma, Malaysia, Singapore (type), Indonesia, Philippines.

Ecology.— Lowland tropical evergreen forest, often by streams, on limestone and granite bedrock, alt. 80–200 m (usually 80–100 m). Flowering Jan.–Nov. (usually Jan.–March), fruiting June–Dec. (usually June–Aug.).

Vernacular.— Ko duei (ก่อเดือย) (Northeastern); ko herm (ก่อเหิม) (Northeastern); ko mu (ก่อหมู), ko khao (ก่อข้าว), ko ta mu (ก่อตาหมู), ko nam (ก่อหนาม) (Peninsular).

Uses.— Nuts edible.

19. *Castanopsis lanceifolia* (Oerst.) Hickel & A. Camus, Bull. Soc. Bot. France 68: 394. 1922; Hickel & A. Camus in H. Lecomte, Fl. Indo-Chine 5: 1012. 1930; Barnett, Quer. Rel. Fag. Asia: 190. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 336. 1944.— *Quercus lanceifolia* Roxb. (*non* Schltdl. & Cham.), Fl. Ind. ed. 1832, 3: 634. 1832; King ex Hook.f., Fl. Brit. India. 5: 616. 1888; Paulsen, Fl. Koh Chang: 255. 1902; Brandis, Indian Trees: 632. 1921.— *Pasania lanceifolia* Oerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1866: 84. 1866;— *Castanea lanceaeifolia* (Oerst.) Kurz, Prelim. Rep. Forest Pegu, App. A: cxxvii. 1875; Forest Fl. Burma 2: 482. 1877.— *Synaedrys lanceaeifolia* Koidz., Bot. Mag. (Tokyo) 30: 186. 1916.— *Castanopsis roxburghiana* S.N. Biswas, Bull. Bot. Surv. Ind. 11: 189. 1971.

Thailand.— NORTHERN: Chiang Mai, Chiang Rai, Nan; SOUTHEASTERN: Chanthaburi, Trat; PENINSULAR: Surat Thani.

Distribution.— India (Himalaya, type), Bhutan, Myanma.

Ecology.— Lowland evergreen and lower montane forests, alt. 10–800 m. Flowering Jan.–Sept., fruiting March–Aug.

Vernacular.— Ko diao (ก่อเดี้ยว), ko bai laem (ก่อใบแหลม), ko paen (ก่อแป้น), ko hin (ก่อหิน) (Northern), ko mu (ก่อหมู) (Peninsular).

20. *Castanopsis malaccensis* Gamble, Bull. Misc. Inform. Kew 1913: 178. 1913; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75: 455. 1915; Ridley, Fl. Malay Penins. 3: 388. 1924; A. Camus, Châtaigniers, Texte: 319. 1929; Corner, Wayside. Trees: 293. 1940; Barnett, Quer. Rel. Fag. Asia: 426. 1940; Soepadmo in Fl. Males. 7(2): 303. 1972. Fig. 10.

Thailand.— PENINSULAR: Satun.

Distribution.— Malaysia (type), Singapore, Indonesia.

Ecology.— Lowland tropical evergreen forest.

Vernacular.— Ko dan (ก่อดาน) (Peninsular).

21. *Castanopsis megacarpa* Gamble, Bull. Misc. Inform. Kew 1914: 180. 1914; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75: 462. 1915; Ridley, Fl. Malay Penins. 3: 390. 1924; A. Camus, Châtaigniers, Texte: 440; Atlas: t. 61. 1929; Corner, Wayside trees: 293. 1940; Barnett, Quer. Rel. Fag. Asia: 460. 1940; Soepadmo in Fl. Males. 7(2): 305. 1972.— *Castanopsis javanica* (*non* A.DC.) Hook.f., Fl. Brit. India 5: 620. 1890. Fig. 10.

Thailand.— PENINSULAR: Satun.

Distribution.— Malaysia (type), Singapore, Indonesia.

Ecology.— Lowland tropical evergreen forest, alt. 300–400 m. Flowering April, fruiting Sept.

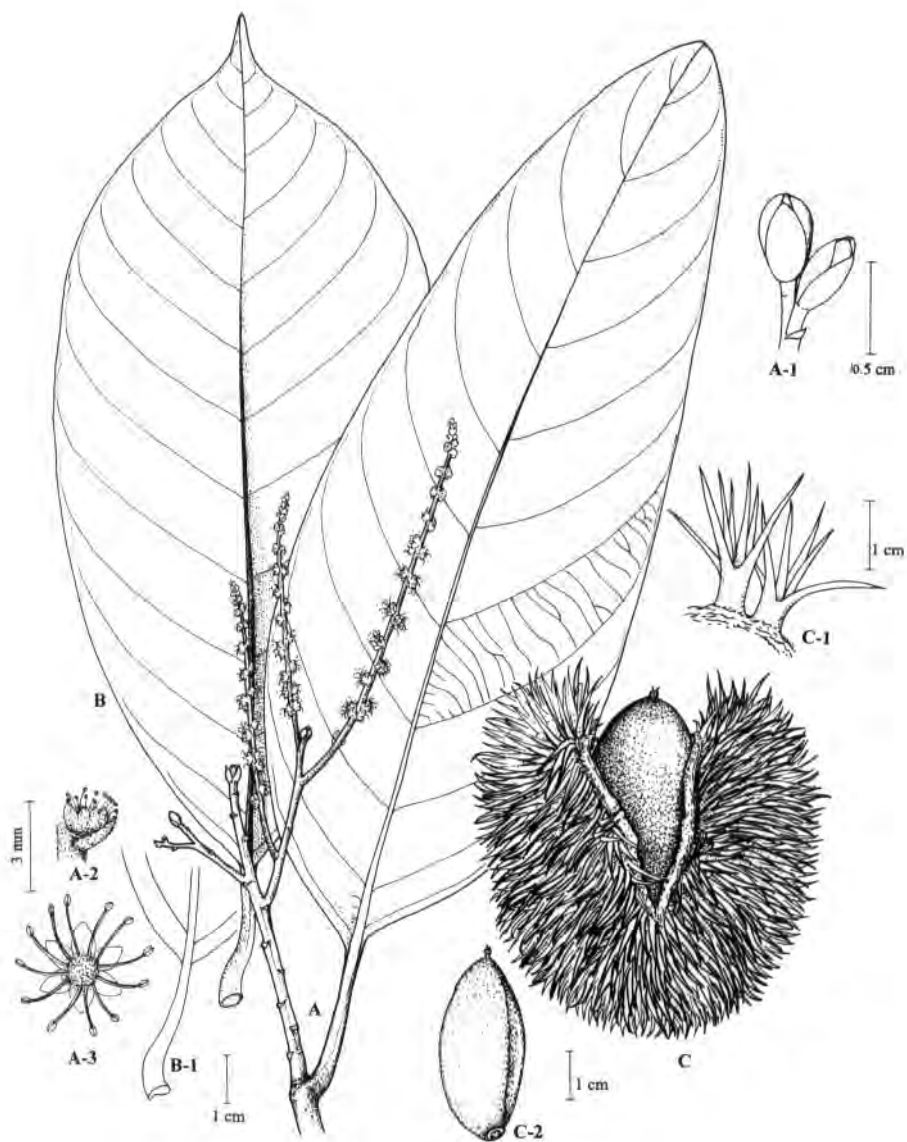


Figure 10. *Castanopsis megacarpa* Gamble: A. leaf and inflorescences (*Abbe* 9734), A-1 bud, A-2 male flower cluster, A-3 male flower; B. detached leaf (showing shape variation when compared with A), B-1 leaf base; C. acorn (*Niyomdham* 4825), C-1 spines, C-2 nut.

Vernacular.— Ko men (ก่อเม่น) (Peninsular).

Uses.— Nuts edible.

22. *Castanopsis nephelioides* King ex Hook.f., Fl. Brit. India 5: 624. 1888; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75: 464. 1915; A.Camus, Chât: 467, t. 69. 1930; Barnett, Quer. Rel. Fag. Asia: 192. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 336. 1944; Soepadmo in Fl. Males. 7(2): 298. 1972.

Thailand.— NORTHERN: Mae Hong Son, Chiang Mai, Lampang; SOUTHEASTERN: Trat; PENINSULAR: Ranong, Surat Thani, Phangnga, Nakhon Si Thammarat, Trang, Narathiwat.

Distribution.— Malaysia (type), Singapore.

Ecology.— Lowland evergreen forest, lower montane forest and oak-pine forest, alt. 50–1600 m (usually 200–800 m). Flowering Jan.–May, fruiting Feb.–Dec. (usually July–Sept.).

Vernacular.— Ko mu (ก่อหมู) (Northern & Peninsular), ko khao (ก่อขาว), ma ko khao (มะก่อขาว) (Peninsular).

Uses.— Nuts edible.

23. *Castanopsis pierrei* Hance, J. Bot. 13: 369. 1875; Hickel & A.Camus, Bull. Soc. Bot. France 68: 490. 1922; Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine 5: 1031. 1930; Barnett, Quer. Rel. Fag. Asia: 182. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 336. 1944; Hjelmq., Dansk Bot. Ark. 23: 498. 1968.

Thailand.— NORTHEASTERN: Nakhon Phanom; SOUTHEASTERN: Chanthaburi, Trat; PENINSULAR: Ranong, Surat Thani, Phangnga, Phuket, Trang.

Distribution.— Cambodia (type).

Ecology.— Lowland tropical evergreen forest, pine-oak-dipterocarp forest, moist upper mixed deciduous forest, along stream banks; alt. 10–350 m. Flowering Jan.–Dec., fruiting April–Dec. (usually April–June).

Vernacular.— Ko khao niao (ก่อข้าวเหนียว) (Northeastern), ko khi mu (ก่อขี้หมู), ko mu (ก่อหมู), ko khao niao (ก่อข้าวเหนียว), ma ko (มะก่อ) (Southeastern).

Uses.— Nuts edible.

24. *Castanopsis piriformis* Hickel & A.Camus, Bull. Soc. Bot. France 68: 395. 1922; H.Lecomte, Les Bois de l'Indochine: t. 2.4. 1926; Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine. 5: 1032. 1930; Barnett, Quer. Rel. Fag. Asia: 188. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 336. 1944; Hjelmq., Dansk Bot. Ark. 23: 500. 1968.

Thailand.— NORTHEASTERN: Nakhon Phanom; EASTERN: Ubon Ratchathani; SOUTHEASTERN: Prachinburi, Chanthaburi; PENINSULAR: Songkhla.

Distribution.— Indochina, Laos (type).

Ecology.— Deciduous dipterocarp-pine forest, dry evergreen forest, on sandstone bedrock; alt. 250–950 m. Flowering Sept.–Dec., fruiting May–Dec.

Vernacular.— Ko bai lueam (ก่อใบเลื่อม) (Northeastern), ko ta mu (ก่อตาหมู), ko mak (ก่อหมาก), ko hin (ก่อหิน) (Eastern); ko kin luk (ก่อกินลูก) (Peninsular).

Uses.— Nuts edible.

25. *Castanopsis pseudo-hystrix* Phengklai, Thai Forest Bull. (Bot.) 32: 115. 2004. Fig. 11.

Thailand.— NORTHERN: Chiang Mai (*Smitinand* 90–198, holotype BKF!), Lampang; NORTHEASTERN: Loei; SOUTHEASTERN: Rayong.

Distribution.— Endemic to Thailand.

Ecology.— Lower montane forest, pine-oak forest and dry evergreen forest, alt. 800–1370 m. (usually 1000–1200 m). Flowering March–Dec. (usually March–April), fruiting Dec.–Jan.

Vernacular.— Ko daeng (ก่อแดง), ko bai lueam (ก่อใบเลื่อม), ko dueai (ก่อเดือย) (Southeastern).

Uses.— Inner bark locally used to prevent dental caries.

26. *Castanopsis purpurea* Barnett, Bull. Misc. Inform. Kew 1938: 105. 1938; Barnett, Quer. Rel. Fag. Asia: 177. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 336. 1944.

Thailand.— NORTHERN: Chiang Mai, Chiang Rai, Lampang, Tak; NORTHEASTERN: Nakhon Phanom; EASTERN: Ubon Ratchathani; PENINSULAR: Ranong, Phangnga, Trang (*Kerr* 19011, type), Songkhla.

Distribution.— Endemic to Thailand.

Ecology.— Lowland evergreen forest, lower montane forest, dry evergreen forest, mixed deciduous forest, often by stream, alt. 50–1300 m (usually 100–800 m). Flowering Feb.–Nov. (usually March–Aug.), fruiting July–Oct.

Vernacular.— Ko ti (ก่อติ้), ko sai (ก่อทราย), ko ap (ก่อแอบ), ko yum (ก่อหยม), ko nam (ก่อหนาม), ko ta mu (ก่อตาหมู); ko lim (ก่อลิ้ม) (Northern); ko khao (ก่อเขา) (Eastern); ko dan (ก่อดาน), ko nam (ก่อหนาม), be-ra-ngae-ba-be (เบร่าเง่าบ้าเบ) (Peninsular).

Uses.— Nuts edible.

27. *Castanopsis rhamnifolia* (Miq.) A.DC. in A.P. de Candolle, Prodr. 16(2): 113. 1864; King ex Hook.f., Fl. Brit. India 5: 624. 1888; King, Ann. Roy. Bot. Gard. (Calcutta) 2: 105. 100 B. 1889; A.Camus, Châtaigniers, Texte: 469; Atlas: t. 69. 1929; Barnett, Quer. Rel. Fag. Asia: 456. 1940; Soepadmo in Fl. Males. 7(2): 299. 1972.— *Quercus rhamnifolia* Miq., Fl. Ned. Ind. 1(1): 853. 1856.— *Callaeocarpus rhamnifolia* (Miq.) Miq., Fl. Ned. Ind., Eerste Bijv.: 353. 1861.— *Castanea rhamnifolia* (Miq.) Oerst., Skr. Vidensk.-Selsk. Christiana, Math.-Naturvidensk. Kl. 5(9): 378. 1873.— *C. rhamnifolia* (Miq.) Kurz, Prelim. Rep. Forest Pegu, App. A: cxxvii. 1875; Kurz, Forest Fl. Burma 2: 481. 1877.— *Castanopsis pachycarpa* A.Camus, Bull. Mus. Hist. Natl. Hist. Nat., II, 6: 92. 1934. Fig. 12.

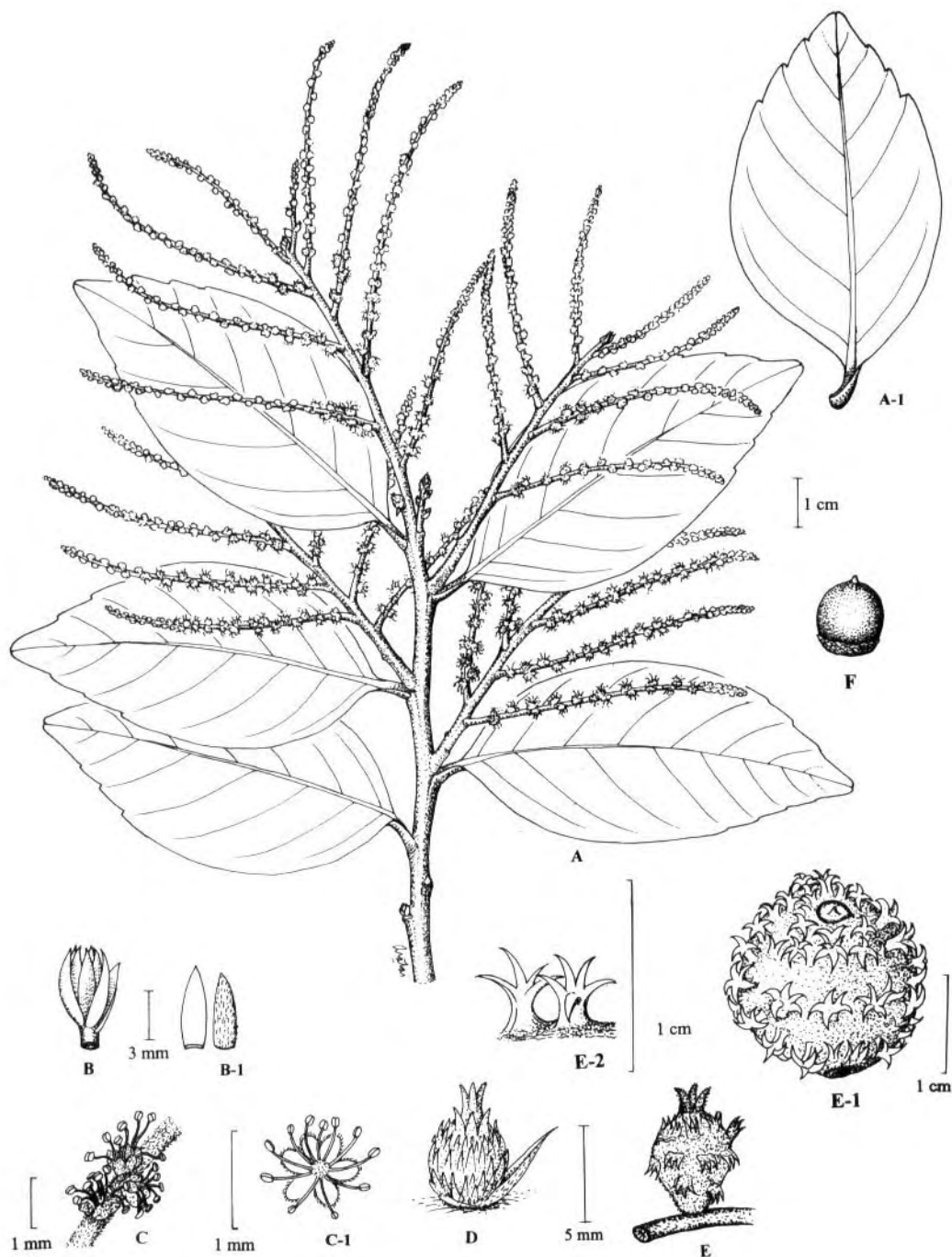


Figure 11. *Castanopsis pseudo-hystrix* Phengklai: A. twig, leaves and inflorescences (Smitinand 90-198), A-1 leaf; B. terminal bud, B-1 inner and outer part of bract; C. male flower cluster, C-1 male flower; D. ovary (Eiadthong BKF 97215); E. young acorn, E-1 mature acorn, E-2 spines; F. nut.

Thailand.— NORTHEASTERN: Phetchabun; EASTERN: Chaiyaphum, Si Sa Ket; SOUTHWESTERN: Kanchanaburi; PENINSULAR: Phangnga, Narathiwat.

Distribution.— Myanma, Malaysia, Singapore, Indonesia (type).

Ecology.— Lowland evergreen forest, pine-oak-dipterocarp forest, alt. 100–800 m. Flowering March–Oct., fruiting Jan.–July.

Vernacular.— Ko khi mu (ก่อขี้หมู) (Southwestern).

28. *Castanopsis rockii* A.Camus, Bull. Mens. Soc. Linn. Lyon 8: 88. 1929; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 188. 1944; Hjelmq., Dansk Bot. Ark. 23: 499. 1968.

Thailand.— NORTHERN: Mae Hong Son, Chiang Mai, Nan, Uttaradit.

Distribution.— China, Vietnam (type).

Ecology.— Mixed deciduous forest, lower montane forest, oak-pine forest, alt. 650–2000 m (usually 1600–2000 m). Flowering Nov.–Dec., fruiting Feb.–March.

Vernacular.— Ko rok (ก่อรอก) (Northern).

29. *Castanopsis schefferiana* Hance, J. Bot. 16: 200. 1878; King, Ann. Roy. Bot. Gard. (Calcutta) 2: 105, t. 99. 1899; A.Camus, Châtaigniers, Texte: 456. 1929; Barnett, Quer. Rel. Fag. Asia: 461. 1940; Soepadmo in Fl. Males. 7(2): 310. 1972.— *Castanopsis andersonii* Gamble, Bull. Misc. Inform. Kew 1914: 179. 1914; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75: 458. 1915; A.Camus, Châtaigniers, Texte: 342; Atlas: t. 49. 1929. Fig. 13.

Thailand.— EASTERN: Ubon Ratchathani; PENINSULAR: Krabi, Songkhla, Yala, Narathiwat.

Distribution.— Malaysia, Singapore (type).

Ecology.— Lowland evergreen forest, scrub vegetation, mixed deciduous forest, alt. 100–400 m. Flowering Feb.–Dec. (usually Nov.–Dec.), fruiting July–Dec.

Vernacular.— Ko khiao mu (ก่อเขี้ยวหมู), ko mu (ก่อหมู) (Peninsular), mak ko nam (มักก่อหนาม) (Eastern).

30. *Castanopsis siamensis* Duanmu, Sci. Silvae Sin. 8: 189. 1963

Thailand.— NORTHERN: Chiang Rai. (*Rock* 1580, type).

Distribution.— Endemic to Thailand.

Ecology.— Mixed deciduous and oak-pine forest, alt. 400–1000 m.

Vernacular.— Ko mae lao (ก่อเม่ลาว), ko sa yam (ก่อสยาม) (Northern).

31. *Castanopsis thaiensis* Phengklae, Thai Forest Bull. (Bot.) 32: 117. 2004. Fig. 14.

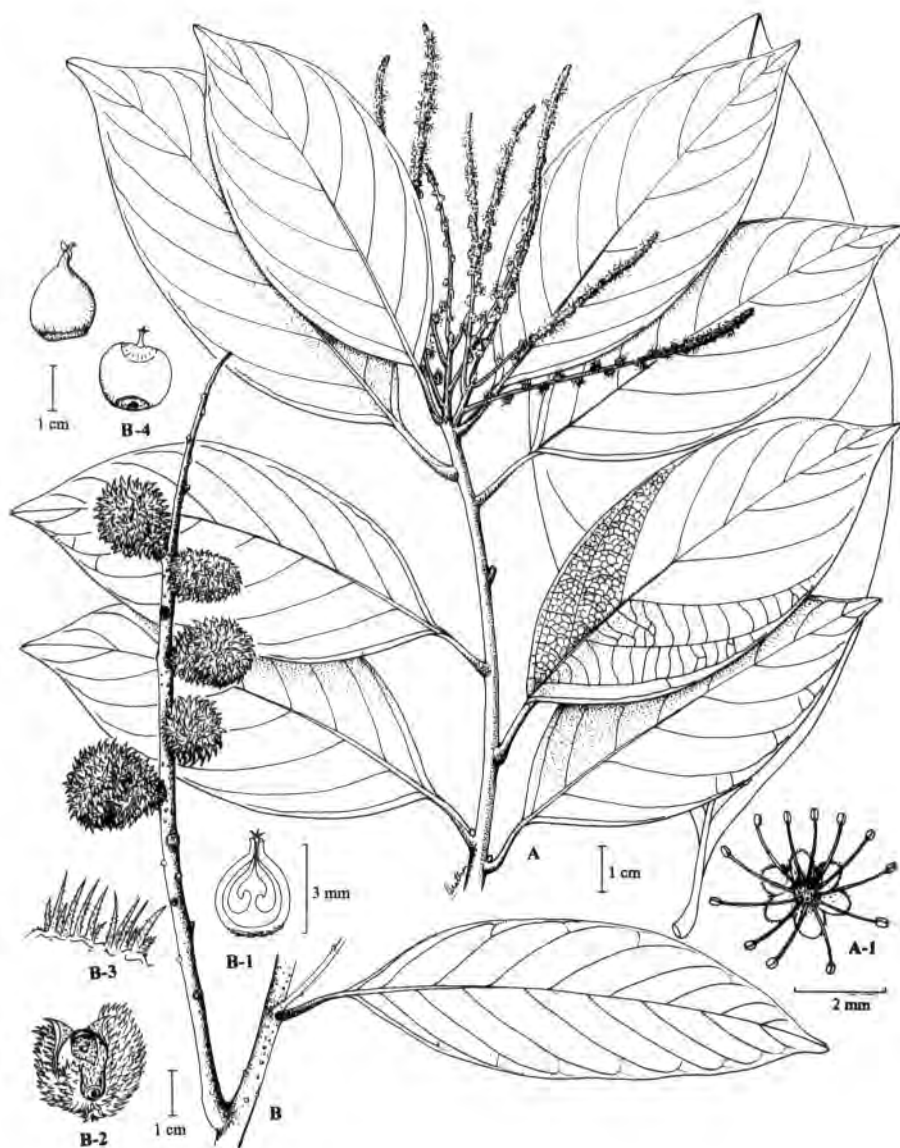


Figure 12. *Castanopsis rhamnifolia* (Miq.) A. DC.: A. DC.: A. twig, leaves and male inflorescence (Murata *et al.* T-49632), A-1 male flower; B. infructescence (Phengklay *et al.* 13476), B-1 longitudinal section of female flower, B-2 acorn, B-3 spines, B-4 nut.

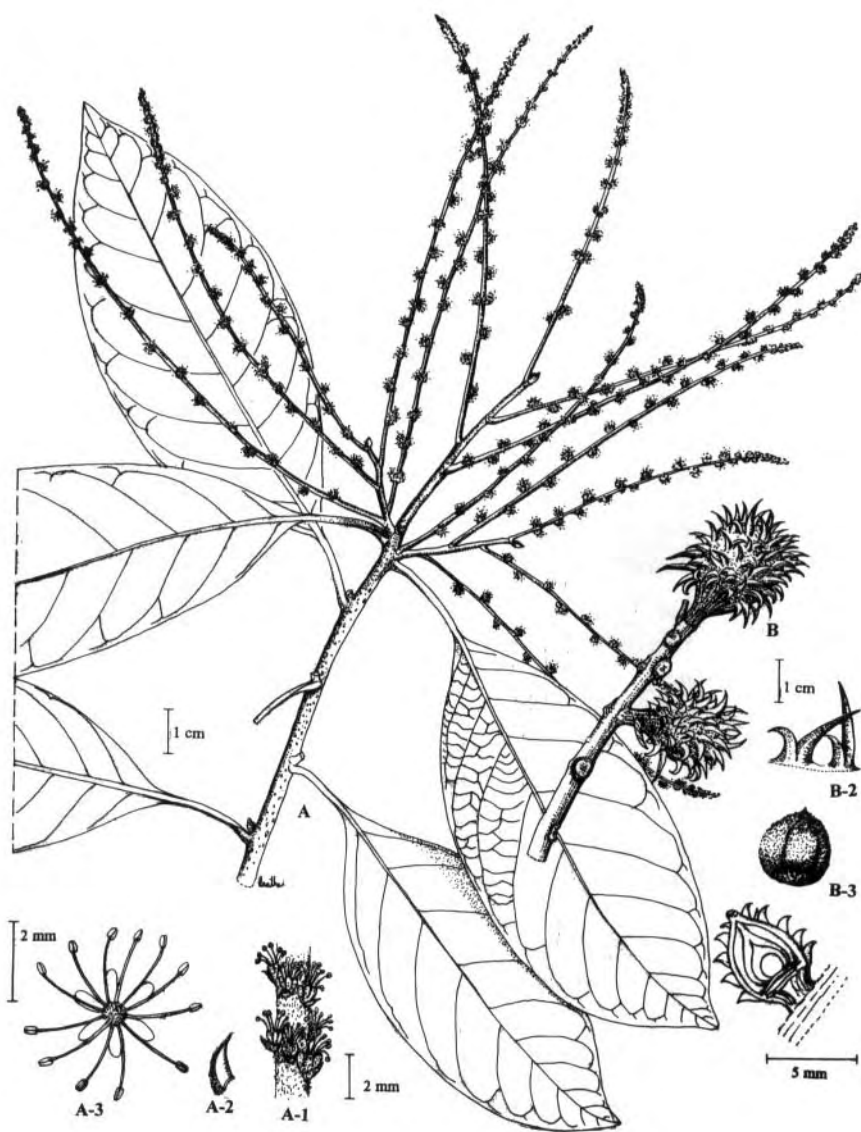


Figure 13. *Castanopsis schefferiana* Hance: A. twig, leaves and inflorescence (Maxwell 85-989), A-1 male flower clusters, A-2 bract, A-3 male flower; B. part of infructescence (Maxwell 84-172), B-1 longitudinal section of young acorn, B-2 spines, B-3 nut.

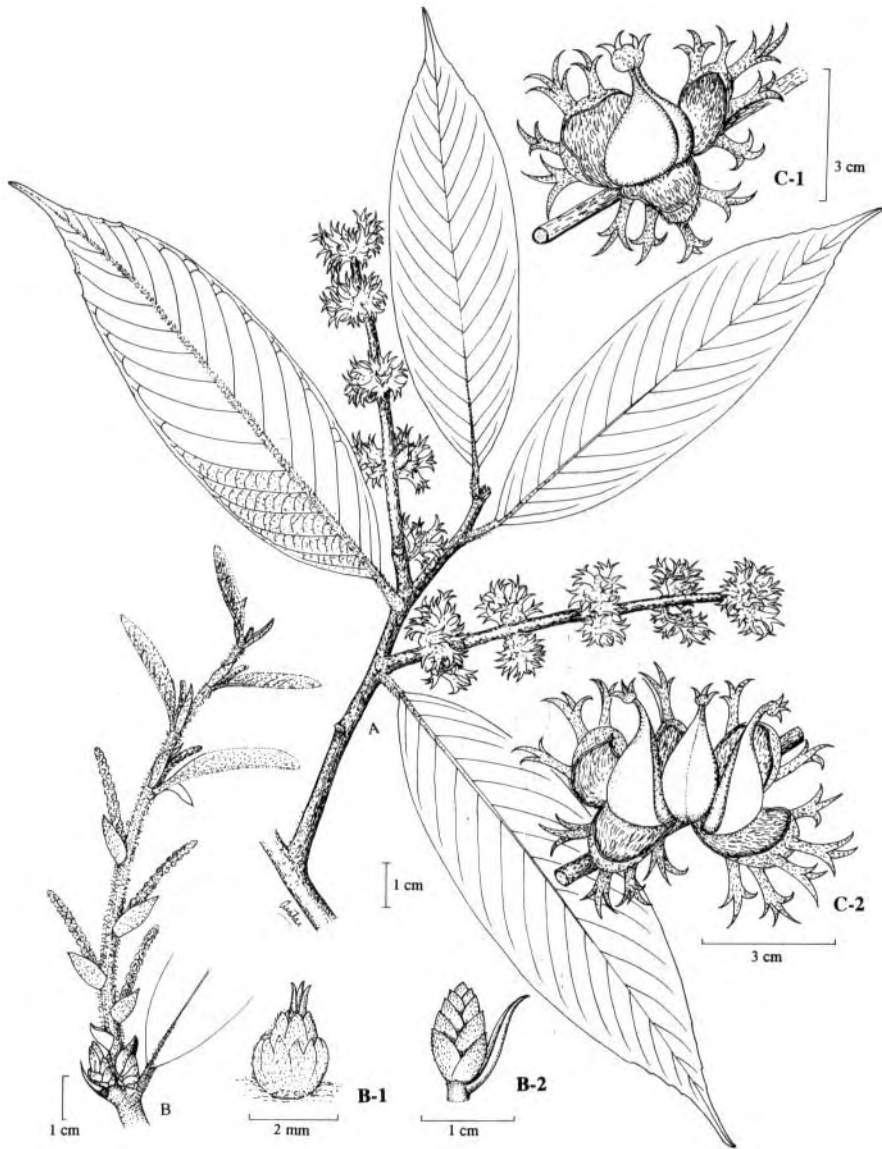


Figure 14. *Castanopsis thaiensis* Phengklai: A. twig, leaves and infructescences, B. female inflorescences, (Larsen et al. 44319), B-1 female flower, B-2 bud; C-1 & C-2 acorns.

Thailand.— NORTHERN: Chiang Mai.

Thailand.— NORTHERN: Chiang Mai, Nan (*Larsen* 44319, holotype **AAU!**, isotype **BKF!**).

Distribution.— Endemic to Thailand.

Ecology.— Evergreen forest, alt. 800–1000 m. Flowering Nov., fruiting Oct.–Nov.

Vernacular.— Ko khao kang (ก่อเขากวาง), ko thai (ก่อไทย) (Northern).

32. *Castanopsis tribuloides* (Sm.) A.DC., J. Bot. 1: 182. 1863; A.DC. in A.P. de Candolle, Prodr. 16(2): 111. 1864; King ex Hook.f., Fl. Brit. India 5: 622. 1888; Brandis, Indian Trees: 634. 1921; Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine 5: 1017. 1930; Barnett, Quer. Rel. Fag. Asia: 172. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 336. 1944; Hjelmq., Dansk Bot. Ark. 23: 498. 1968; C.C.Huang, Y.T.Chang & B.M.Bartol. in C.Y.Wu & P.H.Raven, Fl. China 4: 329. 1999.— *Quercus tribuloides* Sm. in A.Rees, Cycl. 29: 13. 1819.— *Castanea tribuloides* (Sm.) Lindl. in N.Wallich, Pl. Asiat. Rar. 2.6: 102. 1831; Kurz, Forest Fl. Burma 2: 480. 1877.

Thailand.— NORTHERN: Chiang Mai, Chiang Rai, Lamphun, Lampang, Tak; NORTHEASTERN: Phetchabun, Loei; EASTERN: Nakhon Rachasima; SOUTHWESTERN: Kanchanaburi; SOUTHEASTERN: Prachin Buri, Trat.

Distribution.— India, Nepal (type), Myanma, China, Laos, Vietnam.

Ecology.— Lower montane forest, oak-pine forest, deciduous forest on sandstone to granite bedrocks, alt. 600–1700 m (usually 1000–1300 m). Flowering Jan.–Nov. (usually May–June), fruiting March–Nov. (usually June–Sept.).

Vernacular.— Ko khao (ก่อข้าว), ko dueai (ก่อเดื่อ), ko laem (ก่อแหลม), ko bai lueam (ก่อใบเลื่อม), ko nam (ก่อหนาม), ko duk (ก่อตุ๊ก) (Northern), ko nuat maew (ก่อหนวดแมว), ko laem (ก่อแหลม), ko haeng (ก่อเหียง) (Northeastern).

Uses.— Nuts edible, a pioneer species suitable for forest rehabilitation.

33. *Castanopsis wallichii* King ex Hook.f., Fl. Brit. India 5: 624. 1888; King, Ann. Roy. Bot. Gard. (Calcutta) 2: 106, t. 101A. 1889; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75: 464. 1915; Ridley, Fl. Malay Penins. 3: 391. 1924; Barnett, Quer. Rel. Fag. Asia: 463. 1940; Corner, Wayside Trees: 293. 1940; Soepadmo in Fl. Males. 7(2): 300. 1972. Fig. 15.

Thailand.— PENINSULAR: Chumphon, Ranong, Surat Thani, Phangnga, Nakhon Si Thammarat, Trang, Songkhla.

Distribution.— Malaysia (type), Singapore, Indonesia.

Ecology.— Tropical evergreen forest, often by streams, alt. 10–100 m. Flowering Jan.–Nov. (usually July–Sept.), fruiting Jan.–Aug. (usually Jan.).

Vernacular.— Ko ban (ก่อบ้าน), ko kin luk (ก่อกินลูก), ko mu (ก่อหมู), ko lung khao (ก่อหลังขาว), ko yi (ก่ออี) (Peninsular).



Figure 15. *Castanopsis wallichii* King ex Hook.f.: A. twig; B. male inflorescence (*Phusomsaeng* 454), B-1 male flower; C. part of female inflorescence (*Thavon* s.n.); D. part of infructescence (*Soejarto et al.* 5978), D-1 spines, D-2 nut.

2. LITHOCARPUS*

Blume, Bijdr.: 526. 1826; Blume, Fl. Javae 13–14: 34. 1829; Oudem, Nat. Verh. Kon. Akad. 2: 19. 1856; Rehder & E.H. Wilson in C.S. Sargent, Pl. Wilson 3: 205. 1917; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 33: 332. 1942; A. Camus, Chânes, Texte 3: 511. 1954; Soepadmo, Reinwardtia 8: 197. 1970; Soepadmo, Fl. Males. 7(2): 318. 1972.— *Synaedrys* Lindl., Intr. Nat. Syst. Bot., ed. 2: 441. 1836; Hance in Hook., J. Bot. 1: 175. 1849; Koidz., Bot. Mag. (Tokyo) 30: 186. 1916.— *Arcaula* Raf., Alsogr. Amer.: 30. 1838.— *Balanaulax* Raf., Alsogr. Amer.: 28. 1838.— *Cyclobalanus* (Endl.) Oerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1866: 80. 1866.— *Pasania* (Miq.) Oerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1866: 81. 1866; Prantl in H.G.A. Engl. & K.A.E. Prantl, Nat. Pflazenfam. 3(1): 55. 1888; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75: 411. 1915; Hickel & A. Camus, Ann. Sci. Nat., Bot., X, 3: 386. 1921; Hickel & A. Camus, in H. Lecomte, Fl. Indo-Chine 5: 962. 1930; Schwarz, Notizbl. Bot. Gart. Berlin-Dahlem (Append.) 13: 6. 1936.

Evergreen trees, rarely shrubs. Branchlets initially densely yellowish brown-pubescent to tomentose. Terminal buds ovoid to ellipsoid, bracts spirally imbricate. Stipules extrapetiolar, mostly caducous. *Leaves* spiral, rarely serrate, glabrous. Petiole evenly thick, not geniculate. *Inflorescences* male and female separate or the female flowers below and the male flowers on the upper part of some erect spikes, occasionally mixed, including bracts and bracteoles variously densely hairy. *Male* simple or much-branched in the axil and subterminal. Flowers solitary or in clusters of three or more, with one or more small bracts; perianth campanulate or cup-shaped, usually 6-lobed, united for at least half of their length. Stamens 12, occasionally fewer or more, glabrous, anthers dorsifixed. Rudimentary ovary subglobose, villous. *Female*, *androgynous* or *mixed* solitary in the axil or on the lower part of the paniculate cluster. Flowers solitary or in cluster of three, bracts and bracteoles as in male; perianth as in male but smaller. Staminodes 10–12; styles 3(–4), cylindrical erect or spreading, free or connate at base, densely tomentose at base, stigma punctiform terminal. Ovary cells as many as styles. *Cupules* free or in dichasial clusters of 3–7 along the rachis, cup or saucer-shaped to almost globular, variously lamellate squamose, tuberculate or muricate, indehiscent (except *L. blumeanus*, *L. encleisacarpus*, *L. macphailii*, *L. maingayi*, and *L. pattaniensis* which are occasionally dehiscent). *Fruits* ovoid, globose or turbinate, partly or completely enclosed by a cupule from which it is free; scar present.

A genus of about 300 species widely distributed throughout the subtropics and tropics of South-East Asia almost to Australia. A single species is found in the South-Western United States of America. Of the 300 species, 56 species, 1 subspecies and 1 variety are indigenous to Thailand.

* with Th. Wongprasert, Forest Herbarium, National Park, Wildlife and Plant Conservation Department, Bangkok 10900, Thailand.

Uses.— Nuts edible.

KEY TO THE SPECIES

(based on vegetative characters and acorns)

1. Outer surface of cupules with annular or lamellate markings or markings lacking
 2. Cupules without lamellae, chartaceous or subcoriaceous, enclosing nearly all of the nut, more or less dehiscent when mature
 3. Cupules urn- or top-shaped (turbinate), weakly dehiscent from the apex, cupule surface distinctly undulate with vertical and horizontal filiform lines
 4. Cupule urn-shaped, enclosing nut completely and extending beyond it at the apex
 5. Cupule base broadly conical, much broader than apex, skin distinct with many vertical filiform lines or without. Nut conical **5. *L. blumeanus***
 5. Cupule base obconic, much narrower than apex, surface distinct with 3-4 horizontal filiform lines. Nut obconical **33. *L. maingayi***
 4. Cupule top-shaped, enclosing 4/5 of nut, surface with 2-6 distinct horizontal, filiform lines **30. *L. macphailii***
 3. Cupules top-shaped, readily dehiscent into irregular parts from the top, surface with 2-5 filiform, undulate, horizontal lines
 6. Cupules with 2 or 3 such lines **18. *L. encleisacarpus***
 6. Cupules with 4 or 5 such lines **36. *L. pattaniensis***
 2. Cupules with distinct lamellae, coriaceous, enclosing a variable amount of the nut, indehiscent
 7. Cupule enclosing not less than 1/2 of the nut
 8. Cupule enclosing about 1/2 of the nut
 9. Nuts ovoid to conical at apex, scar shallowly concave or flattened **24. *L. gracilis***
 9. Nuts subhemispheric or depressed at apex, scar deeply concave **8. *L. clementianus***
 8. Cupule enclosing not less than 3/4 of the nut
 10. Cupules obconic, enclosing nut almost completely except around the umbonate apex
 11. Nut longer than broad, ca. 1 by 0.7 cm **26. *L. hendersonianus***
 11. Nut shorter than broad, 1-2.7 by 2-3 cm **32. *L. magnificus***
 10. Cupules saucer-shaped, enclosing ca. 3/4 of the nut **1. *L. aggregatus***
 7. Cupule enclosing not more than 1/4 of the nut
 12. Nuts hemispheric or depressed on both sides
 13. Cupule enclosing 1/5 to 1/4 of the nut **38. *L. platycarpus***
 13. Cupule enclosed only the base of the nut
 14. Acorns sessile. Scar deeply concave **15. *L. eichleri***
 14. Acorns with stalk up to 0.5 cm long. Scar slightly concave **6. *L. cantleyanus***
 12. Nuts conical to broadly ovoid, or with a dome-shaped apex
 15. Cupule enclosing only the base of the nut
 16. Acorns sessile. Leaves oblanceolate **29. *L. lucidus***
 16. Acorns with fruit-stalk up to 0.5 cm long. Leaves oblong **42. *L. reinwardtii***
 15. Cupule enclosing ca. 1/4 of the nut
 17. Nut with one horizontal ring around equator. Leaves ensiform to linear-lanceolate **28. *L. loratifolius***
 17. Nut without horizontal ring. Leaves ovate, ovate-oblong or narrowly elliptical
 18. Nut ovoid or conical. Cupules cup or saucer-shaped. Leaves ovate or ovate-oblong, apex caudate **3. *L. bancanus***
 18. Nut broadly ovoid. Cupules slightly obconical to saucer-shaped. Leaves narrowly elliptical **40. *L. rassa***
 1. Outer surface of cupules with alternate lamellae (resembling fish scales) or pseudospines
 19. Mature cupules of one infructescence more or less fused together
 20. Acorns broader than long, depressed both on top and at base. Cupules saucer- or cup-shaped or obconic, some hardly distinct from each other through fusion
 21. Infructescences with densely arranged cupules
 22. Cupules barely distinct, resembling a large gall **13. *L. echinophorus***

- 22. Cupules distinct, saucer-shaped
 - 23. Nut flattened or apiculate at apex, to 2.2 cm diam. Leaves cuneate at base **16. L. elegans**
 - 23. Nut retuse at apex, not less than 3 cm diam. Leaves auriculate at base **2. L. auriculatus**
- 21. Infructescences with spaces between cupules
 - 24. Rachis of infructescence always with sub-branches. Acorns stalked **34. L. mekongensis**
 - 24. Rachis of infructescence without sub-branches
 - 25. Acorns sessile **24. L. finetii**
 - 25. Acorns stalked **57. L. tenuinervis***
- 20. Acorns longer than broad, conical, ovoid or turbinate. Cupules cup-shaped or cylindric
- 26. Rachis of infructescence always with sub-branches. Acorns stalked, nuts shining
 - 27. Acorn up to 1 cm high. Rachis up to 4 mm in diam. **7. L. ceriferus**
 - 27. Acorn not less than 1 cm high (to 2.5 cm). Rachis not less than 4 mm in diam. **39. L. polystachyus**
- 26. Rachis of infructescence without sub-branches. Acorns sessile, nuts more or less shining
 - 28. Twigs glabrous or sparsely pubescent then glabrous
 - 29. Cupules cup-shaped, enclosing up to 1/2 of the nut **12. L. dealbatus**
 - 29. Cupules turbinate, enclosing the whole nut, open only around umbo **51. L. truncatus**
 - 28. Twigs ferruginous or tomentose
 - 30. Leaves glabrous except along midrib. Cupules enclosing up to 1/3 of the nut **25. L. harmandianus**
 - 30. Leaves densely tomentose especially on lower surface. Cupules enclosing 1/2 of the nut **27. L. lindleyanus**
- 19. Mature cupules of one infructescence, free, not fused
- 31. Acorn longer than broad, conical, ovoid or obconical. Cupules cup- or saucer-shaped or obconic
 - 32. Cupules enclosing nut completely or 2/3 of the nut
 - 33. Cupules enclosing ca. 2/3 of the nut
 - 34. Cupules slightly obconical-shaped, nuts hairy at style apex (if persistent) **44. L. rufescens**
 - 34. Cupules cup or saucer-shaped **16. L. elegans**
 - 33. Cupules enclosing nut completely, or up to the apex of the nut
 - 35. Cupules dehiscent, obconic or ovoid
 - 36. Cupules obovoid, sessile, surface with dense, long and narrow recurved pseudospines **41. L. recurvatus**
 - 36. Cupules ovoid, fruit stalk 2–3 mm long, surface finely ornamented with thin, triangular lamellae throughout **35. L. neo-robinsonii**
 - 35. Cupules indehiscent, ovoid, surface clothed with dense, triangular lamellae
 - 37. Infructescences up to 18 cm long. Leaves up to 16 cm long **9. L. craibianus**
 - 37. Infructescences not less than 20 cm long. Leaves not less than 20 cm long **19. L. erythrocarpus**
- 32. Cupules enclosing up to 1/2 of the nut
 - 38. Acorns stalked
 - 39. Cupules slightly obconic. Leaves ovate, ovate-oblong or obovate **47. L. sootepensis**
 - 39. Cupules cup-shaped or saucer-shaped
 - 40. Cupules cup-shaped. Leaves lanceolate to lanceolate oblong **46. L. siamensis**
 - 40. Cupules saucer-shaped to flattened. Leaves oblong to oblong-lanceolate **10. L. curtissii**
 - 38. Acorns sessile
 - 41. Acorns (mature) not less than 3.5 by 2.2 cm

*currently known from Laos but expected to occur in Thailand

- 42. Cupule lamellae bearing pseudo-spined reflexed towards the base. Leaves acute to obtuse at apex **45. *L. scortechinii***
- 42. Lamellae curved towards the cupule apex. Leaves acuminate at apex **20. *L. eucalyptifolius***
- 41. Acorns (mature) up to 3 by 2.2 cm
- 43. Inflorescence with acorns in clusters, but not fused
- 44. Nuts ovoid. Leaves usually curved to one side **54. *L. wallichianus***
- 44. Nuts strongly apically depressed, occasionally conic. Leaves not curved **49. *L. thomsonii***
- 43. Inflorescence with acorns solitary, with spaces between them
- 45. Cupules saucer or cup-shaped, limb recurved. Leaves not less than 12 cm long **21. *L. falconeri***
- 45. Cupules obconical, limb not recurved. Leaves up to 11 cm long **4. *L. bennettii***
- 31. Acorns broader than long, hemisphaeric-depressed
- 46. Cupules enclosing the nut completely or up to the apex of the nut
- 47. Cupules more or less up to the apex of the nut, lamellae with erect or reflexed pseudo-spines which are not fused
- 48. Pseudo-spines erect or spreading. Leaves oblanceolate. Scar nearly 1/2 of the nut **14. *L. echinops***
- 48. Pseudo-spines reflexed. Leaves oblong or oblanceolate
- 49. Inflorescence with acorns packed close together, but not fused. Leaves slightly cuneate at base **23. *L. garrettianus***
- 49. Inflorescence with acorns solitary, with spaces between them. Leaves obtuse at base **52. *L. tubulosus***
- 47. Cupules enclosing the nut completely, except the umbo
- 50. Lamellae pointed, with narrowly pseudospines. Inflorescence with acorns packed close together, but not fused **55. *L. wrayi***
- 50. Lamellae flattened and imbricate. Inflorescence with acorns solitary, with spaces between them
- 51. Lamellae fused on lower half, the upper half free and adaxially curved **22. *L. fenestratus***
- 51. Lamellae fused almost to apex, only a short free lobe adaxially curved **50. *L. trachycarpus***
- 46. Cupules enclosing up to 1/2 of the nut
- 52. Acorns stalked, cupules enclosing only base of the nut
- 53. Stalk up to 1 cm long. Leaves glaucous on lower surface, petiole up to 1 cm long **48. *L. sundaicus***
- 53. Stalk not less than 1 cm long. Leaves pale on lower surface, not glaucous, petiole not less than 1 cm long **31. *L. magneinii***
- 52. Acorns sessile, cupules enclosing up to 1/2 of the nut
- 54. Acorns not less than 2 by 2.5 cm
- 55. Cupules slightly obconical. Leaves oblong, acute to caudate at apex, margin not revolute, petiole not less than 1 cm **11. *L. cyclophorus***
- 55. Cupules saucer-shaped. Leaves obovate, obtuse at apex, margin revolute, petiole up to 0.6 cm long **43. *L. revolutus***
- 54. Acorns up to 1.5 by 2 cm
- 56. Nuts convex at the apex
- 57. Cupules saucer-shaped to flattened and discoid. Leaves not whorled
- 58. Lamellae usually fused throughout. Leaves up to 15 cm long **37. *L. pierrei***
- 58. Lamellae fused at base only, apices free. Leaves not less than 18 cm long **17. *L. elephantum***
- 57. Cupules cup-shaped. Leaves usually whorled at the twig tips **56. *L. xylocarpus***
- 56. Nuts flattened at the apex. Cupule cup-shaped, enclosing 1/5 to 1/2 of the nut. Leaves with unequal sides, usually curved to one side
- 59. Leaves oblong, elliptic oblong, not less than 10 by 3.5 cm, with 14–20 pairs of lateral nerves **53. *L. vestitus***

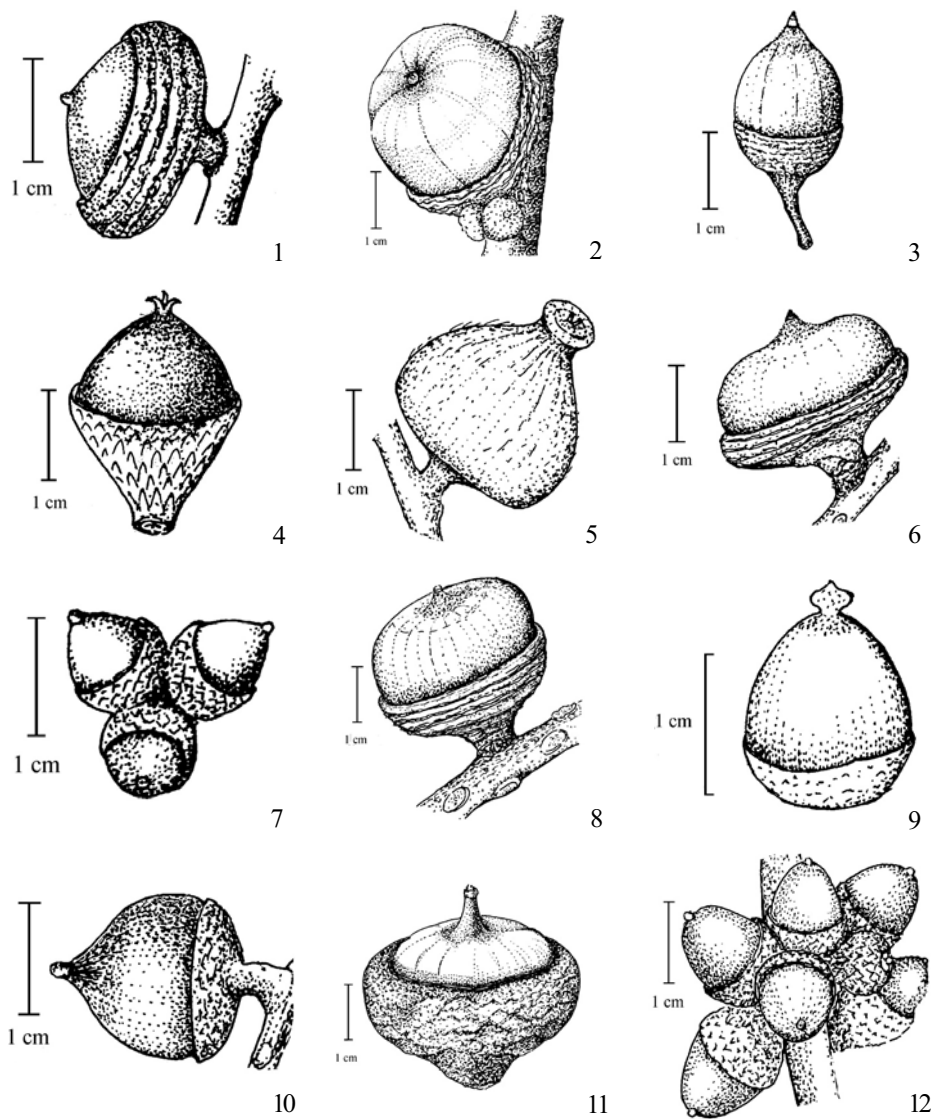


Figure 16. Various acorns in the genus *Lithocarpus* : 1) ก่อพวง *Lithocarpus aggregatus*; 2) ก่อหน้า *L. auriculatus*; 3) ก่อวงเขียด *L. bancanus*; 4) ก่อพรุ *L. bennettii*; 5) ก่อใบขาง *L. blumeanus*; 6) ก่อหลิ้นเนื้อรีว *L. cantleyanus*; 7) มะก้อ *L. ceriferus*; 8) ก่อหลิ้นเนื้อรีว *L. clementianus*; 9) ก่อสุเทพ *L. craibianus*; 10) ก่อหลิ้น *L. curtisii*; 11) ก่อหลิ้นใหญ่ *L. cyclophorus*; 12) ก่อผีวะ *L. dealbatus*.

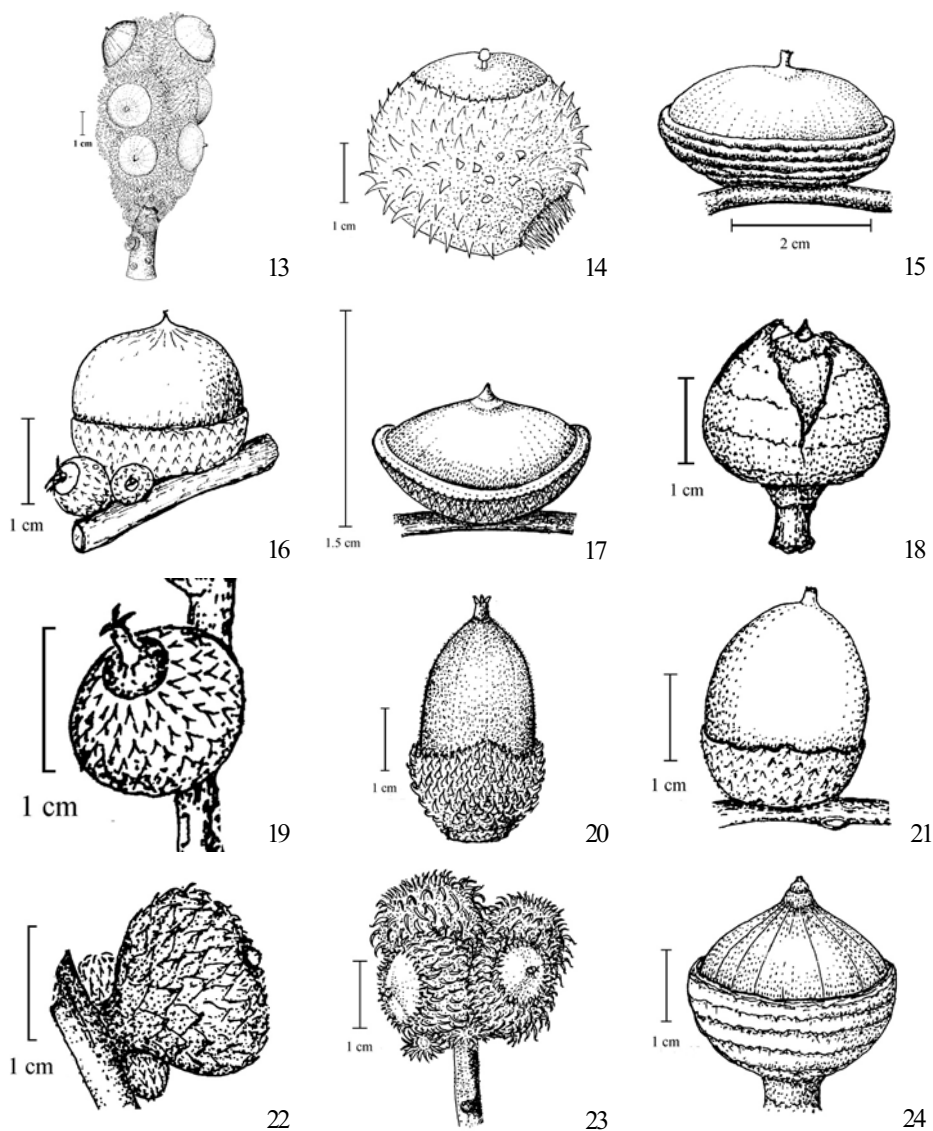


Figure 17. Various acorns in the genus *Lithocarpus* : 13) ก่อปิ่น *Lithocarpus echinophorus*; 14) ก่อตาก *L. echinops*; 15) ก่อหลับ *L. eichleri*; 16) ก่อเหม่ง *L. elegans*; 17) ก่อพลอยตราด *L. elephantum*; 18) ก่อฝ้าย *L. encleisacarpus*; 19) ก่อกาบ *L. erythrocarpus*; 20) ก่อหมุ่น *L. eucalyptifolius*; 21) ก่อเนื้อรีว *L. falconeri*; 22) ก่อพวง *L. fenestratus*; 23) ก่อข้างด้าง *L. garrettianus*; 24) ก่อใบเล็ก *L. gracilis*.

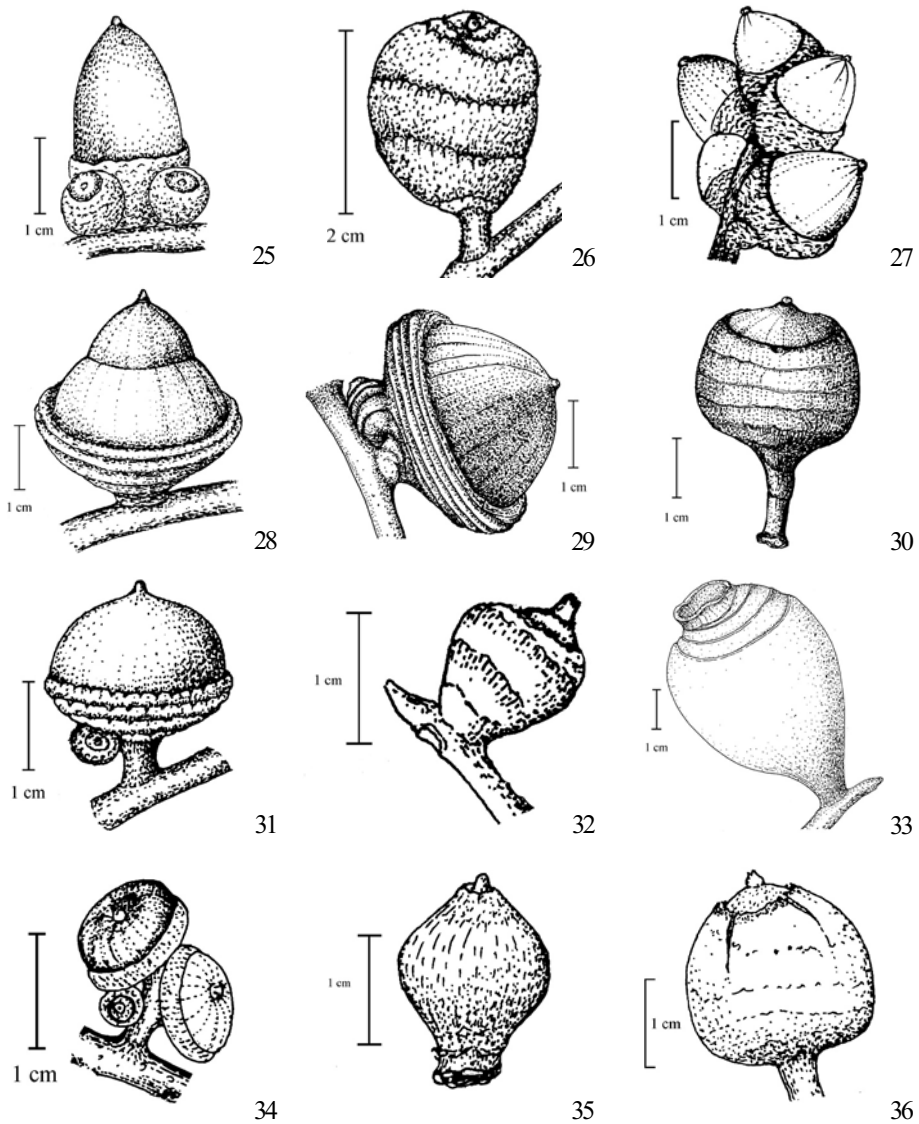


Figure 18. Various acorns in the genus *Lithocarpus* : 25) ก่อขี้กวาง *Lithocarpus harmandianus*; 26) ก่อลำเลียง *L. hendersonianus*; 27) ก่อค้าง *L. lindleyanus*; 28) ก่อวง *L. loratefolius*; 29) มะกอดำ *L. lucidus*; 30) ก่อหิน *L. macphailii*; 31) ก่อใบแหลม *L. magneinii*; 32) ก่อสีก *L. magnificus*; 33) ก่อแตร *L. maingayi*; 34) ก่อน้อย *L. mekongensis*; 35) ก่อครึ่ง *L. neo-robinsonii*; 36) ก่อปัดดาณี *L. pattaniensis*.

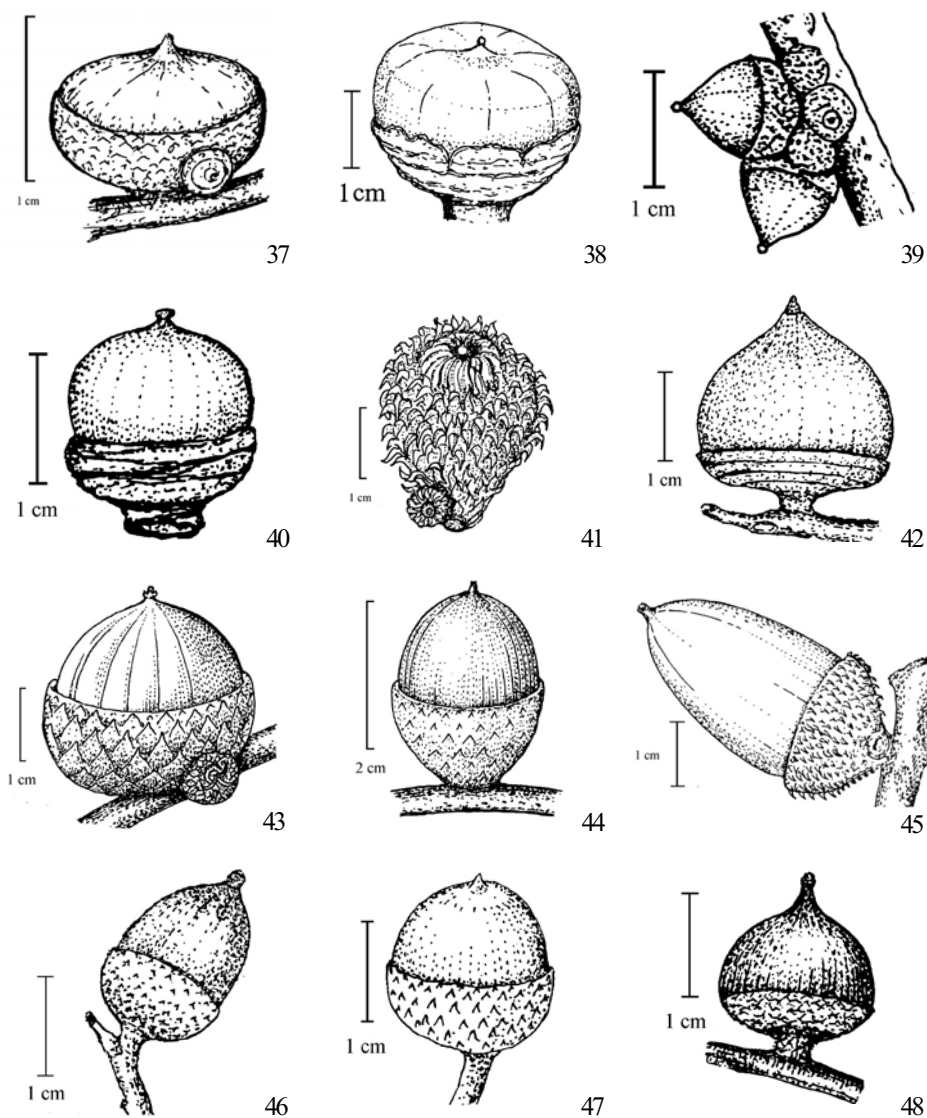


Figure 19. Various acorns in the genus *Lithocarpus* : 37) ถั่วพลอยจันทน์ *Lithocarpus pierrei*; 38) ถั่วชะ *L. platycarpus*; 39) ถั่วหมาก *L. polystachyus*; 40) ถั่วใบเอียง *L. rassa*; 41) ถั่วหัวหนาม *L. recurvatus*; 42) มะถั่วแดง *L. reinwardtii*; 43) ถั่วใบโพธิ์ *L. revolutus* 44) ถั่วสามชาย *L. rufescens*; 45) ถั่วไข่แดง *L. scortechinii*; 46) ถั่วรุ้ง *L. siamensis*; 47) ถั่วเลือด *L. sootepensis*; 48) ถั่วหัวเต้าปูน *L. sundaicus*.

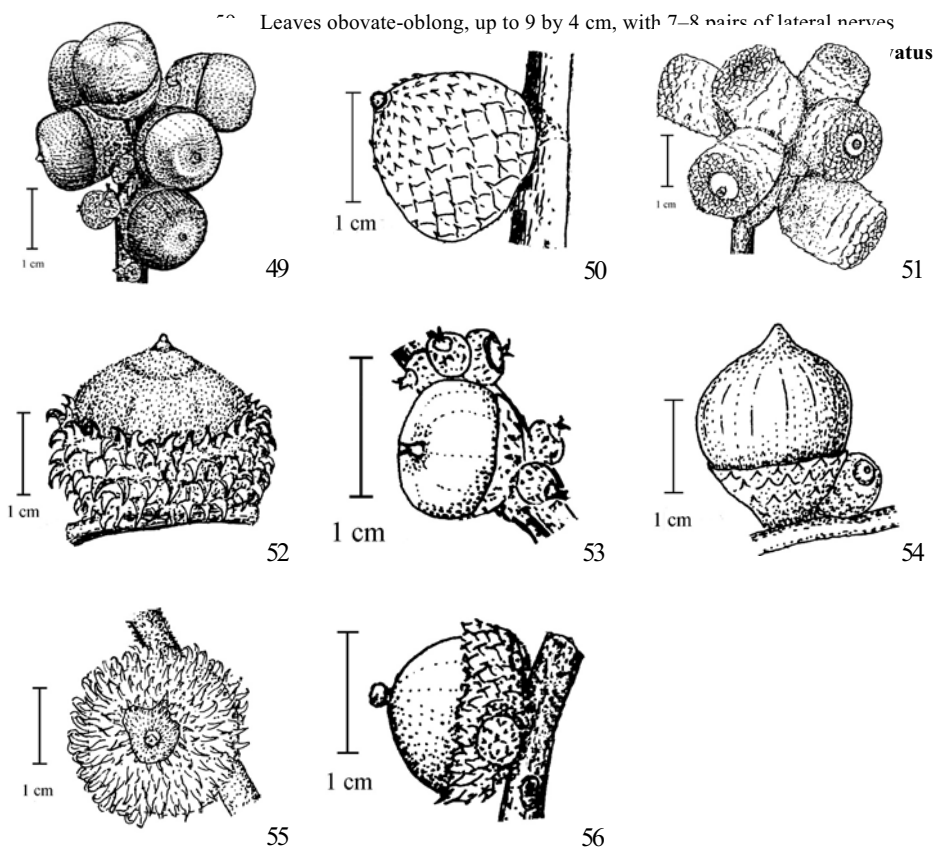


Figure 20. Various acorns in the genus *Lithocarpus*: 49) ก่อข้าว *Lithocarpus thomsonii*; 50) ก่อแดง *L. trachycarpus*; 51) ก่อดำ *L. truncatus*; 52) ก่อจุ๊ก *L. tubulosus*; 53) ก่อขี้หนู *L. vestitus*; 54) ก่อหนู *L. wallichianus*; 55) ก่อเกรียบ *L. wrayi*; 56) ก่อสทิต *L. xylocarpus*.

1. *Lithocarpus aggregatus* Barnett, Bull. Misc. Inform. Kew 1938: 104. 1938; Barnett, Quer. Rel. Fag. Asia: 149. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 33: 335. 1942; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 335. 1944; A. Camus, Enc. Syl. 8: 729. 1953; Hjelmq., Dansk. Bot. Ark. 23: 489. 1968.

Thailand.— NORTHERN: Chiang Mai (*Kerr* 3364, type), Lampang, Tak; EASTERN: Ubon Ratchathani; PENINSULAR: Ranong, Nakhon Si Thammarat, Narathiwat.

Distribution.— Malaysia.

Ecology.— Lower and upper montane forests, pine-deciduous dipterocarp forest, often by streams, alt. 50–2500 m (usually 1200–1900 m). Flowering Jan.–Dec., fruiting Jan.–Dec. (usually June–July).

2. *Lithocarpus auriculatus* (Hickel & A.Camus) Barnett, Quer. Rel. Fag. Asia: 331. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34. 183. 1944; A.Camus, Chânes, Atlas 3: 104. 1949.— *Pasania auriculata* Hickel & A.Camus, Ann. Sci. Nat., Bot., X, 3: 397. 1921; Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine 5: 984. 1930. Fig. 21.

Thailand.— NORTHERN: Chiang Mai, Chiang Rai, Nan, Lampang, Phrae, Phitsanulok.

Distribution.— Laos (type), Vietnam, Myanma.

Ecology.— Lowland evergreen forest, lower montane forest, moist upper mixed deciduous forest, savannah, by streams on granite bedrock, alt. 350–1600 m (usually 1200–1300 m). Flowering Dec.–May, fruiting May–Dec.

Vernacular.— Ko mi (ก่อหมี่), ko nam (ก่อน้ำ), ko nun (ก่อหนุ่น), (Northern), ko kwak (ก่อกวัก)(Laos).

3. *Lithocarpus bancanus* (Scheff.) Rehder, J. Arnold Arbor. 10: 132. 1929; Barnett, Quer. Rel. Fag. Asia: 319. 1940; Soepadmo, Fl. Males. 7(2): 360. 1972; Soepadmo, Julia & Go in E.Soepadmo & L.G. Saw, Tree Fl. Sabah & Sarawak 3: 38. 2000.— *Quercus bancana* Scheff., Natuurw. Tijdschr. Ned.-Indiã 31: 361. 1870; King, Ann. Roy. Bot. Gard. (Calcutta) 2: 67. 1889.— *Q. rajah* Hance, J. Bot. 16: 198. 1878.— *Q. scyphigera* Hance var. *riedelii* King, Ann. Roy. Bot. Gard. (Calcutta) 2: 39. 1889.— *Synaedrys bancana* (Scheff.) Koidz., Bot. Mag. (Tokyo) 30: 190. 1916.— *S. rajah* (Hance) Koidz., Bot. Mag. (Tokyo) 30: 192. 1916.— *Pasania bancana* (Scheff.) Markgr., Bot. Jahrb. Syst. 59: 79. 1924. Fig. 22.

Thailand.— EASTERN: Nakhon Ratchasima; PENINSULAR: Songkhla, Yala.

Distribution.— Malaysia, Indonesia (type), Brunei.

Ecology.— Lowland tropical evergreen forest, by streams, alt. 100–500 m. Flowering June–July, fruiting Aug.

Vernacular.— Ko wong iat (ก่อวงเอียด) (Peninsular).

4. *Lithocarpus bennettii* (Miq.) Rehder, J. Arnold Arbor. 1: 123. 1919; Barnett, Quer. Rel. Fag. Asia: 352. 1940; Soepadmo, Fl. Males. 7(2): 356. 1972.— *Quercus bennettii* Miq., Fl. Ned. Ind. 1(1): 857. 1856; A.DC. in A.P. de Candolle, Prodr. 16(2): 94. 1864; King ex Hook.f., Fl. Brit. India 5: 613. 1888; King, Ann. Roy. Bot. Gard. (Calcutta) 2: 64, t. 58A. 1889; Corner, Wayside Trees: 301. 1940.— *Q. miqueliana* Scheff., Natuurw. Tijdschr. Ned.-Indiã 31: 360. 1870.— *Cyclobalanus bennettii* (Miq.) Oerst, Skr. Vidensk.-Selsk. Christiana, Math.-Naturvidensk. Kl. 5(9): 375. 1873.— *Pasania bennettii* (Miq.) Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75: 433. 1915.— *Synaedrys bennettii* (Miq.) Koidz., Bot. Mag. (Tokyo) 30: 190. 1916. Fig. 23.

Thailand.— PENINSULAR: Narathiwat.

Distribution.— Malaysia, Singapore, Indonesia (type).

Ecology.— Peat swamp forest, lowland tropical rain forest.

Vernacular.— Ko phu (ก่อพู่) (Peninsular).

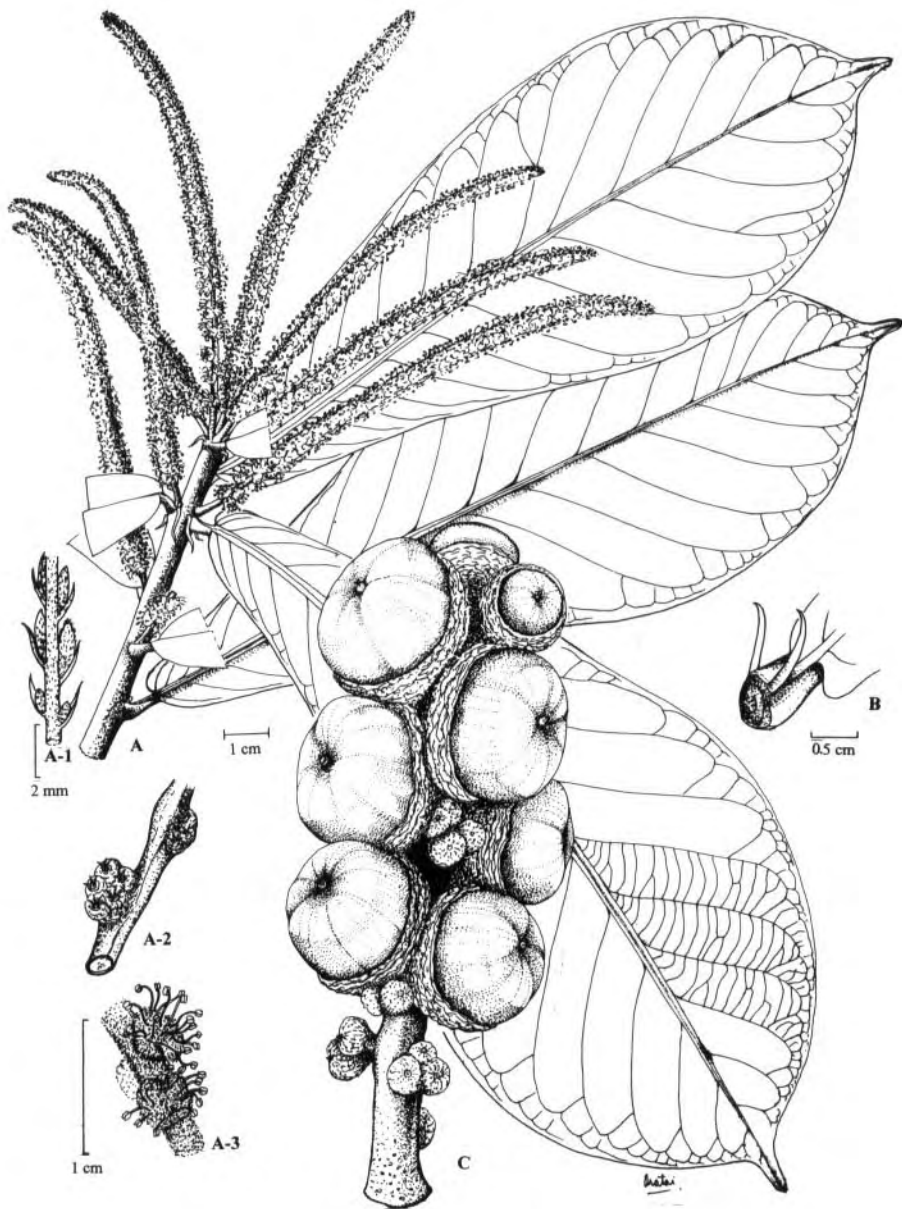


Figure 21. *Lithocarpus auriculatus* (Hickel & A. Camus) Barnett: A. twig, leaves and inflorescences (Smitinand 90-86), A-1 flower buds, A-2 female flower clusters, A-3 male flower clusters; B. stipules; C. infructescence (Pooma 346).



Figure 22. *Lithocarpus bancanus* (Scheff.) Rehder: A. twig, leaves and inflorescences (Maxwell 85-914), A-1 female flower, A-2 male flower; B. twig, leaf and infructescence (Niyomdham et al. 6345), B-1 another form of acorn (Maxwell 85-914).



Figure 23. *Lithocarpus bennettii* (Miq.) Rehder: A. twig, leaves and inflorescences (Niyomdham 930), A-1 male flower cluster, A-2 whole and partial male flower; B. female flowers; C. part of infructescence (Niyomdham 930), C-1 acorn.

5. *Lithocarpus blumeanus* (Korth.) Rehder, J. Arnold Arbor. 10: 132. 1929; Barnett, Quer. Rel. Fag. Asia: 152. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 335. 1944; A. Camus, Châ nes, Texte 3: 774. 1954; Soepadmo, Fl. Males. 7(2): 339. 1972; Soepadmo, Julia & Go in E. Soepadmo & L. G. Saw, Tree Fl. Sabah & Sarawak 3: 40. 2000.— *Quercus blumeana* Korth. (non Koord. & Valetton), Verh. Nat. Gesch. Ned. Bezitt., Bot.: 208, t. 44. 1844; A. DC. in A. P. de Candolle, Prodr. 16(2): 103. 1864.— *Cyclobalanus blumeana* (Korth.) Oerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1866: 81. 1866.— *Pasania blumeana* Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75: 445. 1915; Ridl., Fl. Malay Penins. 3: 385. 1924.— *Synaedrys blumeana* (Korth.) Koidz., Bot. Mag. (Tokyo) 30: 186. 1916.— *Castanopsis blumeana* (Korth.) Rehder, J. Arnold Arbor. 1: 122. 1919.

Thailand.— PENINSULAR: Ranong, Nakhon Si Thammarat.

Distribution.— Malaysia, Indonesia (Borneo, type), Brunei.

Ecology.— Lowland tropical evergreen forest alt. 50–400 m. Flowering and fruiting not recorded.

Vernacular.— Ko bai yang (ก่อใบยาง) (Peninsular).

6. *Lithocarpus cantleyanus* (King ex Hook.f.) Rehder, J. Arnold Arbor. 1: 122. 1919; Barnett, Quer. Rel. Fag. Asia: 141. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 334. 1944; Hjelmq., Dansk Bot. Ark. 23: 488. 1968; Soepadmo, Fl. Males. 7(2): 352. 1972; Soepadmo, Julia & Go in E. Soepadmo & L. G. Saw, Tree Fl. Sabah & Sarawak 3: 44. 2000.— *Quercus cantheyana* King ex Hook.f., Fl. Brit. India 5: 613. 1888.— *Pasania cantleyana* (King ex Hook.f.) Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75: 434. 1915; Ridl., Fl. Malay Penins. 3: 381. 1924.— *Synaedrys cantleyana* (King ex Hook.f.) Koidz., Bot. Mag. (Tokyo) 30: 190. 1916.

Thailand.— NORTHEASTERN: Nakhon Phanom; EASTERN: Nakhon Ratchasima; PENINSULAR: Ranong, Nakhon Si Thammarat, Trang, Songkhla, Narathiwat.

Distribution.— Myanma, Malaysia, Singapore (type).

Ecology.— Lowland tropical evergreen forest, by streams, on granite bedrock.

Vernacular.— Ko lap nua rew (ก่อหลั่นเนื้อรีว) (Peninsular).

7. *Lithocarpus ceriferus* (Hickel & A. Camus) A. Camus, Rivista Sci., 18: 40. 1931; Barnett, Quer. Rel. Fag. Asia: 322. 1940.— *Pasania cerifera* Hickel & A. Camus, Ann. Sci. Nat., Bot., X, 3: 390. 1921; Hickel & A. Camus in H. Lecomte, Fl. Indo-Chine 5: 974. 1930. Fig. 24.

Thailand.— NORTHERN: Chiang Mai, Lamphun, Lampang, Uttaradit; NORTHEASTERN: Phetchabun, Loei, Sakon Nakhon, Nakhon Phanom; EASTERN: Chaiyaphum, Nakhon Ratchasima, Ubon Ratchathani; SOUTHWESTERN: Kanchanaburi; SOUTHEASTERN: Trat; PENINSULAR: Ranong

Distribution.— Cambodia (type), Vietnam.

Ecology.— Deciduous dipterocarp forest, pine-deciduous dipterocarp forest, evergreen forest, on sandstone bedrock.



Figure 24. *Lithocarpus ceriferus* (Hickel & A.Camus) A.Camus: A. male inflorescence (Smitinand s.n.), A-1 male flower cluster; B. twig, leaves and female inflorescences (Koyama T-39685), B-1 female flower clusters; C. infructescence (Larsen 31506), C-1 acorn cluster, C-2 nut.

Vernacular.— Ko mon (ก่อหม่น), ma ko (มะก่อ), ko ki mu (ก่อชี้หมู), (Eastern); ko hum (ก่อหุ้ม) (Northeastern).

8. *Lithocarpus clementianus* (King ex Hook.f.) A.Camus, Rivista Sci. 18: 40. 1931; Barnett, Quer. Rel. Fag. Asia: 153. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 334. 1944; A.Camus, Chânes, Texte 3: 707, t. 391. 1954; Soepadmo, Fl. Males. 7(2): 365. 1972; Soepadmo, Julia & Go in E. Soepadmo & L.G. Saw, Tree Fl. Sabah & Sarawak 3: 45. 2000.— *Quercus clementiana* King ex Hook.f., Fl. Brit. India 5: 614. 1888; Corner, Wayside Trees: 301, f. 96. 1940.— *Pasanian clementiana* (King ex Hook.f.) Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75: 439. 1915; Ridl., Fl. Malay Penins. 3: 383. 1924.— *Quercus teysmanii* (non Blume) Heine in Fedde, Rep. 54: 225. 1951.— *Synaedrys clementiana* (King ex Hook.f.) Koidz., Bot. Mag. (Tokyo) 30: 191. 1916.

Thailand.— SOUTHWESTERN: Kanchanaburi; PENINSULAR: Ranong, Nakhon Si Thammarat, Phatthalung, Trang.

Distribution.— Malaysia (Penang, type), Indonesia.

Ecology.— Lowland evergreen forest, alt. 100–200 m. Flowering Jan.–Oct., fruiting Feb.–Sept.

Vernacular.— Ko lap nua rio (ก่อหลับเนื้อรื้อ), ko muak (ก่อหมวก) (Peninsular).

Uses.— Nuts edible.

9. *Lithocarpus craibianus* Barnett, Bull. Misc. Inform. Kew 1938: 103. 1938. Barnett, Quer. Rel. Fag. Asia: 133. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 334. 1944; Hjelmq., Dansk Bot. Ark. 23: 480. 1968; C.C.Huang, Y.T.Chang & B.M.Bartol. in C.Y.Wu & P.H.Raven, Fl. China 4: 343. 1999.

Thailand.— NORTHERN: Chiang Mai (*Kerr* 140, type), Chiang Rai, Lamphun; NORTHEASTERN: Phetchabun, Loei; SOUTHWESTERN: Kanchanaburi; SOUTHEASTERN: Trat; PENINSULAR: Ranong.

Distribution.— China, Laos.

Ecology.— Lower montane to dry evergreen forest, savannah forest, alt. 150–1650 m (usually 1000–1600 m). Flowering Jan.–Dec. (usually Jan.–May), fruiting Jan.–Dec. (usually Jan.–May).

Vernacular.— Ko suthep (ก่อสุเทพ), ko mon (ก่อหม่น), ko hin (ก่อหิน) (Northern).

Uses.— Nuts eaten by wild animals.

10. *Lithocarpus curtisii* (King ex Hook.f.) A.Camus, Rivista Sci. 18: 40. 1931; Barnett, Quer. Rel. Fag. Asia: 95. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 33: 333. 1942; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 333. 1944; Soepadmo, Reinwardtia 8: 233. 1970; Soepadmo, Fl. Males. 7(2): 380. 1972.— *Quercus curtisii* King ex Hook.f., Fl. Brit. India 5: 612. 1888; King, Ann. Roy. Bot. Gard. (Calcutta) 2: 56, t. 52. 1889.— *Pasanian curtisii* (King ex Hook.f.) Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75: 429. 1915; Ridl., Fl. Malay

Penins. 3: 380. 1924.— *Synaedrys curtisii* (King ex Hook.f.) Koidz, Bot. Mag. (Tokyo) 30: 194. 1916.

Thailand.— PENINSULAR: Songkhla.

Distribution.— Malaysia (type).

Ecology.— Lowland tropical evergreen forest, often by streams, on granite bedrock, alt. up to 200 m. Flowering and Fruiting July–Aug.

Vernacular.— Ko lap (ก่อหลัน) (Peninsular).

11. *Lithocarpus cyclophorus* (Endl.) A.Camus, Rivista Sci. 18: 40. 1931; A.Camus Chênes, Texte 3: 714. 1954; Barnett, Quer. Rel. Fag. Asia: 137. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 33: 334. 1942; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 334. 1944; Soepadmo, Reinwardtia 8: 233. 1970; Soepadmo, Fl. Males. 7(2): 345. 1972.— *Quercus cyclophora* Endl., Gân. Pl., Suppl. 4(2): 28. 1848; A.DC. in A.P. de Candolle, Prodr. 16(2): 102. 1864; Hook.f., Fl. Brit. India 5: 615, t. 64. 1888; Corner, Wayside Trees: 302, f. 97. 1940.— *Pasania cyclophora* (Endl.) Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75: 442. 1915; Ridl., Fl. Malay Penins. 3: 384. 1924.— *Synaedrys cyclophora* (Endl.) Koidz., Bot. Mag. (Tokyo) 30: 191. 1916.

Thailand.— PENINSULAR: Pattani.

Distribution.— Malaysia (type), Singapore, Indonesia.

Ecology.— Lowland tropical rain forest, alt. up to 100 m. Flowering Aug., fruiting Jan.-Aug.

Vernacular.— Ko lap yai (ก่อหลันใหญ่) (Peninsular).

12. *Lithocarpus dealbatus* (Hook.f. & Thomson ex Miq.) Rehder, J. Arnold Arbor. 1: 124. 1919; Barnett, Quer. Rel. Fag. Asia: 129. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 33: 334. 1941; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 334. 1944; C.C.Huang, Y.T.Chang & B.M.Bartol. in C.Y.Wu & P.H.Raven, Fl. China 4: 346. 1999.— *Quercus dealbata* Hook.f. & Thomson ex Miq., Ann. Mus. Bot. Lugduno-Batavi 1: 107. 1863; King ex Hook.f., Fl. Brit. India 5: 609. 1888; A.DC. in A.P. de Candolle, Prodr. 16(2): 85. 1864; Brandis, Indian Trees: 632. 1921.— *Q. fenestrata* Roxb. var. *dealbata* (Hook.f. & Thomson) Wenz., Jahrb. Königl. Bot. Gart. Berlin 4: 224. 1886.— *Pasania dealbata* (Hook.f. & Thomson ex Miq.) Oerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1866: 81. 1866; Schottky, Bot. Jahrb. Syst. 47: 660. 1912; Hickel & A.Camus, in H.Lecomte, Fl. Indo-Chine 5: 990. 1930.— *Synaedrys dealbata* (Hook.f. & Thomson ex Miq.) Koidz., Bot. Mag. (Tokyo) 30: 1888. 1916.— *Quercus dealbata* Hook.f. & Thomson ex Miq. var. *manii* King, Ann. Roy. Bot. Gard. (Calcutta) 2: 46. 1889.

Thailand.— NORTHERN: Mae Hong Son, Chiang Mai, Chiang Rai, Lamphun, Lampang; NORTHEASTERN: Phetchabun, Loei; EASTERN: Chaiyaphum; SOUTHWESTERN: Kanchanaburi.

Distribution.— India (type), China, Laos, Vietnam.

Ecology.—Deciduous dipterocarp forest, mixed deciduous forest, oak-pine forest, lower montane forest, alt. 700–1600 m. (usually 700–1200 m). Flowering Jan.–Dec. (usually Sept.–Dec.), fruiting Jan.–Dec. (usually April–Nov.).

Vernacular.—Ko phua (ก่อผัวะ) (Northern), ko khi mu (ก่อขี้หมู) (Northeastern).

13. *Lithocarpus echinophorus* (Hickel & A.Camus) A.Camus, Rivista Sci. 18: 40. 1931; Barnett, Quer. Rel. Fag. Asia: 282. 1940; C.C.Huang, Y.T.Chang & B.M.Bartol. in C.Y.Wu & P.H.Raven, Fl. China 4: 357. 1999.—*Pasania echinophora* Hickel & A.Camus, Bull. Mus. Natl. Hist. Nat. 34: 364. 1928; Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine 5: 995. 1930. Fig. 25.

Thailand.—NORTHERN: Chiang Mai; NORTHEASTERN: Loei.

Distribution.—Vietnam (type).

Ecology.—Lower montane forest, oak-savannah forest, on sandstone bedrock, alt. 1200–1950 m. Flowering Jan., fruiting Dec.

Vernacular.—Ko pan (ก่อปัน) (North & Northeastern).

14. *Lithocarpus echinops* Hjelmq., Dansk. Bot. Ark. 23: 491. 1968.

Thailand.—NORTHERN: Chiang Mai (*Hansen & Smitinand* 10891, type); Tak.

Distribution.—Endemic to Thailand.

Ecology.—Lower montane forest, alt. 1400–1850 m. Fruiting Jan.

Vernacular.—Ko tak (ก่อตาก), ko nam thu (ก่อหนามทุ) (Northern).

15. *Lithocarpus eichleri* (Wenz.) A.Camus, Rivista Sci. 18: 40. 1931; A.Camus, Chênes, Texte 3: 718, t. 395. 1954; Barnett, Quer. Rel. Fag. Asia: 151. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 33: 334. 1941; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 334. 1944; Soepadmo, Fl. Males. 7(2): 341. 1972.—*Quercus eichleri* Wenz., Jahrb. Königl. Bot. Gart. Berlin 4: 236. 1886; King ex Hook.f., Fl. Brit. India 5: 615. 1888.—*Pasania eichleri* (Wenz.) Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75: 438. 1915; Ridl., Fl. Malay Penins. 3: 383. 1924.—*Synaedrys eichleri* (Wenz.) Koidz, Bot. Mag. (Tokyo) 30: 191. 1916.

Thailand.—PENINSULAR: Surat Thani.

Distribution.—Malaysia (type), Indonesia.

Ecology.—Lowland tropical evergreen forest, alt. 500 m. Flowering Aug., fruiting Sept.–Dec.

Vernacular.—Ko lap (ก่อหลั่น) (Peninsular).

16. *Lithocarpus elegans* (Blume) Hatus. ex Soepadmo, Reinwardtia 8: 236. 1970; Soepadmo, Fl. Males. 7(2): 366. 1972.—*Quercus elegans* Blume, Verh. Batav. Genootsch. Kunsten 9: 208. 1823; Backer & Bakh.f., Fl. Java 2: 7. 1965.—*Quercus spicata* Sm. in A.Rees. Cycl. 29: 12. 1819 (*Quercus* n. 12, non Humb. & Bonpl. 1809). D. Don, Prodr. Fl. Nepal: 56. 1825; A.DC.

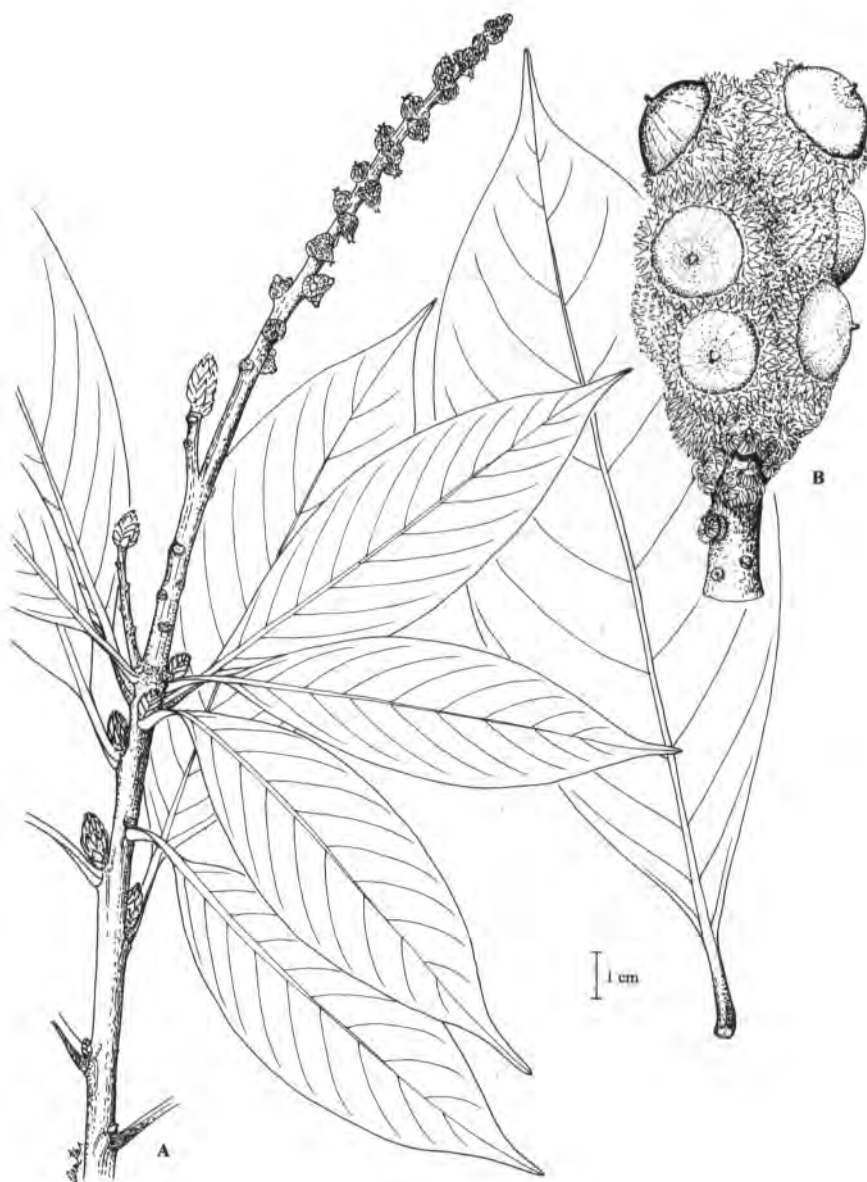


Figure 25. *Lithocarpus echinophorus* (Hickel & A.Camus) A.Camus: A. twig, leaves, buds and female inflorescence (Abbe *et al.* 1952); B. detached leaf and infructescence (Yahara T-79872).

in A.P. de Candolle, Prodr. 16(2): 85. 1864; Kurz, Forest Fl. Burm 2: 486. 1877; King ex Hook.f., Fl. Brit. India 5: 609. 1888; Craib, Bull. Misc. Inform. Kew 1911. 473.— *Q. grandifolia* D. Don in A.B. Lambert, Descr. Pinus, 2: 27, t. 8. 1824; D. Don in Spreng., Syst., 3: 856. 1826.— *Pasania spicata* (Smith) Oerst, Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1866: 83. 1866; Ridl., Fl. Malay Penins. 3: 376. 1924; Hickel & A. Camus in H. Lecomte, Fl. Indo-Chine 5: 983. 1930.— *Lithocarpus spicata* (Sm.) Rehder & E.H. Wilson in C.S. Sargent, Pl. Wilson 3: 207. 1916; Barnett, Quer. Rel. Fag. Asia: 108. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 333. 1944; Hjelmq., Dansk Bot. Ark. 23: 481. 1968.— *Synaedrys spicata* (Blume) Koidz. Bot. Mag. (Tokyo) 30: 198. 1916.— *Lithocarpus finetii* (Hickel & A. Camus) A. Camus, Rivista Sci. 18: 40. 1931; Barnett, Quer. Rel. Fag. Asia: 335. 1940; Hjelmq., Dansk Bot. Ark. 23: 483. 1968.— *Pasania finetii* Hickel & A. Camus, Ann. Sci. Nat., Bot., X, 3: 396. 1921.— *Lithocarpus grandifolia* (D. Don) Biswas, Bull. Bot. Surv. India, 10: 258. 1969; C.C. Huang, Y.T. Chang & B.M. Bartol. in C.Y. Wu & P.H. Raven, Fl. China 4: 364. 1999.— *L. intermedius* Barnett, Bull. Misc. Inform. Kew 1938. 101; Barnett, Quer. Rel. Fag. Asia: 114. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 333. 1944.— *L. collettii* (King ex Hook.f.) A. Camus, Chênes, Atlas 3: 117. 1949; C.C. Huang, Y.T. Chang & B.M. Bartol. in C.Y. Wu & P.H. Raven, Fl. China 4: 364. 1999.— *Quercus spicata* Smith var. *collettii* King ex Hook.f., Fl. Brit. India 5: 610. 1888.

Thailand.— NORTHERN: Chiang Mai, Chiang Rai, Nan, Lampang, Tak, Sukhothai; NORTHEASTERN: Phetchabun, Loei, Sakon Nakhon; EASTERN: Chaiyaphum, Nakhon Rachasima, Si Sa Ket, Ubon Rachathani; SOUTHWESTERN: Kanchanaburi; CENTRAL: Lop Buri; SOUTHEASTERN: Chanthaburi; PENINSULAR: Ranong, Trang, Satun, Songkhla, Narathiwat.

Distribution.— India, Bhutan, Myanma, Laos, Vietnam, Cambodia, China, Malaysia, Singapore, Indonesia (type).

Ecology.— Lowland and lower montane forests, dry evergreen forest, deciduous dipterocarp-oak forest, oak-pine forest on granite, limestone and sandstone bedrock, alt. 20–1550 m (usually 600–900 m) Flowering March–Nov., fruiting March–Dec.

Vernacular.— Ko hin (ก่อหิน), ko neng (ก่อเหม่ง) (Northern); ko soi (ก่อสร้อย), ko khi mu (ก่อขี้หมู) (Northeastern); ko khi mu (ก่อขี้หมู), mak ko mo (มักก่อหมอ) (Eastern); ko mu (ก่อหมู), ta lap tao pun (ตลับเต้าปูน), ko na ring (ก่อนารีง), ko mu (ก่อหมู) (Peninsular).

Uses.— Nuts edible, a pioneer species suitable for forest rehabilitation.

17. *Lithocarpus elephantum* (Hance) A. Camus, Rivista Sci. 18: 40. 1931; Barnett, Quer. Rel. Fag. Asia: 293. 1940.— *Quercus elephantum* Hance, J. Bot. 13: 365. 1875.— *Pasania elephantum* (Hance) Hickel & A. Camus, Ann. Sci. Nat., Bot., X, 3: 292. 1921; Hickel & A. Camus in H. Lecomte, Fl. Indo-Chine 5: 978. 1930. Fig. 26.

Thailand.— SOUTHEASTERN: Trat.

Distribution.— Cambodia (type).

Ecology.— Tropical evergreen forest; alt. sea-level to 50 m. Flowering Sept.; fruiting no record.

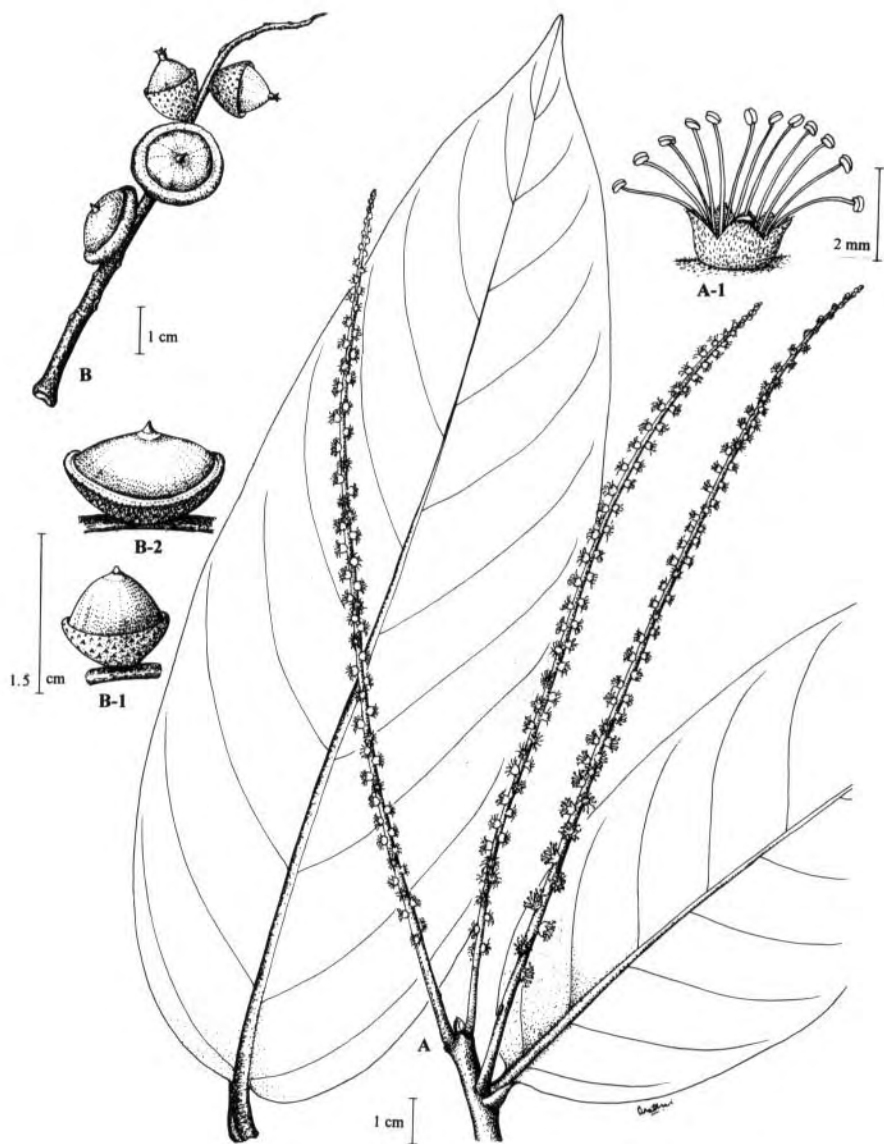


Figure 26. *Lithocarpus elephantum* (Hance) A. Camus: A. twig, leaf base, detached leaf and inflorescences (Larsen et al. 32357), A-1 male flower; B. infructescence (McDonald et al. 5673), B-1 and B-2 acorns.

Vernacular.— Ko ploi trat (ก่อพลอยตราด) (Southeastern).

18. *Lithocarpus encleisacarpus* (Korth.) A.Camus, Rivista Sci. 18: 40. 1931; Barnett, Quer. Rel. Fag. Asia: 144. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 335. 1944; Soepadmo, Fl. Males. 7(2): 338. 1972; Soepadmo, Julia & Go in E. Soepadmo & L.G. Saw, Tree Fl. Sabah & Sarawak 3: 56. 2000.— *Lithocarpus encleisacarpus* var. *aperta* (King ex Hook.f.) Barnett, Quer. Rel. Fag. Asia: 145. 1940.— *Quercus encleisacarpa* Korth, Verh. Nat. Gesch. Ned. Bezitt., Bot.: 209, t. 45. 1844; King ex Hook.f., Fl. Brit. India 5: 617. 1888; Corner, Wayside Trees: 302, f. 95, 98. 1940.— *Cyclobalanus encleisacarpa* (Korth.) Oerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1866: 81. 1866.— *Pasania encleisacarpa* (Korth.) Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75: 449. 1915; Ridl., Fl. Malay Penins. 3: 386. 1924.— *Synaedrys encleisacarpa* (Korth.) Koidz, Bot. Mag. (Tokyo) 30: 186. 1916.— *Castanopsis encleisacarpa* (Korth.) Rehder, J. Arnold Arbor. 1: 122. 1919.

Thailand.— NORTHERN: Chiang Mai; EASTERN: Ubon Ratchathani; SOUTHWESTERN: Kanchanaburi; SOUTHEASTERN: Chanthaburi; PENINSULAR: Nakhon Si Thammarat, Trang, Satun, Songkhla, Pattani.

Distribution.— Malaysia, Singapore, Indonesia (Sumatra, type).

Ecology.— Lowland tropical evergreen to lower montane forests, pine-deciduous dipterocarp forest, often by streams, alt. 50–1200 m (usually 300–800 m). Flowering April–Nov., fruiting April–Jan.

Vernacular.— Ko fai (ก่อไผ่), ko hin (ก่อหิน) (Eastern); ko chaeng (ก่อแฉ่ง) (South-eastern); ko hin (ก่อหิน), ko pan (ก่อปัน) (Peninsular).

Uses.— Nuts edible.

19. *Lithocarpus erythrocarpus* (Ridl.) A.Camus, Rivista Sci. 18: 40. 1931; Barnett, Quer. Rel. Fag. Asia: 330. 1940; A.Camus, Chênes, Texte 3: 962. 1954; Soepadmo, Fl. Males. 7(2): 369. 1972.— *Pasania erythrocarpa* Ridl., J. Bot. 62: 301. 1924. Fig. 27.

Thailand.— NORTHEASTERN: Nakhon Phanom; PENINSULAR: Ranong, Surat Thani, Phangnga, Yala.

Distribution.— Malaysia (type).

Ecology.— Lowland tropical evergreen forest, by streams, on sandstone bedrock, alt. 0–200 m. Flowering April–Dec. (usually Aug.–Dec.), fruiting March–Dec. (usually March–April).

Vernacular.— Ko kap (ก่อกาบ), ko bai hu (ก่อใบหู) (Peninsular).

20. *Lithocarpus eucalyptifolius* (Hickel & A.Camus) A.Camus, Rivista Sci. 18: 40. 1931; Barnett, Quer. Rel. Fag. Asia: 307. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 173. 1944; Hjelmq., Dansk Bot. Ark. 23: 478. 1968.— *Pasania eucalyptifolia* Hickel & A.Camus, Bull. Mus. Natl. Hist. Nat. 34: 363. 1928; Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine 5: 987. 1930.— *Lithocarpus rodgerianus* A.Camus, Bull. Mus. Natl. Hist. Nat., II 3: 690. 1931; Barnett, Quer. Rel. Fag. Asia: 286. 1940; Hjelmq., Dansk Bot. Ark. 23: 477. 1968.

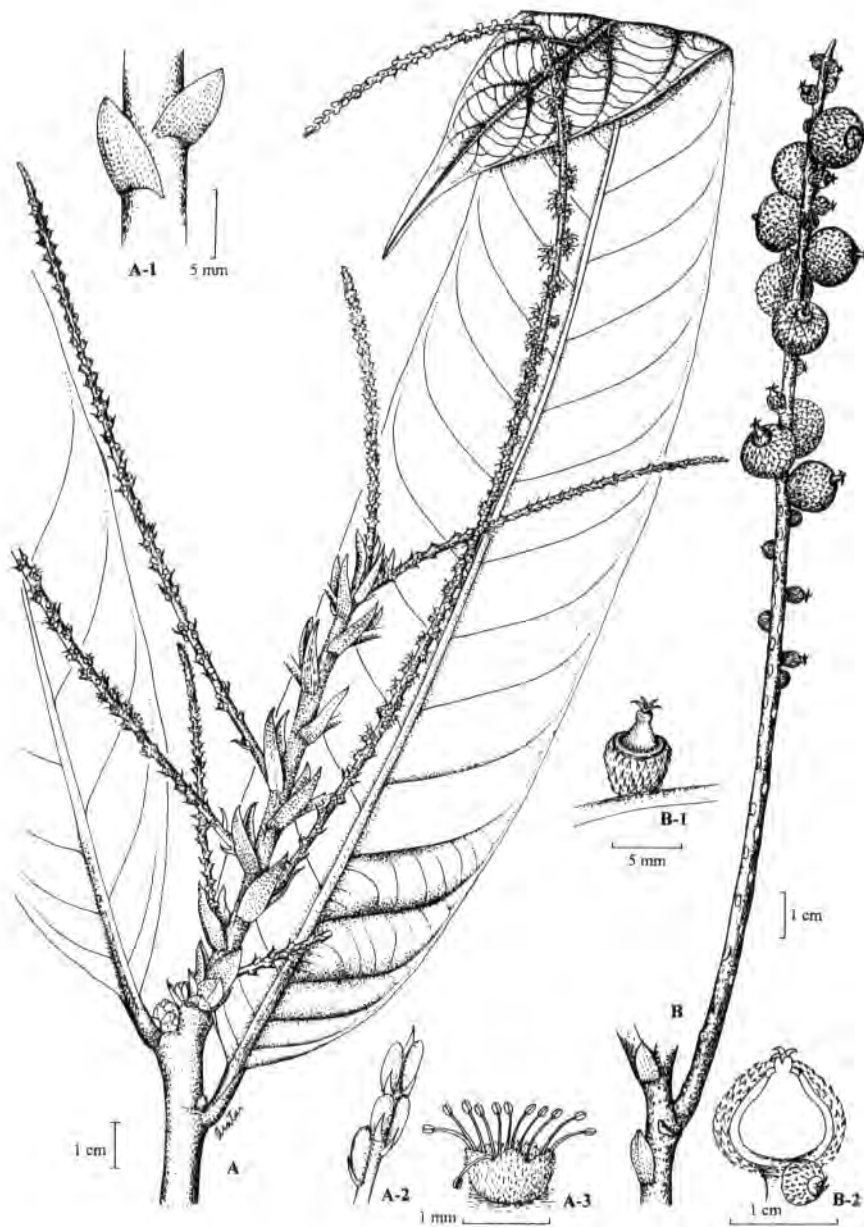


Figure 27. *Lithocarpus erythrocarpus* (Ridl.) A. Camus: A. twig, leaves and inflorescences (Smitinand 1168), A-1 bracts from young twig, A-2 part of young inflorescence, A-3 male flower; B. infructescence (Santisuk s.n.), B-1 young acorn, B-2 mature acorn longitudinal section, showing nut.

Thailand.— EASTERN: Nakhon Rachasima; CENTRAL: Nakhon Nayok; SOUTHEASTERN: Rayong, Chanthaburi; PENINSULAR: Ranong.

Distribution.— Myanma, Vietnam (type), Cambodia.

Ecology.— Lowland and lower montane evergreen forest, often by streams, alt. 700–1200 m (usually 700–800 m). Flowering Jan.–Dec. (usually Oct.–Dec.), fruiting April–Oct.

Vernacular.— Ko mun (ก่อมน) (Southeastern).

21. *Lithocarpus falconeri* (Kurz) Rehder, J. Arnold Arbor. 10: 133. 1929; Barnett, Quer. Rel. Fag. Asia: 117. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 33: 333. 1942; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 333. 1944; Hjelmq., Dansk Bot. Ark. 23: 480. 1968; Soepadmo, Reinwardtia 8: 241. 1970; Soepadmo, Fl. Males. 7(2): 371. 1972.— *Quercus falconeri* Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 44(2): 197. 1875; Kurz, Forest Fl. Burm 2: 485. 1877; King ex Hook.f., Fl. Brit. India 5: 608. 1888.— *Pasania falconeri* (Kurz) Schottky, Bot. Jahrb. Syst., 47: 675. 1912; Ridl., Fl. Malay Penins. 3: 378. 1924.— *Synaedrys falconeri* (Kurz) Koidz., Bot. Mag. (Tokyo) 30: 195. 1916.

Thailand.— NORTHERN: Tak; NORTHEASTERN: Nakhon Phanom; PENINSULAR: Ranong, Surat Thani, Phangnga, Trang, Satun, Pattani, Yala, Narathiwat.

Distribution.— Myanma (type), Malaysia.

Ecology.— Scrub and secondary forests, lowland evergreen forest, on limestone bedrock, often by streams, alt. 10–300 m. Flowering Jan.–Dec., fruiting Jan.–Sept.

Vernacular.— Ko mu (ก่อหมู), ko nuea rio (ก่อเนือริ้ว), ko pan (ก่อปัน), ko khi mu (ก่อชีหมู), ko khi riew (ก่อชีริ้ว), ko sae (ก่อแซะ), ka pun (กาปูน), ko lap tao pun (ก่อหลืบเต้าปูน), ma ngae ba be (มาแงะบาบี), pra mu ning (ประมุณิง) (Peninsular).

22. *Lithocarpus fenestratus* (Roxb.) Rehder, J. Arnold Arbor. 1: 126. 1919; Barnett, Quer. Rel. Fag. Asia: 126. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 33: 334. 1942; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 334. 1944; Hjelmq., Dansk Bot. Ark. 23: 479. 1968.— *Quercus fenestrata* Roxb., Fl. Ind. ed. 1832, 3: 633. 1832; Kurz, Forest Fl. Burm 2: 483. 1877; King ex Hook.f., Fl. Brit. India 5: 608. 1888; Craib, Bull. Misc. Inform. Kew 1911: 471.— *Pasania fenestrata* (Roxb.) Oerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1866: 84. 1866; Schottky, Bot. Jahrb. Syst. 47: 661. 1912; Hickel & A. Camus in H. Lecomte, Fl. Indo-Chine 5: 988. 1930.— *Synaedrys fenestrata* (Roxb.) Koidz., Bot. Mag. (Tokyo) 3: 195. 1916.

Thailand.— NORTHERN: Chiang Mai, Chiang Rai, Nan, Lamphun, Lampang, Tak, Phitsanulok; NORTHEASTERN: Phetchabun, Loei, Nakhon Phanom, Mukdahan, Khon Kaen; SOUTHWESTERN: Kanchanaburi; SOUTHEASTERN: Trat; PENINSULAR: Chumphon, Krabi.

Distribution.— Nepal, Bhutan, India (type), Myanma, China, Laos, Vietnam.

Ecology.— Lower and upper montane evergreen forest, pine-deciduous dipterocarp forest, dry evergreen to savannah-pine forests, by streams on granite bedrock, alt. 800–

2350 m (usually 900–1300 m). Flowering Jan.–Nov., fruiting July–Sept.

Vernacular.— Ko phuang (ก่อพวง), ko ko (ก่อก่อ) (Northern), ko lap tao pun (ก่อหลืบเตาปูน) (Peninsular).

23. *Lithocarpus garrettianus* (Craib) A.Camus, Rivista Sci. 18: 40. 1931; Barnett, Quer. Rel. Fag. Asia: 93. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 33: 333. 1942; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 333. 1944; Hjelmq., Dansk Bot. Ark. 23: 476. 1968; C.C.Huang, Y.T.Chang & B.M.Bartol. in C.Y.Wu & P.H.Raven, Fl. China 4: 369. 1999.— *Quercus garrettiana* Craib, Bull. Misc. Inform. Kew 1911: 471. 1911;— *Pasania garrettiana* (Craib) Hickel & A.Camus, Ann. Sci. Nat., Bot., X, 3: 403. 1921; Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine 5: 994. 1930.

Thailand.— NORTHERN: Chiang Mai (*Kerr* 1185, 1185A, syntypes), Chiang Rai, Phitsanulok; NORTHEASTERN: Phetchabun, Loei, Khon Kaen; EASTERN: Chaiyaphum. SOUTHWESTERN: Kanchanaburi, Phetchaburi; PENINSULAR: Ranong.

Distribution.— China, Myanma, Laos, Vietnam.

Ecology.— Mixed deciduous forest, deciduous dipterocarp forest, oak-deciduous dipterocarp forest, often by streams, on granite bedrock.

Vernacular.— Ko kang dang (ก่อกางดัง), ko khi mu (ก่อขี้หมู) (Northern & Northeastern).

24. *Lithocarpus gracilis* (Korth.) Soepadmo, Reinwardtia 8: 243. 1970; Soepadmo, Fl. Males. 7(2): 362. 1972; Soepadmo, Julia & Go in E.Soepadmo & L.G. Saw, Tree Fl. Sabah & Sarawak 3: 59. 2000.— *Quercus gracilis* Korth, Verh. Nat. Gesch. Ned. Bezitt., Bot.: 207. 1844; A.DC. in A.P. de Candolle, Prodr. 16(2): 93. 1864; King, Ann. Roy. Bot. Gard. (Calcutta) 2: 88. 1889.— *Q. cyrtorhyncha* Miq., Fl. Ned. Ind., Eerste Bijv.: 350. 1861; King ex Hook.f., Fl. Brit. India 5: 613. 1888.— *Q. diepenhorstii* Miq., Fl. Ned. Ind., Eerste Bijv.: 349. 1861.— *Lithocarpus cyathiformis* A.Camus, Bull. Soc. Bot. France 94: 4. 1947.— *Pasania cyrtorhyncha* (Miq.) Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75: 432. 1915. Fig. 28.

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

Distribution.— Malaysia, Indonesia (type), Brunei.

Ecology.— Lowland tropical evergreen to swamp forests, alt. 0–100 m. Flowering and fruiting Nov.–March.

Vernacular.— Ko bai lek (ก่อใบเล็ก) (Peninsular).

25. *Lithocarpus harmandii* (Hickel & A.Camus) A.Camus, Rivista Sci. 18: 40. 1931; Barnett, Quer. Rel. Fag. Asia: 124. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 33: 334. 1942; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 334. 1944.— *Pasania harmandii* Hickel & A.Camus, Ann. Sci. Nat., Bot., X, 3: 390, f. 3. 1921; Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine 5: 973. 1930.



Figure 28. *Lithocarpus gracilis* (Korth.) Soepadmo: A. twig, leaves and inflorescences (Esmitt S. 8163), A-1 male flower, A-2 flower buds; B. infructescence (Kochummen KF 77862), B-1 acorn, B-2 nut.

Thailand.— NORTHERN: Chiang Mai, Phitsanulok; NORTHEASTERN: Phetchabun, Loei, Udon Thani, Sakon Nakhon, Mukdahan, Kalasin, Maha Sarakham, Khon Kaen; EASTERN: Chaiyaphum, Nakhon Rachasima, Si Sa Ket, Ubon Ratchathani; SOUTHWESTERN: Kanchanaburi; SOUTHEASTERN: Prachin Buri, Chanthaburi.

Distribution.— Cambodia (type), Vietnam, Malaysia.

Ecology.— Tropical evergreen and dry evergreen forests, oak-pine deciduous dipterocarp forest, deciduous dipterocarp forest, on sandstone and granite bedrocks, alt. 50–1300 m (usually 200–900 m). Flowering Jan.–Dec. (usually Jan.–May), fruiting Jan.–Dec. (usually June–Aug.).

Vernacular.— Ko khi nu (ก่อชีหนู), ko khi mu (ก่อชีหมู), ko mon (ก่อหม่น) (Northern); ko khi kwang (ก่อชีกว้าง), ko khi mu (ก่อชีหมู), ko muak (ก่อหมวก) (Northeastern); ko khi mu (ก่อชีหมู), ko mu (ก่อหมู), ko ta lap (ก่อตลับ), ko laem (ก่อแหลม), nu tha luang (หนูทะลุวง) (Eastern); ko mon (ก่อหม่น) (South-eastern).

26. *Lithocarpus hendersonianus* A.Camus, Bull. Mus. Hist. Natl. Hist. Nat., II, 6: 92. 1934; A.Camus, Chênes, Texte 3: 589. 1954. Soepadmo, Reinwardtia 8: 246. 1970; Soepadmo, Fl. Males. 7(2): 328. 1972.

Thailand.— PENINSULAR: Ranong.

Distribution.— Vietnam, Malaysia (type).

Ecology.— Lowland tropical evergreen forest, alt. up to 50 m. Flowering and fruiting Dec.

Vernacular.— Ko lam liang (ก่อลำเลียง) (Peninsular).

27. *Lithocarpus lindleyanus* (Wall. ex A.DC.) A.Camus, Rivista Sci. 18: 41. 1931; Barnett, Quer. Rel. Fag. Asia: 122. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 33: 333. 1942; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 1944; Hjelmq., Dansk Bot. Ark. 23: 484. 1968.— *Quercus lindleyana* Wall. ex A. DC. In A.P.de Candolle, Prodr., 16(2): 108. 1864; Kurz, Forest Fl. Burm 2: 486. 1877; King ex Hook.f., Fl. Brit. India 5: 607. 1888; Brandis, Indian Trees: 629. 1921; Craib, Bull. Misc. Inform. Kew 1911: 427. 1911;— *Pasania lindleyana* (Wall. ex A.DC.) Schottky, Bot. Jahrb. Syst., 47: 667. 1912; Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine 5: 970. 1930.— *Synaedrys lindleyana* (Wall. ex A.DC.) Koidz., Bot. Mag. (Tokyo) 30: 196. 1916.

Thailand.— NORTHERN: Mae Hong Son, Chiang Mai.

Distribution.— Myanma (type), Vietnam, Cambodia.

Ecology.— Tropical evergreen forest, lower montane forest, moist upper mixed deciduous forest, deciduous dipterocarp-oak forest, on granite and sandstone bedrocks, alt. 700–1500 m (usually 700–1000 m). Flowering Feb.–Dec. (usually Feb.–May), fruiting May–Dec. (usually May–July).

Vernacular.— Ko dang (ก่อด่าง), ko mu bai luang (ก่อหมูใบหลวง), ko bai yai (ก่อใบใหญ่),

ko khon (ก่อชน), ko mu (ก่อหมู), ko dueai kai (ก่อเคี้ยวไก่), ko ta mu luang (ก่อตาหมูหลวง) (Northern).

28. *Lithocarpus loratefolius* Phengklai, Thai Forest Bull. (Bot.) 32: 119. 2004. Fig. 29.

Thailand.— PENINSULAR: Ranong (*Wongprasert* 92-6-68, holotype **BKF!**).

Distribution.— Endemic to Thailand.

Ecology.— Lowland tropical evergreen forest, alt. 100–200 m. Fruiting May–June.

Vernacular.— Ko wong (ก่อวง), ko ranong (ก่อระนอง) (Peninsular).

29. *Lithocarpus lucidus* (Roxb.) Rehder, J. Arnold Arbor. 1: 128. 1919; Barnett, Quer. Rel. Fag. Asia: 363. 1940; A.Camus, Chânes, Texte 3: 390, t. 386. 1954; Soepadmo, Fl. Males. 7(2): 341. 1972.— *Quercus lucida* Roxb., Fl. Ind. ed. 1832, 3: 635. 1832; King ex Hook.f., Fl. Brit. India 5: 614. 1888; King, Ann. Roy. Bot. Gard. (Calcutta) 2: 69, t. 64. 1889; Corner, Wayside Trees: 304. 1940.— *Q. omalokos* Korth., Verh. Nat. Gesch. Ned. Bezitt., Bot.: 214. 1844; King ex Hook.f., Fl. Brit. India 5: 614. 1888.— *Q. cuneata* Roxb. ex A.DC. in A.P. de Candolle, Prodr. 16(2): 108. 1864.— *Cyclobalanus omalokos* (Korth.) Oerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1866: 80. 1866.— *Pasania lucida* (Roxb.) Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75: 440. 1915; Ridl., Fl. Malay Penins. 3: 383. 1924.— *Synaedrys omakokos* (Korth.) Koidz., Bot. Mag. (Tokyo) 30: 192. 1916.— *Lithocarpus omalokos* (Korth.) Rehder, J. Arnold Arbor. 1: 129. 1919; Barnett, Quer. Rel. Fag. Asia: 135. 1940; A.Camus, Chânes, Texte 3: 695, t. 387. 1954.— *Synaedrys lucida* (Roxb.) Koidz., Bot. Mag. (Tokyo). 30: 192. 1916.

Thailand.— SOUTHEASTERN: Chanthaburi; PENINSULAR: Songkhla.

Distribution.— India, Malaysia (type), Singapore, Indonesia, Brunei.

Ecology.— Lowland tropical evergreen forest, often by streams, on granite bedrock.

Vernacular.— Ma ko dam (มะก่อดำ), ko dam (ก่อดำ) (Southeastern).

30. *Lithocarpus macphailii* (M.R.Hend.) Barnett, Quer. Rel. Fag. Asia: 368. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 178. 1944; A.Camus, Chânes, Atlas 3: 76. 1949; Soepadmo, Fl. Males. 7(2): 339. 1972.— *Pasania macphailii* M.R.Hend., Gard. Bull. Straits Settle. 5: 76. 1930.

Thailand.— PENINSULAR: Nakhon Si Thammarat, Narathiwat.

Distribution.— Malaysia (Kalimantan, type), Indonesia.

Ecology.— Lowland tropical evergreen forest, alt. 100–250 m. Flowering and fruiting July–Aug.

Vernacular.— Ko hin (ก่อหิน) (Peninsular).

31. *Lithocarpus magneinii* (Hickel & A.Camus) A.Camus, Rivista Sci. 18: 41. 1931; Barnett, Quer. Rel. Fag. Asia: 349. 1940; C.C.Huang, Y.T.Chang & B.M.Bartol. in C.Y.Wu & P.H.Raven,

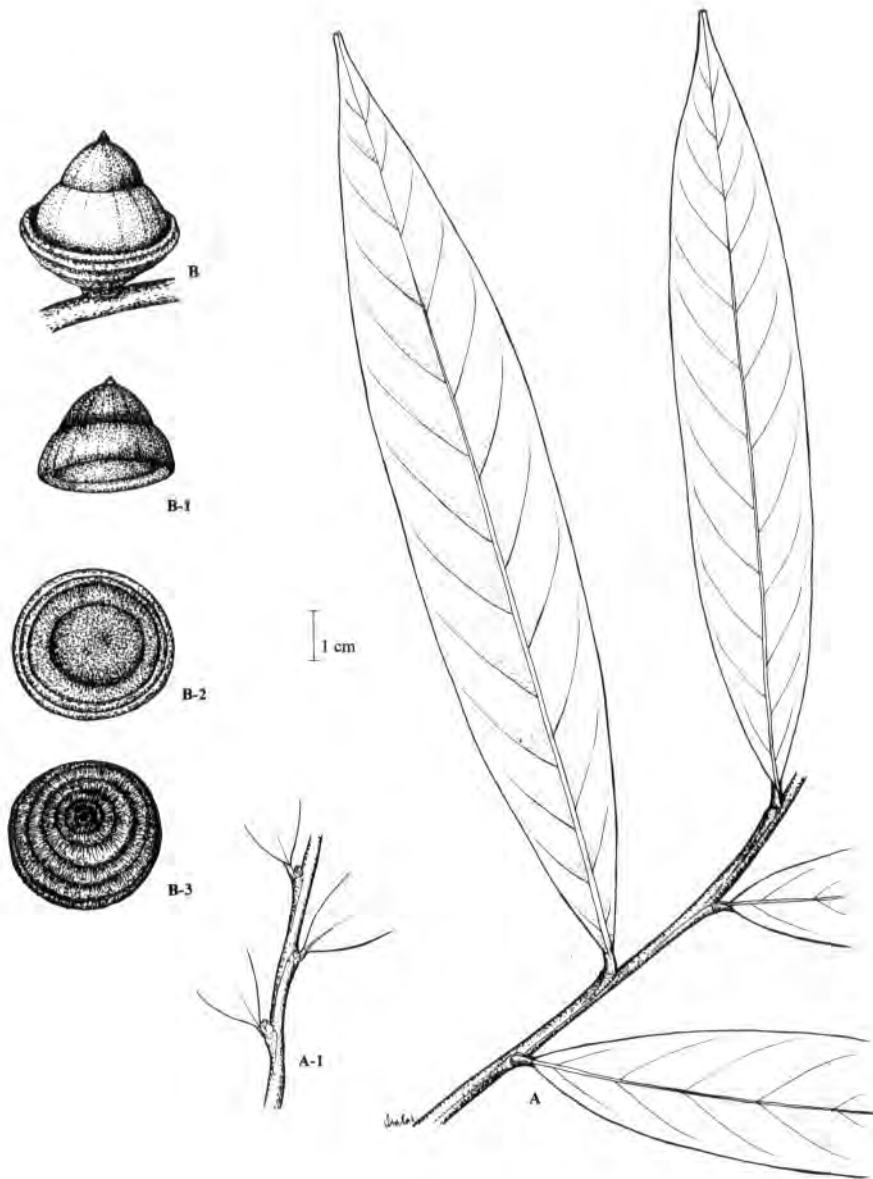


Figure 29. *Lithocarpus loratefolius* Phengklai: A. twig and leaves, A-1 young twig; B. acorn, B-1 nut, B-2 view of inside of cupule, B-3 outside of cupule (Wongprasert 68).

Fl. China 4: 355. 1999.— *Pasania magneinii* Hickel & A.Camus, Ann. Sci. Nat., Bot., X, 3: 405. 1921; Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine 5: 999. 1930. Fig. 30.

Thailand.— NORTHERN: Chiang Mai, Lamphun.

Distribution.— China (type), Laos, Vietnam.

Ecology.— Lower montane forest, evergreen forest, deciduous dipterocarp forest, alt. 880–2000 m (usually 900–1300 m). Flowering Feb.–Dec. (usually Aug.–Sept.), fruiting March.

Vernacular.— Ko laem (ก่อแหลม), ko bai laem (ก่อใบแหลม) (Northern).

32. *Lithocarpus magnificus* (Brandis) A.Camus, Rivista Sci. 18: 41. 1931; Barnett, Quer. Rel. Fag. Asia: 381. 1940.— *Quercus magnifica* Brandis (*non* Hort. Ex Dippel), Indian Trees, ed 3: 631. 1911. Fig. 31.

Thailand.— NORTHERN: Chiang Mai, Nan, Phrae; SOUTHWESTERN: Kanchanaburi.

Distribution.— Myanma (type).

Ecology.— Lower montane forest, oak forest, dry evergreen forest, on limestone bedrock, alt. 750–2200 m (usually 1100–1300 m). Flowering Dec.–Feb., fruiting Jan.–June.

Vernacular.— Ko sak (ก่อสัก) (Northern).

33. *Lithocarpus maingayi* (Benth.) Rehder, J. Arnold Arbor. 1: 129. 1919; Barnett, Quer. Rel. Fag. Asia: 392. 1940; A.Camus, Chânes, Texte 3: 577. 1954; Soepadmo, Fl. Males. 7(2): 331. 1972.— *Quercus maingayi* Benth., Hooker's Icon Pl. 14: t. 1314. 1880; King ex Hook.f., Fl. Brit. India 5: 617. 1888; Corner, Wayside Trees: 304, f. 98. 1940.— *Pasania maingayi* (Benth.) Schottky, Bot. Jahrb. Syst. 47: 627. 1912; Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75: 451. 1915.— *Synaedrys maingayi* (Benth.) Koidz., Bot. Mag. (Tokyo) 30: 189. 1916.— *Lithocarpus subnucifer* A.Camus, Bull. Mus. Hist. Natl. Hist. Nat., II, 4: 123. 1932. Fig. 32.

Thailand.— SOUTHEASTERN: Trat; PENINSULAR: Songkhla.

Distribution.— Malaysia (Penang, type).

Ecology.— Lowland tropical evergreen forest, on granite bedrock, alt. 100–500 m. Flowering Sept.–Nov., fruiting Nov.–Jan.

Vernacular.— Ko trae (ก่อเตร) (Peninsular).

34. *Lithocarpus mekongensis* (A.Camus) C.C.Huang & Y.T.Chang, Guihaia 12: 2. 1992; C.C.Huang, Y.T.Chang & B.M.Bartol. in C.Y.Wu & P.H.Raven, Fl. China 4: 365. 1999.— *L. microspermus* A.Camus ssp. *mekongensis* A.Camus, Chênes, Atlas 3: 116. 1948. Fig. 33.

Thailand.— NORTHERN: Chiang Mai, Chiang Rai, Lampang.

Distribution.— China, Laos (type), Vietnam.

Ecology.— Evergreen forest, pine-deciduous dipterocarp forest, on sandstone, and granite bedrock.



Figure 30. *Lithocarpus magneinii* (Hickel & A.Camus) A.Camus: A. twig, leaves and male inflorescences (Tagawa *et al.* T-9125), A-1 terminal and lateral buds, A-2 male flower; B. female inflorescence (Konta 4282), B-1 female flowers; C. acorn.



Figure 31. *Lithocarpus magnificus* (Brandis) A. Camus: A. twig, female inflorescence and young infructescences and leaves, A-1 female inflorescence; B. infructescence, leaf and detached leaf (Konta 4288).

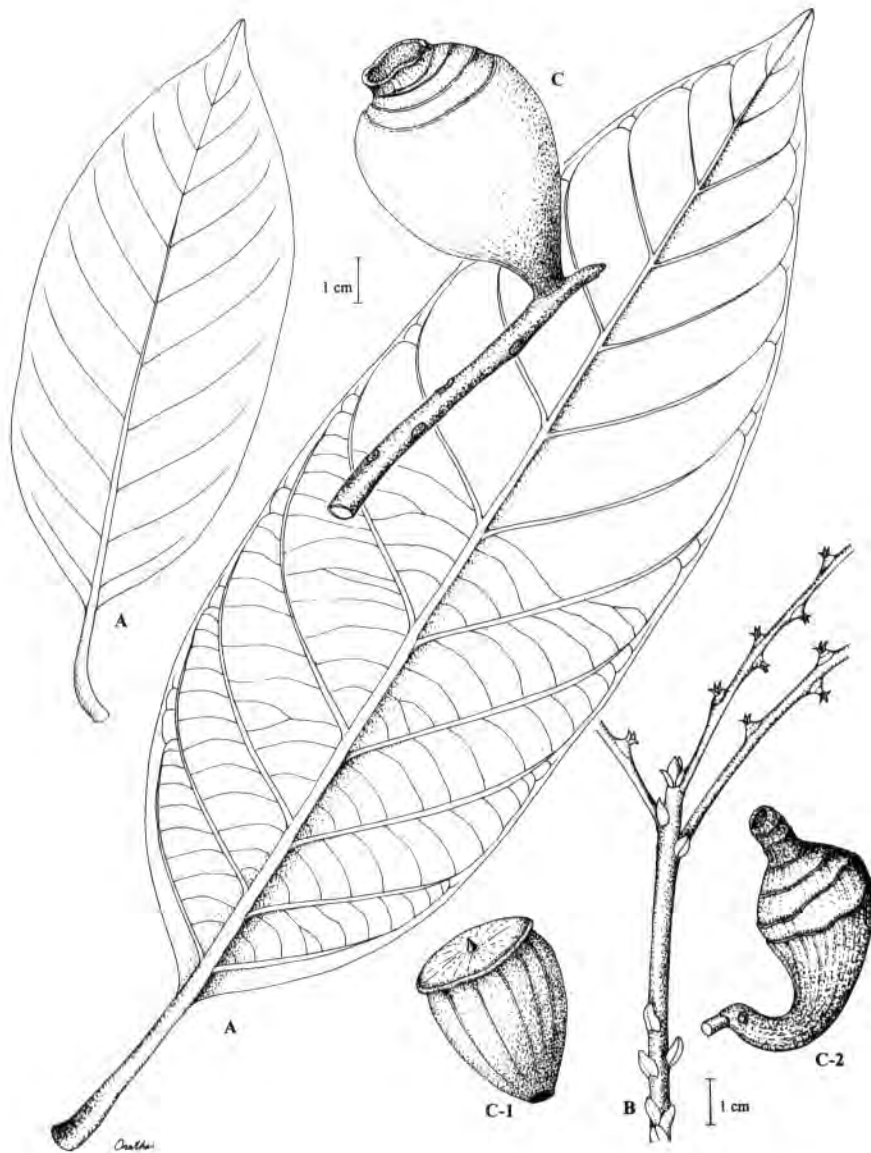


Figure 32. *Lithocarpus maingayi* (Benth.) Rehder: A. two detached leaves; B. female inflorescences (Poore 1375); C. mature acorn (Stone 9594), C-1 nut, C-2 young acorn (Niyomdham 3096).



Figure 33. *Lithocarpus mekongensis* (A.Camus) C.C.Huang & Y.T.Chang: A. twig, leaves and inflorescences (van Beusekom *et al.* 2500), A-1 male flower cluster; B. infructescence (Sangkhachand 116).

Vernacular.— Ko noi (ก๋อน้อย) (Northern).

35. *Lithocarpus neo-robinsonii* A.Camus, Notul. Syst. (Paris) 13: 265. 1949; A. Camus, Chênes, Atlas 3: 77, t. 410. 1949; A.Camus, Chênes, Texte 3: 780. 1954; Soepadmo, Reinwardtia 8: 261. 1970; Soepadmo, Fl. Males. 7(2): 336. 1972.— *Quercus robinsonii* Ridl. (non Merr.), J. Fed. Malay States Mus. 5: 46. 1914.— *Pasania robinsonii* (Ridl.) Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75: 450. 1915. Fig. 34.

Thailand.— PENINSULAR: Ranong, Phangnga.

Distribution.— Malaysia (type).

Ecology.— Tropical evergreen forest, lower montane forest, alt. 900–1500 m. Flowering and fruiting Feb.–March.

Vernacular.— Ko khrang (ก๋อครั่ง) (Peninsular).

36. *Lithocarpus pattaniensis* Barnett, Bull. Misc. Inform. Kew 1938: 104. 1938; Barnett, Quer. Rel. Fag. Asia: 147. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 335. 1944. A.Camus, Chênes, Texte 3: 770. 1954; Soepadmo, Fl. Males. 7(2): 336. 1972.

Thailand.— PENINSULAR: Surat Thani, Pattani (*Kerr* 7583, type), Narathiwat.

Distribution.— Malaysia.

Ecology.— On ridges in tropical evergreen forest. Flowering Sept., fruiting Aug.–Sept.

Vernacular.— Ko pattani (ก๋อป่าตานี), ko lap (ก๋อหลั่น).

37. *Lithocarpus pierrei* (Hickel & A.Camus) A.Camus, Rivista Sci. 18: 41. 1931; Barnett, Quer. Rel. Fag. Asia: 328. 1940; Hjelmq., Dansk Bot. Ark. 23: 484. 1968. — *Pasania pierrei* Hickel & A.Camus, Ann. Sci. Nat., Bot., X, 3: 398, f. 3. 1921; Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine 5: 987. 1930.

Thailand.— SOUTHEASTERN: Chanthaburi.

Distribution.— Vietnam (type).

Ecology.— Lowland tropical evergreen forest, alt. up to 500 m. Flowering and fruiting July.

Vernacular.— Ko phloi chan (ก๋อพลอยจันทร์) (Southeastern)

38. *Lithocarpus platycarpus* (Blume) Rehder, J. Arnold Arbor. 1: 130. 1919; Barnett, Quer. Rel. Fag. Asia: 364. 1940; A.Camus, Chênes, Texte 3: 698. 1954; Soepadmo, Fl. Males. 7(2): 340. 1972.— *Quercus platycarpa* Blume, Fl. Javae 13–14: 27, t. 15. 1829; A.DC. in A.P. de Candolle, Prodr. 16(2): 92. 1864; King, Ann. Roy. Bot. Gard. (Calcutta) 2: 70, t. 65. 1889; Backer & Bakh.f., Fl. Java 2: 7. 1965.— *Cyclobalanus platycarpa* (Blume) Oerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1866: 80. 1866.— *Synaedrys platycarpa* (Blume) Koidz., Bot. Mag. (Tokyo) 30: 192. 1916. Fig. 35.

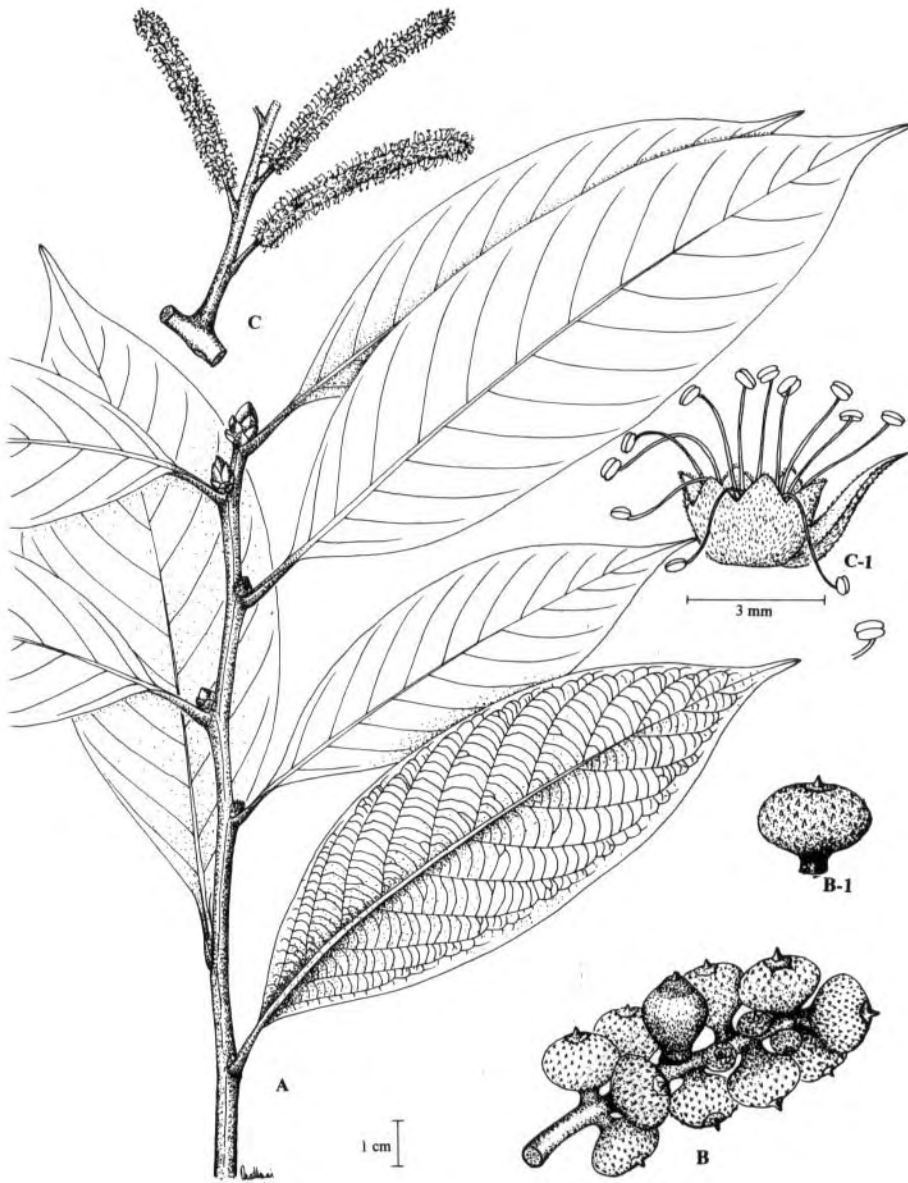


Figure 34. *Lithocarpus neo-robinsonii* A. Camus: A. twig and buds; B. & B-1 infructescence & acorn (Abbe et al. 9105); C & C-1 male inflorescences & flower (enlarged) (Ogata, KEP. 110274).

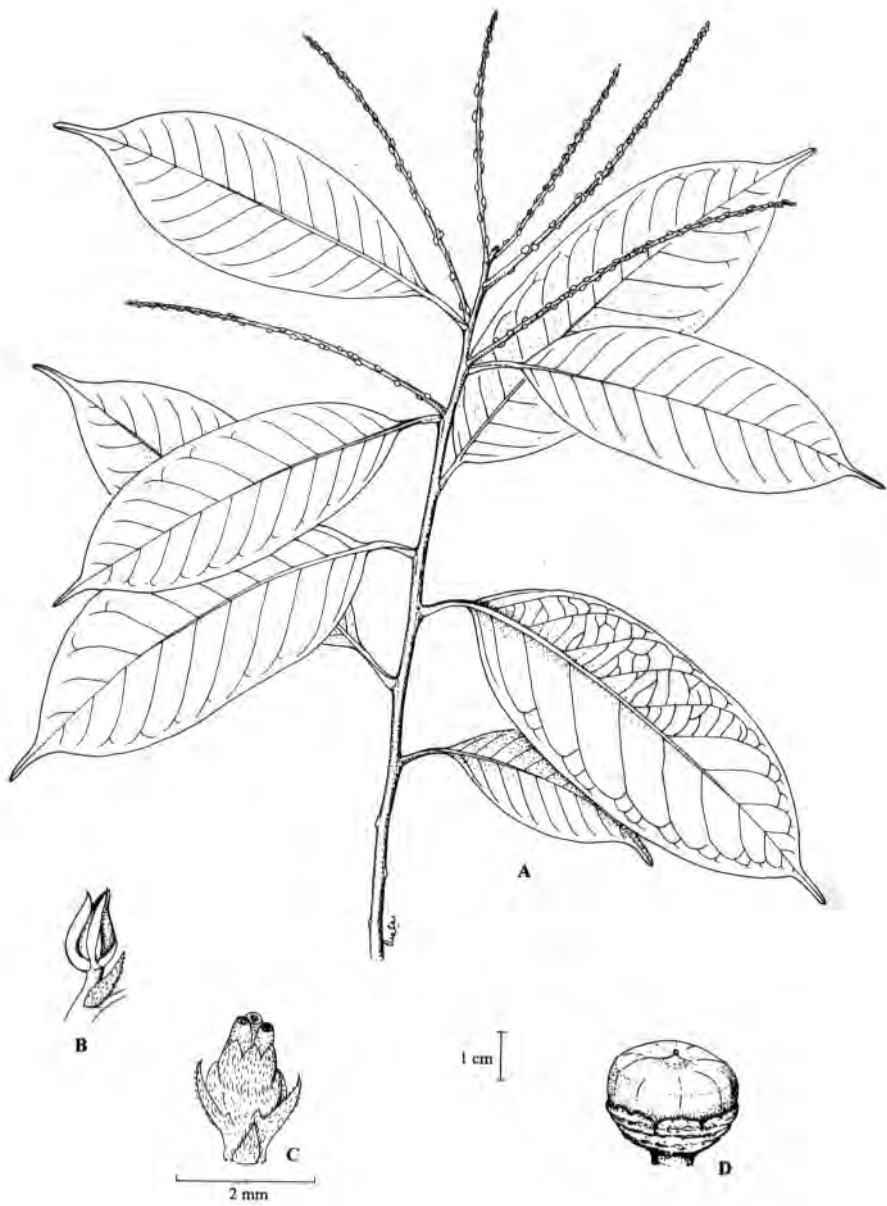


Figure 35. *Lithocarpus platycarpus* (Blume) Rehder: A. twig, leaves and inflorescences (Abbe *et al.* 9694); B. bud; C. female flower; D. acorn (Smitinand 2332).

Thailand.— PENINSULAR: Surat Thani, Phangnga, Nakhon Si Thammarat, Phatthalung, Trang.

Distribution.— Malaysia, Indonesia (type).

Ecology.— Lowland tropical evergreen to lower montane forest, on granite bedrock, alt. 50–1750 m (usually 200–300 m). Flowering Feb.–Nov., fruiting March–Aug.

Vernacular.— Ko sae (ก่อแซะ), ko lap (ก่อหลับ)

39. *Lithocarpus polystachyus* (Wall. ex A.DC.) Rehder, J. Arnold Arbor. 1: 130. 1919; Barnett, Quer. Rel. Fag. Asia: 105. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 33: 333. 1941; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 333. 1944; Hjelmq., Dansk Bot. Ark. 23: 487. 1968.— *Quercus polystachya* Wall. ex A.DC. in A.P. de Candolle, Prodr. 16(2): 107. 1864; Kurz, Forest Fl. Burm 2: 485. 1877; King ex Hook.f., Fl. Brit. India 5: 610. 1888; Craib, Bull. Misc. Inform. Kew 1911. 472; Brandis, Indian Trees: 630. 1921.— *Q. bancana* Kurz (non Scheff.), Forest Fl. Burm 2: 485. 1877.— *Pasania polystachya* (Wall. ex A.DC.) Schottky, Bot. Jahrb. Syst. 47: 667. 1912.— *Synaedrys polystachya* (Wall. ex A.DC.) Koidz., Bot. Mag. (Tokyo) 30: 197. 1916.

Thailand.— NORTHERN: Mae Hong Son, Chiang Mai, Chiang Rai, Lamphun, Lampang, Phitsanulok, Kamphaeng Phet; NORTHEASTERN: Phetchabun, Loei, Maha Sarakham; EASTERN: Nakhon Rachasima, Ubon Ratchathani; SOUTHWESTERN: Uthai Thani, Kanchanaburi; CENTRAL: Suphan Buri; SOUTHEASTERN: Trat; PENINSULAR: Ranong, Narathiwat.

Distribution.— India, Myanma (type), Laos, Vietnam.

Ecology.— Deciduous dipterocarp forest, deciduous dipterocarp-pine forest, mixed deciduous-oak forest, old clearings, evergreen to lower montane forests; on sandstone bedrock, alt. 60–2200 m (usually 600–1000 m). Flowering Jan.–Dec. (usually Nov.–May), fruiting June–Nov.

Vernacular.— Ko mak (ก่อหมาก), ko hin (ก่อหิน), ko ngae (ก่อแงะ), ko daeng (ก่อแดง), ko ta mu (ก่อตาหมู) (Northern); ko ket dam (ก่อเก็ดดำ) (Northeastern); ko hua mu (ก่อหัวหมู) (Eastern); ko khua (ก่อควัว) (Peninsular).

Uses.— Nuts edible.

40. *Lithocarpus rassa* (Miq.) Rehder, J. Arnold Arbor. 1: 130. 1919; Barnett, Quer. Rel. Fag. Asia: 356. 1940; A. Camus, Chênes, Texte 3: 739, t. 1954; Soepadmo, Fl. Males. 7(2): 364. 1972.— *Quercus rassa* Miq., Fl. Ned. Ind., Eerste Bijv.: 350. 1861; A.DC. in A.P. de Candolle, Prodr. 16(2): 95. 1864; King ex Hook.f., Fl. Brit. India 5: 613. 1888; Corner, Wayside Trees: 304, f. 96. 1940.— *Cyclobalanus rassa* (Miq.) Oerst., Skr. Vidensk.-Selsk. Christiana, Math.-Naturvidensk. Kl. 5(9): 376. 1871.— *Quercus wenzigiana* King ex Hook.f., Fl. Brit. India 5: 613. 1888.— *Q. rassa* Miq. var. *lanuginosa* Ridl., J. Straits Branch Roy. Asiat. Soc. 61: 37. 1912.— *Pasania rassa* (Miq.) Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75: 436. 1915.— *P. wenzigiana* (King ex Hook.f.) Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75: 435. 1915.— *Synaedrys rassa* (Miq.) Koidz., Bot. Mag. (Tokyo) 30: 192. 1916.— *S. wenzigiana*

(King ex Hook.f.) Koidz, Bot. Mag. (Tokyo): 193. 1916.— *Lithocarpus rangerianus* A.Camus, Bull. Mus. Natl. Hist. Nat., II, 4: 913. 1932.— *L. ridleyanus* A.Camus, Bull. Mus. Natl. Hist. Nat., II, 4: 913. 1932. Fig. 36.

Thailand.— PENINSULAR: Nakhon Si Thammarat, Trang.

Distribution.— Malaysia, Indonesia (type).

Ecology.— Tropical evergreen forest, along ridges, alt. 700–900 m. Flowering March–Sept., fruiting Aug.

Vernacular.— Ko bai iat (ก่อใบเอียง), ko iat (ก่อเอียง) (Peninsular).

41. *Lithocarpus recurvatus* Barnett, Bull. Misc. Inform. Kew 1938. 101. 1938; Barnett, Quer. Rel. Fag. Asia: 92. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh, 33: 333. 1942; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 333. 1944; Hjelmq., Dansk Bot. Ark. 23: 746. 1968.

Thailand.— NORTHERN: Chiang Mai (*Kerr* 5340, type), Tak; NORTHEASTERN: Phetchabun, Loei; EASTERN: Chaiyaphum; SOUTHWESTERN: Kanchanaburi; PENINSULAR: Ranong.

Distribution.— Laos, Vietnam.

Ecology.— Lower and upper montane forests, tropical lowland evergreen forest, alt. 180–2400 m (usually 1300–2400 m). Flowering Jan.–Dec. (usually Jan.–May), fruiting Feb.–Nov. (usually Oct.–Nov.).

Vernacular.— Ko phua nam (ก่อฟ้าะหนาม), ko phua (ก่อฟ้าะ), ko tia (ก่อเตี้ย), ko laeng (ก่อเล้ง) (Northeastern); ko ta mu (ก่อตาหมู), ko-mi (ก่อหมี่) (Northern).

42. *Lithocarpus reinwardtii* (Korth.) A.Camus, Rivista Sci. 18: 41. 1931; A.Camus, Chênes, Texte 3: 726, t. 397. 1954; Barnett, Quer. Rel. Fag. Asia: 151. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 334. 1944; Soepadmo, Fl. Males. 7(2): 359. 1972.— *Quercus reinwardtii* Korth., Verh. Nat. Gesch. Ned. Bezitt., Bot.: 211. 1844; A.DC. in A.P. de Candolle, Prodr. 16(2): 92. 1864.— *Cyclobalanus reinwardtii* (Korth.) Oerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1866: 81. 1866.— *Pasania reinwardtii* (Korth.) Prantl in H.G.A.Engl. & K.A.E.Prantl, Nat. Pflazenfam. 3(1): 55. 1888.— *Synaedrys reinwardtii* (Korth.) Koidz., Bot. Mag. (Tokyo) 30: 192. 1916.

Thailand.— SOUTHEASTERN: Chanthaburi, Trat; PENINSULAR: Nakhon Si Thammarat.

Distribution.— Myanma, Cambodia, Malaysia, Indonesia (type).

Ecology.— Lowland tropical evergreen forest, often by streams, alt. 40–400 m. Flowering Jan.–June, fruiting March–Aug.

Vernacular.— Ma ko chaeng (มะก่อเจ็ง), chaeng (เจ็ง), mak ko (มักก่อ) (Southeastern).

43. *Lithocarpus revolutus* Hatus. ex Soepadmo, Reinwardtia 8: 273, f. 12. 1970; Soepadmo, Fl. Males. 7(2): 346, f. 25. 1972. Fig. 37.

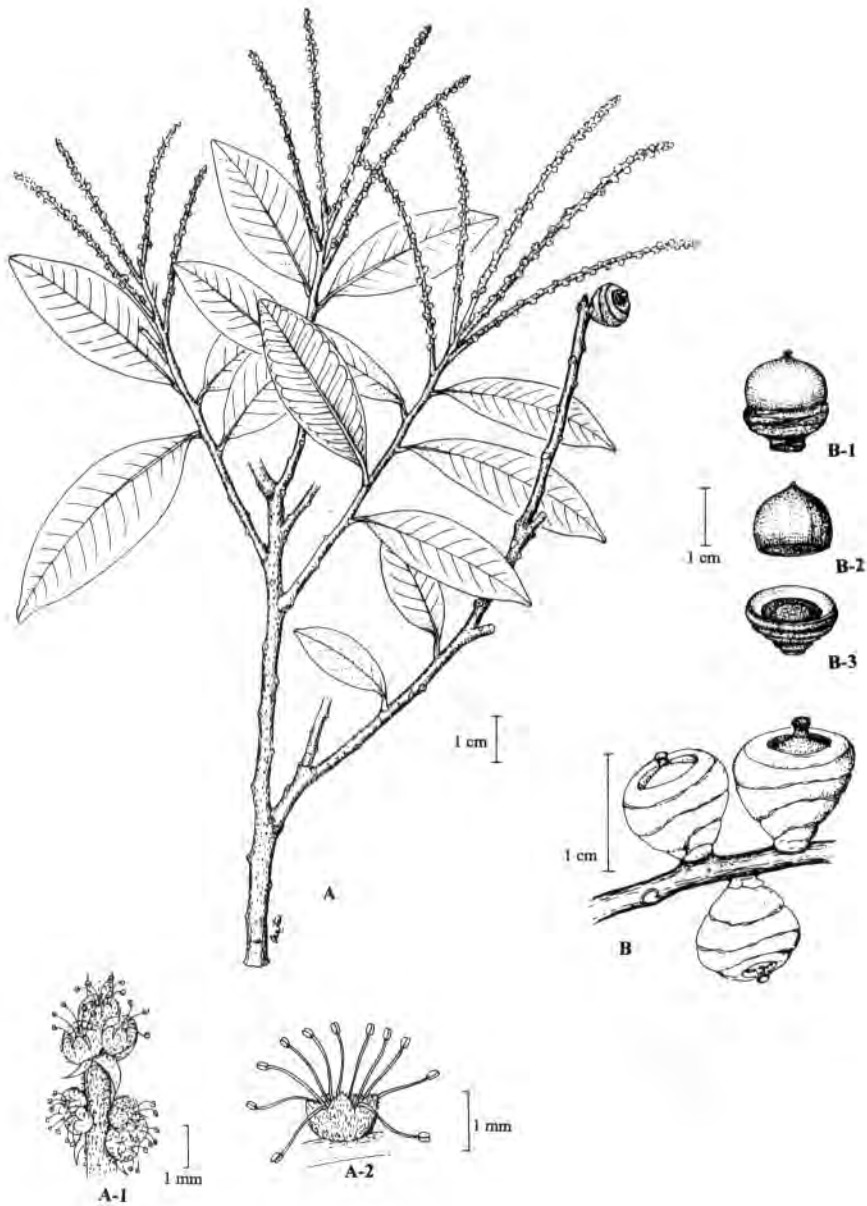


Figure 36. *Lithocarpus rassa* (Miq.) Rehder: A. branch with twigs bearing leaves, inflorescences and an infructescence (Smitinand 830), A-1 male flower clusters, A-2 male flower; B. part of infructescence, B-1 acorn, B-2 nut, B-3 cupule.



Figure 37. *Lithocarpus revolutus* Hatus. ex Soepadmo: A. twig, leaves and inflorescences (Smitinand s.n.), A-1 male flower, A-2 female flower; B. acorn (RSNB 4171).

Thailand.— PENINSULAR: Narathiwat.

Distribution.— Indonesia (type).

Ecology.— Lowland tropical evergreen forest, by streams, alt. 50–200 m. Flowering and fruiting no recorded.

Vernacular.— Ko bai sai (ก่อใบไทร) (Peninsular).

44. *Lithocarpus rufescens* Barnett, Bull. Misc. Inform. Kew 1938: 102. 1938; Barnett, Quer. Rel. Fag. Asia: 120. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 334. 1944.

Thailand.— PENINSULAR: Phuket (*Kerr* 7218, type).

Distribution.— Endemic to Thailand.

Ecology.— Lowland tropical evergreen forest, alt. 100–150 m. Flowering July, fruiting Sept.

Vernacular.— Ko sam chai (ก่อสามชาย), ko phuket (ก่อภูเก็ต) (Peninsular).

45. *Lithocarpus scortechinii* (King ex Hook.f.) A.Camus, Rivista Sci. 18: 42. 1931; Barnett, Quer. Rel. Fag. Asia: 85. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 33: 333. 1941; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 333. 1944; Soepadmo, Reinwardtia 8: 278. 1970; Soepadmo, Fl. Males. 7(2): 380. 1972.— *Quercus scortechinii* King ex Hook.f., Fl. Brit. India 5: 608. 1888; Corner, Wayside Trees: 304, f. 96. 1940.— *Pasania scortechinii* (King ex Hook.f.) Schottky, Bot. Jahrb. Syst. 47: 676. 1912.— *Lithocarpus smitinandianus* A.Camus, Notul. Syst. (Paris) 14: 257. 1953.

Thailand.— PENINSULAR: Phangnga, Nakhon Si Thammarat, Pattani.

Distribution.— Malaysia (type).

Ecology.— Tropical evergreen forest, alt. 650–1000 m. Flowering Nov., fruiting April–Sept.

Vernacular.— Ko khai laen (ก่อไข่เลน), ko do lae (ก่อดอแล) (Peninsular).

46. *Lithocarpus siamensis* A.Camus, Notul. Syst. (Paris) 14: 257. 1953; A. Camus, Chânes, Texte 3: 1271, t. 28. 1954; Hjelm., Dansk Bot. Ark. 23: 480. 1968.

Thailand.— PENINSULAR: Nakhon Si Thammarat (*Smitinand* 5076, type).

Distribution.— Cambodia.

Ecology.— Tropical evergreen forest, alt. 650–750 m. Flowering Nov.–Jan., fruiting Jan.–March.

Vernacular.— Ko ruk (ก่อรุก) (Peninsular).

47. *Lithocarpus sootepensis* (Craib) A.Camus, Rivista Sci. 18: 42. 1931; A. Camus, Chânes, Texte 3: 807. 1954; Barnett, Quer. Rel. Fag. Asia: 139. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 33: 334. 1942; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 334. 1944; Hjelmq.,

Dansk Bot. Ark. 23: 488. 1968.— *Quercus sootepensis* Craib, Bull. Misc. Inform. Kew 1911: 472. 1911; Craib, Contr. Fl. Siam, Aber. Univ.: 201. 1912.— *Pasania sootepensis* (Craib) Hickel & A.Camus, Ann. Sci. Nat., Bot., X, 3: 399. 1921; Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine 5: 989. 1930.

Thailand.— NORTHERN: Chiang Mai (*Kerr* 780, type), Chiang Rai, Lamphun.

Distribution.— Malaysia (Kedah).

Ecology.— Deciduous dipterocarp forest, mixed deciduous forest, lower montane forest, oak-pine forest, on granite bedrock, alt. 600–1650 m (usually 800–1200 m). Flowering Jan.–Dec. (usually Sept.–Dec.), fruiting June–Dec.

Vernacular.— Ko lueat (ก่อเลื้อย), ko ta mu (ก่อตาหมู), ko hua mu (ก่อหัวหมู), ko sa yak (ก่อสะหยาก), ko daeng (ก่อแดง), ko hua suea (ก่อหัวเสือ) (Northern).

48. *Lithocarpus sundaicus* (Blume) Rehder, J. Arnold Arbor. 1: 131. 1919; Barnett, Quer. Rel. Fag. Asia: 97. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 33: 333. 1941; Barnett, Trans. & Proc. Bot. Soc. Edinburgh, 34: 333. 1944; A.Camus, Chânes, Texte 3: 910, t. 448. 1954; Soepadmo, Reinwardtia 8: 282. 1970; Soepadmo, Fl. Males. 7(2): 375. 1972.— *Quercus sundaica* Blume, Verh. Batav. Genootsch. Kunsten 9: 216. 1825; King ex Hook.f., Fl. Brit. India 5: 611. 1888; Corner, Wayside Trees: 305. 1940; Backer & Bakh.f., Fl. Java 2: 8. 1965.— *Pasania sundaica* (Blume) Oerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1866: 83. 1866; Ridl., Fl. Malay Penins. 3: 379. 1924.— *Quercus lamponga* Miq., Fl. Ned. Ind., Eerste Bijv.: 348. 1861; Corner, Wayside Trees: 303. 1940.— *Cyclobalanus lamponga* (Miq.) Oerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1866: 81. 1867.— *Pasania lamponga* (Miq.) Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75: 423. 1915.— *Quercus grandifrons* King ex Hook.f., Fl. Brit. India, 5: 610. 1888; Corner, Wayside Trees: 303. 1940.

Thailand.— PENINSULAR: Ranong, Surat Thani, Phangnga, Nakhon Si Thammarat, Trang, Songkhla, Pattani, Yala, Narathiwat.

Distribution.— Malaysia, Indonesia (type), Brunei.

Ecology.— Swamp forest, tropical rain forest, alt. 50–900 m. Flowering April–Nov., fruiting July–Dec.

Vernacular.— Ko lap tao pun (ก่อหล้าเต่าปูน), ko hin (ก่อหิน), ko kriap (ก่อเกรียบ), ko talap (ก่อตลับ), ko mu (ก่อหมู), ko lang khao (ก่อหลังขาว).

49. *Lithocarpus thomsonii* (Miq.) Rehder, J. Arnold Arbor. 1: 132. 1919; Barnett, Quer. Rel. Fag. Asia: 102. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 333. 1944; Hjelmq., Dansk Bot. Ark. 23: 485. 1968; C.C.Huang, Y.T.Chang & B.M.Bartol. in C.Y.Wu & P.H.Raven, Fl. China 4: 346. 1999.— *Quercus thomsoni* Miq., Ann. Mus. Bot. Lugduno-Batavi 1: 109. 1864; Kurz, Forest Fl. Burm 2: 486. 1877; Hook.f., Fl. Brit. India 5: 615. 1888; Craib, Bull. Misc. Inform. Kew 1911: 473; Brandis, Indian Trees: 632. 1911.— *Synaedrys thomsonii* (Miq.) Koidz., Bot. Mag. (Tokyo) 30: 193. 1916.— *Pasania thomsonii* (Miq.) Hickel & A.Camus, Ann. Sci. Nat., Bot., X, 3: 390. 1921; Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine 5: 974.

1930.— *Quercus tubinata* Roxb., (non Blume), Fl. Ind. ed. 1832, 3: 636. 1832.— *Lithocarpus annamensis* [non (Hickel & A.Camus) A.Camus], Hjelmq., Dansk Bot. Ark. 23: 483. 1968.

Thailand.— NORTHERN: Chiang Mai, Chiang Rai, Nan, Lampang, Tak, Phitsanulok; NORTHEASTERN: Phetchabun, Loei, Nakhon Phanom; SOUTHWESTERN: Kanchanaburi; CENTRAL: Nakhon Nayok; SOUTHEASTERN: Prachinburi, Rayong, Chanthaburi, Trat; PENINSULAR: Ranong, Narathiwat.

Distribution.— India (type), Myanma, China, Laos, Vietnam.

Ecology.— Mixed deciduous forest, dry evergreen forest, scrub forest, lower montane forest, alt. 100–1700 m (usually 500–900 m). Flowering Jan.–Dec. (usually Nov.–Dec.), fruiting Jan.–Dec. (usually July–Sept.).

Vernacular.— Ko khao (ก่อข้าว), ko mon (ก่อหม่น), ko nam (กอน้ำ), ko khao (ก่อขาว), ko ta mu (ก่อตาหมู), (Northern); ko khao (ก่อขาว), ko chaeng (ก่อแฉง) (Southeastern); klang cha mon (เกลี้ยงชะโหม่น), (Peninsular); muk ko mo (หมักก่อหม้อ) (Eastern).

50. *Lithocarpus trachycarpus* (Hickel & A.Camus) A.Camus, Rivista Sci. 18: 42. 1931; A.Camus, Chênes, Texte 3: 836. 1954; Barnett, Quer. Rel. Fag. Asia: 374. 1940; Hjelmq., Dansk Bot. Ark. 23: 478. 1968; C.C.Huang, Y.T.Chang & B.M.Bartol. in C.Y.Wu & P.H.Raven, Fl. China 4: 358. 1999.— *Pasania trachycarpa* Hickel & A.Camus, Bull. Mus. Natl. Hist. Nat. 29: 604. 1923; Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine 5: 977. 1930.

Thailand.— NORTHERN: Chiang Mai, Chiang Rai, Nan, Lampang; NORTHEASTERN: Phetchabun, Loei; SOUTHWESTERN: Phetchaburi; PENINSULAR: Songkhla.

Distribution.— Laos (type), Vietnam.

Ecology.— Lower montane forest, dry evergreen forest, deciduous dipterocarp forest, on rocky and granite bedrock, alt. 470–1500 m (usually 1000–1300 m). Flowering Jan.–Dec. (usually May–Aug.), fruiting March–Sept.

Vernacular.— Ko lai (ก่อลาย), ko duei (ก่อเดือย), ko wai (ก่อหวาย) (Northern); ko daeng (ก่อแดง), ko nuat daeng (ก่อหนวดแดง), ko phuang (ก่อพวง), ko phua (ก่อฝัวะ), ko khao (ก่อข้าว) (Northeastern).

Uses.— Nuts edible.

51. *Lithocarpus truncatus* (King ex Hook.f.) Rehder & Wilson, J. Arnold Arbor. 1: 132. 1919; Barnett, Quer. Rel. Fag. Asia: 131. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 33: 339. 1942; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 335. 1944; Hjelmq., Dansk Bot. Ark. 23: 490. 1968; A.Camus, Chênes, Texte 3: 645. 1954; C.C.Huang, Y.T.Chang & B.M.Bartol. in C.Y.Wu & P.H.Raven, Fl. China 4: 343. 1999.— *Quercus truncata* King ex Hook.f., Fl. Brit. India 5: 618. 1888; Craib, Kew Bull 1911: 473; Brandis, Indian Trees: 632. 1921.— *Pasania truncata* (King ex Hook.f.) Schottky, Bot. Jahrb. Syst., 47: 663. 1912; Hickel & A.Camus, Ann. Sci. Nat., Bot., X, 3: 402. 1921; Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine 5: 992. 1930.— *Synaedrys truncata* (King ex Hook.f.) Koidz., Bot. Mag. (Tokyo) 30: 190. 1916.

Thailand.— NORTHERN: Chiang Mai, Chiang Rai; NORTHEASTERN: Loei; EASTERN:

Chaiyaphum; SOUTHWESTERN: Kanchanaburi.

Distribution.— India (type), Myanma, China, Laos, Vietnam.

Ecology.— Lower montane forest, pine-oak savannah forest, dry evergreen forest, on sandstone and granite bedrocks, alt. 600–1260 m (usually 900–1000 m). Flowering May–Jan., fruiting March–Nov.

Vernacular.— Ko duk (ก่อดุก) (Northern); ko dam (ก่อดำ), ko duk (ก่อดุก), ko khao (ก่อขาว), ko klet dam (ก่อเกล็ดดำ) (Northeastern).

52. *Lithocarpus tubulosus* (Hickel & A.Camus) A.Camus, Rivista Sci. 18: 42. 1931; A.Camus, Chênes, Texte 3: 782. 1954; Barnett, Quer. Rel. Fag. Asia: 395. 1940; C.C.Huang, Y.T.Chang & B.M.Bartol. in C.Y.Wu & P.H.Raven, Fl. China 4: 351. 1999.— *Pasania tubulosa* Hickel & A.Camus, Ann. Sci. Nat., Bot., X, 3: 405. 1921; Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine 5: 1000. 1930.

Thailand.— SOUTHEASTERN: Trat; PENINSULAR: Trang.

Distribution.— Laos, Vietnam (type).

Ecology.— Lowland tropical evergreen forest, alt. 50–100 m. Flowering Feb.–April, fruiting June–Dec.

Vernacular.— Ko chuk (ก่อจุก), ko khon (ก่อขน) (Peninsular), chaeng (แฉ่ง) (South eastern).

Uses.— Nuts edible (Laos).

53. *Lithocarpus vestitus* (Hickel & A.Camus) A.Camus, Rivista Sci. 18: 42. 1931; A.Camus, Chênes, Texte 3: 940. 1954. Barnett, Quer. Rel. Fag. Asia: 338. 1940; Chun., J. Arnold Arbor. 28: 230. 1947; Hjelmq., Dansk Bot. Ark. 23: 486. 1968.— *Pasania vestita* Hickel & A.Camus, Ann. Sci. Nat., Bot., X, 3: 393. 1921; Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine 5: 980. 1930.— *Lithocarpus microspermus* A.Camus, Bull. Soc. Bot. France 81: 818. 1935.

Thailand.— NORTHERN: Chiang Mai, Chiang Rai, Phitsanulok; NORTHEASTERN: Phetchabun; EASTERN: Nakhon Rachasima; SOUTHWESTERN: Kanchanaburi; PENINSULAR: Ranong.

Distribution.— Laos (type).

Ecology.— Tropical evergreen and dry evergreen forest, pine-deciduous dipterocarp and oak-pine forests, mixed deciduous forest, alt. 50–1400 m (usually 600–1100 m). Flowering Dec.–May, fruiting Feb.–Oct.

Vernacular.— Ko nu (ก่อหนู) (Northern); ko khi mu (ก่อขี้หนู) (Southwestern).

54. *Lithocarpus wallichianus* (Lindl. ex Hance) Rehder, J. Arnold Arbor. 1: 132. 1919; Barnett, Quer. Rel. Fag. Asia: 100. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh, 33: 333. 1942; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 333. 1944; A.Camus, Chênes, Texte 3: 1102, t. 503. 1954; Soepadmo, Reinwardtia 8: 287. 1970; Soepadmo, Fl. Males. 7(2):

368. 1972; Soepadmo, Julia & Go in E. Soepadmo & L.G. Saw, Tree Fl. Sabah & Sarawak 3: 94. 2000.— *Quercus wallichiana* Lindl. ex Hance, J. Bot. 8: 4. 1870; King ex Hook.f., Fl. Brit. India 5: 610. 1888; Corner, Wayside Trees: 305, f. 96. 1940.— *Pasania wallichiana* (Lindl. ex Hance) Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75: 425. 1915; Ridl., Fl. Malay Penins. 3: 378. 1924.— *Synaedrys wallichiana* (Lindl. ex Hance) Koidz., Bot. Mag. (Tokyo), 30: 199. 1916.

Thailand.— NORTHERN: Chiang Mai; SOUTHWESTERN: Kanchanaburi; SOUTHEASTERN: Chanthaburi; PENINSULAR: Surat Thani, Nakhon Si Thammarat, Songkhla, Narathiwat.

Distribution.— Malaysia (type), Singapore, Indonesia.

Ecology.— Tropical evergreen forest, lower montane oak-pine forest, often by stream, on sandstone bedrock.

Vernacular.— Ko mu (ก่อหมู), chaeng (แฉ่ง), ko chaeng (ก่อแฉ่ง) (Southeastern), pan fa pun (ปันฝาปูน) (Peninsular).

55. *Lithocarpus wrayi* (King) A. Camus, Rivista Sci. 18: 42. 1931; Soepadmo, Reinwardtia 8: 288. 1970; Soepadmo, Fl. Males. 7(2): 334. 1972.— *Quercus wrayi* King, Ann. Roy. Bot. Gard. (Calcutta) 2: 77, t. 104. 1889.— *Q. lappaceus* King ex Hook.f. (non Rock), Fl. Brit. India 5: 607. 1888, *quoad Malaya*; King, Ann. Roy. Bot. Gard. (Calcutta) 2: 41. 1888; Corner, Wayside Trees: 303. 1943.— Brandis, Indian Trees: 633. 1921.— *Pasania wrayi* (King) Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75: 446. 1915.— *P. lappacea* Gamble (non Oerst.), J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 75: 446. 1915.— *Synaedrys wrayi* (King) Koidz., Bot. Mag. (Tokyo) 30: 187. 1916.— *Lithocarpus longispinus* Barnett, Bull. Misc. Inform. Kew 1938: 100. 1938; Barnett, Quer. Rel. Fag. Asia: 87. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 333. 1944; A. Camus, Chânes, Texte 3: 770, t. 1948. 1954; Soepadmo, Reinwardtia 8: 266. 1970; Soepadmo, Fl. Males. 7(2): 334, f. 22. 1972.

Thailand.— NORTHERN: Chiang Mai; NORTHEASTERN: Loei; SOUTHEASTERN: Chanthaburi; PENINSULAR: Ranong, Surat Thani, Phangnga, Nakhon Si Thammarat, Phatthalung, Trang, Satun, Songkhla, Yala, Narathiwat.

Distribution.— Vietnam, Malaysia (type), Indonesia.

Ecology.— Lowland tropical evergreen forest, savannah forest, often by stream, on limestone and granite bedrocks, alt. 50–600 m. Flowering Jan.–July, fruiting April–Sept.

Vernacular.— Ko kriap (ก่อกริ๊ยบ), ko kuan (ก่อกวน), ko ruk (ก่อรุก), ko ta lap (ก่อตลับ), ta lap tao pun (ตลับเต้าปูน), ko lang khao (ก่อหลังขาว), ko dan (ก่อดาน) (Peninsular).

56. *Lithocarpus xylocarpus* (Kurz) Markgr., Bot. Jahrb. Syst. 59: 66. 1924; Barnett, Quer. Rel. Fag. Asia: 375. 1940; A. Camus, Chânes, Texte 3: 604. 1954; C.C. Huang, Y.T. Chang & B.M. Bartol. in C.Y. Wu & P.H. Raven, Fl. China 4: 339. 1999.— *Quercus xylocarpa* Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 44(2): 196. 1875; Kurz, Forest Fl. Burm 2: 489. 1877; Hook.f., Fl. Brit. India 5: 618. 1888.— *Pasania xylocarpa* (Kurz) Schottky, Bot. Jahrb. Syst. 47: 674. 1912; Hickel & A. Camus in H. Lecomte, Fl. Indo-Chine 5: 995. 1930.— *Synaedrys*

xylocarpa (Kurz) Koidz., Bot. Mag. (Tokyo), 30: 190. 1916.— *Pasania capusii* Hickel & A.Camus, Ann. Sci. Nat., Bot., X, 3: 404. 1921; Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine 5: 995.1930. Fig 38.

Thailand.— NORTHERN: Chiang Mai.

Distribution.— China, Myanma (type), India, Laos, Vietnam.

Ecology.— Lower and upper montane forests, alt. 1400–2400 m. Flowering and fruiting Oct.–Dec.

Vernacular.— Ko satit (ก่อสาคิด) (Northern).

3. QUERCUS*

L., Gen. Pl. ed. 5: 413. 1754; A.DC. in A.P.de Candolle, Prodr. 16(2): 2. 1864; Benth. & Hook., Gen. Pl. 3: 407. 1880; Hook.f., Fl. Brit. India 5: 600. 1888; Prantl in H.G.A.Engl. & K.A.E.Prantl, Nat. Pflazenfam. 3(1): 55. 1888; King, Ann. Roy. Bot. Gard. (Calcutta) 2: 19. 1889; A.Camus, Chânes, Texte 1: 7. 1938; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 33: 329. 1942; Hutchinson, Gen. Fl. Pl. 2: 13. 1967; Soepadmo, Gard. Bull. Singapore 22: 355. 1968; Soepadmo, Fl. Males. 7(2): 385. 1972.— *Cyclobalanopsis* Oerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1866: 77. 1866; C.C.Huang, Y.T.Chang & B.M.Bartol. in C.Y.Wu & P.H.Raven, Fl. China 4: 380. 1999.

Deciduous or evergreen trees rarely shrubs. Branchlets initially densely tomentose or brownish, stiff, pubescent, glabrescent. Terminal buds usually ovoid, conical or ellipsoid, usually densely crowded. Stipules extrapetiolar, caducous. *Leaves* spirally arranged or rarely pseudo-whorled, serrate, dentate or lobed, rarely entire, very variable in form and size even within the species, glabrous to densely pubescent or tomentose. *Inflorescences* with male and female flowers separate on same branch. *Male inflorescences* solitary or in paniculate clusters of pendulous catkins, in upper leaf scars or subterminal below new shoots. *Female inflorescences* erect, solitary spikes, axillary. *Male flowers* solitary or in clusters of 3–4; perianth scarious, 4–6 lobed, the lobes connate at base, densely tomentose. Stamens (4–)6, anther basifixed, dehiscing with a longitudinal slit, usually hairy. Rudimentary ovary always absent. *Female flowers* always solitary, perianth (4–)6 lobed, staminodes absent or 5–7. Styles 3(–6), cylindrical, more or less recurved, free or connate at base; stigmas broadly capitate, glabrous. Ovary cells as many as styles. *Cupule* cup or saucer-shaped, obconic or obovoid-globose, lamellate, hairy on both sides, lamellae imbricate or ring-like and in 5–12 lines. *Fruit* ovoid, globose or turbinate, nut partly or nearly completely enclosed by a cupule from which it is free; scar present and noticeable.

A genus of about 600 species widely distributed through North & South America, North Africa and Europe into the Asian tropics and subtropics. Twenty-nine species are indigenous to Thailand.

* with T. Boonthavikoon & P. Phonsena, The Forest Herbarium, National Park, Wildlife and Plant Conservation Department, Bangkok 10900, Thailand.



Figure 38. *Lithocarpus xylocarpus* (Kurz) Markgr.: A. twig & buds, A-1 a form of leaf; B. infructescence, B-1 nut (Smitinand *et al.* 8340).

Vernacular.— Ko phuang (ก่อพuang) (Northern).

KEY TO THE SPECIES
(based on acorns)

1. External surface of cupules with alternate lamellae, resembling fish scales, or some lamellae spread out
 2. Cupule obconic or crown-shaped
 3. Cupule crown-shaped with spreading lamellae. Leaves strongly serrate and the end of secondary nerves projecting as long spines **1. *Q. acutissimus***
 3. Cupule obconic
 4. Lamellae with thick and incurved as a terete hook at apex. Leaves densely tomentose on both sides, especially on lower surface **11. *Q. kingianus***
 4. Lamellae evenly flattened. Leaves glabrous and shiny on both sides **28. *Q. setulosus***
 2. Cupule cup- or saucer-shaped or globose
 5. Each infructescence with (1–)2 acorns. Leaves elliptic or ovate, entire or serrate. Stipule not caducous
 6. Leaves serrate **8. *Q. franchetii***
 6. Leaves entire **26. *Q. semecarpifolia***
 5. Each infructescence not less than 3-acorned. Leaves obovate or ovate, serrate. Stipules caducous
 7. Mature nuts ovoid, broader than long, up to 1 by 1.5 cm. Leaves usually cordate or auriculate at base **13. *Q. lanata***
 7. Mature nuts tubular-ovoid, longer than broad, not less than 1.5 by 1 cm. Leaves slightly cuneate and more or less auriculate at base **2. *Q. aliena***
1. External surface of cupules with lines of lamellae arranged in rings
 8. Cupules cup- or dish-shaped
 9. Cupules with fruit stalks, 0.5–1 cm long
 10. Acorns (cupule & nut) broader than long
 11. Nuts ovoid; cupules covering 1/2 of nut, limb always dilated (when mature). Leaves up to 18 cm long **23. *Q. ramsbottomii***
 11. Nuts flattened both top and base; cupules covering the nut to the apex or beyond, but not enclosing the tapex, limb not dilated (when mature). Leaves up to 30 cm long **5. *Q. austro-cochinchinensis***
 10. Acorns (cupule & nut) longer than broad
 12. Style (young acorn) with capitate stigmata. Cupules (mature) covering about 1/2 or more of nuts **19. *Q. oidocarpus***
 12. Style (young acorn) with dilate stigmata. Cupules (mature) covering 1/4 to 1/3 of nuts **27. *Q. semiserratus***
 9. Cupules sessile
 13. Cupules (mature) covering the nuts for up to 1/3 or occasionally nearly 1/2 of their length. Leaves always in pseudo-whorls at the end of twigs
 14. Nuts not less than 3 cm long. Cupules with dilated (mature) limb and densely ferruginous-tomentose. Leaves obovate, ovate-oblong **7. *Q. fleuryi***
 14. Nuts up to 3 cm long. Cupules lacking dilated limb, densely brown-tomentose. Leaves lanceolate, elliptic-lanceolate **22. *Q. quangtrienensis***
 13. Cupules (mature) enclosing nuts for up to 2/3 or 1/2 of their length. Leaves not in pseudo-whorls at the end of twigs
 15. Acorns (cupule and nut) up to 2.1 by 2 cm. Twigs glabrous. Leaves elliptic, elliptic oblong, petioles blackish when dry.
 16. Acorns up to 1 by 1 cm, densely brown-hairy **18. *Q. sessilifolia***
 16. Acorns not less than 2 by 1.7 cm, pale tawny-pubescent **3. *Q. augustinii***
 15. Acorns (cupule & nut) not less than 3 by 2.5 cm. Twigs densely tomentose. Leaves lanceolate, obovate, petioles not black when dry

- 17. Leaves weakly obovate, minutely serrate on apical 1/3, secondary nerves up to 9 pairs
4. Q. auricoma
- 17. Leaves lanceolate, strongly serrate on apical 2/3, secondary nerves not less than 14 pairs
15. Q. lineatus
- 8. Cupules saucer-shaped or obconic
 - 18. Nuts conical, dome-shaped or mammilliform
 - 19. Cupules obconic
 - 20. Nut conical. Leaves obovate or oblong-lanceolate
6. Q. brandisianus
 - 21. Leaves obovate or ovate. Acorns sessile
25. Q. saravannensis
 - 21. Leaves oblong-lanceolate. Acorns stalked
17. Q. mysinaefolius
 - 20. Nuts mammilliform. Leaves lanceolate
 - 19. Cupules saucer-shaped
 - 22. Leaves obovate, densely yellow tomentose on lower surface. Stigmata capitate
21. Q. poilanei
 - 22. Leaves oblong, ovate-oblong, pubescent then glabrous on both surfaces. Stigmata dilate
20. Q. oxyodon
- 18. Nuts hemisphaeric, flattened or subflattened
 - 23. Nut apices weakly cone-like. Cupules saucer-shaped
 - 24. Nuts up to 2.1 cm broad. Styles 3, stigmata capitate
14. Q. lenticellatus
 - 24. Nuts not less than 2.5 cm broad. Styles (3–)4–6, stigmata capitate
 - 25. Apex of rings or lamellae pointing upward, adnate or fused to the cupule surface. Leaves oblong, base obtuse
29. Q. vestitus
 - 25. Apex of rings or lamellae reflexed, not adnate or fused to cupule surface. Leaves obovate, base cuneate
24. Q. rex
- 23. Nut apices flattened to retuse
 - 26. Cupules enclosing the nuts to their apices
 - 27. Cupules obconical-shaped, lamellae set in fine ringed or lamellae
10. Q. kerrii
 - 27. Cupules saucer-shaped, lamellae set in irregular rings or lamellae, especially on the lateral part
12. Q. lamellosa
 - 26. Cupules enclosing the nuts for up to 1/2 their length
 - 28. Cupules enclosing the nuts for up to one-fifth of their length or at the base only. Leaves velutinous on lower surface
9. Q. helferianus
 - 28. Cupules enclosing the nuts for 1/3 to 1/2 of their length. Leaves glabrescent or densely pubescent on lower surface
16. Q. mespilifolius

1. Quercus acutissima Carruth., J. Linn. Soc., Bot. 6: 33. 1862; C.C.Huang, Y.T.Chang & B.M.Bartol. in C.Y.Wu & P.H.Raven, Fl. China 4: 372. 1999.— *Q. serrata* Barnett (non Thunb.), Quer. Rel. Fag. Asia: 28. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 366. 1944.

Thailand.— NORTHERN: Chiang Mai. NORTHEASTERN: Phetchabun, Loei. EASTERN: Chaiyaphum.

Distribution.— India, Nepal (type), Myanma, Vietnam, Laos, China, Korea, Japan, U.S.A.

Ecology.— Lower montane forest, oak-pine forest and oak-savannah forest, on sandstone bedrock, alt. 650–1300 m. (usually 1000–1300 m). Flowering Jan.–March, fruiting March–Nov.

Vernacular.— Ko khi kwang (ก่อชีกวาง), ko daeng (ก่อแดง), ko ub khao (ก่ออุบข้าว) (Northeastern).

2. Quercus aliena Blume, Mus. Bot. 1.: 298. 1851; A.DC. in A.P.de Candolle, Prodr. 16(2): 14. Dec. (usually April–May).

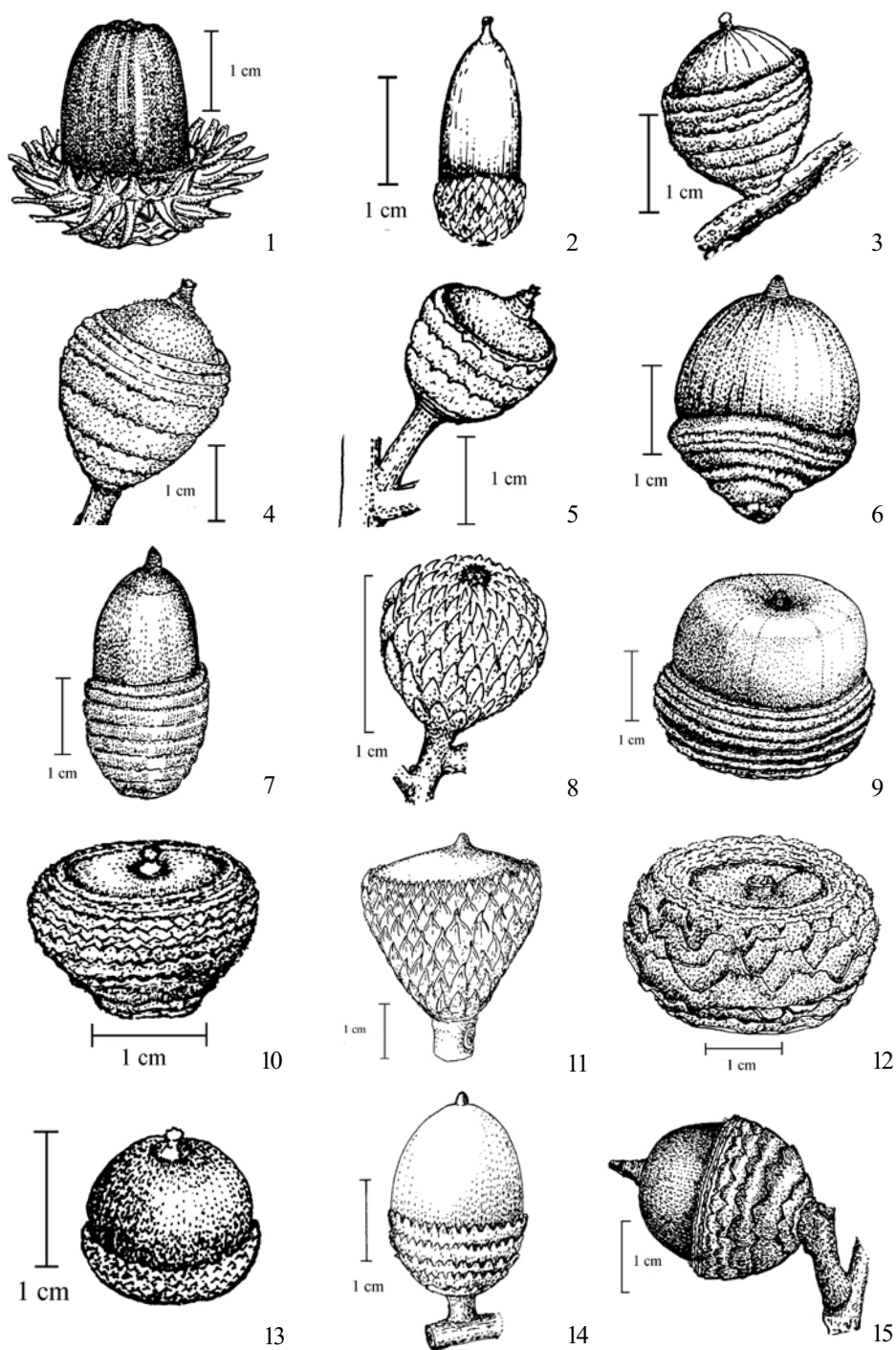


Figure 39. Various acorns in the genus *Quercus*: 1) ก่อซี่กว้าง *Quercus acutissimus*; 2) ก่อเตี้ย *Q. aliena* sub sp. *aliena*; 3) ก่อใบรี *Q. augustinii*; 4) ก่อหมวก *Q. auricomus*; 5) ก่อแอบ *Q. austro-cochinchinensis*; 6) ก่อดาควาย *Q. brandisianus*; 7) ก่อหิน *Q. fleuryi*; 8) ก่อกระระ *Q. franchetii*; 9) ก่อซี่หนู *Q. helferianus*; 10) ก่อแพะ *Q. kerrii*; 11) ก่อแดง *Q. kingianus*; 12) ก่อแอบข้าว *Q. lamellosa*; 13) ก่อเทา *Q. lanata*; 14) ก่อดาคลอย *Q. lenticellatus*; 15) ก่อหมอก *Q. lineatus*.

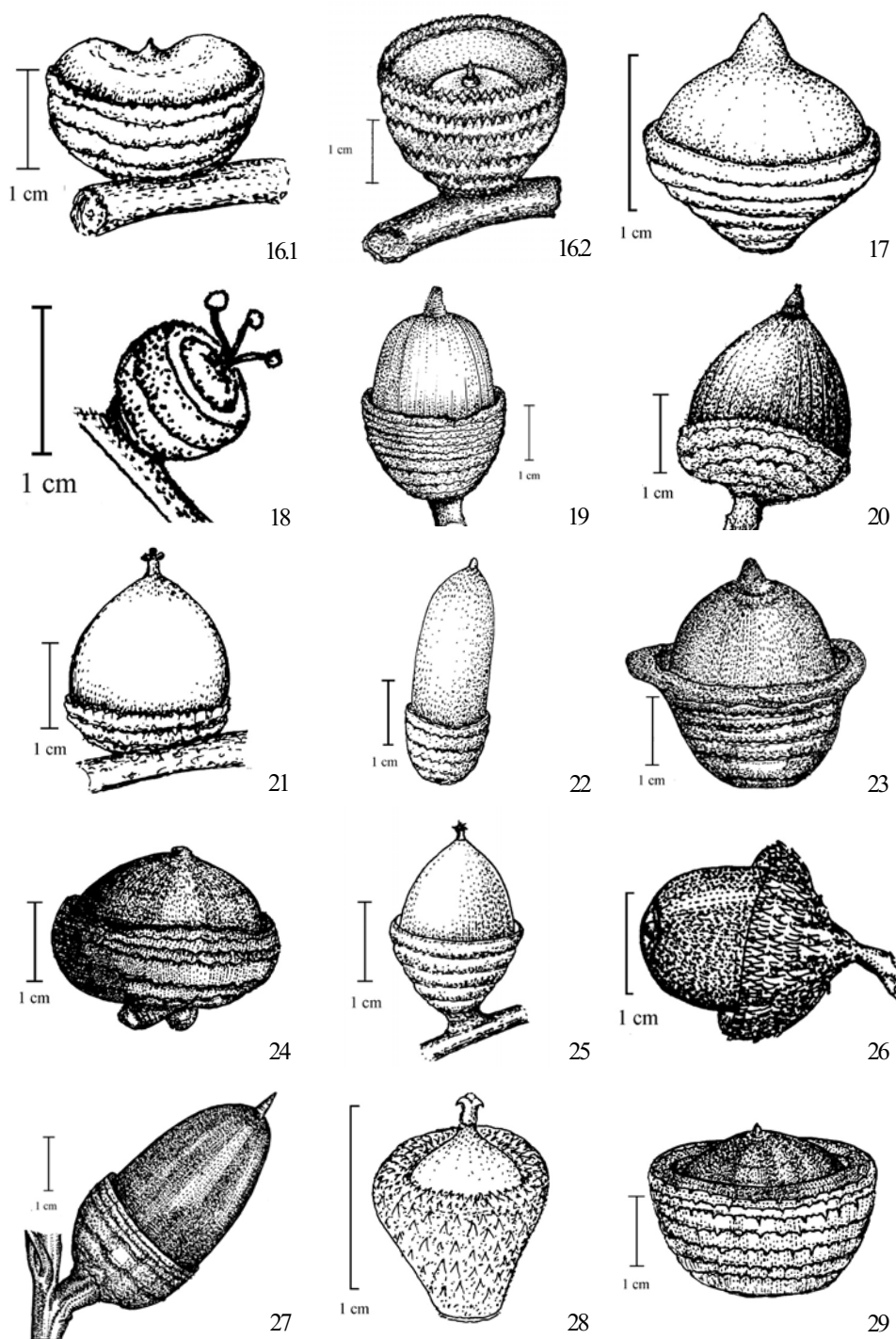


Figure 40. Various acorns in the genus *Quercus*: 16.1) ถั่วแระ *Quercus mespilifolius* var. *mespilifolius*; 16.2) ถั่วคัส *Quercus mespilifolius* var. *pubescens*; 17) ถั่วต่าง *Q. myrsinaefolius*; 18) ถั่วจันทน์ *Q. sessilifolia*; 19) ถั่วหมาก *Q. oidocarpus*; 20) ถั่วเลื่อม *Q. oxydon*; 21) ถั่วสีเสียด *Q. poilanei*; 22) ถั่วหนวดแมว *Q. quangtriensis*; 23) ถั่วคัส *Q. ramsbottomii*; 24) ถั่วคัส *Q. rex*; 25) ถั่วเกลี้ยง *Q. saravanensis*; 26) ถั่วเขียงดา *Q. semecarpifolia*; 27) ถั่วกระดุม *Q. semiserratus*; 28) ถั่วคาง *Q. setulosus*; 29) ถั่วแอบ *Q. vestitus*.

KEY TO SUBSPECIES

- | | |
|--|------------------------------|
| 1. Leaves glabrous on both surfaces | 2.1 subsp. <i>aliena</i> |
| 1. Leaves densely tomentose on lower surface | 2.2 subsp. <i>griffithii</i> |

subsp. ***aliena***

Thailand.— NORTHERN: Chiang Mai; NORTHEASTERN: Phetchabun, Loei; EASTERN: Chaiyaphum.

Distribution.— India, Myanma, Laos, China, Japan (type).

Ecology.— Pine-deciduous forest, mixed deciduous forest, savannah and lower montane forest, on granite bedrock, alt. 800–1400 m. (usually 1000–1300 m). Flowering Jan.–Nov. (usually Feb.–April), fruiting Jan.–Aug..

Vernacular.—Ko tia (ก่อเตี้ย), ko na ae (ก่อนะแอ) (Northern), ko nam (ก่อน้ำ) (Northeastern).

Uses.— Nut edible.

subsp. ***griffithii*** (Hook.f. & Thomson ex Miq.) Schottky, Bot. Jahrb. Syst. 47: 635. 1912.— *Quercus griffithii* Hook.f. & Thomson ex Miq. in A.DC. in A.P.de Candolle, Prodr. 16(2): 14. 1864; King ex Hook.f., Fl. Brit. India 5: 602. 1888; Franch., J. Bot.: 147. 1899; Brandis, Indian Trees: 625. 1921; Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine 5: 943. 1930; Barnett, Quer. Rel. Fag. Asia: 24. 1940.

Thailand.— NORTHEASTERN: Phetchabun, Loei; EASTERN: Chaiyaphum.

Distribution.— India (Sikkim, type).

Ecology.— Mixed deciduous forest, lower montane forest, deciduous dipterocarp-pine forest and open and wet savannah, usually in pure stands on sandstone bedrock by streams; alt. 800–1500 m. (usually 1200–1300 m). Flowering March–June, fruiting March–Dec..

Vernacular.—Ko nam (ก่อน้ำ), ko khi mu (ก่อขี้หมู) (Northeastern).

Uses.— Nut edible.

3. *Quercus augustinii* Skan, J. Linn. Soc., Bot. 26: 507. 1889; Barnett, Quer. Rel. Fag. Asia: 230. 1940.— *Cyclobalanopsis augustinii* (Skan.) Schott., Bot. Jahrb. Syst. 47: 656. 1912; C.C.Huang, Y.T.Chang & B.M.Bartol. in C.Y.Wu & P.H.Raven, Fl. China 4: 398. 1999.— *Quercus glabricupula* Barnett, Bull. Misc. Inform. Kew 1938: 99. 1938; Barnett, Quer. Rel. Fag. Asia: 69. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh. 34: 331. 1944.

Thailand.— NORTHERN: Chiang Mai; NORTHEASTERN: Loei; SOUTHEASTERN: Chanthaburi.

Distribution.— China (type), Myanma.

Ecology.— Lower and upper montane forests on granite bedrock, alt. 1100–2500 m (usually 1500–2000 m). Flowering Jan.–March, fruiting Jan.–Dec. (usually Jan.–March).

Vernacular.— Ko mong kut (ก๋อมงกุก) (Northern); ko bai ri (ก๋อใบรี), ko laem (ก๋อแหลม) (Northeastern).

4. *Quercus auricoma* A.Camus, Chênes, Atlas. 2: 122. 1935. Fig. 41.

Thailand.— NORTHERN: Chiang Mai, Chiang Rai, Tak; NORTHEASTERN: Phetchabun, Loei; EASTERN: Chaiyaphum.

Distribution.— Vietnam (type).

Ecology.— Lower montane forest, oak-pine forest and pine-deciduous dipterocarp forest on limestone hills, often by streams, alt. 800–2500 m (usually 800–1200 m. Flowering Jan.–Dec. (usually Jan.–May), fruiting Jan.–Dec. (usually June–Sept.).

Vernacular.— Ko daeng (ก๋อแดง) (Northern); ko muak (ก๋อหมวก) (Northeastern).

5. *Quercus austro-cochinchinensis* Hickel & A.Camus, Ann. Sci. Nat., Bot., X, 3: 386. 1921; Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine 5: 959. 1930; Barnett, Quer. Ral. Fag. Asia: 266. 1940.— *Cyclobalanopsis austrocochinchinensis* (Hickel & A.Camus) Hjelmq., Dansk. Bot. Ark., 23: 503. 1968; C.C.Huang, Y.T.Chang & B.M.Bartol. in C.Y.Wu & P.H.Raven, Fl. China 4: 397. 1999.

Thailand.— SOUTHEASTERN: Chanthaburi; PENINSULAR: Phangnga.

Distribution.— Laos, Vietnam (type).

Ecology.— On slopes of stream valleys in tropical evergreen forest and lower montane forest, alt. 600–1400 m. Flowering Jan., fruiting Feb.–Dec. (usually Feb.–March).

Vernacular.— Ko aep (ก๋อแอบ) (Southeastern).

6. *Quercus brandisiana* Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 42(2): 108. 1873; Kurz, Forest Fl. Burm. 2: 488. 1877; King ex Hook.f., Fl. Brit. India 5: 604. 1888; Barnett, Quer. Rel. Fag. Asia: 48. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 331. 1944.— *Cyclobalanopsis brandisiana* (Kurz) Schottky, Bot. Jahrb. Syst. 47: 657. 1912; Hjelm., Dansk Bot. Ark., 23: 507. 1968.

Thailand.— NORTHERN: Mae Hong Son, Chiang Mai, Chiang Rai, Lampang; NORTHEASTERN: Loei; EASTERN: Chaiyaphum.

Distribution.— Myanmar (type).

Ecology.— Pine-oak forest, mixed deciduous forest, pine-deciduous dipterocarp forest, deciduous dipterocarp forest and lower montane forest, on limestone and granite bedrock, alt. 850–1500 m (usually 850–1000 m). Flowering March–Dec., fruiting Feb.–Dec. (usually April–May).

Vernacular.— Ko ta khwai (ก๋อตาควาย), ko si siat (ก๋อสีเสียด), ko daeng (ก๋อแดง), ko nun (ก๋อหนูน) (Northern).

Uses.— Bark chewed locally with betel nut.



Figure 41. *Quercus auricoma* A.Camus: A. twig, leaves and infructescence (Phengkhai 6799), A-1 view of cupule from above, A-2 nut; B. female inflorescence (Pooma 76).

7. *Quercus fleuryi* Hickel & A.Camus, Bull. Mus. Natl. Hist. Nat 29: 600. 1923; Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine 5: 951. 1930; Barnett, Quer. Rel. Fag. Asia: 245. 1940.— *Cyclobalanopsis fleuryi* (Hickel & A.Camus) W.T.Chun. in Fl. Fujianica 1: 403. 1982; C.C.Huang, Y.T.Chang & B.M.Bartol. in C.Y.Wu & P.H.Raven, Fl. China 4: 385. 1999. Fig. 42.

Thailand.— NORTHERN: Chiang Mai; NORTHEASTERN: Loei, Nakhon Phanom; EASTERN: Nakhon Ratchasima.

Distribution.— Vietnam (type).

Ecology.— Lowland evergreen to lower montane forest, often by streams; alt. 100–1500 m (usually 1200 m). Flowering Feb.–Dec. (usually Nov.–Dec.). fruiting Feb.–Dec. (usually Feb.–April).

Vernacular.— Se di (เซดี) (Northern); mak ko hin (หมากก่อหิน), ko hin (ก่อหิน) (Eastern).

8. *Quercus franchetii* Skan, J. Linn. Soc., Bot. 26: 513. 1889; Barnett, Quer. Rel. Fag. Asia: 37. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 331. 1944; Hjelm., Dansk Bot. Ark., 23: 513. 1968.— *Quercus lanuginosa* Franch (non D.Don), J. Bot. (Morot) 13: 149. 1899.

Thailand.— NORTHERN: Chiang Mai; NORTHEASTERN: Phetchabun; EASTERN: Chaiyaphum.

Distribution.— Afghanistan, Myanma, China (type).

Ecology.— Dry upper mixed deciduous forest, oak-savannah forest, frequent on limestone bedrock, alt. 1600–2100 m. Flowering April, fruiting Feb.–Sept.

Vernacular.— Ko pha (ก่อผา), ko khrae (ก่อแคระ) (Northern).

9. *Quercus helferiana* A.DC. in A.P.de Candolle, Prodr. 16(2): 101. 1864; King ex Hook.f., Fl. Brit. India 5: 605. 1888; Brandis, Indian Trees: 628. 1921; Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine 5: 958. 1933; Barnett, Quer. Rel. Fag. Asia: 50. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 331. 1944.— *Cyclobalanopsis helferiana* (A.DC.) Oerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1866: 79. 1866; Hielm., Dansk. Bot. Ark, 23: 504. 1968; C.C.Huang, Y.T.Chang & B.M.Bartol. in C.Y.Wu & P.H.Raven, Fl. China 4: 391. 1999.

Thailand.— NORTHERN: Mae Hong Son, Chiang Mai, Chiang Rai, Lamphun, Lampang; NORTHEASTERN: Phetchabun, Loei; EASTERN: Chaiyaphum; SOUTHWESTERN: Kanchanaburi.

Distribution.— India (type), Myanma, China, Laos, Vietnam.

Ecology.— Mixed deciduous forest, oak-pine forest, oak-savannah forest, lower montane forest and deciduous dipterocarp forest on granite bedrock, alt. 500–2650 m. (usually 800–1500 m). Flowering Dec.–March, fruiting Feb.–Nov.

Vernacular.— Ko aep luang (ก่อแอบหลวง), ko daeng (ก่อแดง), ko ta mu (ก่อตาหมู), ko lum (ก่อหลุม), ko kup (ก่อกั๊บ) (Northern), ko khi mu (ก่อขี้หมู) (Southwestern).

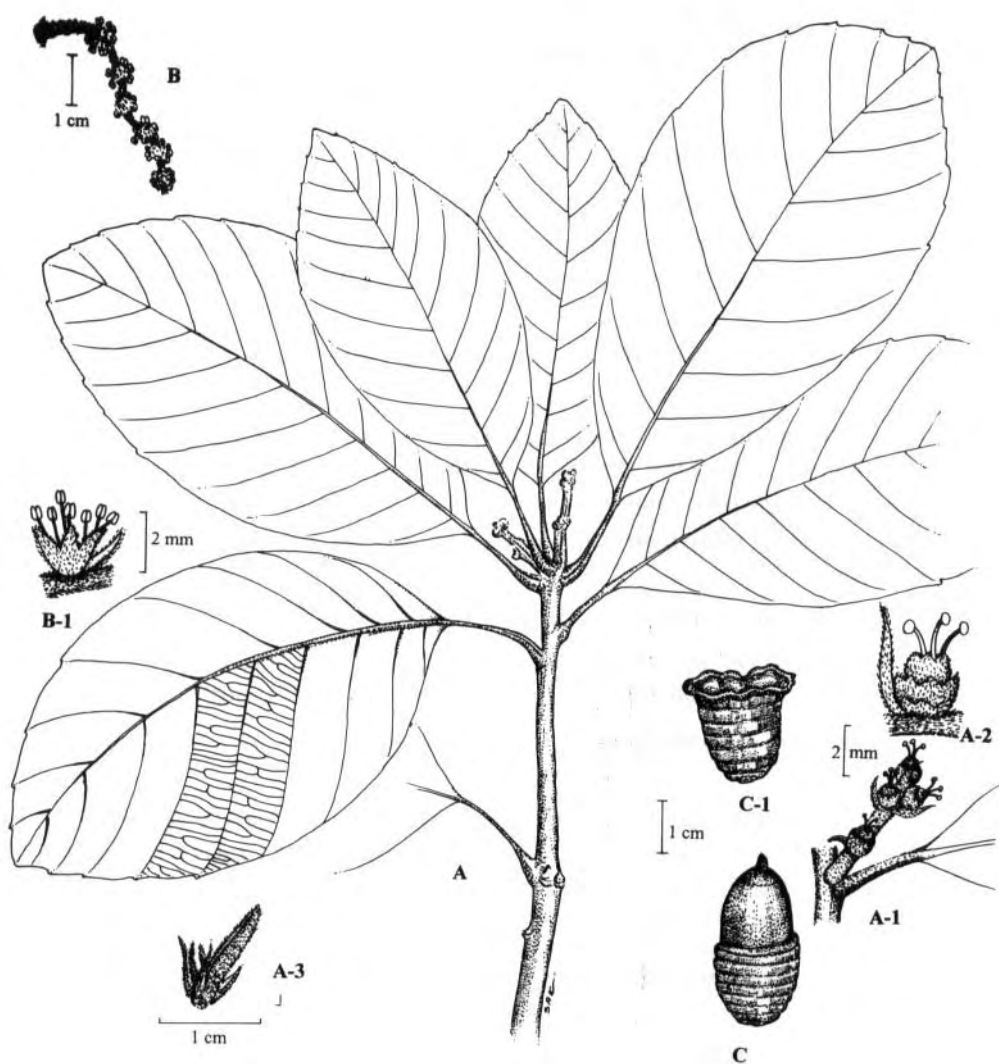


Figure 42. *Quercus fleuryi* Hickel & A.Camus: A. twig, leaves and female inflorescences (Murata *et al.* T-42597), A-1 female inflorescence, A-2 female flower, A-3 bud; B. male inflorescence (Bingtingngon 36), B-1 male flower; C. acorn, C-1 cupule (Garrett 850).

Uses.— Wood suitable for heavy construction.

10. *Quercus kerrii* Craib, Bull. Misc. Inform. Kew 1911: 471. 1911; Craib, Bull. Misc. Inform. Kew 1912: 199. 1912; Hickel & A. Camus in H. Lecomte, Fl. Indo-Chine 5: 958. 1930; Barnett, Quer. Rel. Fag. Asia: 54. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 331. 1944.— *Cyclobalanopsis kerrii* (Craib) Hu, Bull. Fan. Mem. Inst. Biol. 10: 106. 1940; Hjelm., Dansk Bot. Ark., 23: 505. 1968; C.C. Huang, Y.T. Chang & B.M. Bartol. in C.Y. Wu & P.H. Raven, Fl. China 4: 391. 1999.

Thailand.— NORTHERN: Mae Hong Son, Chiang Mai, (*Kerr* 550, type), Chiang Rai, Lampang, Phrae, Uttaradit, Tak; NORTHEASTERN: Phetchabun, Loei; EASTERN: Chaiyaphum. SOUTHWESTERN: Kanchanaburi, Phetchaburi; PENINSULAR: Ranong.

Distribution.— Myanma, Indochina.

Ecology.— Mixed deciduous forest, oak-deciduous dipterocarp forest, lower montane forest and deciduous dipterocarp forest, on granite bedrock, alt. 400–1250 m (usually 500–900 m). Flowering March–April, fruiting Jan.–Oct.

Vernacular.— Ko aep (ก่อแอบ), ko ta mu (ก่อตาหมู), ko phae (ก่อแพะ) (Northern), ko aep (ก่อแอบ), ko phae (ก่อแพะ), ko khi mu (ก่อขี้หมู), ko hin (ก่อหิน) (Northeastern), ko ta mu (ก่อตาหมู) (Southwestern).

Uses.— Barrels made from the wood of this species are occasionally used for fermenting alcoholic beverages.

11. *Quercus kingiana* Craib, Bull. Misc. Inform. Kew 1911: 472. 1911; Craib, Bull. Misc. Inform. Kew 1912: 200. 1912; Hickel & A. Camus in H. Lecomte, Fl. Indo-Chine 5: 945. 1930; Barnett, Quer. Rel. Fag. Asia: 31. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 330. 1944; Hjelm., Dansk Bot. Ark., 23: 509. 1968.

Thailand.— NORTHERN: Mae Hong Son, Chiang Mai, (*Kerr* 956, 1284 type), Chiang Rai, Nan, Lampang; NORTHEASTERN: Phetchabun, Loei, Nakhon Phanom; PENINSULAR: Trang.

Distribution.— Myanma.

Ecology.— Mixed deciduous forest, savannah forest, oak-pine forest and lower montane forest, on limestone and granite bedrock, alt. 500–2100 m (usually 700–1000 m). Flowering Jan.–Nov. (usually Jan.–March), fruiting Jan.–Nov. (usually May–Oct.).

Vernacular.— Ko daeng (ก่อแดง), ko ngae (ก่อเงาะ), ko ta mu (ก่อตาหมู), ko dam (ก่อดำ), ko aep (ก่อแอบ), ko maeng nun (ก่อแมงนูน) (Northern), ko daeng (ก่อแดง), ko khi mu (ก่อขี้หมู), ko yuak (ก่อหยา) (Northeastern).

Uses.— Barrels made from the wood of this species are occasionally used for fermenting alcoholic beverages.

12. *Quercus lamellosa* Sm. in A. Rees, Cycl. 29: 23. 1819; A. DC. in A. P. de Candolle, Prodr. 16(2): 101. 1864; Brandis, Indian Trees: 629. 1921; King ex Hook.f., Fl. Brit. India 5: 606. 1888;

Barnett, Quer. Rel. Fag. Asia: 255. 1940.— *Quercus imbricata* Buch.-Ham. ex D.Don, Prodr. Fl. Nepal.: 57. 1825.— *Q. paucilamellosa* A.DC. in A.P.de Candolle, Prodr. 16(2): 101. 1864.— *Cyclobalanopsis lamellosa* (Sm.) Oerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1866: 79. 1866. Fig. 43.

Thailand.— NORTHERN: Chiang Mai, Chiang Rai.

Distribution.— India, Nepal (type), Bhutan, Myanma.

Ecology.— Lower montane forest, on limestone bedrock, alt. 1500–1700 m.

Vernacular.— Ko aep khao (ก่อแอบข้าว) (Northern).

13. *Quercus lanata* Sm. in A.Rees. Cycl. 29: 27. 1819; Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine 5: 943, f. 9. 1930; Barnett, Quer. Rel. Fag. Asia: 33. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 330. 1944; Hjelm., Dansk Bot. Ark., 23.4: 512. 1968.— *Quercus lanuginosa* D.Don (non. Franch.), Prodr. Fl. Nepal.: 57. 1825; King ex Hook.f., Fl. Brit. India 5: 603. 1888; Brandis, Indian Trees: 626. 1921.

Thailand.— NORTHERN: Chiang Mai.

Distribution.— Nepal (type), Bhutan, Vietnam.

Ecology.— Exposed ridges of lower montane forest, on limestone bedrock, alt. 1400–2200 m (usually 1800–2100 m). Flowering Jan.–Dec. (usually Dec.); fruiting July–Nov.

Vernacular.— Ko pha (ก่อผา), ko thao (ก่อเตา), ko lanna (ก่อล้านนา) (Northern).

14. *Quercus lenticellata* Barnett, Bull. Misc. Inform. Kew 1938: 98. 1938; Barnett, Quer. Rel. Fag. Asia: 66. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 331. 1944.— *Cyclobalanopsis lenticellata* (Barnett) Hjelmq., Dansk. Bot. Ark. 23: 508. 1968.

Thailand.— NORTHERN: Chiang Mai (*Put 3775*, type), Lampang.

Distribution.— Endemic to Thailand.

Ecology.— Mixed deciduous forest and lower montane forest, by streams on granite bedrock; alt. 880–1800 m. (usually 1000 m or more) Flowering May–Nov..

Vernacular.— Ko ta khloi (ก่อตาคลอย), ko lanna (ก่อล้านนา) (Northern).

15. *Quercus lineata* Blume, Bijdr.: 523. 1826; Barnett, Quer. Rel. Fag. Asia: 57. 1940. Soepadmo, Fl. Males. 7(2): 396. 1972.— *Q. polyneura* Miq., Pl. Jungh.: 11. 1851.— *Q. lineata* var. *heterochroa* Miq., Fl. Ned. Ind. 1(1): 855. 1856.— *Q. oxyrhyncha* Miq., Fl. Ned. Ind., Eerste Bijv.: 347. 1861.— *Cyclobalanopsis lineata* (Blume) Qerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1866: 78. 1866.— *Quercus lineata* Blume var. *hildebrandii* King, Ann. Roy. Bot. Gard. (Calcutta) 2: 33, t. 26: 1. 1889; Barnett, Quer. Rel. Fag. Asia: 57. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 331. 1944.— *Q. hendersoniana* A.Camus, Bull. Mus. Natl. Hist. Nat., II, 4: 123. 1923; A.Camus, Chênes, Texte 1: 210, t. 6. 1938.— *Q. chapensis* Hickel & A.Camus, Bull. Mus. Natl. Hist. Nat. 29: 598. 1923

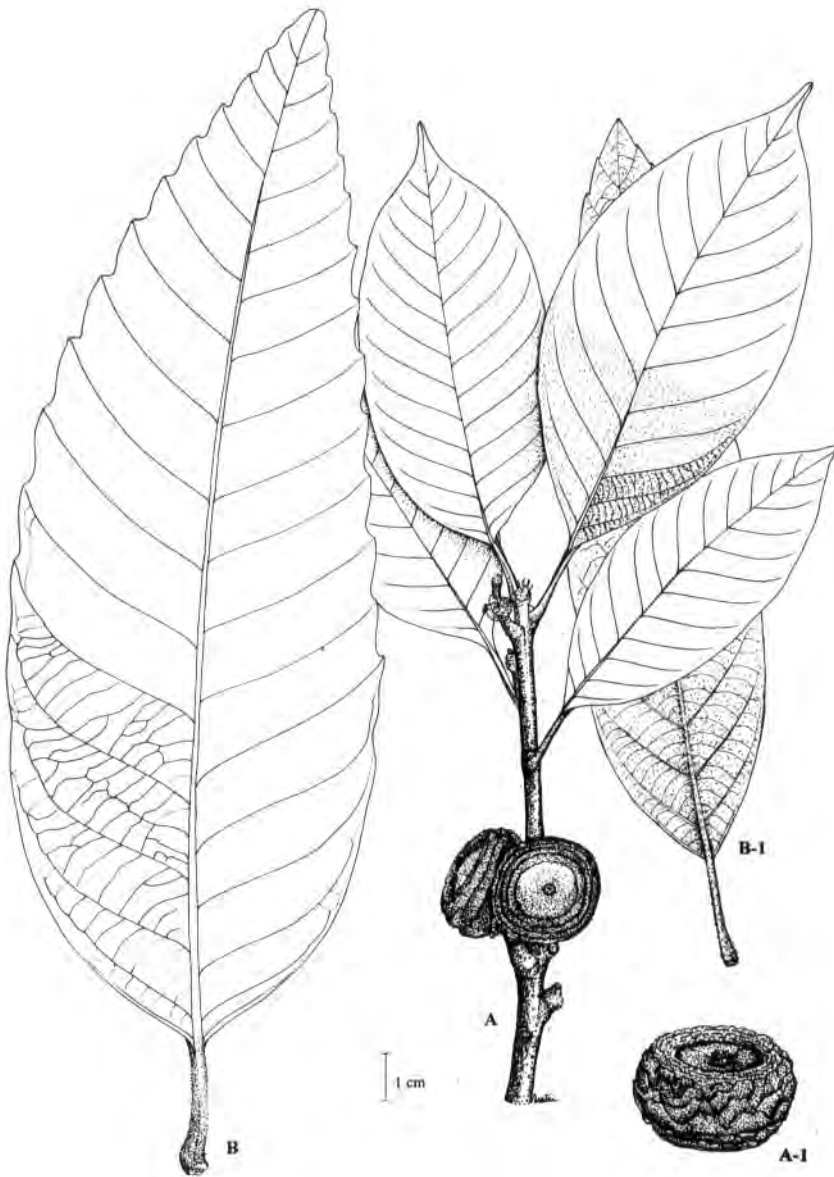


Figure 43. *Quercus lamellosa* Sm.: A. twig, leaves and infructescence (Chaloenphol 17), A-1 mature acorn; B. & B-1 different leaf forms (Bunchuai 979).

Thailand.— NORTHERN: Mae Hong Son, Chiang Mai, Chiang Rai; NORTHEASTERN: Loei; PENINSULAR: Nakhon Si Thammarat.

Distribution.— India, Myanma, Malaysia, Indonesia (type), Vietnam.

Ecology.— Lower montane forest, oak-pine forest and mixed deciduous forest, occasionally on limestone bedrock; alt. 500–2200 m (usually 1200–1500 m). Flowering Jan.–Nov., fruiting Jan.–Dec. (usually May–Sept.).

Vernacular.— Ko mok (ก่อหมอก), ko ta mu (ก่อตาหมู) (Northern).

16. *Quercus mespilifolia* Wall. ex A.DC. in A.P.de Candolle, Prodr. 16(2): 101. 1864; Kurz, Forest Fl. Burm. 2: 488. 1877; King ex Hook.f., Fl. Brit India 5: 605. 1888; King, Ann. Roy. Bot. Gard. (Calcutta) 2: 35, t. 28. 1889; Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine 5: 960. 1930; Barnett, Quer. Rel. Fag. Asia: 259. 1940.— *Cylobalanopsis mespilifolia* Qerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1866: 79. 1866.; Hjelm., Dansk. Bot. Ark. 23.4: 506. 1968.— *Quercus mespilifolioides* A.Camus, Rivista Sci. 22: 66. 1935.

KEY TO VARIETIES

1. Leaves pubescent then glabrescent on both surfaces, margin slightly serrate **16.1 var. mespilifolia**
1. Leaves pubescent then glabrescent on the upper surface, and durable soft grey hairy on lower surface, margin strongly serrate **16.2 var. pubescens**

var. mespilifolia Fig. 44.

Thailand.— NORTHERN: Mae Hong Son, Chiang Mai, Chiang Rai, Nan, Phrae, Uttaradit, Tak; NORTHEASTERN: Phetchabun, Loei; EASTERN: Nakhon Ratchasima; SOUTHWESTERN: Kanchanaburi, Uthai Thani; SOUTHEASTERN: Chanthaburi.

Distribution.— India, Myanma (type), Laos, Vietnam.

Ecology.— Deciduous dipterocarp forest, pine-oak forest and dry evergreen forest, on limestone and granite bedrock, alt. 200–1000 m (usually 700–1000 m). Flowering Feb.–Sept., fruiting Jan.–Sept..

Vernacular.— Ko ngae (ก่อเงาะ), ko daeng (ก่อแดง), ko aep (ก่อแอบ), ko dam (ก่อดำ), ko ta mu (ก่อตาหมู) (Northern), ko khi mu (ก่อขี้หมู), ko daeng (ก่อแดง), ko khaeng (ก่อแข็ง) (Northeastern), ko talup (ก่อตลับ) (Southwestern).

var. pubescens Barnett ex Smitinand & Phengklai, Thai Forest Bull., Bot. 32: 119. 2004.— *Quercus kerrii* Craib var. *pubescens* Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 331. 1944. Fig. 45.

Thailand.— NORTHERN: Chiang Mai, Kamphaeng Phet (*Kerr* 6107, type); SOUTHWESTERN: Kanchanaburi.

Distribution.— Endemic to Thailand.

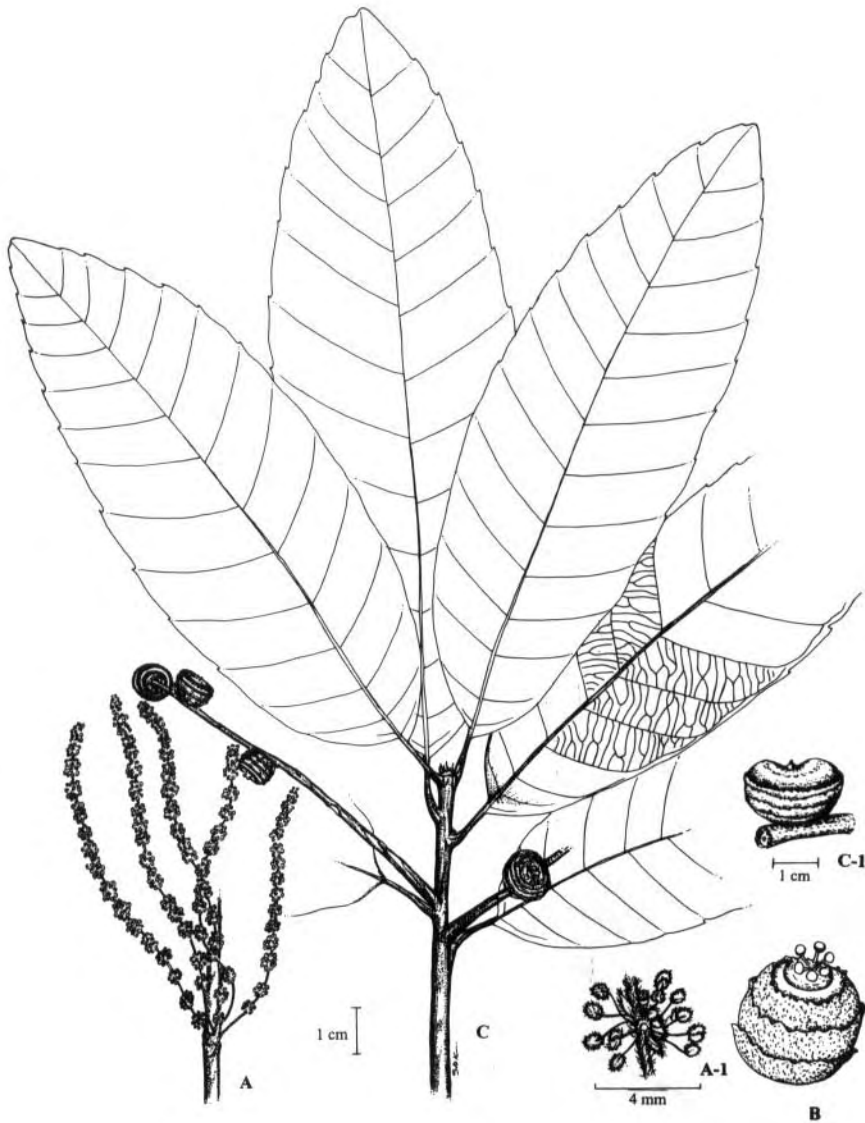


Figure 44. *Quercus mespilifolius* Wall. ex A.DC. var. *mespilifolius*: A. male inflorescences (Suvanasudhi 260), A-1 male flower cluster; B. female flower (Suvanasudhi 260); C. twig, leaves and infructescences (Phengklai et al. 6803), C-1 mature acorn.



Figure 45. *Quercus mespilifolia* Wall. ex A.DC. var. *pubescens* Barnett ex Smitinand & Phengklai: A. twig, leaves and infructescences, A-1 & A-2 detached leaf and leaf margin; B. acorn, side view, B-1 top view (enlarged) (Kerr 6107).

Ecology.— Dry evergreen forest, mixed deciduous forest and deciduous dipterocarp forest, on granite and limestone bedrock.

Vernacular.— Ko kamphaeng (ก่อกำแพง) (Northern), ko talup (ก่อตลับ) (Southwestern).

17. *Quercus myrsinaefolia* Blume, Mus. Bot. 1: 305. 1851; Miq., Mus. Bot. 1: 117. 1851; Rehder & E.H. Wilson in C.S. Sargent, Pl. Wilson, 3: 236. 1917; Barnett, Quer. Rel. Fag. Asia: 233. 1940.— *Q. bambusifolia* Fortune, Gard. Chron. 1860: 170. 1860.— *Cyclobalanopsis myrsinaefolia* (Blume) Oerst., Kongel. Danske Vidensk. Selsk. Skr. Naturvidensk. Math. Afd., V, 9: 879. 1873; C.C. Huang, Y.T. Chang & B.M. Bartol. in C.Y. Wu & P.H. Raven, Fl. China 4: 398. 1999.— *C. myrsinaefolia* (Blume) Schott., Bot. Jahrb. Syst. 47: 656. 1912; Hjelm, Dansk Bot. Ark., 23.4: 501. 1968.

Thailand.— NORTHERN: Phitsanulok; NORTHEASTERN: Phetchabun; EASTERN: Nakhon Ratchasima, Ubon Ratchathani; SOUTHWESTERN: Kanchanaburi; CENTRAL: Nakhon Nayok; PENINSULAR: Ranong, Phangnga.

Distribution.— Laos, Vietnam, China, Korea, Japan (type).

Ecology.— Deciduous dipterocarp forest, dry evergreen forest and lowland evergreen forest, on sandy soils and granite bedrock, often by streams, alt. 50–900 m (usually 500–900 m). Flowering Feb.–Dec. (usually Oct.–Dec.), fruiting March–Dec. (usually Aug.–Oct.).

Vernacular.— Ko dang (ก่อด่าง), tao pun nok (เต้าปูนนก), sae (เส้), (Peninsular).

18. *Quercus sessilifolia* Blume, Mus. Bot. 1: 305. 1850.— *Cyclobalanopsis sessilifolia* (Blume) Schottky, Bot. Jahrb. Syst. 47: 652. 1912; C.C. Huang, Y.T. Chang & B.M. Bartol. in C.Y. Wu & P.H. Raven, Fl. China 4: 389. 1999.— *Quercus nubium* Hand.-Mazz, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 59: 137. 1922.— *Q. paucidentata* Franch. ex Nakai, Bot. Mag. (Tokyo) 40: 583. 1926.

Thailand.— SOUTHEASTERN: Trat.

Distribution.— China (type) (isotype C).

Ecology.— Lowland evergreen forest on granite bedrock.

Vernacular.— Ko chan (ก่อจันทร์).

19. *Quercus oidocarpus* Korth., Verh. Nat. Gesch. Ned. Bezitt., Bot.: 216, t. 47, fig. 18. 1844; King ex Hook.f., Fl. Brit. India 5: 603. 1888; Hickel & A. Camus in H. Lecomte, Fl. Indo-Chine 5: 952. 1930; Ridl., Fl. Malay Penins. 3: 373. 1967; Barnett, Quer. Rel. Fag. Asia: 64. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 331. 1944. Soepadmo, Fl. Males. 7(2): 392. 1972.— *Cyclobalanopsis oidocarpa* (Korth.) Oerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1866: 78. 1866.— *Quercus brevistyla* A. Camus, Bull. Soc. Bot. France 80: 353. 1933; A. Camus, Chênes, Texte. 1: 276, t. 17. 1938.

Thailand.— NORTHERN: Chiang Mai, Chiang Rai; NORTHEASTERN: Loei; PENINSULAR: Nakhon Si Thammarat, Phattalung, Trang, Yala, Narathiwat.

Distribution.— Myanma, Vietnam, Malaysia, Indonesia (type).

Ecology.— Tropical evergreen forest, lower montane forest, frequent on ridges of granite bedrock, alt. 800–1700 m (usually 1200–1400 m). Flowering Dec., fruiting March–Dec.

Vernacular.— Ko muak (ก่อหมวก) (Peninsular).

20. *Quercus oxyodon* Miq., Ann. Mus. Bot. Lugduno-Batavi 1: 114. 1864; A.DC. in A.P.de Candolle, Prodr. 16(2): 98. 1864; Barnett, Quer. Rel. Fag. Asia.: 255. 1940.— *Cyclobalanopsis oxyodon* (Miq.) Oerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1866: 79. 1866; C.C.Huang, Y.T.Chang & B.M.Bartol. in C.Y.Wu & P.H.Raven, Fl. China 4: 391. 1999.— *Quercus lineata* Blume var. *oxyodon* (Miq.) Wenz., Jahrb. Königl. Bot. Gart. Berlin 4: 232. 1886; King ex Hook.f., Brit. India 5: 605. 1888; King, Ann. Roy. Bot. Gard. (Calcutta): 33, t. 26. 1889.— *Q. lineata* Blume var. *grandifolia* Skan, J. Linn. Soc., Bot. 26: 517. 1889. Fig. 46.

Thailand.— NORTHERN: Chiang Mai; NORTHEASTERN: Phetchabun; EASTERN: Nakhon Ratchasima; PENINSULAR: Ranong.

Distribution.— India (type), Nepal, Bhutan, Myanma, China.

Ecology.— Lower montane forest and evergreen forest on ridges, alt. 1800–2000 m. Flowering and fruiting March–Dec.

Vernacular.— Ko luem (ก่อเลื่อม) (Northern).

21. *Quercus poilanei* Hickel & A.Camus, Ann. Sci. Nat., Bot., X, 3: 384. 1921; Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine 5: 961. 1930; Barnett, Quer. Rel. Fag. Asia: 273. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 169. 1944.— *Cyclobalanopsis poilanei* (Hickel & A.Camus) Hjelmq., Dansk. Bot. Ark. 23: 503. 1968. Fig. 47.

Thailand.— NORTHERN: Mae Hong Son, Chiang Mai.

Distribution.— Vietnam (type).

Ecology.— Oak-pine forest and dry upper mixed deciduous forest, frequent on ridges of granite bedrock, alt. 600–1400 m (usually 600–900 m). Flowering Feb.–April, fruiting Jan.–Dec. (usually Jan.–March).

Vernacular.— Ko si siat (ก่อสี่เสียด) (Northern).

Uses.— Bark chewed locally with betel nut.

22. *Quercus quangtriensis* Hickel & A.Camus, Bull. Mus. Natl. Hist. Nat. 32: 400. 1926; Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine 5: 949. 1930; Barnett, Quer. Rel. Fag. Asia: 247. 1940.— *Q. longistyla* Barnett, Bull. Misc. Inform. Kew 1938: 100. 1938; Barnett, Quer. Rel. Fag. Asia: 75. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 332. 1944.— *Q. wangsaiensis* Barnett, Bull. Misc. Inform. Kew. 1938: 99. 1938; Barnett, Quer. Rel. Fag. Asia: 68. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 331. 1944.

Thailand.— NORTHERN: Chiang Mai, Tak; NORTHEASTERN: Phetchabun, Loei,

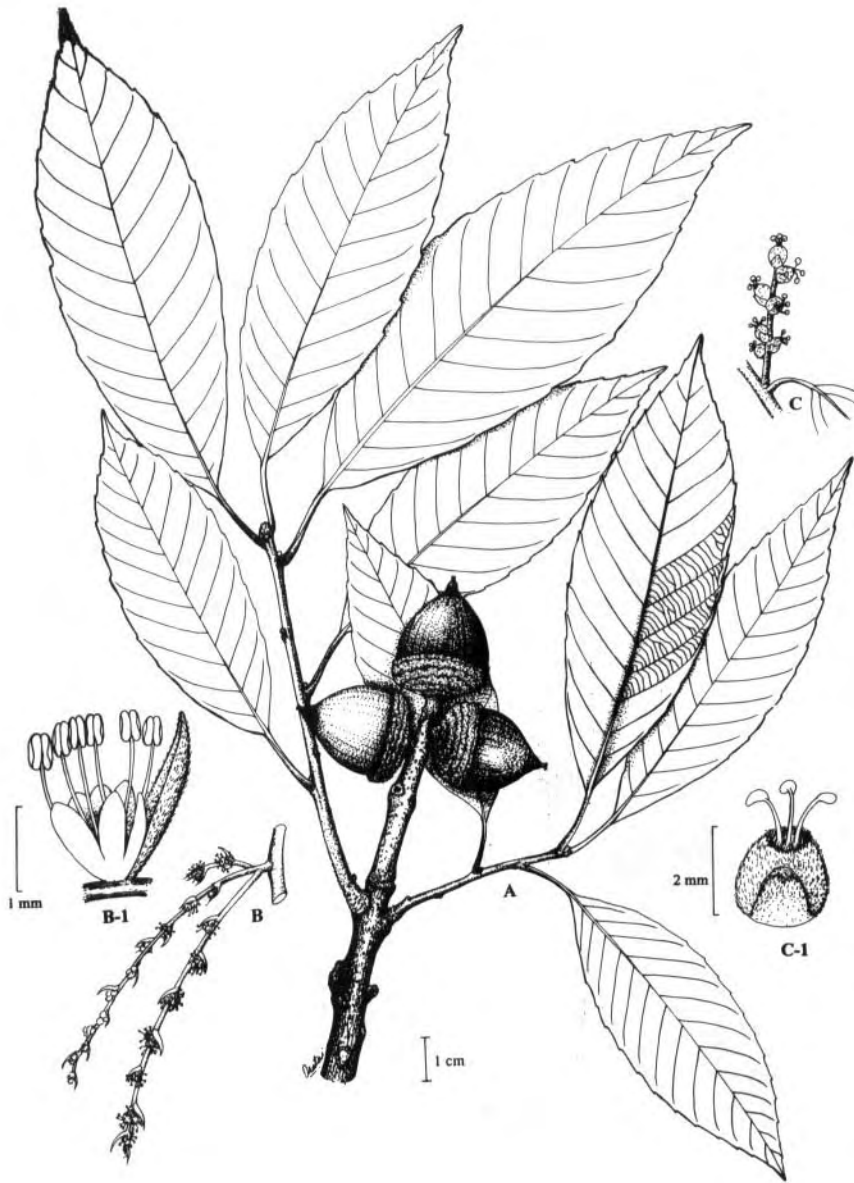


Figure 46. *Quercus oxyodon* Miq.: A. twig with leaves and infructescence (Smitinand 90-28); B. male inflorescences (Frh. H. 11133), B-1 male flower; C. female flower (Frh. H. 11133), C-1 female flower.



Figure 47. *Quercus poilanei* Hickel & A. Camus: A. twig with leaves and infructescence (Smitinand *et al.* 7579), A-1, A-2, A-3 acorns; B. male inflorescences (Smitinand 4391), B-1 male flower cluster, B-2 male flower.

Nakhon Phanom; SOUTHWESTERN: Kanchanaburi; CENTRAL: Lop Buri; SOUTHEASTERN: Rayong, Chanthaburi; PENINSULAR: Nakhon Si Thammarat.

Distribution.— Vietnam (type).

Ecology.— Lower and upper montane forest and evergreen forest, by streams, alt. 800–2500 m (usually 900–1300 m). Flowering Feb.–April, fruiting Feb.–Nov.

Vernacular.— Ko nuat maew (ก่อหนวดแมว), ko khwai siak (ก่อควายเสีย), (Northeastern); ko paen (ก่อแป้น) (Peninsular).

23. *Quercus ramsbottomii* A.Camus, Bull. Soc. Bot. France 83: 343. 1936; Barnett, Quer. Rel. Fag. Asia: 74. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 33: 332. 1942.— *Cyclobalanopsis ramsbottomii* (A.Camus) Hjelmq., Dansk. Ark. 23: 502. 1968.

Thailand.— NORTHERN: Chiang Mai; NORTHEASTERN: Phetchabun, Loei; EASTERN: Chaiyaphum, Nakhon Rachasima; CENTRAL: Nakhon Nayok; SOUTHWESTERN: Kanchanaburi; SOUTHEASTERN: Prachin Buri.

Distribution.— Myanmar (type).

Ecology.— Lower montane forest, oak-pine forest, mixed deciduous forest and savannah forest, often by streams on granite bedrock.

Vernacular.— Ko talap (ก่อตลับ) (Northern); ko aep (ก่อแอบ), ko um (ก่ออุ้ม), ko daeng (ก่อแดง), ko khi mu (ก่อขี้หมู) (Northeastern); ko talap (ก่อตลับ) (Central).

24. *Quercus rex* Hemsl., Hooker's Icon. Pl. 27: t. 2663. 1899; Brandis, Indian Trees: 631. 1921, Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine 5: 957. 1930; Barnett, Quer. Rel. Fag. Asia: 62. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh. 34: 331. 1944.— *Cyclobalanopsis rex* (Hemsl.) Schottky, Bot. Jahrb. Syst. 47: 651. 1912; C.C.Huang, Y.T.Chang & B.M.Bartol. in C.Y.Wu & P.H.Raven, Fl. China 4: 390. 1999.— *Quercus fructiseptata* A.Camus, Chênes, Atlas. 1: 22. 1934.— *Cyclobalanopsis fructiseptata* (A.Camus) Hjelmq., Dansk. Bot. Ark. 23: 503. 1968.— *Quercus dussaudii* Hickel & A.Camus, Ann. Sci. Nat., Bot., X, 3: 384. 1921; Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine 5: 953. 1930; Barnett, Quer. Rel. Fag. Asia: 267. 1940.

Thailand.— NORTHERN: Chiang Mai, Tak

Distribution.— China (type), Myanmar, Laos.

Ecology.— Lower montane forest and evergreen forest, alt. 880–1600 m (usually 1200–1600 m). Flowering March–Dec., fruiting July.

Vernacular.— Ko plai chak (ก่อปลายจัก), ko talap (ก่อตลับ) (Northern).

25. *Quercus saravanensis* A.Camus, Chênes, Atlas. 1: 19. 1934; C.C.Huang, Y.T.Chang & B.M.Bartol. in C.Y.Wu & P.H.Raven, Fl. China 4: 389. 1999.— *Q. kontumensis* A.Camus, Chênes, Atlas 1: 24. 1934.— *Cyclobalanopsis kontumensis* (A.Camus) Y.C.Hsu & H.Wei Jen., Acta Phytotax. Sin., 34: 339. 1996. Fig. 48.

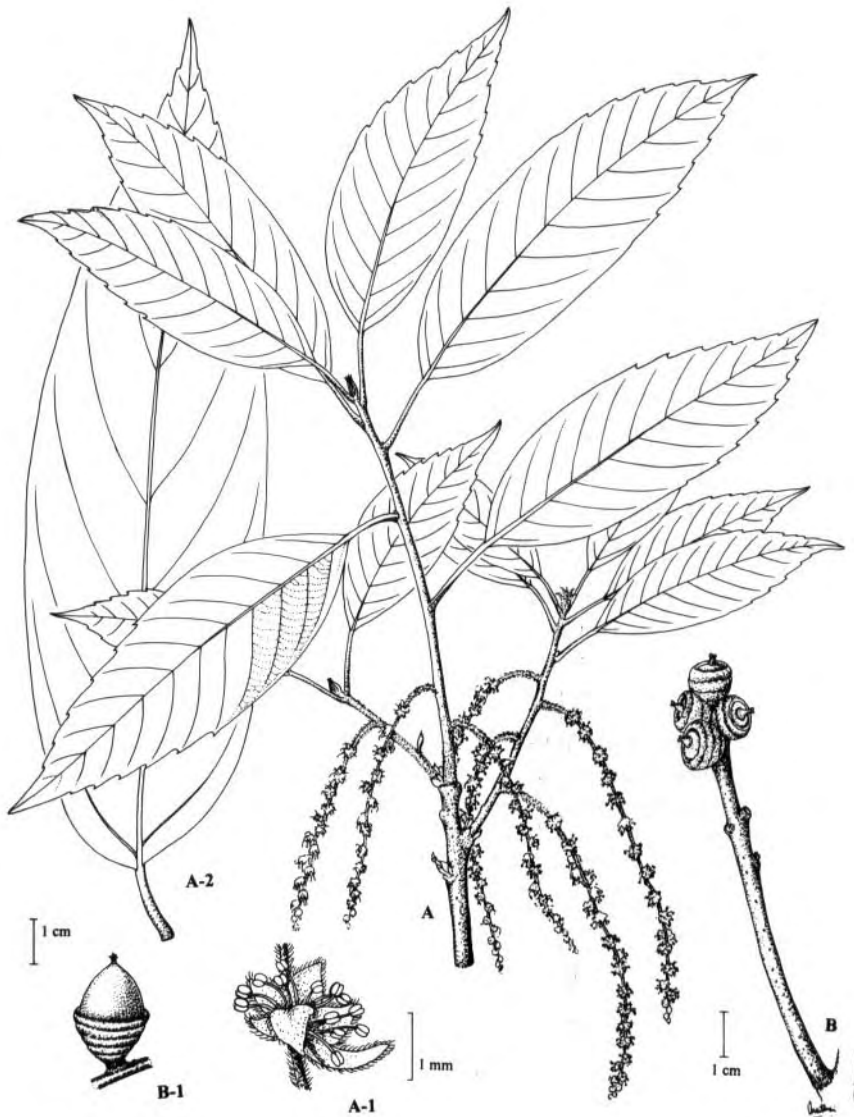


Figure 48. *Quercus saravanensis* A. Camus: A. twig with leaves and inflorescences (Smitinand 90-190), A-1 male flower clusters, A-2 different form of leaf (detached); B. infructescence (Smitinand 90-195), B-1 mature acorn.

Thailand.—SOUTHEASTERN: Prachin Buri.

Distribution.—China, Laos (type), Vietnam.

Ecology.—Dry evergreen forest, alt. 500–800 m. Flowering and fruiting July–Sept.

Vernacular.—Ko kliang (ก่อเกลี้ยง) (Southeastern).

26. *Quercus semecarpifolia* Sm. in A.Rees, Cycl.: 29: 20. 1819; King ex Hook.f., Fl. Brit. India 5: 601. 1888; Skan. J. Linn. Soc., Bot. 26: 520. 1899; Barnett, Quer. Rel. Fag. Asia: 41. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 331. 1944; C.C.Huang, Y.T.Chang & B.M.Bartol. in C.Y.Wu & P.H.Raven, Fl. China 4: 375. 1999.

Thailand.—NORTHERN: Chiang Mai.

Distribution.—Afghanistan, Bhutan, India, Nepal (type), Pakistan, China.

Ecology.—Exposed ridges of lower and upper montane forests, on limestone bedrock, alt. 1950–2200 m. Flowering May, fruiting April–July.

Vernacular.—Ko chiangdao (ก่อเชียงดาว).

27. *Quercus semiserrata* Roxb., Fl. Ind. ed. 1832, 3: 641. 1832; Kurz, Forest Fl. Burm. 2: 488. 1877; King ex Hook.f., Fl. Brit. India 5: 604. 1888; Paulsen, J. Bot. Tidssk. 24.3: 255. 1902; Craib, Bull. Misc. Inform. Kew 1911: 472. 1911; Hickel & A.Camus in H.Lecomte, Fl. Indo-Chine 5: 948. 1930; Barnett, Quer. Rel. Fag. Asia: 70. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 332. 1944.—*Cyclobalanopsis semiserata* (Roxb.) Oerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1866: 79. 1866; Hjelm., Dansk Bot. Ark., 23.4: 501. 1968; C.C.Huang, Y.T.Chang & B.M.Bartol. in C.Y.Wu & P.H.Raven, Fl. China 4: 386. 1999.

Thailand.—NORTHERN: Chiang Mai, Chiang Rai, Phrae; NORTHEASTERN: Loei. SOUTHWESTERN: Kanchanaburi; SOUTHEASTERN: Trat; PENINSULAR: Ranong, Phangnga, Trang.

Distribution.—India, Myanma (type), China, Malaysia.

Ecology.—Lowland evergreen forest and lower montane forest, on granite, limestone or sandstone bedrock., on slopes of stream valleys, alt. 250–1800 m (usually 1200–1400 m). Flowering Feb.–Dec. (usually March), fruiting Jan.–Dec. (usually May–June).

Vernacular.—Ko mu (ก่อหมู), (Northern & Northeastern); ko kra dum (ก่อกระดุม) (Southeastern); ko nua rew (ก่อเนื้อรว), tao pun nok khao (เตาปูนนกเขา) (Peninsular).

28. *Quercus setulosa* Hickel & A.Camus, Bull. Mus. Natl. Hist. Nat. 29: 598. 1923; Barnett, Quer. Rel. Fag. Asia: 43. 1940; Barnett, Trans. & Proc. Bot. Soc. Edinburgh 34: 331. 1944; C.C.Huang, Y.T.Chang & B.M.Bartol. in C.Y.Wu & P.H.Raven, Fl. China 4: 380. 1999.

Thailand.—NORTHEASTERN: Phetchabun, Loei; EASTERN: Chaiyaphum.

Distribution.—Vietnam (type).

Ecology.—Evergreen forest, savannah forest and oak forest, frequent on loamy soil by streams, alt. 600–1000 m. Flowering Jan.–May, fruiting Jan.–Nov. (usually May–Sept.).

Vernacular.— Ko ta chi (ก่อตาจี) (Northeastern).

29. *Quercus vestita* Rehder & E.H. Wilson in C.S. Sargent, Pl. Wilson, 3: 236. 1916; (except cited specimens); Barnett, Quer. Rel. Fag. Asia: 60. 1940.— *Q. velutina* Lindl. ex Wall., Pl. Asiat. Rar. 2: 41, t. 150. 1831 (non Wall. Cat. 2768); Kurz, Forest Fl. Burm. 2: 487. 1877; King ex Hook.f., Fl. Brit. India 5: 606. 1888; Koidz., Bot. Mag. (Tokyo) 30: 202. 1916; Brandis, Indian Trees: 628. 1921; Hickel & A. Camus in H. Lecomte, Fl. Indo-Chine 5: 953. 1930.— *Cyclobalanopsis velutina* (Lindl.) Oerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1866: 79. 1866.

Thailand.— NORTHERN: Chiang Mai, Lamphun, Tak; NORTHEASTERN: Loei.

Distribution.— India, Myanma (type), Laos.

Ecology.— Lowland evergreen forest and lower montane forest, in open galleries, on sandstone and granite bedrock, alt. 500–1750 m (usually 900–1300 m). Flowering Feb.–Dec. (usually Nov.–Dec.), fruiting Feb.–Aug.

Vernacular.— Ko aep (ก่อเอ็บ), ko muak (ก่อหมวก) (Northern).

4. TRIGONOBALANUS

Forman, Taxon 11: 140. 1962; Forman, Kew Bull. 17: 387. 1964; Forman, Kew Bull. 21: 331. 1967; Soepadmo, Fl. Males. 7(2): 398. 1972; Soepadmo, Julia & Go in E. Soepadmo & L.G. Saw, Tree Fl. Sabah & Sarawak 3: 115. 2000.— *Formanodendron* Nixon & Crepet, Amer. J. Bot. 46: 840. 1989.

Evergreen tree. Branchlets initially densely fulvous adpressed-pubescent. Terminal buds ovoid, scales imbricate. Stipules extra- or interpetiolar, caducous. *Leaves* spirally arranged, entire. *Inflorescences* separate male and female or female below and male on the upper part of the same suberect spiklets, occasionally mixed. *Male inflorescences* simple or branched in the axil or upper leaf-scars or subterminal. *Female androgynous* or *mixed* inflorescences a simple, erect catkin, axillary. *Male flowers* usually in clusters of three or more, with one or more bracts; perianth campanulate, 6-lobed, free or minutely connate near base. Stamens 6, anthers glabrous, basifixed, a cluster of minute erect hairs present instead of rudimentary ovary. *Female flowers* in clusters of 3 or more, bracts as male; perianth campanulate, with 6 imbricate lobes, the lower parts adnate to the ovary. Staminodes 6. Style 3 recurved or connate near base, stigma capitate. *Cupule* set in an irregularly saucer-shaped support, normally with 1–3 nuts. *Fruits* strongly longitudinally trigonous; scar present, visible.

A genus of 3 species, scattered in South and Southeast Asia and South America. Among these one species indigenous to Thailand.

Trigonobalanus doichangensis (A. Camus) Forman, Kew Bull. 17: 387. 1964.— *Quercus doichangensis* A. Camus, Bull. Soc. Bot. France 80: 355. 1933; Barnett, Quer. Rel. Fag. Asia: 77. 1940.— *Formanodendron doichangensis* (A. Camus) Nixon & Crepet, Crepet, Amer. J.

Bot. 76: 840. 1989; C.C.Huang, Y.T.Chang & B.M.Bartol. in C.Y.Wu & P.H.Raven, Fl. China 4: 370. 1999.

Thailand.— NORTHERN: Chiang Mai, Mae Hong Son.

Distribution.— China (Yunnan).

Ecology.— Rare along ridges in lower montane forest, alt. 900–1600 m. Flowering and fruiting Dec.–Feb.

Vernacular.— Ko doichang (ก่อดอยช้าง), ko samliam (ก่อสามเหลี่ยม) (Northern).

Note.— This species is rare and endangered. Both seed dispersal and seedling establishment are rare events; the acorns are readily damaged by fungi and insects.

J. FAGACEAE

GENERA & SPECIES NUMBERS

1. CASTANOPSIS (D. Don) Spach.

- | | |
|--|---|
| 1.1 <i>C. acuminatissima</i> (Blume) A. DC. | 1.17 <i>C. indica</i> (Roxb.) A. DC. |
| 1.2 <i>C. argentea</i> (Blume) A. DC. | 1.18 <i>C. inermis</i> (Lindl. ex Wall.) Benth. & Hook.f. |
| 1.3 <i>C. argyrophylla</i> King ex Hook.f. | 1.19 <i>C. lanceifolia</i> (Roxb.) Hickel & A. Camus |
| 1.4 <i>C. armata</i> (Roxb.) Spach. | 1.20 <i>C. malaccensis</i> Gamble |
| 1.5 <i>C. brevispinula</i> Hickel. & A. Camus | 1.21 <i>C. megacarpa</i> Gamble |
| 1.6 <i>C. calathiformis</i> (Skan) Rehder & Wilson | 1.22 <i>C. nephelioides</i> King ex Hook.f. |
| 1.7 <i>C. cerebrina</i> (Hickel & A. Camus) Barnett | 1.23 <i>C. pierrei</i> Hance |
| 1.8 <i>C. costata</i> (Blume) A. DC. | 1.24 <i>C. piriformis</i> Hickel & A. Camus |
| 1.9 <i>C. crassifolia</i> Hickel & A. Camus | 1.25 <i>C. pseudohystrix</i> Phengklai |
| 1.10 <i>C. diversifolia</i> (Kurz) King & Hook.f. | 1.26 <i>C. purpurea</i> Barnett |
| 1.11 <i>C. echidnocarpa</i> (Hook. & Thom. ex A.DC.) A.DC. | 1.27 <i>C. rhamnifolia</i> (Miq.) A. DC. |
| 1.12 <i>C. ferox</i> (Roxb.) Spach | 1.28 <i>C. rockii</i> A. Camus |
| 1.13 <i>C. fissa</i> (Champ.) Rehder & Wilson | 1.29 <i>C. schefferiana</i> Hance |
| 1.14 <i>C. fordii</i> Hance | 1.30 <i>C. siamensis</i> Duanmu |
| 1.15 <i>C. javanica</i> (Blume) A. DC. | 1.31 <i>C. thaiensis</i> Phengklai |
| 1.16 <i>C. hystrix</i> (Hook.f. & Thom. ex Miq.) A. DC. | 1.32 <i>C. tribuloides</i> (Smith) A. DC. |
| | 1.33 <i>C. wallichii</i> King & Hook.f. |

2. LITHOCARPUS Blume

- | | |
|---|--|
| 2.1 <i>L. aggregatus</i> Barnett | 2.28 <i>L. loratefolius</i> Phengklai |
| 2.2 <i>L. auriculatus</i> (Hickel & A. Camus) Barnett | 2.29 <i>L. lucidus</i> (Roxb.) Rehder |
| 2.3 <i>L. bancanus</i> (Scheff.) Rehder | 2.30 <i>L. macphailii</i> (M.R. Hend.) Barnett |
| 2.4 <i>L. bennettii</i> (Miq.) Rehder | 2.31 <i>L. magneinii</i> (Hickel & A. Camus) A. Camus |
| 2.5 <i>L. blumeanus</i> (Korth.) Rehder | 2.32 <i>L. magnificus</i> (Brandis) A. Camus |
| 2.6 <i>L. cantleyanus</i> (King ex Hook.f.) Rehder | 2.33 <i>L. maingayi</i> (Benth.) Rehder |
| 2.7 <i>L. ceriferus</i> (Hickel & A. Camus) A. Camus | 2.34 <i>L. mekongensis</i> (A. Camus) Huang & Y.T. Zhang |
| 2.8 <i>L. clementianus</i> (King ex Hook.f.) A. Camus | 2.35 <i>L. neorobinsonii</i> (Ridl.) A. Camus |
| 2.9 <i>L. craibianus</i> Barnett | 2.36 <i>L. pattaniensis</i> Barnett |
| 2.10 <i>L. curtisii</i> (King ex Hook.f.) A. Camus | 2.37 <i>L. pierrei</i> (Hickel & A. Camus) A. Camus |
| 2.11 <i>L. cyclophorus</i> (Endl.) A. Camus | 2.38 <i>L. platycarpus</i> (Blume) Rehder |
| 2.12 <i>L. dealbatus</i> (Hook.f. & Thom.) Rehder | 2.39 <i>L. polystachyus</i> (Wall. ex A. DC.) Rehder |
| 2.13 <i>L. echinophorus</i> (Hickel & A. Camus) A. Camus | 2.40 <i>L. rassa</i> (Miq.) Rehder |
| 2.14 <i>L. echinops</i> Hjelmq. | 2.41 <i>L. recurvatus</i> Barnett |
| 2.15 <i>L. eichleri</i> (Wenzing) A. Camus | 2.42 <i>L. reinwardtii</i> (Korth.) A. Camus |
| 2.16 <i>L. elegans</i> (Blume) Hatus. ex Soepadmo | 2.43 <i>L. revolutus</i> Hatus. ex Soepadmo |
| 2.17 <i>L. elephantum</i> (Hance) A. Camus | 2.44 <i>L. rufescens</i> Barnett |
| 2.18 <i>L. encleisacarpus</i> (Korth.) A. Camus | 2.45 <i>L. scortechinii</i> (King ex Hook.f.) A. Camus |
| 2.19 <i>L. erythrocarpus</i> (Ridl.) A. Camus | 2.46 <i>L. siamensis</i> A. Camus |
| 2.20 <i>L. eucalyptifolius</i> (Hickel & A. Camus) A. Camus | 2.47 <i>L. sootepensis</i> (Craib) A. Camus |
| 2.21 <i>L. falconeri</i> (Kurz) Rehder | 2.48 <i>L. sundaicus</i> (Blume) Rehder |
| 2.22 <i>L. fenestratus</i> (Roxb.) Rehder | 2.49 <i>L. thomsonii</i> (Miq.) Rehder |
| 2.23 <i>L. garrettianus</i> (Craib) A. Camus | 2.50 <i>L. trachycarpus</i> (Hickel & A. Camus) A. Camus |
| 2.24 <i>L. gracilis</i> (Korth) Soepadmo | 2.51 <i>L. truncatus</i> (King ex Hook.f.) Rehder & Wilson |
| 2.25 <i>L. harmandianus</i> (Hickel & A. Camus) A. Camus | 2.52 <i>L. tubulosus</i> (Hickel & A. Camus) A. Camus |
| | 2.53 <i>L. vestitus</i> (Hickel & A. Camus) A. Camus |
| | 2.54 <i>L. wallichianus</i> (Lindl. ex Hance) Rehder |
| | 2.55 <i>L. wrayi</i> (King) A. Camus |

2.26 *L. hendersonianus* A. Camus2.27 *L. lindleyanus* (Wall. ex A. DC.) A. Camus2.56 *L. xylocarpus* (Kurz) Markgr.3. QUERCUS L.3.1 *Q. acutissimus* Carruth.3.2.1 *Q. aliena* Blume subsp. *aliena*3.2.2 *Q. aliena* Blume subsp. *griffithii*3.3 *Q. augustinii* Skan3.4 *Q. auricoma* A. Camus3.5 *Q. austro-cochinchinensis* Hickel &
A. Camus3.6 *Q. brandisianus* Kurz3.7 *Q. fleuryi* Hickel & A. Camus3.8 *Q. franchetii* Skan3.9 *Q. helferianus* A. DC.3.10 *Q. kerrii* Craib3.11 *Q. kingianus* Craib3.12 *Q. lamellosa* Sm.3.13 *Q. lanata* Sm.3.14 *Q. lenticellatus* Barnett3.15 *Q. lineatus* Blume3.16.1 *Q. mespilifolius* Wall. ex A. DC var.
*mespilifolius*3.16.2 *Q. mespilifolius* Wall.ex A. DC.var. *pubescens*
Barnett ex Smitinand & Phengklai3.17 *Q. myrsinaefolius* Blume3.18 *Q. sessilifolia* Blume3.19 *Q. oidocarpus* Korth.3.20 *Q. oxyodon* Miq.3.21 *Q. poilanei* (Hickel & A. Camus) Hjelmq.3.22 *Q. quangtriensis* Hickel & A. Camus3.23 *Q. ramsbottomii* A. Camus3.24 *Q. rex* (Hemsl.) Schottky3.25 *Q. saravanensis* A. Camus3.26 *Q. semecarpifolia* Sm.3.27 *Q. semiserratus* Roxb.3.28 *Q. setulosus* Hickel & A. Camus3.29 *Q. vestitus* Rehder & Wilson4. TRIGONOBALANUS Forman4.1 *T. doichangensis* (A. Camus) Forman

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- Bunchu** 755 : 2.16 (BK).
- Bunchuai K.** 21 : 1.17 (BKF); 24 : 1.17 (BKF); 43 : 2.12 (BKF); 45 : 2.39 (BKF); 58 : 1.10 (BKF); 63 : 2.16 (BKF); 73 : 2.25 (BKF); 77 : 3.11 (BKF); 102 : 1.32 (BKF); 102A : 1.5 (BKF, C); 108 : 1.26 (BKF); 109 : 1.32 (BKF); 112 : 2.47 (BKF); 112A : 3.11 (BKF); 114 : 1.4 (BKF); 116 : 1.11 (BKF); 134 : 2.51 (BKF); 142 : 2.51 (BKF); 149 : 1.26 (BKF); 150 : 3.10 (BKF, C, K); 152 : 2.39

(BKF); 153 : 2.47 (BKF); 160 : 1.17 (BKF); 161 : 2.52 (BKF); 168 : 2.23 (BKF); 169 : 2.7 (AAU, BKF, C, K); 178 : 2.51 (BKF); 179 : 2.51 (BKF); 180 : 3.11 (BKF); 193 : 2.51 (BKF); 208 : 3.9 (BKF); 213 : 3.11 (BKF); 214 : 3.11 (BKF); 230 : 2.27 (BKF); 265 : 3.11 (BKF); 266 : 2.39 (BKF); 276 : 2.50 (BKF); 280 : 1.1 (BKF); 287 : 2.39 (BKF); 291 : 2.49 (BKF); 605 : 1.8 (BKF); 607 : 1.4 (BKF); 629 : 1.10 (BKF, C); 631 : 2.9 (BKF, K); 633 : 2.39 (BKF, C); 634 : 2.47 (BKF); 645 : 3.10 (BKF); 646 : 2.1 (BKF); 647 : 2.47 (BKF, K); 648 : 1.32 (BKF, C, K); 656 : 2.27 (BKF); 657 : 3.11 (BKF); 658 : 3.10 (BKF, K); 622 : 1.12 (BKF); 666 : 1.1 (BKF); 672 : 2.47 (BKF); 674 : 3.16.1 (BKF); 675 : 2.39 (BKF); 678 : 2.39 (BKF); 680 : 2.39 (BKF); 682 : 2.47 (BKF); 684 : 2.23 (BKF); 685 : 2.23 (BKF); 689 : 1.11 (BKF); 691 : 2.39 (BKF); 965 : 2.12 (BKF); 1244 : 2.7 (BKF, C, K); 1339 : 2.49 (BKF, C, K); 1348 : 2.22 (BKF, C, K); 1349 : 3.9 (BKF, C, K); 1350 : 2.47 (AAU, BKF, C, K); 1378 : 1.2 (BKF, C, K); 1385 : 1.17 (BKF, C, K); 1387 : 2.47 (AAU, BKF, C, K); 1389 : 1.26 (BKF, C); 1405 : 1.32 (BKF, C, K); 1441 : 2.12 (BKF, K); 1442 : 2.16 (BKF, C, K); 1443 : 3.9 (AAU, BKF, C); 1449 : 1.3 (BKF, C, K); 1453 : 1.3 (BKF, C, K); 1462 : 2.47 (BKF, C); 1464 : 3.9 (BKF, C, K); 1466 : 3.9 (AAU, BKF, C, K); 1473 : 3.4 (AAU, BKF, C, K); 1507 : 2.41 (BKF, C, K); 1548 : 2.25 (AAU, BKF, C, K); 1550 : 2.7 (BKF, K); 1551 : 2.7 (BKF, C, K); 1552 : 2.25 (BKF, C, K); 1650 : 2.25 (BKF, C, K); 1667 : 2.25 (AAU, BKF, C, K); 1746 : 2.55 (BKF, K); 1749 : 2.39 (AAU, BKF, C, K); 1750 : 2.55 (BKF, C, K); 1751 : 2.55 (BKF, K); 1881 : 2.7 (BKF).

Bunnab Ch. 82 : 1.18 (BKF); 118 : 2.52 (BKF); 192 : 1.33(BKF); 295 : 1.4 (BKF); 297 : 2.21 (BKF); 345 : 1.22 (BKF); 346 : 2.55 (BKF); 373 : 2.52 (BKF); 464 : 1.18 (BKF).

Bunpheng D. 54 : 1.32; 92 : 2.51 (BKF); 302 : 2.51 (BKF); 310 : 3.22 (BKF); 312 : 3.22 (BKF); 373 : 2.16 (BKF, K); 391 : 3.23 (BKF); 400 : 3.1 (BKF); 410 : 3.1 (BKF, K); 442 : 3.1 (BKF); 551 : 3.2.2 (BKF); 596 : 1.1 (BKF); 630 : 2.23 (BKF); 632 : 1.32 (BKF); 641 : 3.23 (BKF); 667 : 3.2.2 (BKF); 695 : 2.16 (BKF, BK); 703 : 2.16 (BKF); 802 : 3.23 (BKF); 827 : 1.11 (BKF); 870 : 2.16 (BKF); 885 : 2.51 (BKF); 887 : 2.23 (BKF); 888 : 1.17 (BKF); 889 : 2.12 (BKF).

Bunyarathabhan A. 62 : 2.25 (BKF); 114 : 2.39 (BKF).

Charoenchai P. 5 : 3.24 (MAU); 339 : 1.1 (MAU).

Chaemchumroon V. 98-41 : 2.21 (BKF).

Chaemchusri B. s.n. : 1.13 (BKF).

Chan-sa-nguan P. sn. : 3.16.1 (BKF); sn. : 1.32 (BKF); sn. : 2.16 (BKF).

Chantaranothai P. et al. 90-166 : 3.4 (K); 90-224 : 3.6 (K); 991 : 2.16 (BKF, K); 1307 : 2.21 (K); 1402 : 1.15 (K).

Chanthanamuk A. 699 : 1.26 (BK); 709 : 1.5 (BK); 743 : 3.16.1 (BK); 744 : 2.25 (BK).

Charoenphol Ch. 34 : 1.3 (BKF); 74 : 3.9 (BKF); 90 : 2.25 (BKF, C, K); 442 : 1.1 (BKF, C); 445 : 3.15 (BKF, C, K); 485 : 2.34 (BKF); 493 : 3.27 (BKF); 4381 : 2.49 (AAU, BKF, K); 4799 : 3.4 (AAU, BKF).

Chayamarit K. et al. 698 : 1.10 (BKF); 748 : 2.16 (BKF); 927 : 2.51 (BKF); 992 : 3.10 (BKF); 1001 : 3.10 (BKF); 1366 : 3.23 (BKF); 1472 : 3.3 (BKF); 1583 : 3.10 (BKF); 1640 : 1.3 (BKF); 1641 : 1.2 (BKF); 1643 : 1.3 (BKF); 1660 : 1.32 (BKF); 1662 : 2.16 (BKF); 1914 : 2.39 (BKF); 2971 : 2.7 (BKF); 2985 : 2.12 (BKF).

Chermisrivathana C. 499 : 3.16.1 (BK); 519 : 2.47 (BK); 841 : 2.9 (BK); 1104A : 2.9 (BK); 1409 : 1.23 (BK); 1824 : 2.16 (BK); sn. (18-11-1968) : 2.16 (BK).

Chingsoognoern P. sn. : 1.1 (BKF).

Chintana N. 22 : 2.21 (BKF).

Chitpong P. 218 : 2.25 (BK); 297 : 2.20 (BK); 457 : 2.16 (BK); 655 : 1.11 (BK); 758 : 1.9 (BK); 759 : 2.23 (BK).

Chob 24 : 1.10 (BKF).

Chom 21 : 2.53 (BKF).

Chongko S. 346 : 2.16 (MAU).

Chu-ha-rue-tai I. 3 : 3.21 (BKF).

Collin D.J. 805 : 2.25 (BK, K); 1076 : 2.25 (AAU, BKF, K); 1110 : 2.25 (BK); 1202 : 1.1 (K); 1209 : 1.32 (BK, K); 1238 : 2.39 (K); 1960 : 2.25 (C, K); 2401 : 1.33 (K); 2453 : 1.33 (K).

Congdon G. 540 : 2.16 (PSU); 751 : 1.20 (AAU, PSU).

Curtis 1677 : 2.21 (K).

Decha-gai-saya T. 7 : 2.21 (BKF).

Duang-jai S. et al. 10 : 2.6 (BKF); 11 : 1.33 (BKF); sn. (-2-2002) : 1.8 (BKF); sn. (-2-2002) : 1.8 (BKF).

Eiadthong W. 3 : 1.12 (BKF); 4 : 1.10 (BKF); 5 : 2.38 (BKF); 6 : 2.47 (BKF); 6A : 2.47 (BKF); 6B : 2.47 (BKF); 6C : 2.47 (BKF); 8 : 2.23 (BKF); 10 : 1.32 (BKF); 12 : 1.4 (BKF); sn. (BKF 97215) : 1.25 (BKF).

Floto F. 4766 : 2.22 (BKF); 7372 : 2.51 (BKF); 7466 : 2.22 (BKF); 7468 : 1.32 (BKF).

Fukuoka N. et al. T-35004 : 2.20 (BKF); T-35047 : 2.53 (BKF); T-35179 : 1.1 (BKF); T-35180 : 3.6 (BKF); T-35188 : 3.15 (BKF); T-35189 : 3.6 (BKF); T-35190 : 1.22 (BKF); T-35205 : 2.1 (BKF); T-35412 : 2.16 (BKF); T-35413 : 2.16 (BKF); T-35550 : 1.9 (BKF); T-36221 : 2.51 (BKF); T-4445 : 2.53 (BKF); T-62009 : 3.10 (BKF); T-62010 : 2.7 (BKF); T-62066 : 1.9 (BKF); T-62066A : 2.34 (BKF); T-62068 : 1.1 (BKF); T-62121 : 1.6 (BKF); T-62123 : 3.6 (BKF); T-62135 : 1.9 (BKF); T-62279 : 2.1 (BKF); T-62309 : 2.22 (BKF); T-62314 : 1.10 (BKF); T-62321 : 1.32 (BKF); T-62391 : 2.32 (BKF); T-62482 : 3.16.1 (BKF); T-62516 : 3.16.1 (BKF); T-63798 : 2.51 (BKF); T-63802 : 2.16 (BKF); T-63820 : 1.1 (BKF).

Garrett H. B.G. 46 : 2.47 (AAU, BKF, K); 98 : 2.23 (K); 550 : 3.7 (BKF); 588 : 3.24 (BKF); 685 : 1.10 (BKF, C, K); 686 : 2.2 (BKF, C, K); 719 : 1.6 (C, K); 767 : 1.1 (BKF, K); 758 : 2.9 (BKF, C, K); 850 : 3.4 (AAU, BKF, K); 854 : 1.12 (BKF, K); 913 : 1.12 (BKF, C, K); 1116 : 3.27 (K); 1175 : 3.9 (K).

Geesink R. et al. 4882 : 2.21 (BKF, C, L); 4924 : 2.21 (AAU, BKF, C, K, L); 4996 : 1.33 (AAU, L); 5008 : 2.42 (AAU, BKF, K, L); 5015 : 1.27 (AAU, BKF, C, L); 5298 : 2.21 (AAU, BKF, C, K, L); 5497 : 2.48 (AAU, L); 5497A : 1.3 (BKF, C, K, L); 5623 : 1.22 (AAU, BKF, C, L); 5660 : 2.16 (K, L); 5795 : 1.25 (AAU, BKF, C, L); 5802 : 2.47 (AAU, BKF, C, K, L); 5802 : 1.2 (AAU, BKF, C, L); 6066 : 3.16.1 (AAU, BKF, C, L); 6172 : 3.16.1 (AAU, BKF, C, L); 6207 : 1.12 (AAU, C, L); 6302 : 2.48 (BKF, C, L); 6486 : 2.7 (AAU, BKF, K, L); 6553 : 2.48 (AAU, BKF, K, L); 6970 : 1.19 (AAU, BKF, C, K, L); 7022 : 2.12 (AAU, BKF, C, K, L); 7120 : 2.12 (AAU, BKF, C, K, L); 7156 : 3.4 (AAU, BKF, C, L); 7159 : 3.28 (AAU, BKF, C, L); 7249 : 1.18 (AAU, C, L); 7271 : 2.55 (AAU, BKF, L); 7414 : 2.21 (AAU, BKF, K, L); 7569 : 2.8 (AAU, BKF, C, K, L); 7670 : 2.45 (BKF, C, L); 8272 : 3.27 (BKF, L).

Gongdon G. 525 : 2.21 (PSU).

Gram K. et al. 49 : 3.9 (C); 82 : 2.39 (C); 122 : 3.6 (C); 135 : 3.10 (C).

Greijmans M. 44 : 2.12 (BKF); 48 : 2.16 (BKF); 49 : 1.24 (BKF); 95 : 2.7 (BKF); 96 : 1.26 (BKF); 97 : 1.26 (BKF); 98 : 2.25 (BKF); 101 : 2.39 (BKF); 102 : 2.1 (BKF); 108 : 1.24 (BKF); 116 : 2.16 (BKF).

Hambhanon C. 152 : 2.16 (BKF); sn. : 2.16 (BKF).

Hamilton C. et al. 217 : 2.16 (PSU).

Haniff M. 362 : 1.2 (K); 2053 : 2.23 (K); 2705 : 1.3 (K); 4299 : 2.21 (K); sn. : 1.27 (BM).

Hansen B. et al. 10863 : 2.2 (C); 10864 : 2.1 (BKF, C); 10867 : 2.1 (BKF, C); 10868 : 2.41 (BKF, C); 10890 : 2.53 (BKF, C); 10891 : 2.14 (C); 10907 : 3.14 (BKF, C); 10917 : 2.1 (BKF, C); 10922 : 2.1 (C); 10923 : 3.24 (BKF, C); 10944 : 2.16 (BKF, C); 10953 : 3.2.1 (BKF, C, K); 10999 : 3.6 (BKF, K); 11053 : 3.11 (BKF, C); 11177 : 3.17 (C, K); 11188 : 2.49 (BKF, C); 11206 : 3.10 (C); 11207 : 3.4 (C); 11220 : 1.1 (BKF, C); 11250 : 2.50 (BKF, C); 11273 : 2.23 (BKF, C); 11306 : 2.25 (BKF, C, K); 11315 : 3.27 (C); 11900 : 3.27 (BKF); 11958 : 2.41 (BKF, C); 12132 : 2.46 (BKF, C, K); 12410 : 2.21 (BKF, C, K); 12614 : 3.15 (AAU, BKF, C); 12615 : 3.15 (AAU, BKF,

C, K); 12617 : 3.9 (K); 12638 : 2.22 (AAU, BKF, C, K); 12641 : 3.9 (AAU, BKF, C, K); 12667 : 2.14 (C); 12691 : 2.16 (AAU, C, K); 12764 : 2.14 (BKF, C); 12774 : 1.4 (AAU, BKF, C); 12793 : 3.3 (AAU, BKF, C, K); 12801 : 2.1 (BKF, C, K); 12828 : 3.15 (BKF, C); 12852 : 1.10 (AAU, BKF, C); 12853 : 1.1 (BKF, C, K); 12867 : 1.4 (AAU, BKF, C); 12876 : 2.16 (AAU, BKF, C, K); 12879 : 1.4 (BKF, C, K); 12888 : 2.14 (BKF, C); 12889 : 1.2 (BKF); 12890 : 3.24 (BKF, C); 12931 : 1.12 (BKF, C); 12968 : 2.49 (BKF, C); 12997 : 3.24 (BKF, C); 12999 : 3.22 (AAU, BKF, C, K).

Hanuphakdi C. 100 : 2.29 (BKF); 255 : 2.42 (BKF); 344 : 2.18 (BKF); 344A : 2.18 (BKF).

Hardial 594 : 2.20 (K).

Hennipman E. 3287 : 3.13 (BKF, K, L).

Hosseus C.C. 300 : 3.11 (BM, C, K); 307 : 1.1 (BM, K); 391a : 3.23 (C); 420 : 1.17 (K); 438 : 3.14 (BM, K); 446 : 2.39 (K); 500 : 1.10 (BM, C, K); 625 : 2.27 (C, K).

Iwatsuki K. et al. T-9357 : 2.27 (BKF, KYO); T-9358 : 1.10 (BKF, KYO); T-9452 : 2.16 (BKF, KYO); T-9678 : 2.22 (BKF, KYO).

Jackson J. K. 6049 : 2.27 (BKF); 6068 : 1.32 (BKF); 6094 : 2.27 (BKF); 6129 : 3.11 (BKF); 6187 : 1.3 (BKF); 6190 : 3.16.1 (BKF).

Jong-a-nurak T. 732 : 2.48 (BKF); 733 : 2.55 (BKF); 735 : 2.48 (BKF); 735A : 2.30 (BKF); 736 : 2.53 (BKF); 737 : 2.18 (BKF); 738 : 1.8 (BKF); 739 : 1.33 (BKF); 742 : 2.54 (BKF); 743 : 2.46 (BKF); 744 : 2.46 (BKF); 746 : 2.45 (BKF); 747 : 2.46 (BKF); 748 : 2.48 (BKF); 749 : 2.46 (BKF); 750 : 2.42 (BKF); 752 : 2.42 (BKF); 752A : 2.42 (BKF); 752B : 2.42 (BKF); 753 : 2.42 (BKF); 755 : 2.42 (BKF); 757 : 2.42 (BKF); 759 : 2.48 (BKF); 760 : 2.3 (BKF); 761 : 2.42 (BKF); 765 : 2.42 (BKF); 770 : 2.54 (BKF); 772 : 2.48 (BKF); 773 : 2.54 (BKF); 774 : 2.18 (BKF); 774A : 2.9 (BKF); 776 : 2.55 (BKF); 777 : 2.55 (BKF); 778 : 1.11 (BKF); 779 : 1.22 (BKF); 780 : 1.22 (BKF); 781 : 3.15 (BKF); 782 : 1.23 (BKF); 783 : 2.48 (BKF); 784 : 1.18 (BKF); 786 : 2.48 (BKF); 787 : 2.6 (BKF); 788 : 2.55 (BKF); 789 : 1.15 (BKF); 790 : 2.21 (BKF); 791 : 2.21 (BKF); 792 : 1.33 (BKF); 793 : 1.33 (BKF); 794 : 1.33 (BKF); 795 : 1.33 (BKF); 796 : 1.33 (BKF);

Juengwirote P. sn. : 2.39 (BKF).

Kerr A.F.G. 550 : 3.10 (BM); 550A : 3.10 (BM); 708 : 2.39 (BM, K); 780 : 2.47 (BM, K); 796 : 2.39 (K); 817 : 1.1 (BM, C, K); 956 : 3.11 (BM, K); 1086 : 2.16 (K); 1086A : 2.16 (K); 1110 : 2.25 (K); 1113 : 3.27 (K); 1163 : 2.27 (BM, C, K); 1185 : 2.23 (BM, K); 1185A : 2.23 (BM, K); 1191 : 2.51 (K); 1261 : 2.49 (K); 1283 : 1.10 (K); 1284 : 3.11 (BM, K); 1285A : 2.51 (K); 1303 : 1.3 (BM, K); 1312 : 2.47 (BM, C, K); 1320 : 2.9 (BM, K); 1520 : 1.17 (BM, K); 1644 : 3.27 (AAU, K); 1769 : 1.10 (BM, K); 1936 : 1.10 (K); 1965 : 2.27 (K); 2528 : 1.13 (BM, K); 2656 : 3.9 (BM, K); 2656A : 3.9 (K); 2679 : 3.11 (BM, K); 2702 : 1.3 (BM, K); 2880 : 3.8 (BM, K); 3099 : 2.49 (BM, C, K); 3364 : 2.1 (BM); 3439 : 2.16 (BM, K); 3474 : 4.1 (BK); 4422 : 2.16 (BM); 4496 : 1.17 (BK); 4508 : 3.6 (BK); 4560 : 3.6 (BK); 4683 : 2.16 (BK, BM, C); 4683A : 1.3 (K); 4713 : 3.11 (BK, BM, K); 4758 : 1.10 (BK, BM, K); 4890 : 2.2 (C, K); 4896 : 1.17 (BM, C, K); 4927 : 1.3 (BK, BM, K); 4933 : 2.9 (BK, BM, C, K); 4966 : 2.49 (BK, BM, C, K); 5152 : 1.10 (BK, BM, C, K); 5170 : 2.50 (BK, K); 5170A : 2.50 (BK, K); 5172 : 3.6 (BK, BM, C, K); 5172A : 3.6 (BK); 5204 : 1.1 (BK); 5206 : 1.1 (BM, C, K); 5207 : 1.6 (BK, BM, C, K); 5213 : 1.17 (BK, BM, C, K); 5216 : 3.2.1 (BK, BM, K); 5217 : 1.1 (BK, BM, C, K); 5274 : 3.7 (BK); 5276 : 3.4 (C, K); 5295 : 3.3 (BK, BM, K); 5301 : 2.1 (BM); 5303 : 2.1 (K); 5306 : 3.14 (BM, C, K); 5340 : 2.41 (BK, BM, K); 5350 : 2.27 (BK, K); 5368 : 3.9 (BK, BM, K); 5382 : 3.15 (BK, C, K); 5383 : 3.15 (BM); 5384 : 3.9 (BK, BM, K); 5391 : 1.6 (BK, BM, K); 5417 : 1.26 (BM); 5424 : 2.1 (BK, BM, K); 5469 : 3.6 (BK, BM, K); 5554 : 3.8 (BK, K); 5594 : 3.13 (BM, K); 5595 : 3.26 (BK, BM, C, K); 5758 : 2.2 (BK, C, K); 5807 : 2.16 (BK, BM, C, K); 5829 : 2.25 (BK, C, K); 5834 : 2.55 (BK, C, K); 5928 : 2.16 (BK); 5928A : 2.16 (BK, C, K); 6071 : 2.18 (BK, BM, K); 6107 : 3.16.2 (BK, BM, K); 6211 : 1.2 (BK, BM, C, K); 6220 : 3.2.1 (BK, BM, K); 6223 : 2.16 (BK, BM, K); 6262 : 1.4 (BK, BM, C); 6282 : 3.27 (BK, K); 6304 : 1.1 (BM, K); 6306 : 2.9 (BK); 6322 : 1.6 (BK, BM, K); 6353 : 2.22 (BK, C, K); 6430 : 1.9 (BK, BM, K); 6431 : 2.49 (BK); 6481 : 1.17 (BK, BM, C, K); 6483 : 2.16 (BK, BM, K); 6487 : 2.12 (BK, K); 6508 : 3.6 (BM, C, K); 6622 : 2.16 (BK, K); 6644 : 3.13 (BK, BM, K); 6648 : 1.4 (BK, BM); 6661 : 1.11 (BK, BM, C); 6932 : 2.42

(BK, BM, C, K); 7218 : 2.44 (BK, K); 7229 : 2.21 (BK, K); 7229A : 2.21 (BK, K); 7311 : 2.16 (BK, K); 7435 : 2.10 (BK, BM, C, K); 7464 : 2.18 (BK, BM, K); 7583 : 2.36 (BK, BM, K); 7597 : 2.11 (AAU, BK, BM, K); 7626 : 1.9 (BK, K); 7635 : 2.10 (BK, BM, C, K); 7655 : 2.42 (BK, BM, K); 7678 : 2.48 (C, K); 7755 : 2.55 (K); 7774 : 2.48 (BK, C, K); 7777 : 2.45 (BKF, K); 7841 : 2.16 (BK, BM, K); 7901 : 1.20 (BM); 7922 : 2.48 (K); 8248 : 2.25 (BK, C, K); 8281 : 1.24 (BK, BM, C, K); 8306 : 2.49 (BK, BM, C, K); 8441 : 1.18 (BK, BM, C, K); 8599 : 3.10 (BK, BM, C, K); 8653 : 3.4 (BK); 8688 : 1.26 (BK, BM); 8691 : 3.4 (BK, C, K); 8693 : 3.2.1 (BK, BM, C, K); 8708 : 3.22 (BK, BM); 8741 : 3.1 (BK, BM, C, K); 8742 : 3.2.1 (BK, C, K); 8792 : 3.11 (BK, BM, K); 8794 : 3.9 (BK, BM, K); 8845 : 3.28 (BK, BM, C, K); 8892 : 2.25 (BK, C, K); 9193 : 1.9 (BK, BM, C, K); 9291 : 1.9 (BK, BM, C, K); 9449 : 2.52 (BK, C, K); 9663 : 1.1 (BK, BM, C, K); 9804 : 2.49 (BK, BM, C, K); 9853 : 3.4 (BK, C, K); 9895 : 1.1 (BM, C, K); 10284 : 3.16.2 (BM, C, K); 10361 : 2.54 (BK, BM, K); 10391 : 2.12 (BK); 10394 : 3.23 (BK, BM, C, K); 10417 : 2.51 (BK, BM); 10584 : 3.10 (BK, BM, K); 11658 : 1.33 (BK, BM, C, K); 11659 : 2.16 (BK, C, K); 11697 : 2.55 (BK, C, K); 12069 : 2.22 (BK, C, K); 12136 : 1.33 (AAU, BK, BKF, BM, K); 12139 : 2.21 (C, K); 12231 : 2.47 (BK, BM); 13239 : 2.15 (BK, K); 12242 : 2.55 (BK, C, K); 13239 : 2.38 (BM); 13306 : 1.2 (BK, BM); 13323 : 2.21 (BK, C, K); 13372 : 2.21 (BK, C, K); 13675 : 1.26 (BK, BM, K); 13675A : 1.11 (K); 13817 : 2.21 (BK, C, K); 14018 : 1.26 (BM); 14209 : 2.16 (BK, BM, K); 14415 : 2.21 (BK, K); 14553 : 2.12 (BK, BM, K); 14566 : 2.55 (BK, BM, C, K); 14642 : 1.26 (BM); 14685 : 1.26 (BK, BM); 14738 : 2.16 (BK, BM, K); 14743 : 1.24 (BK, BM, C, K); 14786 : 1.26 (BK, BM, K); 14983 : 2.45 (BKF, K); 15168 : 2.55 (BK, C, K); 15175 : 1.23 (BK, BM, C, K); 15531 : 2.40 (BK, BM, K); 15555 : 2.55 (BK, C, K); 15634 : 2.55 (BK, K); 15813 : 2.16 (BK, K); 15815 : 2.21 (BK, C, K); 15861 : 2.55 (BK, C, K); 15862 : 3.22 (BK, BM); 15875 : 2.54 (BK, BM, K); 15883 : 2.18 (BK, BM, C, K); 15887 : 2.48 (BK, C, K); 16275 : 2.55 (BK, BM, K); 16392 : 2.23 (BK, BM, C, K); 16401 : 3.27 (BK, BM, C, K); 16402 : 3.17 (BK, K); 16430 : 2.26 (BK, BM, C, K); 16431 : 2.21 (BK, K); 16823 : 1.33 (BK, BM, C, K); 16830 : 2.55 (BK, C, K); 16832 : 1.27 (BK, BM, C, K); 16969 : 2.35 (BK, BM, C, K); 16976 : 2.35 (BM, C, K); 17054 : 2.55 (BK, C, K); 17059 : 2.38 (BK, BM, C, K); 17084 : 2.16 (BK, BM, C, K); 17109 : 2.16 (BK, K); 17197 : 2.35 (BK, BM, C, K); 17334 : 1.26 (BK, BM); 17405 : 2.21 (BK, C, K); 17452 : 2.16 (BK, BM, C, K); 17478 : 1.10 (BK, K); 17596 : 1.23 (BK, BM, C, K); 17733 : 2.1 (BK, K); 17895 : 1.23 (BK, BM, K); 17897 : 2.42 (BK, BM, C, K); 17972 : 3.23 (BM); 18183 : 1.11 (BK, BM, C, K); 18317 : 2.38 (BK, BM, C, K); 18321 : 2.21 (C, K); 18337 : 1.33 (BK, BM, C, K); 18395 : 1.27 (BK, BM, C, K); 18442 : 1.11 (BK); 18453 : 2.5 (BK, BM, C, K); 18502 : 3.27 (BK, BM, C, K); 18553 : 2.16 (BK, K); 18560 : 2.16 (BK, BM, K); 18562 : 1.9 (BK, BM, C, K); 18829 : 2.3 (BK, C, K); 18953 : 2.16 (BK, BM); 18996 : 1.9 (BK, BM, C, K); 19010 : 1.9 (BK, BM, C, K); 19011 : 1.26 (BM, C, K); 19013 : 2.16 (BK, BM, C, K); 19015 : 2.21 (BK, K); 19188 : 2.18 (BK, BM); 19254 : 2.16 (BK, BM, K); 19784 : 1.24 (BK, BM, C, K); 20046 : 3.4 (BK, BM, C, K); 20064 : 3.4 (BK, C, K); 20072 : 2.39 (BK, BM, C, K); 20136 : 3.22 (BK, BM); 20225 : 2.23 (BM, K); 20230 : 1.26 (BK, BM); 20235 : 1.17 (BK, BM, C, K); 20240 : 1.17 (BK, BM, C, K); 20242 : 3.8 (BM); 20664 : 2.12 (BK); 20666 : 3.10 (BM); ¹[20715 : 1.17 (BK, K); 20954 : 1.19 (BK, BM); 20956 : 3.2.2 (BK, BM); 20992 : 2.16 (BK); 20993 : 1.6 (BKF); 21216 : 2.4.1 (BK); 21277 : 3.5 (BK); 21311 : 1.17 (BK, K);] 21377 : 2.4 (BK, BM); 21440 : 2.16 (BK); 21545 : 2.27 (BK); ²[21624 : 2.6 (BK, BM); 21627 : 2.42 (BK, K);]

The follow without numbers so code indate :- 11-3-1912 : 1.13 (C); 22-12-1920 : 1.1 (BK); 22-12-1920 : 1.1 (BK); 13-3-1921 : 3.6 (BK); 15-3-1921 : 3.6 (BK); 27-3-1921 : 2.53 (BM); 3-7-1922 : 3.16.1 (BK, BM); 4-7-1922 : 1.4 (BK); 4-7-1922 : 2.22 (BK); 5-7-1922 : 2.47 (BK); 17-7-1922 : 2.25 (BK); 27-3-1924 : 2.23 (BK); 30-3-1924 : 3.16.1 (BK).

Kerr F.H.W. 31 : 1.1 (K); 35 : 1.1 (K); 71 : 2.27 (K); 72 : 2.27 (K); 110 : 2.47 (C, K); 117 : 3.10 (K); 117A : 3.10 (K); 117B : 2.39 (C); 118 : 2.23 (K); 120 : 2.51 (K); 122 : 1.10 (K); 127 : 2.51 (AAU, C); 127A : 2.51 (K); 140 : 2.9 (K); 149 : 2.39 (K); 149B : 3.11 (K); 159 : 2.51 (K); 160 : 3.11 (K); 177 : 2.39 (K); 179 : 3.10 (K); 181 : 2.39 (K); 181A : 2.39 (K); 188A : 3.10 (K); 190B : 3.11 (C, K); 191A : 2.51 (K); 192A : 3.11 (K); 193A : 2.51 (K); 196A : 2.51 (K); 196B : 1.3 (K); 196C : 1.3 (K); 196D : 2.51 (K); 225A : 2.16 (K); 226A : 2.39 (K); 226B : 2.51 (K); 226C : 1.1 (K); 230A : 2.9 (K); 277A : 2.49 (K); 426 : 2.39 (K).

¹ [] = from Laos ; ² [] = from Laos

Kiah 24343 : 2.21 (K); 24373 : 3.19 (K).

Kloss C.B. 6816 : 1.2 (K).

Kok kamhaeng T. 20 : 3.10 (BKF).

Konta F. et al. 3934 : 1.22 (BKF, NSMT); 3969 : 3.9 (BKF, NSMT); 3997 : 1.3 (BKF, NSMT); 4004 : 1.1 (BKF, NSMT); 4023 : 1.2 (BKF, NSMT); 4192 : 1.3 (BKF, NSMT); 4282 : 2.31 (BKF, NSMT); 4284 : 1.2 (BKF, NSMT); 4294 : 1.1 (BKF, NSMT); 4448 : 2.11 (BKF, NSMT); 4450 : 1.32 (BKF, NSMT); 4455 : 2.12 (BKF, NSMT); 4457 : 1.23 (BKF, NSMT); 4656 : 1.10 (BKF, NSMT); 4680 : 1.10 (BKF, NSMT); 4686 : 2.12 (BKF, NSMT); 4756 : 1.17 (BKF, NSMT); 4759 : 1.1 (BKF, NSMT); 4760 : 3.16.1 (BKF, NSMT); 4763 : 1.2 (BKF, NSMT); 4784 : 1.32 (BKF, NSMT); 4787 : 3.16.1 (BKF, NSMT); 4793 : 1.23 (BKF, NSMT); 4801 : 2.12 (BKF, NSMT); 4802 : 1.2 (BKF, NSMT); 4825 : 1.10 (BKF, NSMT); 4834 : 1.23 (BKF, NSMT); 4911 : 3.3 (BKF, NSMT); 4928 : 3.13 (BKF, NSMT); 4969 : 1.1 (BKF, NSMT); T-49082 : 1.1 (BKF, NSMT); T-49090 : 2.20 (BKF, NSMT).

Kosol 16 : 1.29. (BKF).

Kosterman A. : 418 : 3.16.2 (BK, K); 865 : 2.16 (K).

Koyama H. et al. T-15666 : 3.2.1 (BKF, KYO); T-31380 : 2.50 (BKF, KYO); T-31454 : 3.2.2 (BKF, KYO); T-31455 : 3.1 (BKF, KYO); T-31621 : 2.41 (BKF, KYO); T-32120 : 3.6 (BKF, KYO); T-32799 : 2.54 (BKF, KYO); T-33541 : 3.27 (BKF, KYO); T-33586 : 1.1 (BKF, KYO); T-33588 : 3.9 (AAU, BKF, KYO); T-33865 : 2.9 (BKF, KYO); T-39005 : 2.7 (BKF, KYO); T-39006 : 2.1 (BKF, KYO); T-39014 : 2.7 (BKF, KYO); T-39020 : 2.7 (BKF, KYO); T-39027 : 2.41 (BKF, KYO); T-39042 : 2.12 (BKF, KYO); T-39061 : 1.11 (BKF, KYO); T-39073 : 1.6 (BKF, KYO); T-39093 : 1.4 (AAU, BKF, KYO); T-39105 : 2.50 (AAU, BKF, KYO); T-39367 : 1.3 (BKF, KYO); T-39368 : 1.12 (BKF, KYO); T-39372 : 1.12 (BKF, KYO); T-39373 : 1.12 (BKF, KYO); T-39374 : 3.3 (BKF, KYO); T-39375 : 1.3 (BKF, KYO); T-39376 : 2.47 (BKF, KYO); T-39377 : 2.31 (BKF, KYO); T-39380 : 3.27 (BKF, KYO); T-39381 : 3.27 (BKF, KYO); T-39412 : 1.8 (BKF, KYO); T-39559 : 3.27 (BKF, KYO); T-39561 : 1.4 (BKF, KYO); T-39562 : 1.12 (BKF, KYO); T-39563 : 1.12 (BKF, KYO); T-39564 : 1.12 (BKF, KYO); T-39566 : 2.33 (BKF, KYO); T-39588 : 2.12 (AAU, BKF, KYO); T-39591 : 1.13 (BKF, KYO); T-39674 : 1.3 (BKF, KYO); T-39675 : 1.3 (BKF, KYO); T-39676 : 2.7 (BKF, KYO); T-39685 : 2.7 (AAU, BKF, KYO); T-39686 : 2.7 (BKF, KYO); T-39901 : 2.7 (BKF, KYO); T-39903 : 2.16 (BKF, KYO); T-48720 : 3.1 (BKF, KYO); T-48918 : 2.16 (BKF, KYO); T-48922 : 2.1 (BKF, KYO); T-48932 : 2.53 (BKF, KYO); T-48936 : 1.4 (BKF, KYO); T-48939 : 2.22 (BKF, KYO); T-48947 : 1.9 (BKF, KYO); T-48962 : 1.19 (BKF, KYO); T-48969 : 1.19 (BKF, KYO); T-48988 : 2.7 (BKF, KYO); T-48996 : 1.1 (BKF, KYO); T-49503 : 2.12 (BKF, KYO); T-49963 : 3.20 (BKF, KYO); T-49964 : 2.49 (BKF, KYO); T-50112 : 3.27 (BKF, KYO); T-50118 : 3.27 (BKF, KYO); T-61904 : 2.47 (BKF, KYO); T-61905 : 2.25 (BKF, KYO); T-61906 : 3.9 (BKF, KYO).

Koyama T. et al. 15435 : 3.27 (AAU, BKF); 15466 : 2.12 (AAU, BKF); 15494 : 3.2.2 (AAU); 15666 : 3.2.1 (AAU).

Kumlen Y. sn. (QBG 11308) : 1.4 (QBG).

Lakshnakara M.C. 616 : 2.48 (BK, C, K); 940 : 2.16 (BK); sn. (9-1-1922) : 2.51 (BK).

Larsen K. et al. 92 : 2.49 (AAU, BKF); 97 : 1.1 (BKF, C); 109 : 2.49 (AAU, BKF); 315 : 2.20 (AAU); 629 : 1.17 (AAU, BKF); 663 : 2.23 (AAU, BKF); 664 : 2.53 (AAU, BKF, C); 947 : 3.15 (AAU); 974 : 2.53 (AAU, BKF, C); 984 : 3.23 (AAU, BKF); 1008 : 2.25 (AAU, BKF); 1009 : 1.1 (AAU); 1015 : 2.22 (AAU); 1022 : 2.1 (AAU); 1877 : 1.1 (AAU); 1921 : 2.47 (AAU, BKF, K); 1930 : 1.25 (AAU, BKF, C, K); 2001 : 3.16.1 (AAU, BKF); 2003 : 2.27 (AAU, BKF, K); 2132 : 1.3 (AAU, BKF, K); 2593 : 1.1 (AAU); 2771 : 3.10 (AAU, BKF, C, K); 2841 : 2.22 (AAU, BKF, K); 2872 : 2.51 (AAU, BKF, C); 2842 : 2.2 (AAU, BKF, C, K); 3107 : 3.17 (AAU, BKF, K); 3606 : 3.3 (AAU); 7092 : 3.27 (AAU); 8709 : 2.49 (C); 8801 : 2.39 (C); 9359 : 1.5 (C); 9411 : 2.30 (BKF, C, K); 9738 : 1.23 (C); 9943 : 1.23 (BKF, C); 9970 : 1.24 (BKF, C); 10264 : 2.20 (AAU, BKF, C); 10282 : 3.17 (AAU, BKF); 30612 : 1.33 (AAU, BKF, K); 30697 : 2.29 (AAU); 30698 : 2.8 (AAU); 30882 : 2.6 (AAU, BKF, K); 31207 : 1.29 (AAU, BKF); 31364 : 2.16 (AAU, BKF); 31506 : 2.7 (AAU, BKF, K); 31517 : 3.10 (AAU, BKF, K); 31609 : 3.28 (AAU, BKF, K); 31661

: 2.22 (BKF, C, K); 31822 : 2.39 (AAU, BKF, C); 31849 : 3.11 (AAU, BKF, C, K); 31867 : 3.11 (AAU, BKF, K); 32357 : 2.17 (AAU); 33549 : 2.55 (AAU, BKF); 33792 : 3.4 (AAU); 33946 : 1.12 (AAU); 33949 : 1.12 (BKF); 34209 : 2.39 (AAU); 34239 : 1.4 (BKF); 40977 : 1.33 (AAU); 41224 : 2.25 (AAU); 42733 : 1.15 (BKF); 42823 : 2.16 (AAU, BKF); 43502 : 2.37 (AAU, PSU); 43543 : 1.9 (AAU); 43548 : 1.14 (AAU, BKF); 44319 : 1.31 (AAU, BKF); 44652 : 2.16 (AAU); 44773 : 2.16 (AAU); 45693 : 2.52 (AAU, BKF); 45750 : 2.48 (QBG); 46249 : 2.7 (AAU); 46490 : 1.17 (AAU); 46491 : 2.7 (AAU); 46557 : 2.16 (AAU); 46638 : 3.10 (AAU); 46948 : 3.16.1 (AAU).

Lekagul T. 92 : 1.17 (BKF).

Lenkam Y. s.n. (QBG 11296) : 2.2 (BKF, QBG); s.n. (QBG 11302) : 1.4 (QBG); s.n. (QBG 11305) : 2.12 (QBG); s.n. (QBG 11306) : 1.1 (QBG); s.n. (QBG 11307) : 2.47 (QBG); s.n. (QBG 11309) : 1.3 (QBG); s.n. (QBG 11311) : 2.51 (QBG); s.n. (QBG 11312) : 1.31 (QBG); s.n. (QBG 11316) : 1.1 (QBG); s.n. (QBG 11317) : 1.1 (QBG); s.n. (QBG 11319) : 2.16 (QBG); s.n. (QBG 11322) : 1.4 (QBG).

Manyrak M. 2 : 2.7 (BKF).

Marcan A. 1229 : 1.23 (BM, K); 1253 : 2.42 (BK, K); 2424 : 2.8 (K); 2531 : 1.24 (BM, K).

Martin v.d. Bult 515 : 2.22 (BKF).

Maxwell J.F. 71-264 : 1.23 (AAU, BK); 72-549 : 1.22 (BK); 72-579 : 2.48 (AAU); 73-379 : 2.48 (AAU, BK); 74-379 : 2.39 (BK); 74-857 : 3.17 (AAU, BK); 74-858 : 2.49 (AAU, BK); 75-820 : 2.54 (BK); 75-635 : 1.24 (AAU, BK); 75-664 : 3.16.1 (AAU, BK); 75-820 : 1.23 (AAU); 75-837 : 2.48 (AAU, BK); 75-976 : 1.24 (BK); 76-212 : 2.25 (AAU, BK); 76-488 : 1.24 (AAU, BK); 76-574 : 2.25 (AAU, BK); 84-172 : 1.29 (BKF, PSU); 84-407 : 2.18 (BKF); 84-562 : 1.29 (BKF, PSU); 85-229 : 1.29 (BKF, PSU); 85-624 : 1.29 (AAU, BKF, PSU); 85-671 : 2.30 (AAU, BKF, PSU); 85-747 : 1.8 (AAU, BKF, PSU); 85-860 : 2.48 (AAU, BKF, PSU); 85-914 : 2.3 (PSU); 85-989 : 1.29 (AAU, BKF, PSU); 85-1089 : 2.16 (PSU); 86-22 : 1.23 (AAU, BKF, PSU); 86-74 : 2.55 (PSU); 86-226 : 2.55 (BKF); 86-545 : 1.8 (BKF, PSU); 86-560 : 1.8 (AAU, BKF, PSU); 86-649 : 2.8 (PSU); 86-742 : 1.8 (BKF, PSU); 86-1365 : 2.12 (BKF); 86-1385 : 3.11 (BKF); 87-592 : 2.39 (BKF); 87-622 : 2.1 (BKF); 87-626 : 1.17 (BKF); 87-640 : 2.16 (BKF); 87-854 : 3.10 (BKF); 87-658 : 2.23 (BKF); 87-947 : 2.27 (BKF); 87-924 : 1.32 (BKF); 87-941 : 1.1 (BKF); 87-993 : 1.1 (BKF); 87-1010 : 2.16 (AAU, BKF); 87-1028 : 3.10 (BKF); 87-1030 : 1.3 (BKF); 87-1050 : 1.17 (BKF); 87-1051 : 2.23 (BKF); 87-1052 : 2.47 (BKF); 87-1053 : 2.47 (BKF); 87-1057 : 2.16 (BKF); 87-1068 : 1.1 (BKF); 87-1110 : 2.16 (AAU, BKF); 87-1651 : 2.23 (AAU); 88-9 : 3.11 (AAU); 88-59 : 3.9 (BKF); 88-87 : 1.1 (BKF); 88-118 : 1.17 (BKF); 88-180 : 1.10 (AAU); 88-329 : 3.16.1 (AAU, BKF); 88-348 : 3.10 (BKF); 88-359 : 2.39 (BKF); 88-416 : 2.16 (BKF); 88-543 : 3.10 (AAU); 88-660 : 3.9 (BKF); 88-667 : 1.4 (AAU, BKF); 88-684 : 1.12 (AAU, BKF); 88-687 : 2.39 (BKF); 88-687A : 1.2 (AAU); 88-708 : 1.2 (AAU, BKF); 88-738 : 3.16.1 (AAU, BKF); 88-804 : 1.1 (BKF); 88-830 : 1.17 (AAU, BKF); 88-895 : 3.10 (BKF); 88-952 : 3.9 (BKF); 88-980 : 3.11 (AAU, BKF); 88-1017 : 2.9 (AAU, BKF); 88-1058 : 3.19 (AAU, BKF); 88-1064 : 3.10 (BKF); 88-1127 : 1.3 (BKF); 88-1278 : 2.49 (AAU, BKF); 88-1384 : 3.9 (AAU, BKF); 88-1420 : 1.1 (BKF); 89-173 : 3.16.1 (BKF); 89-338 : 2.9 (BKF); 89-596 : 2.27 (AAU, BKF); 89-611 : 3.27 (BKF); 90-1015 : 2.39 (AAU); 90-1058 : 2.51 (AAU); 90-1062 : 1.12 (AAU); 90-1263 : 2.53 (AAU); 90-1293 : 3.11 (AAU); 91-24 : 1.1 (AAU); 91-114 : 1.7 (AAU); 91-162 : 1.4 (AAU); 91-261 : 2.23 (AAU); 91-632 : 2.16 (AAU); 91-641 : 3.11 (AAU); 91-724 : 2.22 (AAU); 92-44 : 2.16 (AAU); 92-591 : 1.7 (AAU); 92-845 : 2.27 (AAU); 93-357 : 1.4 (BKF); 93-687 : 2.16 (BKF); 93-709 : 1.32 (BKF); 93-715 : 1.3 (BKF); 93-789 : 3.11 (BKF); 93-956 : 2.16 (BKF); 93-998 : 1.3 (BKF); 93-999 : 1.10 (BKF); 93-1000 : 2.9 (BKF); 93-1007 : 1.32 (BKF); 93-1116 : 2.22 (BKF); 93-1560 : 3.29 (BKF); 94-752 : 1.32 (BKF); 94-792 : 3.16.1 (BKF); 95-166 : 2.16 (BKF); 95-198 : 1.10 (BKF); 95-207 : 2.2 (BKF); 95-211 : 1.10 (BKF); 95-226 : 3.21 (BKF); 95-227 : 3.27 (BKF); 95-340 : 1.25 (BKF); 95-480 : 2.16 (BKF); 95-486 : 2.47 (BKF); 95-610 : 1.32 (BKF); 95-782 : 1.11 (BKF); 95-896 : 1.3 (BKF); 95-918 : 2.16 (BKF); 95-1061 : 2.16 (BKF); 95-1233 : 3.6 (BKF); 96-1 : 1.3 (BKF); 96-121 : 3.29 (BKF); 96-171 : 3.29 (BKF); 96-257 : 1.17 (BKF); 96-414 : 2.2 (BKF); 96-448 : 2.16 (BKF); 96-582 : 1.7 (BKF); 96-695 : 2.39 (BKF); 96-731 : 1.32 (BKF); 96-809 : 3.11 (BKF); 96-810 : 1.3 (BKF); 96-812 : 3.29 (BKF); 96-868 : 1.3 (BKF); 96-1033 : 3.10

(BKF); 96-1048 : 3.11 (BKF); 96-1173 : 2.16 (BKF); 96-1177 : 3.10 (BKF); 96-1206 : 3.16.1 (BKF); 96-1252 : 2.51 (BKF); 96-1457 : 1.32 (BKF); 96-1459 : 3.14 (BKF); 96-1631 : 2.2 (BKF); 97-93 : 2.34 (BKF); 97-153 : 3.29 (BKF); 97-174 : 1.1 (BKF); 97-259 : 3.10 (BKF); 97-329 : 1.4 (BKF); 97-352 : 1.17 (BKF); 97-525 : 2.16 (BKF); 97-548 : 1.32 (BKF); 97-564 : 1.32 (BKF); 97-637 : 1.3 (BKF); 97-666 : 1.7 (BKF); 97-723 : 1.3 (BKF); 97-1006 : 2.22 (BKF); 97-1270 : 1.11 (BKF); 97-1292 : 1.3 (BKF); 97-1352 : 2.39 (BKF); 97-1384 : 3.14 (BKF); 97-1455 : 1.7 (BKF); 97-1498 : 3.29 (BKF); 97-1520 : 3.29 (BKF); 97-1555 : 2.16 (BKF); 98-14 : 1.4 (BKF); 98-401 : 3.10 (BKF); 98-410 : 1.10 (BKF); 98-621 : 1.2 (BKF); 98-645 : 2.16 (BKF); 98-666 : 1.32 (BKF); 98-716 : 2.22 (BKF); 01-126 : 2.16 (BKF); 01-371 : 1.1 (MAU); 02-15 : 3.22 (MAU); 02-209 : 3.17 (MAU).

Middleton D.J. et al. 1397 : 2.21 (AAU, BKF); 1569 : 2.23 (BKF); 1666 : 2.53 (AAU, BKF); 1790 : 1.9 (BKF); 2005 : 2.40 (BKF); s.n. (30-3-2003) : 1.4 (BKF); s.n. (30-3-2003) : 2.47 (BKF).

Mitsuta S. et al. T-40364 : 2.12 (BKF, KYO); T-42295 : 2.12 (AAU, BKF, KYO); T-42335 : 2.12 (BKF, KYO); T-42336 : 3.23 (BKF, KYO); T-42337 : 2.16 (BKF, KYO); T-42340 : 2.9 (BKF, KYO); T-43152 : 2.1 (BKF, KYO); T-43162 : 3.4 (BKF, KYO); T-43166 : 3.22 (BKF, KYO); T-44244 : 3.3 (BKF, KYO); T-44257 : 3.9 (BKF, KYO); T-45376 : 1.17 (BKF, KYO); T-46446 : 1.17 (BKF, KYO); T-46447 : 3.24 (BKF, KYO); T-46449 : 3.11 (BKF, KYO); T-46467 : 1.4 (AAU, BKF, KYO); T-46481 : 2.47 (AAU, BKF, KYO); T-46482 : 2.16 (BKF, KYO); T-46498 : 2.47 (BKF, KYO); T-47531 : 2.39 (AAU, BKF, KYO); T-47537 : 2.7 (AAU, BKF, KYO); T-47539 : 2.39 (AAU, BKF, KYO); T-47541 : 3.14 (BKF, KYO).

Monakot 18 : 2.16 (QBG); 54 : 1.3 (QBG); 59 : 1.11 (QBG).

Murata G. et al. T-38456 : 1.17 (BKF, KYO); T-40175 : 3.11 (BKF, KYO); T-40189 : 3.19 (BKF, KYO); T-40197 : 3.2.2 (BKF, KYO); T-40241 : 2.51 (BKF, KYO); T-40494 : 3.27 (BKF, KYO); T-40498 : 2.16 (BKF, KYO); T-40499 : 1.32 (BKF, KYO); T-41504 : 3.2.1 (BKF, KYO); T-41508 : 2.7 (BKF, KYO); T-41639 : 1.17 (BKF, KYO); T-41758 : 2.25 (BKF, KYO); T-41763 : 2.51 (BKF, KYO); T-42568 : 3.22 (BKF, KYO); T-42794 : 2.12 (BKF, KYO); T-42848 : 3.3 (BKF, KYO); T-42873 : 2.12 (BKF, KYO); T-42915 : 2.50 (AAU, BKF, KYO); T-42925 : 2.16 (BKF, KYO); T-42926 : 2.16 (BKF, KYO); T-43006 : 3.2.1 (BKF, KYO); T-43007 : 1.4 (BKF, KYO); T-43008 : 2.12 (BKF, KYO); T-43011 : 2.7 (BKF, KYO); T-43012 : 2.12 (BKF, KYO); T-43014 : 3.9 (BKF, KYO); T-43125 : 3.2.1 (BKF, KYO); T-43126 : 3.2.1 (BKF, KYO); T-49632 : 1.27 (AAU, BKF, KYO); T-50127 : 2.23 (BKF, KYO); T-50133 : 1.4 (BKF, KYO); T-50640 : 2.7 (AAU, BKF, KYO); T-50694 : 1.3 (AAU, BKF, KYO); T-50702 : 1.3 (BKF, KYO); T-50743 : 1.3 (BKF, KYO); T-50784 : 2.39 (AAU, BKF, KYO); T-51145 : 1.9 (BKF, KYO); T-51360 : 2.16 (BKF, KYO); T-51491 : 2.23 (BKF, KYO); T-51567 : 2.7 (BKF, KYO); T-51571 : 3.11 (BKF, KYO); T-51616 : 2.16 (BKF, KYO); T-51712 : 3.11 (BKF, KYO); T-51714 : 3.11 (BKF, KYO); T-51716 : 2.51 (BKF, KYO); T-51733 : 3.16.1 (BKF, KYO); T-52125 : 2.16 (BKF, KYO); T-52535 : 3.17 (BKF, KYO); T-79053 : 3.11 (BKF, KYO).

Nagamasu H. et al. T-49942 : 2.23 (BKF, KYO); T-49946 : 1.12 (BKF, KYO); T-49948 : 3.23 (BKF, KYO); T-49950 : 3.19 (BKF, KYO); T-49951 : 2.16 (BKF, KYO); T-49954 : 1.12 (BKF, KYO); T-49956 : 3.19 (BKF, KYO); T-50090 : 2.1 (BKF, KYO); T-50096 : 2.9 (BKF, KYO); T-50097 : 2.47 (BKF, KYO); T-50103 : 2.12 (BKF, KYO).

Nakkan D. 6 : 2.50 (BKF); 13 : 1.32 (BKF); 29 : 2.7 (BKF); 59 : 1.9 (BKF); 73 : 2.50 (BKF); 74 : 1.32 (BKF); 93 : 3.23 (BKF); 144 : 2.50 (BKF); 152 : 2.7 (BKF); 159 : 1.3 (BKF); 178 : 3.23 (BKF); 218 : 2.25 (BKF); 294 : 2.21 (BKF); 334 : 1.18 (BKF).

Nalampoon A. 12 : 2.25 (BKF); 12A : 2.16 (BKF).

Nanakorn W. et al. 4 : 2.49 (QBG); 16 : 1.11 (QBG); 45 : 2.16 (BKF, QBG); 61 : 2.7 (BKF, QBG); 62 : 2.47 (BKF, QBG); 80 : 1.3 (BKF, QBG); 87 : 1.17 (BKF, QBG); 386 : 2.22 (AAU); 505 : 2.22 (BKF, QBG); 508 : 3.10 (BKF, QBG); 736 : 1.17 (BKF, QBG); 811 : 2.16 (BKF, QBG); 838 : 3.27 (BKF, QBG); 846 : 1.11 (BKF, QBG); 1025 : 3.5 (AAU); 1026 : 3.10 (BKF, QBG); 1239 : 1.1 (BKF, QBG); 1265 : 1.11 (BKF, QBG); 1375 : 3.9 (BKF, QBG); 1376 : 2.7 (BKF, QBG); 1380 : 2.7 (BKF, QBG); 1507 : 2.7 (BKF, QBG); 1819 : 1.32 (BKF, QBG); 1841 : 2.47 (BKF, QBG); 1876 : 3.6 (BKF, QBG); 1988 : 3.12 (BKF, QBG); 2001 : 1.11 (BKF, QBG); 2463 : 3.23 (BKF, QBG); 2583 : 2.23 (BKF, QBG); 2847 : 1.1 (BKF, QBG); 2860 : 3.23 (BKF, QBG); 2862 : 1.1

- (BKF, QBG); 2929 : 3.9 (BKF, QBG); 4203 : 1.11 (BKF, QBG); 4204 : 1.11 (QBG); 4287 : 1.3 (BKF, QBG); 4288 : 1.17 (BKF, QBG); 4325 : 1.3 (BKF, QBG); 4354 : 2.7 (BKF, QBG); 4508 : 2.16 (BKF, QBG); 4762 : 3.16.1 (BKF, QBG); 4785 : 3.6 (BKF, QBG); 5011 : 2.53 (BKF, QBG); 5101 : 2.23 (BKF, QBG); 5221 : 1.1 (BKF, QBG); 5353 : 1.1 (BKF, QBG); 5420 : 2.23 (BKF, QBG); 5487 : 1.1 (BKF, QBG); 5549 : 1.1 (BKF, QBG); 5567 : 1.1 (BKF, QBG); 5694 : 3.6 (BKF, QBG); 5745 : 3.6 (BKF, QBG); 5793 : 1.3 (BKF, QBG); 5824 : 1.1 (BKF, QBG); 5827 : 1.1 (QBG); 5832 : 2.34 (BKF, QBG); 5847 : 1.1 (QBG); 5984 : 1.10 (QBG); 5969 : 3.21 (BKF, QBG); 6022 : 2.25 (BKF, QBG); 6084 : 2.23 (BKF, QBG); 6172 : 1.4 (BKF, QBG); 6195 : 2.56 (QBG); 6226 : 2.16 (BKF, QBG); 6242 : 3.11 (BKF, QBG); 6243 : 2.27 (BKF, QBG); 6345 : 1.4 (BKF, QBG); 6401 : 1.3 (BKF, QBG); 6551 : 2.27 (BKF, QBG); 6553 : 3.9 (BKF, QBG); 6554 : 3.9 (QBG); 6581 : 2.7 (BKF, QBG); 6583 : 1.10 (BKF, QBG); 6664 : 3.11 (BKF, QBG); 6667 : 3.9 (BKF, QBG); 6699 : 2.16 (BKF, QBG); 6740 : 1.17 (BKF, QBG); 6765 : 1.17 (BKF, QBG); 6768 : 2.27 (QBG); 6923 : 3.11 (BKF, QBG); 6985 : 3.9 (BKF, QBG); 7005 : 2.47 (BKF, QBG); 7011 : 2.23 (BKF, QBG); 7038 : 3.11 (BKF, QBG); 7046 : 2.47 (BKF, QBG); 7063 : 3.10 (BKF, QBG); 7071 : 1.3 (BKF, QBG); 7156 : 1.11 (BKF, QBG); 7316 : 1.18 (BKF, QBG); 7980 : 2.16 (BKF, QBG); 7982 : 1.3 (BKF, QBG); 8193 : 2.7 (BKF, QBG); 8233 : 2.49 (BKF, QBG); 8507 : 1.11 (BKF, QBG); 8650 : 3.6 (BKF, QBG); 8717 : 2.2 (BKF, QBG); 8967 : 1.4 (BKF, QBG); 9321 : 1.17 (BKF, QBG); 9430 : 3.11 (BKF, QBG); 9431 : 3.11 (BKF, QBG); 9432 : 3.26 (BKF, QBG); 9434 : 3.26 (BKF, QBG); 9527 : 2.27 (BKF, QBG); 9547 : 2.51 (BKF, QBG); 9564 : 2.47 (BKF, QBG); 9953 : 2.7 (BKF, QBG); 9954 : 1.11 (BKF, QBG); 10097 : 2.49 (QBG); 10193 : 3.9 (BKF, QBG); 10283 : 1.1 (BKF, QBG); 10879 : 3.11 (QBG); 14854 : 3.10 (BKF, QBG); 15701 : 1.32 (BKF, QBG); s.n. (21-9-1931) : 2.8 (BKF, QBG).
- Nilphanit S.** 6 : 3.17 (BKF); 21 : 1.17 (BKF); 27 : 3.23 (BKF); 28 : 2.41 (BKF); 32 : 2.50 (BKF); 34 : 2.39 (BKF); 40 : 2.25 (BKF); 42 : 1.3 (BKF); 43 : 3.16.1 (BKF).
- Nilviset Ch.** 1 : 3.2.2 (BKF); 1a : 2.25 (BKF); 3 : 3.1 (BKF); 4 : 3.23 (BKF); 5 : 1.4 (BKF); 8 : 1.32 (BKF); 10 : 2.51 (BKF); 12 : 2.25 (BKF); 24 : 2.25 (BKF); 42 : 3.16.1 (BKF); 46 : 3.16.1 (BKF); 48 : 3.16.1 (BKF); 50 : 3.10 (BKF); 51 : 3.10 (BKF); s.n. (-1-1-1954) : 3.10 (BKF).
- Nimanong B. et al.** 4 : 1.6 (BKF); 44 : 2.16 (BKF, C, K); 165 : 2.39 (BKF, C); 166 : 1.7 (BKF, C); 268 : 3.19 (BKF, C); 815 : 3.10 (BKF); 1225 : 2.36 (BKF); 1727 : 2.27 (BKF, PSU); 1759 : 1.7 (BKF, PSU); 1762 : 1.10 (BKF, PSU); 1861 : 1.10 (BKF).
- Nitrasirilak P. et al.** 411 : 1.29 (BKF); 429 : 2.48 (AAU, BKF, C, K); 430 : 2.19 (BKF).
- Niyomdham C. et al.** 129 : 2.27 (AAU, BKF, PSU, K); 290 : 2.54 (AAU, BKF); 366 : 1.10 (BKF); 375 : 1.10 (BKF); 522 : 3.4 (AAU, BKF, C); 523 : 3.23 (BKF); 719 : 2.21 (BKF, C); 905 : 3.16.1 (BKF); 930 : 2.4 (AAU, BKF, C, K); 987 : 1.22 (AAU, BKF, C, K); 1038 : 2.21 (BKF, C, K); 1201 : 2.4 (AAU, BKF, C, K); 1234 : 2.18 (BKF); 2123 : 2.21 (BKF); 2141 : 2.21 (BKF); 2358 : 2.54 (BKF); 2914 : 1.9 (AAU, BKF, QBG, PSU); 3067 : 2.29 (BKF); 3073 : 2.50 (BKF); 3074 : 2.6 (BKF); 3082 : 1.3 (AAU, BKF); 3096 : 2.33 (BKF); 3149 : 2.3 (AAU, BKF); 4067 : 2.54 (BKF); 4718 : 2.48 (AAU, BKF); 4739 : 1.29 (BKF); 4784 : 2.6 (AAU, BKF); 4825 : 1.21 (AAU, BKF); 4914 : 1.23 (BKF); 5050 : 2.49 (AAU, BKF); 5069 : 1.23 (AAU, BKF); 5070 : 2.22 (AAU, BKF); 6140 : 1.27 (BKF); 6141 : 2.21 (AAU, BKF); 6206 : 2.22 (BKF); 6207 : 2.21 (BKF); 6208 : 2.16 (BKF); 6345 : 2.3 (AAU, BKF); s.n. (18-6-1992) : 1.1 (BKF); s.n. : 2.6 (BKF).
- Noe** 42 : 2.42 (BK, K); s.n. (20-9-1921) : 1.1 (BK); s.n. (13-10-1921) : 1.26 (BK).
- Nooteboom H. P. et al.** 881 : 2.47 (BKF, C).
- Norsaeng sri M.** 1046 : 2.55 (BKF, QBG); 1047 : 2.49 (BKF, QBG); 1048 : 3.23 (BKF, QBG); 1230 : 3.6 (BKF, QBG); 1231 : 3.6 (BKF, QBG).
- Nur** s.n. : 1.29 (BM)
- Phattarahirankanok K.** 121 : 2.49 (BKF).
- Phengklae C. et al.** 103 : 2.16 (BKF, C, K); 178 : 2.49 (BKF); 211 : 2.39 (BKF); 423 : 2.20 (BKF, K); 425 : 2.16 (BKF, K); 461 : 2.49 (BKF, C, K); 526 : 2.20 (BKF, C, K); 560 : 3.4 (BKF, C, K); 676 : 1.1 (BKF, C, K); 697 : 3.4 (BKF, C, K); 909 : 2.25 (BKF); 1122 : 2.21 (BKF); 1955 : 2.25 (BKF); 2961 : 3.16.2 (AAU, BKF, C); 2967 : 3.16.1 (AAU, BKF, C, K); 3027 : 1.5 (AAU, BKF, C); 3291 : 1.1 (BKF, PSU); 4052 : 1.2 (BKF, C); 4062 : 1.17 (BKF); 4075 : 1.4 (BKF, C); 4184

: 3.16.1 (BKF, K); 4185 : 2.27 (BKF); 6031 : 1.4 (BKF); 6100 : 1.10 (BKF); 6155 : 2.12 (BKF); 6155A : 2.51 (BKF); 6156 : 2.23 (BKF); 6157 : 1.28 (BKF); 6194 : 3.15 (BKF); 6232 : 3.24 (BKF); 6244 : 2.23 (BKF); 6309 : 1.1 (AAU, BKF, C); 6613 : 1.2 (BKF); 6673 : 3.11 (BKF, K); 6797 : 3.9 (BKF); 6798 : 2.22 (BKF, C, K); 6799 : 3.4 (BKF, C); 6800 : 3.6 (BKF); 6801 : 2.47 (BKF); 6802 : 3.11 (BKF, C, K); 6803 : 3.16.1 (BKF, K); 6852 : 1.3 (BKF); 6883 : 3.16.1 (BKF); 6884 : 1.10 (BKF, K); 6887 : 2.39 (BKF, C, K); 6901 : 2.47 (AAU, BKF, C, K); 6984 : 3.14 (BKF); 6985 : 3.14 (BKF); 6986 : 1.4 (BKF); 6987 : 1.32 (BKF, C); 7038 : 1.12 (BKF); 7039 : 1.7 (BKF); 7040 : 3.3 (BKF); 7068 : 2.47 (BKF); 7092 : 3.15 (BKF); 7110 : 2.25 (BKF); 7114 : 2.47 (BKF); 7157 : 2.47 (BKF); 7163 : 2.47 (BKF); 7164 : 2.1 (BKF); 7196 : 1.12 (BKF); 7200 : 1.12 (BKF); 7201 : 1.12 (BKF); 7202 : 1.12 (BKF); 7224 : 2.39 (BKF); 67234 : 3.16.1 (BKF, C, K); 7247 : 2.47 (BKF); 7305 : 2.1 (BKF); 7324 : 2.1 (BKF); 7326 : 1.3 (BKF); 7357 : 2.16 (BKF); 7423 : 1.10 (BKF); 7473 : 3.16.1 (BKF); 7638 : 2.26 (BKF); 10076 : 2.22 (BKF); 10860 : 1.3 (BKF); 10869 : 1.2 (BKF); 10946 : 1.3 (BKF); 11043 : 1.1 (BKF); 11293 : 1.2 (BKF); 11300 : 1.10 (BKF); 11311 : 2.41 (BKF); 11342 : 1.1 (BKF); 11355 : 1.17 (BKF); 11358 : 1.1 (BKF); 11367 : 1.10 (BKF); 11370 : 1.1 (BKF); 11442 : 1.1 (BKF); 12298 : 3.8 (BKF); 12300 : 2.25 (BKF); 12301 : 2.7 (BKF); 13038 : 2.49 (BKF); 13086 : 2.22 (BKF); 13102 : 2.49 (BKF); 13162 : 2.49 (BKF); 13342 : 1.23 (BKF); 13480 : 2.42 (BKF); s.n. : 3.11 (BKF).

Phengnaren S. 12 : 2.16 (BKF); 203 : 1.1 (BKF); 207 : 1.26 (BKF); 284 : 2.25 (BKF); 350 : 2.16 (BKF); 387 : 2.16 (BKF, K); 420 : 3.16.1 (BKF, K); 427 : 2.16 (BKF); 510 : 2.16 (BKF, C, K); 533 : 2.25 (BKF); 585 : 1.24 (BKF); 700 : 3.10 (BKF, C); 832 : 3.16.1 (BKF); s.n. (11-8-1968) : 2.47 (BKF); s.n. (12-8-1968) : 1.12 (BKF); s.n. (13-8-1968) : 2.38 (BKF).

Phonsena P. et al. 2659 : 2.49 (BKF); 3391 : 2.20 (BKF); 3393 : 2.20 (BKF); 3396 : 2.20 (BKF); 3411 : 2.20 (BKF); 3414 : 1.24 (BKF); 3430 : 1.24 (BKF); 3458 : 2.49 (BKF); 3483 : 2.49 (BKF); 3484 : 3.22 (BKF); 3485 : 2.16 (BKF); 3486 : 2.16 (BKF); 3492 : 2.49 (BKF); 3493 : 2.49 (BKF); 3494 : 2.49 (BKF); 3495 : 2.49 (BKF); 3497 : 2.49 (BKF); 3552 : 1.25 (BKF); 3553 : 1.1 (BKF); 3556 : 3.23 (BKF); 3557 : 3.23 (BKF); 3558 : 3.23 (BKF); 3561 : 2.20 (BKF); 3562 : 2.49 (BKF); 3563 : 2.49 (BKF); 3564 : 2.20 (BKF); 3565 : 2.20 (BKF); 3566 : 2.20 (BKF); 3568 : 2.49 (BKF); 3569 : 2.49 (BKF); 3570 : 2.49 (BKF); 3571 : 2.49 (BKF); 3581 : 1.1 (BKF); 3582 : 1.9 (BKF); 3584 : 1.1 (BKF); 3587 : 2.20 (BKF); 3598 : 2.49 (BKF); 3599 : 3.22 (BKF); 3600 : 3.22 (BKF); 3613 : 3.22 (BKF); 3616 : 3.22 (BKF); 3617 : 2.49 (BKF); 3618 : 2.16 (BKF); 3620 : 2.49 (BKF); 3621 : 2.49 (BKF); 3626 : 2.16 (BKF); 3640 : 3.22 (BKF); 3641 : 2.16 (BKF); 3642 : 2.49 (BKF); 3643 : 3.22 (BKF); 3644 : 2.49 (BKF); 3645 : 3.22 (BKF); 3646 : 2.16 (BKF); 3647 : 3.22 (BKF); 3648 : 2.49 (BKF); 3649 : 2.16 (BKF); 3650 : 2.16 (BKF); 3651 : 2.16 (BKF); 3652 : 2.16 (BKF); 3653 : 2.16 (BKF); 3654 : 2.16 (BKF); 3656 : 3.22 (BKF); 3657 : 3.22 (BKF); 3658 : 2.16 (BKF); 3661 : 2.16 (BKF); 3662 : 2.25 (BKF); 3663 : 2.20 (BKF); 3666 : 3.23 (BKF); 3668 : 2.20 (BKF); 3669 : 2.20 (BKF); 3673 : 2.25 (BKF); 3674 : 2.20 (BKF); 3676 : 1.1 (BKF); 3677 : 3.22 (BKF); 3678 : 2.20 (BKF); 3726 : 2.49 (BKF); 3727 : 2.49 (BKF); 3728 : 2.49 (BKF); 3729 : 2.49 (BKF); 3731 : 2.49 (BKF); 3733 : 2.20 (BKF); 3734 : 2.20 (BKF); 3735 : 2.20 (BKF); 3736 : 2.20 (BKF); 3740 : 3.23 (BKF); 3741 : 3.23 (BKF); 3751 : 2.25 (BKF); 3752 : 2.25 (BKF); 3753 : 1.23 (BKF); 3757 : 1.24 (BKF); 3768 : 2.20 (BKF); 3770 : 2.20 (BKF); 3771 : 2.25 (BKF); 3774 : 3.22 (BKF); 3824 : 2.20 (BKF); 3825 : 2.20 (BKF); 3826 : 2.20 (BKF); 3862 : 3.23 (BKF); 3875 : 3.23 (BKF); 3877 : 1.1 (BKF); 3881 : 1.25 (BKF); 3882 : 1.1 (BKF); 3885 : 3.23 (BKF); 3886 : 3.23 (BKF); 3887 : 3.25 (BKF); 3890 : 2.25 (BKF); 3894 : 1.23 (BKF); s.n. (23-4-1942) : 3.49 (BKF).

Phrombubpha A. 21 : 2.7 (BKF).

Phusomsaeng S. 15 : 2.25 (BKF, K); 15A : 1.3 (BKF); 57 : 1.4 (BKF); 62 : 2.39 (BKF); 74 : 3.9 (AAU, BKF, C); 108 : 2.55 (BKF); 128 : 1.33 (BKF); 181 : 2.48 (BKF, C); 192 : 3.15 (BKF); 266 : 1.1 (BKF); 267 : 3.11 (BKF); 415 : 3.11 (BKF); 461 : 1.18 (BKF); 528 : 3.20 (BKF, C); 529 : 2.55 (BKF, C); 1574 : 2.55 (BKF, C); 1585 : 2.55 (BKF, C, K); 1614 : 1.23 (BKF); s.n. (15-11-1965) : 2.39 (BKF, C).

Pichet S. 3 : 2.16 (PSU).

Pinnin S. et al. 54 : 3.1 (AAU, BKF, C, K); 61 : 2.51 (BKF); 65 : 1.32 (BKF, C); 96 : 3.2.2 (BKF, C); 98 : 2.50 (BKF, C, K); 529 : 1.8 (BKF); 1574 : 1.8 (BKF).

Pongamornkul W. 115 : 1.4 (BKF, QBG); 118 : 1.3 (BKF, QBG); 294 : 1.11 (BKF, QBG); 395 : 1.4 (BKF, QBG); 605 : 3.6 (QBG); 607 : 2.1 (QBG); 657 : 3.22 (BKF, QBG).

Pongthong S. s.n. (25-4-2002) : 1.22 (BKF).

Pooma R. 41 : 1.3 (BKF); 42 : 2.27 (BKF); 64 : 3.6 (BKF); 65 : 3.10 (BKF); 66 : 3.10 (BKF); 67 : 2.22 (BKF); 69 : 1.3 (BKF); 69A : 2.47 (BKF); 70 : 1.3 (BKF); 72 : 1.3 (BKF); 73 : 2.2 (BKF); 76 : 3.4 (BKF); 90 : 3.1 (BKF); 91 : 3.2.2 (BKF); 92 : 2.51 (BKF); 208 : 1.32 (BKF); 209 : 1.9 (BKF); 210 : 1.3 (BKF); 211 : 2.49 (BKF); 212 : 2.25 (BKF); 213 : 1.17 (BKF); 214 : 1.3 (BKF); 215 : 2.27 (BKF); 216 : 3.11 (BKF); 217 : 2.39 (BKF); 218 : 3.16.1 (BKF); 219 : 2.16 (BKF); 220 : 2.49 (BKF); 227 : 2.93 (BKF); 228 : 1.22 (BKF); 229 : 3.16.1 (BKF); 230 : 3.9 (BKF); 232 : 3.11 (BKF); 235 : 1.3 (BKF); 342 : 3.15 (BKF); 346 : 2.2 (BKF); 368 : 2.25 (BKF); 409 : 2.47 (BKF); 418 : 1.3 (BKF); 476 : 3.4 (BKF); 606 : 3.15 (BKF); 733 : 3.19 (BKF); 784 : 3.27 (BKF); 836 : 2.23 (BKF); 838 : 1.17 (BKF); 858 : 3.4 (BKF); 1379 : 3.29 (BKF); 1480 : 2.32 (BKF); 1518 : 3.4 (BKF); 1533 : 3.28 (BKF); 1676 : 3.17 (BKF); 2315 : 2.7 (BKF); 2322 : 2.25 (BKF); 2373 : 2.7 (BKF); 2513 : 3.16.1 (BKF); 2553 : 2.7 (BKF); 2654 : 1.26 (BKF); 2670 : 1.24 (BKF); 2770 : 2.21 (BKF); 2778 : 3.11 (BKF); 2779 : 2.20 (BKF); 2779A : 2.19 (BKF); 2850 : 1.26 (BKF); 2851 : 2.41 (BKF).

Poore M.E.D. s.n. (-1-1 1962) : 2.27 (AAU).

Prachasaisoradet V. 450 : 2.53 (BKF).

Prachit et al. 3 : 1.11 (BKF, QBG).

Praphat D. 34 : 2.7 (BKF); 160 : 2.55 (BKF); 181 : 3.16.1 (BKF); 604 : 2.7 (BKF); 660 : 1.18 (BKF); 668 : 2.25 (BKF); 685 : 2.16 (BKF); 757 : 3.17 (BKF).

Premrasami A. 104 : 3.22 (BKF).

Prommongkol R. s.n. (1-11-1979) : 1.4 (BKF); s.n. (1-11-1979) : 1.1 (BKF).

Put P. 137 : 3.9 (BKF); 162 : 1.13 (BKF); 166 : 2.22 (BKF); 208 : 1.18 (BKF); 212 : 2.8 (BKF); 248 : 2.52 (BKF); 269 : 3.27 (BKF); 279 : 1.4 (BKF); 381 : 2.18 (BKF); 640 : 2.25 (BK, C, K); 926 : 1.23 (BK, BM, C, K); 1686 : 1.11 (BK, BM, C); 1847 : 2.16 (BK, C, K); 2714 : 2.25 (BK, C, K); 3032 : 2.9 (BK, C, K); 3306 : 2.9 (BK, C, K); 3312 : 4.1 (BK); 3338 : 2.9 (BK, K); 3361 : 1.6 (BK, BM, C, K); 3364 : 1.9 (BK); 3366 : 1.9 (BK); 3385 : 2.16 (BK, BM, K); 3392 : 1.32 (BK, BM, C); 3402 : 3.27 (BK, BM, C, K); 3472 : 2.16 (BK, BM, K); 3473 : 2.16 (K); 3474 : 2.16 (BK, BM, C); 3515 : 3.4 (BK, C, K); 3521 : 1.1 (BK, BM); 3567 : 3.4 (BK, C, K); 3679 : 2.21 (BK, K); 3753 : 1.6 (BK, BM, C, K); 3763 : 1.1 (BM, C, K); 3771 : 1.26 (BK, BM); 3775 : 3.14 (BK, BM, K); 3778 : 4.1 (K); 3787 : 2.9 (BK, BM, K); 3791 : 1.6 (BK, BM, C, K); 3800 : 2.9 (BK, BM, K); 3801 : 1.26 (BK, BM); 3808 : 1.13 (BK, K); 3825 : 1.9 (BK); 3882 : 2.53 (BK, BM, C, K); 3916 : 1.10 (BK, BM, C, K); 3918 : 1.26 (BK, BM); 3919 : 1.26 (BK, BM); 3934 : 3.27 (BK, K); 3958 : 1.9 (BK, BM, C, K); 3975 : 3.10 (BK, BM, C, K); 4445 : 3.13 (BK, BM, K); 4523 : 3.9 (BK, BM, K); 4530 : 3.6 (BK, BM, K); 4533 : 3.9 (BM, K).

Puudjaa P. 134 : 1.24 (BKF); 1000 : 2.4 (BKF); 1196 : 2.30 (BKF); 1225 : 2.1 (BKF); 1226 : 2.49 (BKF); 1233 : 2.36 (BKF); 1235 : 2.1 (BKF); 1238 : 2.48 (BKF); 1240 : 2.6 (BKF); 1241 : 2.6 (BKF); 1250 : 2.54 (BKF); 1356 : 2.16 (BKF); 1359 : 2.16 (BKF); 1404 : 2.53 (BKF); 1445 : 1.24 (BKF).QBG 3 : 3.11 (QBG); 33 : 1.1 (QBG); 87 : 1.17 (QBG); 222 : 1.4 (QBG); 798 : 1.4 (QBG); 934 : 1.11 (QBG); 1819 : 1.32 (QBG); 2001 : 1.11 (QBG); 2601 : 2.31 (QBG); 4288 : 1.17 (QBG); 4783 : 2.12 (QBG); 4784 : 2.12 (QBG); 5027 : 3.16.1 (QBG); 5550 : 3.10 (QBG); 5789 : 1.4 (QBG); 5969 : 3.21 (QBG); 5970 : 3.9 (QBG); 6123 : 3.20 (QBG); 6162 : 3.6 (QBG); 6546 : 1.4 (QBG); 6552 : 2.27 (QBG); 6583 : 1.4 (BKF, QBG); 6740 : 1.17 (QBG); 6765 : 1.17 (QBG); 6974 : 3.11 (QBG); 7058 : 1.17 (QBG); 9321 : 1.17 (QBG); 9424 : 3.26 (QBG); 9832 : 2.27 (QBG); 9956 : 1.11 (QBG); 10888 : 1.11 (QBG); 11058 : 1.11 (QBG); 11297 : 3.11 (QBG); 11298 : 3.15 (QBG); 11299 : 3.21 (QBG); 11300 : 3.9 (QBG); 11301 : 3.16.1 (QBG); 11302 : 1.4 (QBG); 11303 : 3.11 (QBG); 11304 : 2.22 (QBG); 11310 : 2.23 (QBG); 11306 : 1.11 (QBG); 11313 : 3.6 (QBG); 11314 : 1.17 (QBG); 11315 : 1.17 (QBG); 11317 : 1.11 (QBG); 11318 : 3.2.1 (QBG); 11320 : 3.27 (QBG); 31121 : 3.10 (QBG); 11322 : 1.4 (QBG); 15701 : 1.32 (BKF, QBG).

Rabil 82 : 2.21 (BK, C, K); 88 : 1.11 (BK, BM, C, K); 178 : 2.18 (BK, C, K); 271 : 2.16 (BK); 352 :

2.55 (BK, C, K); 354 : 1.18 (BK, BM, C, K).

Rock J.F. 1755 : 4.1 (K); 1830 : 1.6 (K).

Rueang-iam T. 4 : 2.21 (AAU, BKF, C)

Sadakorn J. 510 : 2.50 (BK); 534 : 1.26 (BK); 563 : 2.9 (BK); 624 : 1.26 (BK).

Sangkhachand B. 3 : 2.16 (BKF); 4 : 2.21 (BKF, C, K); 7 : 2.22 (BKF); 8 : 2.50 (BKF); 15 : 2.50 (BKF); 19 : 2.16 (BKF); 29 : 2.49 (BKF); 34 : 1.1 (BKF); 39 : 3.24 (BKF); 42 : 2.16 (BKF); 64 : 1.26 (BKF); 78 : 1.32 (BKF); 94 : 3.16 (BKF); 95 : 2.16 (BKF); 99 : 1.3 (BKF); 107 : 1.22 (BKF, C); 108 : 2.21 (BKF, C, K); 125 : 2.16 (BKF); 116 : 2.34 (BKF); 145 : 1.23 (BKF); 146 : 1.23 (BKF); 214 : 2.29 (BKF, C, K); 273 : 2.36 (BKF, C, K); 356 : 1.19 (BKF); 379 : 2.42 (BKF); 446 : 1.23 (BKF); 842 : 3.10 (BKF, C, K); 859 : 1.27 (BKF, C); 988 : 2.16 (BKF); 1030 : 2.16 (BKF); 1053 : 2.48 (BKF, K); 1183 : 2.55 (BKF); 1221 : 2.55 (BKF, C, K); 1236 : 2.48 (BKF, K); 1243 : 2.39 (BKF); 1253 : 2.6 (BKF); 1352 : 2.55 (BKF); 1442 : 2.48 (AAU, BKF); 1525 : 1.18 (BKF, C, K); 1529 : 1.33 (BKF, C, K); 1532 : 2.21 (BKF); 1540 : 1.1 (BKF); 1659 : 3.11 (BKF, C, K); 3039 : 1.22 (BKF); 3051 : 1.17 (BKF, C); 3091 : 3.10 (BKF, C); 3091 : 3.10 (BKF, C); 3125 : 1.4 (BKF); 3217 : 1.19 (BKF).

Sangkhachand P. 94 : 2.16 (BK); 135 : 1.19 (BK); 152 : 1.11 (BK); 215 : 2.25 (BK); 371 : 2.4 (BK); 413 : 2.48 (BK); 491 : 2.55 (BK); 762 : 2.16 (BK); 847 : 2.39 (BK); 850 : 3.16.1 (BK); 851 : 2.47 (BK); 861 : 1.10 (BK); 892 : 1.17 (BK); 893 : 1.9 (BK); 897 : 2.47 (BK); 903 : 1.9 (BK); 945 : 3.16.1 (BK); 946 : 2.47 (BK); 947 : 2.47 (BK); 953 : 1.26 (BK); 954 : 1.26 (BK); 966 : 2.12 (BK); 967 : 3.16.1 (BK); 968 : 2.16 (BK); 1090 : 2.50 (BK); 1091 : 2.51 (BK); 1092 : 3.2.2 (BK); 1177 : 3.16.1 (BK); 1354 : 1.22 (BK); 1464 : 3.27 (BK); 1663 : 2.21 (BK); 1843 : 1.33 (BK); 1860 : 2.48 (BK); 2101 : 2.50 (BK); 2115 : 3.7 (BK); 2116 : 2.50 (BK); 2117 : 3.2.2 (BK).

Santisuk Th. et al. 17 : 2.54 (BKF); 23 : 2.21 (BKF); 62 : 2.25 (BKF); 333 : 2.53 (BKF); 372 : 1.3 (BKF); 401 : 3.9 (BKF); 405 : 1.18 (BKF, C, K); 421 : 2.21 (BKF, C, K); 441 : 1.18 (BKF); 482 : 2.21 (BKF, C, K); 483 : 2.21 (BKF, K); 484 : 2.21 (BKF, K); 736 : 2.7 (BKF); 831 : 2.53 (BKF); 889 : 1.23 (BKF, PSU); 1011 : 3.15 (BKF); 1018 : 1.4 (BKF); 1079 : 2.54 (BKF); 1080 : 2.2 (BKF); 1081 : 3.27 (BKF); 1084 : 1.10 (BKF); 1087 : 3.9 (BKF, PSU); 1115 : 3.6 (BKF, PSU); 1139 : 3.15 (BKF); 1168 : 2.19 (BKF); 1183 : 2.48 (BKF, PSU); 1210 : 2.21 (BKF); 1242 : 2.16 (BKF, PSU); 1282 : 1.23 (BKF); 1284 : 2.19 (BKF, PSU); 1451 : 1.1 (AAU, BKF, C, K); 1457 : 1.11 (BKF, C, K); 1484 : 3.11 (AAU, BKF); 1516 : 3.6 (AAU, BKF, C, K); 1517 : 3.9 (AAU, BKF, C, K); 1521 : 1.10 (AAU, BKF, C, K); 1603 : 3.6 (BKF); 6665 : 1.1 (BKF); 6678 : 3.10 (BKF); 6684 : 2.16 (BKF); 6700 : 3.10 (BKF); 6831 : 1.19 (BKF); 6840 : 3.3 (BKF); 6922 : 1.28 (BKF); s.n. (8-4-1982) : 1.23 (BKF); s.n. (20-10-1982) : 1.10 (BKF); s.n. (11-4-1987) : 1.23 (BKF); s.n. (4-6-1987) : 3.23 (BKF); s.n. (9-6-1987) : 2.1 (BKF); s.n. (23-7-1987) : 2.1 (BKF); s.n. (20-10-1987) : 2.27 (BKF); s.n. (20-10-1987) : 2.22 (BKF); s.n. (20-10-1987) : 2.27 (BKF); s.n. (20-10-1987) : 1.11 (BKF); s.n. (20-10-1987) : 1.3 (BKF); s.n. (21-7-1990) : 1.23 (BKF); s.n. (5-5-1992) : 1.11 (BKF); s.n. (11-6-1994) : 1.9 (BKF); s.n. (10-12-1994) : 2.7 (BKF).

Sawongto M. s.n. (15-1-1977) : 2.25 (BKF).

Schmidt J. 395 : 3.27 (C); 426 : 1.19 (C); 534 : 1.23 (C); 586 : 2.42 (C); 688 : 3.27 (C); 718 : 1.19 (C); 841 : 3.18 (C).

Seidenfaden G. 2584 : 1.18 (C); 2623 : 2.49 (C, K).

Shimizu T. et al. T-02940 : 3.13 (BKF, KYO); T-10140 : 3.13 (BKF, KYO); T-11725 : 1.11 (BKF, KYO); T-11727 : 3.22 (BKF, KYO); T-18126 : 3.16.1 (BKF, KYO); T-18620 : 1.1 (AAU, BKF, C, K, KYO); T-19198 : 1.3 (AAU, BKF, KYO); T-20447 : 2.1 (BKF, KYO); T-20587 : 2.1 (BKF, KYO); T-20699 : 1..... (AAU, BKF, KYO); T-20940 : 3.13 (AAU, KYO); T-21057 : 3.13 (BKF, KYO); T-22644 : 3.22 (BKF, KYO); T-22953 : 3.2.2 (AAU, BKF, KYO); T-26892 : 2.16 (BKF, KYO); T-26910 : 2.1 (BKF, KYO); T-28562 : 3.2.1 (BKF, KYO); T-28608 : 2.22 (BKF, KYO); T-28830 : 2.54 (BKF, KYO).

Singhasatit S. 76 : 3.11 (BKF); 130 : 2.31 (BKF); 152 : 2.23 (BKF); 230 : 3.11 (BKF); 287 : 2.23 (BKF); 288 : 2.39 (BKF); 419 : 1.10 (BKF); 433 : 2.27 (BKF); 445 : 1.32 (BKF); 477 : 1.3 (BKF).

Siriphum S. et al. QBG-9923 : 1.11 (QBG); QBG-9925 : 1.3 (QBG).

Sirirugsa P. 231 : 2.16 (PSU); 908 : 2.8 (PSU).

Smitinand T. et al. 102 : 3.10 (BKF); 102A : 3.11 (BKF); 104 : 2.16 (BKF); 180 : 1.5 (BKF); 195 : 2.2 (BKF); 346 : 3.10 (BKF); 374 : 3.16.1 (BKF); 405 : 3.9 (BKF); 414 : 3.10 (BKF); 456 : 2.50 (BKF); 565 : 2.51 (BKF); 615 : 2.48 (BKF); 757 : 2.55 (BKF); 780 : 1.2 (BKF); 830 : 2.40 (BKF); 846 : 2.55 (BKF); 862 : 3.21 (BKF); 1053 : 3.8 (BKF); 1070 : 2.50 (BKF); 1073 : 3.23 (BKF); 1076 : 2.56 (BKF); 1085 : 2.56 (BKF); 1130 : 1.9 (BKF); 1154 : 3.22 (BKF); 1155 : 2.25 (BKF); 1175 : 3.22 (BKF); 1193 : 3.2.1 (BKF); 1194 : 3.2.2 (BKF); 1206 : 3.10 (BKF); 1249 : 3.1 (BKF); 1356 : 2.42 (BKF); 1376 : 1.23 (BKF); 1571 : 3.11 (BKF); 1631 : 3.16.1 (BKF); 1639 : 2.16 (BKF); 1640 : 2.2 (BKF); 1646 : 1.4 (BKF); 1647 : 1.26 (BKF); 1648 : 3.11 (BKF); 1723 : 1.32 (BKF); 1780 : 2.51 (BKF); 1781 : 1.7 (BKF); 1805 : 2.51 (BKF, K); 1806 : 1.9 (BKF, C, K); 1806A : 1.9 (BKF); 1809 : 3.1 (BKF); 1809A : 3.1 (BKF); 1831 : 1.19 (BKF); 1832 : 3.16.1 (BKF); 1853 : 1.32 (BKF); 1854 : 3.2.1 (BKF); 1855 : 3.29 (BKF); 1875 : 3.23 (BKF); 1900 : 2.51 (BKF); 1916 : 2.50 (BKF); 1985 : 1.1 (BKF); 2018 : 1.11 (BKF); 2279 : 2.6 (BKF); 2330 : 2.5 (BKF); 2331 : 2.42 (BKF); 2332 : 2.38 (BKF); 2335 : 2.40 (BKF); 2430 : 1.2 (BKF); 2490 : 1.32 (BKF); 2491 : 1.1 (BKF); 2493 : 2.12 (BKF); 2496 : 3.2.1 (BKF); 2504 : 3.2.1 (BKF); 2505 : 3.9 (BKF); 2507 : 3.22 (BKF); 2508 : 3.22 (BKF); 2510 : 3.22 (BKF); 2516 : 3.22 (BKF); 2518 : 2.12 (BKF); 2548 : 2.16 (BKF); 2562 : 3.11 (BKF); 2565 : 3.28 (BKF); 2568 : 2.41 (BKF); 2569 : 1.4 (BKF); 2570 : 3.10 (BKF); 2573 : 3.28 (BKF); 2576 : 2.12 (BKF); 2577 : 3.16.1 (BKF); 2578 : 2.12 (BKF); 2585 : 3.11 (BKF); 2598 : 3.16.1 (BKF); 2615 : 2.53 (BKF); 2619 : 3.2.1 (BKF); 2623 : 3.11 (BKF); 2630 : 1.17 (BKF); 2632 : 1.17 (BKF); 2662 : 3.8 (BKF); 2663 : 3.28 (BKF); 2664 : 3.11 (BKF); 2665 : 3.16.1 (BKF); 2669 : 3.23 (BKF); 2671 : 2.53 (BKF); 2672 : 3.1 (BKF); 2679 : 2.9 (BKF); 2681 : 2.12 (BKF); 2683 : 2.51 (BKF); 2695 : 2.49 (BKF); 2698 : 3.28 (BKF); 2701 : 3.11 (BKF); 2727 : 1.3 (BKF); 2739 : 3.11 (BKF); 2748 : 2.27 (BKF); 2753 : 2.39 (BKF); 2778 : 1.1 (BKF); 2779 : 1.26 (BKF); 2780 : 2.2 (BKF); 2781 : 3.27 (BKF); 2784 : 2.2 (BKF); 2826 : 2.36 (BKF); 2863 : 2.21 (BKF); 2923 : 1.18 (BKF); 2974 : 1.33 (BKF); 2982 : 1.18 (BKF); 2997 : 2.48 (BKF); 3028 : 2.8 (BKF); 3099 : 2.12 (BKF); 3194 : 3.5 (BKF); 3298 : 1.32 (BKF); 3320 : 2.55 (BKF); 3321 : 1.19 (BKF); 3385 : 2.21 (BKF); 3409 : 2.54 (BKF); 3463 : 2.54 (BKF); 3721 : 2.47 (BKF); 2728 : 2.47 (BKF); 3746 : 2.47 (BKF); 3754 : 1.17 (BKF); 3757 : 3.6 (BKF); 4100 : 2.39 (BKF); 4215 : 2.32 (BKF); 4242 : 3.8 (BKF); 4242A : 3.8 (BKF); 4330 : 2.53 (BKF); 4336 : 1.6 (BKF); 4391 : 3.21 (BKF); 4392 : 2.39 (BKF); 4399 : 2.2 (BKF); 4568 : 2.20 (BKF); 4739 : 3.8 (BKF, C, K); 4749 : 3.13 (BKF, K); 4821 : 2.20 (BKF); 4935 : 2.41 (BKF); 4977 : 3.23 (BKF); 5001 : 3.23 (BKF); 5029 : 3.22 (BKF); 5235 : 3.21 (BKF); 5476 : 1.1 (BKF); 5478 : 3.5 (BKF); 5511 : 3.22 (BKF); 5523 : 3.11 (BKF); 5537 : 3.11 (BKF); 5542 : 1.7 (BKF); 5596 : 2.21 (BKF); 5943 : 1.9 (BKF); 6041 : 1.26 (BKF); 6068 : 1.1 (BKF); 6118 : 3.2.2 (BKF, K); 6119 : 3.2.1 (BKF, K); 6126 : 1.18 (BKF); 6289 : 3.17 (BKF); 6290 : 3.17 (BKF); 6314 : 2.25 (BKF); 6315 : 3.16.1 (BKF); 6316 : 3.11 (BKF); 6319 : 1.17 (BKF); 6580 : 2.8 (BKF); 6582 : 2.8 (BKF); 6604 : 3.11 (BKF, K); 6605 : 1.2 (BKF); 6625 : 1.7 (BKF); 6627 : 3.3 (BKF); 6640 : 2.1 (BKF); 6667 : 3.19 (BKF); 6703 : 1.26 (BKF); 6734 : 1.32 (BKF, K); 6742 : 3.6 (BKF, K); 6755 : 2.1 (BKF); 6780 : 3.8 (BKF); 6781 : 3.8 (BKF, K); 6784 : 3.13 (BKF, K); 6785 : 3.26 (BKF, K); 6799 : 3.4 (BKF, K); 6973 : 1.2 (BKF); 6978 : 1.15 (BKF); 7013 : 3.29 (BKF); 7016 : 3.24 (BKF); 7051 : 2.49 (BKF); 7063 : 3.4 (BKF); 7064 : 2.22 (BKF); 7114 : 2.21 (BKF); 7176 : 1.1 (BKF); 7187 : 3.2.1 (BKF); 7202 : 1.1 (BKF); 7290 : 2.56 (BKF); 7321 : 3.13 (BKF); 7395 : 3.10 (BKF); 7398 : 2.32 (BKF); 7440 : 2.20 (BKF); 7484 : 1.1 (BKF); 7517 : 2.20 (AAU, BKF, C, K); 7553 : 2.49 (BKF, K); 7564 : 3.16.1 (BKF); 7565 : 2.39 (BKF); 7566 : 1.3 (BKF); 7575 : 2.2 (BKF); 7579 : 3.21 (BKF); 7584 : 3.4 (BKF); 7608 : 1.6 (BKF); 7610 : 1.6 (BKF); 7619 : 3.24 (BKF); 7629 : 2.56 (BKF); 7659 : 2.56 (BKF, C); 7694 : 1.1 (BKF); 7710 : 3.24 (BKF); 7716 : 1.2 (BKF); 7799 : 3.8 (BKF); 7800 : 3.13 (BKF); 7833 : 3.8 (BKF); 7847 : 2.16 (BKF); 7870 : 2.49 (BKF); 7885 : 3.17 (BKF); 7919 : 3.23 (BKF); 7930 : 2.20 (BKF); 8098 : 2.25 (BKF); 8340 : 2.56 (BKF); 8364 : 3.16.1 (BKF, K); 8421 : 2.20 (BKF, C, K); 8573 : 1.4 (BKF); 8579 : 2.22 (BKF); 8607 : 1.4 (BKF); 8633 : 3.27 (BKF); 8705 : 3.21 (BKF); 8735 : 2.53 (BKF); 8768 : 1.1 (BKF); 8941 : 1.18 (BKF); 8973 : 2.48 (BKF); 10061 : 2.7 (BKF); 10073 : 3.22 (BKF); 10074 : 2.6 (BKF); 10077 : 3.23 (BKF); 10106 : 2.20 (BKF); 10109 : 2.7 (BKF); 10117 : 3.28 (BKF); 10157 : 3.28 (BKF); 10161 : 2.49 (BKF, K); 10162 : 2.51 (BKF); 10250 : 3.7 (BK, BKF); 10256 : 4.1 (BKF, L); 10292 : 2.1 (BKF); 10321 : 3.3 (BK, BKF, K); 10326 : 3.3 (BK, BKF, C, K); 10327 : 3.7 (BKF, C, K); 10341 : 2.12 (BKF, C, K); 10452 :

2.20 (AAU, BKF, C, K); 10470 : 3.2.2 (BKF); 10483 : 2.55 (BKF); 10494 : 2.39 (BKF); 10539 : 2.21 (BKF); 10610 : 1.13 (BKF); 10611 : 1.32 (BKF); 10664 : 2.11 (BKF); 10825 : 4.1 (AAU, BKF, K); 11007 : 2.55 (BKF); 11206 : 3.29 (BKF); 11515 : 2.6 (BKF); 11596 : 3.11 (BKF); 11597 : 2.12 (BKF); 11611 : 2.21 (BKF); 11678 : 2.55 (BKF); 11683 : 2.39 (BKF, C); 11684 : 2.12 (BKF, K); 11685 : 3.28 (BKF); 11688 : 3.11 (BKF); 11709 : 2.48 (BKF); 11723 : 3.19 (BKF); 11730 : 2.18 (BKF); 11744 : 2.6 (BKF); 11823 : 2.39 (BKF); 11823A : 2.16 (BKF); 11835 : 2.47 (BKF); 11854 : 2.23 (BKF); 11860 : 3.28 (BKF); 11872 : 3.23 (BKF); 11898 : 3.2.1 (BKF); 11915 : 1.17 (BKF); 11926 : 2.39 (BKF); 11933 : 2.10 (BKF, PSU); 11967 : 2.18 (BKF); 11968 : 2.55 (BKF); 12002 : 3.17 (BKF); 12021 : 3.3 (BKF); 12084 : 2.47 (BKF); 12086 : 1.13 (BKF); 12087 : 3.9 (BKF); 12146 : 2.54 (BKF); 12154 : 2.19 (BKF); 12174 : 2.54 (BKF); 12212 : 3.8 (BKF); 81-5 : 1.23 (BKF, K); 86-9 : 1.32 (BKF); 88-1 : 2.53 (BKF, PSU, QBG); 88-42 : 2.53 (BKF); 88-76 : 3.15 (BKF); 88-194 : 1.2 (BKF); 89-22 : 3.16.1 (BKF); 89-24 : 2.39 (BKF); 89-28 : 2.16 (BKF); 90-1 : 3.10 (BKF); 90-24 : 2.22 (BKF); 90-27 : 1.28 (BKF); 90-28 : 3.20 (BKF); 90-41 : 3.10 (BKF); 90-46 : 2.31 (BKF); 90-68 : 3.9 (BKF); 90-69 : 3.6 (BKF); 90-70 : 3.27 (BKF); 90-73 : 1.12 (BKF); 90-74 : 1.3 (BKF); 90-75 : 3.11 (BKF); 90-76 : 2.16 (BKF); 90-77 : 1.32 (BKF); 90-78 : 2.27 (BKF); 90-79 : 2.50 (BKF); 90-80 : 1.12 (BKF); 90-82 : 3.20 (BKF); 90-84 : 1.4 (BKF); 90-86 : 2.2 (BKF); 90-87 : 2.31 (BKF); 90-90 : 1.28 (BKF); 90-91 : 3.27 (BKF); 90-92 : 3.3 (BKF); 90-95 : 1.3 (BKF); 90-138 : 2.16 (BKF); 90-140 : 3.22 (BKF); 90-174 : 2.47 (BKF); 90-176 : 1.32 (BKF); 90-177 : 1.1 (BKF); 90-187 : 2.39 (BKF); 90-190 : 1.3 (BKF); 90-191 : 3.10 (BKF); 90-193 : 2.53 (BKF); 90-194 : 1.2 (BKF); 90-196 : 3.9 (BKF); 90-197 : 2.2 (BKF); 90-198 : 1.25 (BKF); 90-203 : 2.16 (BKF); 90-215 : 3.9 (BKF); 90-221 : 1.22 (BKF); 90-226 : 1.27 (BKF); 90-233 : 2.27 (BKF, QBG, PSU); 90-234 : 3.11 (BKF); 90-235 : 3.11 (BKF); 90-236 : 3.16.1 (BKF); 90-237 : 3.11 (BKF); 90-238 : 3.6 (BKF); 90-252 : 2.22 (BKF); 90-253 : 3.27 (BKF); 90-257 : 1.17 (BKF); 90-258 : 3.11 (BKF); 90-259 : 2.16 (BKF); 90-264 : 2.25 (BKF); 90-265 : 1.23 (BKF); 91-22 : 1.32 (BKF); 91-35 : 3.17 (BKF); 91-63 : 2.16 (BKF); 92-12 : 2.32 (BKF); 92-13 : 3.15 (BKF); 92-28 : 1.24 (BKF); 92-31 : 2.49 (BKF); s.n. (24-6-1951) : 3.11 (BKF); s.n. (24-12-1952) : 1.32 (BKF); s.n. (5-1-1954) : 3.6 (BKF); s.n. (24-6-1954) : 3.10 (BKF); s.n. (29-6-1954) : 1.1 (BKF); s.n. (29-6-1954) : 2.39 (BKF); s.n. (12-8-1954) : 3.29 (BKF); s.n. (2-9-1954) : 3.2.3 (BKF); s.n. (9-7-1975) : 1.22 (BKF); s.n. (16-8-1955) : 1.2 (BKF); s.n. (23-8-1955) : 2.21 (BKF); s.n. (14-2-1961) : 3.16.1 (BKF); s.n. (10-11-1962) : 3.13 (BKF); s.n. (6-3-1971) : 3.2.1 (BKF); s.n. (12-12-1973) : 2.22 (BKF); s.n. (26-1-1977) : 2.1 (BKF); s.n. (27-1-1977) : 2.53 (BKF); s.n. (27-1-1977) : 1.4 (BKF); s.n. (27-1-1977) : 2.22 (BKF); s.n. (5-4-1978) : 1.6 (BKF); s.n. (28-10-1979) : 2.41 (BKF); s.n. (13-3-1980) : 2.12 (BKF); s.n. (13-3-1980) : 2.55 (BKF); s.n. (23-3-1980) : 3.28 (BKF); s.n. (24-3-1980) : 3.28 (BKF); s.n. (25-3-1980) : 1.1 (BKF); s.n. (25-3-1980) : 2.41 (BKF); s.n. (25-3-1980) : 2.23 (BKF); s.n. (20-5-1980) : 3.1 (BKF); s.n. (9-5-1981) : 2.54 (BKF); s.n. (18-12-1981) : 1.1 (BKF); s.n. (10-10-1982) : 1.17 (BKF); s.n. (1-6-1983) : 1.33 (BKF); *s.n. (22-6-1983) : 1.25 (BKF); s.n. (23-6-1983) : 2.47 (BKF); s.n. (23-6-1983) : 3.2.1 (BKF); s.n. (24-6-1983) : 2.49 (BKF); s.n. (4-12-1983) : 1.9 (BKF); s.n. (5-12-1983) : 1.2 (BKF); s.n. (6-5-1985) : 3.10 (BKF); s.n. (6-5-1985) : 2.39 (BKF); s.n. (9-5-1987) : 3.4 (BKF); s.n. (23-7-1987) : 3.29 (BKF); s.n. (7-10-1987) : 2.53 (BKF); s.n. (9-10-1987) : 2.53 (BKF); s.n. (9-10-1987) : 2.49 (BKF); s.n. (10-10-1987) : 2.47 (BKF); s.n. (10-10-1987) : 2.39 (BKF); s.n. (10-10-1987) : 1.3 (BKF); s.n. (10-10-1987) : 3.10 (BKF); s.n. (10-10-1987) : 3.10 (BKF); s.n. (10-10-1987) : 3.11 (BKF); s.n. (19-10-1987) : 3.9 (BKF); s.n. (6-2-1988) : 2.49 (BKF); s.n. (7-2-1988) : 2.2 (BKF); s.n. (7-3-1988) : 2.39 (BKF); s.n. (14-5-1988) : 1.25 (BKF); s.n. (14-5-1988) : 1.22 (BKF); s.n. (23-11-1988) : 1.7 (BKF); s.n. (23-11-1988) : 2.53 (BKF); s.n. (23-11-1988) : 2.16 (BKF); s.n. (10-3-1989) : 2.20 (BKF); s.n. (15-7-1989) : 3.10 (BKF); s.n. (15-7-1989) : 1.27 (BKF); s.n. (16-7-1989) : 3.17 (BKF); s.n. (16-7-1989) : 3.11 (BKF); s.n. (16-7-1989) : 3.4 (BKF); s.n. (17-7-1989) : 1.32 (BKF); s.n. (25-7-1989) : 1.9 (BKF); s.n. (25-7-1989) : 1.10 (BKF); s.n. (13-3-1990) : 3.27 (BKF); s.n. (20-5-1990) : 2.18 (BKF); s.n. (20-5-1990) : 1.10 (BKF); s.n. (20-5-1990) : 3.27 (BKF); s.n. (20-5-1990) : 3.10 (BKF); s.n. (20-5-1990) : 3.6 (BKF); s.n. (28-2-1991) : 3.15 (BKF); s.n. (1-3-1991) : 3.20 (BKF, PSU, QBG); s.n. (11-3-1991) : 3.24 (BKF); s.n. (11-3-1991) : 3.3 (BKF); s.n. (18-7-1993) : 2.16 (BKF); s.n. (8-1-1994) : 2.22 (BKF); s.n. (8-1-1994) : 1.3 (BKF); s.n. (8-1-1994) : 1.17 (BKF); s.n. (8-1-1994) : 1.10 (BKF); s.n. (8-1-1994) : 3.9 (BKF); s.n. (18-12-1994) : 1.28 (BKF); s.n. (13-8-1995) : 1.32 (BKF); s.n. (13-3-1997) : 3.3 (BKF); s.n. (13-11-1997) : 1.10 (BKF).

- Sørensen Th et al.** 164 : 2.25 (BKF, C); 550 : 1.23 (C); 885 : 1.1 (BKF, C); 954 : 3.11 (BKF, C); 957 : 3.10 (C); 985 : 1.3 (C, K); 1001 : 1.10 (C); 1006 : 1.12 (C); 1009 : 2.53 (BKF, C); 1010 : 2.47 (BKF, C); 1013 : 2.39 (BKF, C, K); 1286 : 3.8 (BKF, C); 1565 : 1.6 (BKF, C); 1599 : 2.53 (BKF, C); 1740 : 2.7 (C); 1742 : 3.6 (BKF); 1806 : 2.2 (BKF, C); 2212 : 3.22 (C); 2404 : 3.2.1 (BKF, C, K); 2537 : 1.10 (BKF, C); 2572 : 3.10 (BKF, C); 3590 : 2.39 (C); 2645 : 2.47 (C); 2653 : 2.47 (C); 2660 : 3.11 (C); 2661 : 3.16.1 (C); 3684 : 2.39 (BKF, C); 2696 : 1.32 (C); 2803 : 1.1 (C); 2825 : 1.1 (C); 2861 : 3.10 (BKF, C); 2862 : 2.27 (C); 2870 : 3.21 (BKF, C); 2883 : 3.10 (C); 2887 : 3.9 (C); 2902 : 1.1 (BKF, C); 2917 : 1.10 (BKF, C); 3070 : 2.23 (BKF, C); 3237 : 2.9 (C); 3239 : 2.50 (BKF, C); 3303 : 3.10 (BKF, C); 4338 : 2.51 (C); 3391 : 3.11 (C); 3427 : 1.1 (C); 3530 : 1.1 (BKF, C); 3767 : 1.32 (BKF, K); 4803 : 2.39 (C, K); 3894 : 3.11 (C); 4188 : 3.8 (BKF, C); 4193 : 3.8 (C); 4393 : 2.51 (C); 4427 : 3.10 (C); 4738 : 3.10 (C); 4815 : 1.3 (BKF, C); 4972 : 2.23 (BKF); 5259 : 3.2.1 (C); 5349 : 2.39 (BKF, C); 5353 : 3.10 (C); 5376 : 3.10 (BKF, C); 5393 : 3.10 (C); 5394 : 3.10 (C); 5395 : 3.11 (C); 5395A : 3.10 (C); 5397 : 3.6 (C); 5400 : 3.10 (C); 5401 : 3.10 (BKF, C); 5402 : 1.3 (C); 5404 : 1.3 (C); 5429 : 2.27 (C); 5449 : 3.10 (C); 5453 : 3.10 (C); 5458 : 1.26 (C); 5485 : 2.39 (BKF, C); 5486 : 2.23 (BKF); 5487 : 1.1 (C); 5488 : 1.12 (BKF, C); 5502 : 3.9 (C); 5503 : 3.10 (BKF, C); 5507 : 2.27 (C); 5522 : 1.1 (C); 5556 : 2.39 (C); 5559 : 1.1 (BKF, C); 5560 : 1.10 (C); 5561 : 2.47 (BKF, C); 5563 : 3.9 (C); 5591 : 2.9 (BKF, C, K); 5612 : 3.10 (C); 5661 : 2.39 (C); 5664 : 2.47 (C); 5667 : 1.32 (BKF, C); 5682 : 3.10 (C); 5690 : 1.32 (C); 5700 : 1.32 (C); 5733 : 1.17 (BKF, C); 5736 : 3.11 (C); 5739 : 1.2 (C); 5744 : 1.32 (C); 5750 : 1.32 (C); 5754 : 1.3 (C); 5755 : 2.16 (C); 5806 : 1.3 (BKF, C); 5846 : 1.32 (C); 5856 : 1.5 (C); 5953 : 2.53 (C); 5957A : 1.1 (C); 5960 : 1.1 (C); 5971 : 1.10 (C); 6021 : 1.32 (C); 6031 : 3.10 (C); 6032 : 3.9 (C); 6217 : 3.4 (BKF, C, K); 6223 : 2.22 (BKF, C); 6225 : 2.41 (BKF, C); 6267 : 3.2.2 (BKF, C, K); 6270 : 3.1 (BKF, C, K); 6281 : 3.4 (C); 6519 : 1.1 (BKF, C); 6578 : 2.23 (BKF, C, K); 6586 : 1.1 (BKF, C); 6678 : 1.17 (BKF, C); 6845 : 2.53 (BKF, C, K); 6861 : 1.10 (BKF, C, K); 6867 : 3.11 (BKF, C); 6875 : 2.53 (BKF, C); 6877 : 1.17 (C); 6878 : 1.17 (C); 6885 : 2.47 (BKF, C); 7002 : 3.2.1 (BKF, C, K); 7092 : 3.27 (BKF, C); 7277 : 1.10 (C); 7278 : 1.1 (C); 7279 : 3.9 (C); 7280 : 2.47 (C); 7281 : 3.10 (C); 7282 : 3.10 (C); 7285 : 3.11 (C); 7972 : 3.11 (C); 7974 : 1.32 (BKF); 7975 : 1.17 (C); 7978 : 1.1 (C); 7982 : 2.25 (C); 7983 : 3.10 (C); 7984 : 3.10 (C); 9359 : 1.32 (BKF); s.n. (6-10-1958) : 1.1 (BKF).
- Sri-sa-nga P. et al.** 21 : 3.3 (BKF, QBG); 1008 : 2.55 (QBG); 1010 : 2.55 (BKF, QBG); 1011 : 1.32 (QBG); 1818 : 3.11 (BKF, QBG).
- Sucheera** s.n. (QBG 10888) : 1.1 (QBG).
- Suddee S.** 34 : 3.10 (BKF); 62 : 1.3 (BKF); 217 : 3.6 (BKF); 312 : 3.11 (BKF).
- Sukkri B.** 19 : 3.11 (BKF).
- Suksathan P.** 1175 : 3.26 (QBG); 1127 : 3.26 (QBG); 1420 : 1.11 (BKF, QBG); 1435 : 1.25 (QBG); 1679 : 3.16.1 (QBG); 2562 : 3.5 (QBG); 2708 : 1.1 (BKF, QBG); 2737 : 2.49 (BKF, QBG); 2874 : 3.8 (QBG); 2892 : 3.4 (BKF, QBG).
- Suthisorn S.** 534 : 3.16.1 (BK); 715 : 2.16 (BK); 1085 : 2.21 (BK); 1153 : 2.16 (BK); 1259 : 1.26 (BK); 1507 : 2.2 (BK); 1519 : 2.2 (BK); 1580 : 3.4 (QBG); 2241 : 2.21 (BK); 2360 : 1.8 (BK); 2501 : 2.16 (BK); 2514 : 1.22 (BK); 2570 : 1.1 (BK); 2623 : 3.16.1 (BK); 2638 : 1.9 (BK); 3274 : 1.6 (BK); 3388 : 2.21 (BKF); 3402 : 2.55 (BK); 3551 : 2.25 (BK); 3626 : 2.16 (BK); 3748 : 2.21 (BK); 4105 : 2.16 (BK); 4116 : 2.47 (BK); 4198 : 2.47 (BK).
- Suvanakes P.** 1 : 1.1 (BKF); 100 : 1.1 (BKF); 101 : 1.2 (BKF); 102 : 1.1 (BKF); 103 : 2.23 (BKF); 104 : 1.32 (BKF); 106 : 3.11 (BKF); 109 : 1.4 (BKF); 110 : 1.32 (BKF); 113 : 1.3 (BKF); 120 : 2.48 (BKF); 122 : 2.55 (BKF); 196 : 2.9 (BKF); 695 : 2.55 (BKF); 878 : 2.55 (BKF); 899 : 1.2 (BKF); 901 : 2.12 (BKF); 931 : 1.12 (BKF); 936 : 3.27 (BKF); 974 : 2.47 (BKF); 975 : 2.47 (BKF); 980 : 2.39 (BKF); 983 : 2.47 (BKF); 1038 : 3.11 (BKF); 1083 : 2.16 (BKF); 1104 : 3.11 (BKF); 1258 : 2.23 (BKF); 1259 : 1.10 (BKF); 1260 : 2.9 (BKF); 1434 : 2.25 (BKF); 1435 : 3.10 (BKF); 1508 : 2.25 (BKF); 1620 : 2.21 (BKF, C, K); 1852 : 2.55 (BKF, C, K); 1865 : 2.55 (BKF); 2131 : 2.55 (BKF).
- Suvasutdhi K.** 10 : 1.10 (BKF); 11 : 2.23 (BKF); 13 : 2.27 (BKF); 19 : 3.27 (BKF); 20 : 3.9 (BKF); 23 : 2.22 (BKF); 112 : 1.5 (BKF); 121 : 3.10 (BKF); 165 : 1.1 (BKF); 189 : 2.16 (BKF); 214 :

- 1.19 (BKF); 231 : 2.22 (BKF); 254 : 1.11 (BKF); 260 : 3.16.1 (BKF); 263 : 2.22 (BKF); 305 : 1.10 (BKF); 306 : 2.1 (BKF); 322 : 2.2 (BKF); 332 : 1.10 (BKF); 340 : 3.15 (BKF); 345 : 2.27 (BKF); 346 : 1.32 (BKF); 458 : 3.16.1 (BKF); 494 : 3.2.2 (BKF); 514 : 2.16 (BKF); 521 : 3.2.2 (BKF).
- Suvatabandhu K.** 21 : 2.16 (BK); 58 : 1.9 (BK); 74 : 3.7 (BK, K); 77 : 2.16 (BK, K); 171 : 2.16 (K); 189 : 2.25 (BK).
- Tagawa M. et al.** T-86 : 3.9 (BKF, KYO); T-927 : 2.50 (BKF, KYO); T-1526 : 2.1 (BKF, KYO); T-9071 : 2.16 (BKF, KYO); T-9148 : 1.11 (BKF, KYO); T-9152 : 2.31 (BKF, KYO).
- Takahashi H. et al.** T-60581 : 1.1 (BKF, KYO); T-60606 : 2.51 (BKF, KYO); T-60608 : 1.1 (BKF, KYO); T-60619 : 2.39 (BKF, KYO); T-62966 : 1.17 (BKF, KYO); T-63313 : 2.16 (AAU, BKF, KYO); T-63324 : 1.32 (BKF, KYO); T-63327 : 2.50 (BKF, KYO); T-63441 : 2.51 (BKF, KYO); T-63526 : 3.2.2 (BKF, KYO); T-63530 : 3.1 (BKF, KYO); T-63532 : 2.16 (AAU, BKF, KYO); T-63534 : 1.32 (BKF, KYO); T-63536 : 2.50 (AAU, BKF, KYO); T-63538 : 2.51 (BKF, KYO); T-63539 : 1.32 (BKF, KYO).
- Tamura M.N. et al.** ; T-60490 : 2.16 (BKF, KYO); T-60493 : 2.16 (BKF, KYO); T-60668 : 3.11 (BKF, KYO).
- Thaworn S.** 2 : 3.27 (AAU, BKF, C, K); 334 : 2.21 (BKF); 447 : 2.1 (BKF); 454 : 1.33 (BKF); 642 : 2.21 (BKF); 747 : 2.21 (BKF); 798 : 2.18 (BKF); 1033 : 2.21 (BKF).
- Thananon N.** 6 : 3.19 (BKF).
- Tressukhon U.** s.n. (26-1-1980) : 1.1 (BKF).
- Vanpruk L.** 56 : 3.27 (BKF); 86 : 1.4 (BKF); 164 : 2.2 (K); 458 : 2.2 (BKF); 700 : 2.21 (BKF, K); 833 : 1.23 (BKF).
- Vidal J.E. et al.** 5340 : 1.10 (AAU); 6208 : 1.1 (AAU, BKF); 6210 : 3.14 (AAU, BKF, C, K); 6217 : 2.27 (AAU, BKF); 6224 : 3.16.2 (BKF, C, K); 6224A : 3.9 (K); 6308 : 1.10 (AAU, BKF); 6355 : 2.53 (AAU); s.n. (7-6-1979) : 2.37 (BKF).
- Wanakit S.** 142 : 1.19 (BKF).
- Wanarak L.A.** 19 : 1.12 (BK, K); s.n. (19-1-1925) : 1.22 (BK).
- Wathana S. et al.** 23 : 3.12 (BKF, QBG); 28 : 1.3 (QBG); 113 : 1.11 (BKF, QBG); 200 : 3.27 (QBG); 277 : 2.7 (BKF, QBG); 300 : 1.2 (BKF, QBG); 319 : 2.16 (QBG); 320 : 1.4 (BKF, QBG); 404 : 2.7 (QBG); 651 : 2.22 (QBG); 908 : 3.23 (BKF, QBG); 1021 : 3.2.1 (BKF, QBG); 1031 : 3.6 (BKF, QBG); 1319 : 4.1 (AAU); 1408 : 2.22 (QBG); 1413 : 1.32 (QBG); 96-5 : 1.11 (QBG); 97-2 : 2.27 (QBG); 98-1 : 4.1 (BKF, QBG); s.n. (27-10-1997) : 1.3 (QBG).
- Winit** 269 : 3.27 (BKF); 305 : 3.10 (BM, K); 306 : 2.25 (BK, K); 307 : 3.11 (BM, K); 308 : 2.39 (K); 408 : 2.2 (K); 702 : 2.2 (BKF, K); 720 : 3.6 (BK, BKF, K); 764 : 2.47 (BKF, K); 786 : 3.29 (BK, BKF, K); 1141 : 3.11 (BKF, K); 1283 : 2.49 (BKF, K); 1299 : 3.11 (BKF); 1315 : 3.4 (BKF, K); 1351 : 1.1 (BK, BKF, K); 1374 : 3.27 (BK, BKF, K); 1790 : 3.11 (BK, BKF, K); 1963 : 2.49 (BK, BKF, K).
- Wongnak M.** 56 : 1.11 (BKF, QBG); 57 : 3.6 (QBG); 109 : 1.4 (BKF, QBG); 110 : 3.6 (BKF, QBG); 111 : 1.22 (BKF, QBG); 112 : 3.6 (QBG); 113 : 3.10 (BKF, QBG); 114 : 2.23 (BKF, QBG); 115 : 2.27 (BKF, QBG); 116 : 2.27 (BKF, QBG); 150 : 2.25 (QBG); 151 : 1.32 (QBG, BKF); 152 : 3.6 (QBG); 153 : 3.11 (BKF, QBG).
- Wongprasert Th.** 82-3-6 : 3.2.2 (BKF, C, K); 83-3-16 : 3.8 (BKF); 88-8-30 : 2.51 (BKF); 88-8-30A : 2.9 (BKF); 88-8-31 : 1.32 (BKF); 88-10-24 : 2.16 (BKF); *92-6-68 : 2.28 (BKF); 92-6-s.n. : 2.49 (BKF); 92-6-s.n. : 2.21 (BKF); 94-12-2 : 3.16.1 (BKF); 94-12-9 : 1.28 (BKF); 94-12-11 : 1.24 (BKF); 95-8-12 : 2.9 (BKF); 95-8-12A : 1.11 (BKF); 97-5-2 : 2.21 (BKF); 97-11-24 : 1.3 (BKF); 97-12-11 : 1.12 (BKF); 97-12-13 : 2.55 (BKF); 98-5-13 : 3.23 (BKF); 98-5-14 : 2.55 (BKF); 98-5-16 : 2.7 (BKF); 98-5-16A : 3.27 (BKF); 98-5-30 : 2.49 (BKF); 99-3-6 : 1.2 (BKF); 99-7-10 : 3.16.1 (BKF); 99-7-12 : 2.39 (BKF); 99-7-14 : 3.29 (BKF); 99-7-16 : 1.10 (BKF); 99-7-16A : 1.32 (BKF); 99-7-20 : 2.50 (BKF); 99-8-22 : 3.16.1 (BKF); 99-10-19 : 1.4 (BKF); 00-3-30 : 1.23 (BKF); 01-7-18 : 1.17 (BKF); 01-7-24 : 2.34 (BKF); 02-3-33 : 1.11 (BKF); 02-12-

15 : 2.32 (BKF); 02-12-16 : 1.12 (BKF); 02-12-17 : 2.53 (BKF); 02-12-18 : 1.12 (BKF); 02-12-20 : 1.12 (BKF); 02-12-21 : 1.25 (BKF); 02-12-22 : 1.12 (BKF); 02-12-23 : 1.12 (BKF); 02-12-24 : 1.2 (BKF); 02-12-34 : 1.9 (BKF); 02-12-35 : 1.7 (BKF); 02-12-38 : 2.22 (BKF); 02-12-39 : 1.9 (BKF); 02-12-41 : 1.32 (BKF); 02-12-42 : 1.9 (BKF); 02-12-44 : 1.32 (BKF); 02-12-45 : 1.32 (BKF); 02-12-48 : 1.32 (BKF); 02-12-49 : 1.32 (BKF); 02-12-51 : 1.32 (BKF); 02-12-61 : 1.4 (BKF); 03-1-04 : 3.1 (BKF); 03-1-05 : 1.9 (BKF); 03-1-06 : 2.7 (BKF); 03-1-07 : 2.7 (BKF); 03-1-08 : 2.22 (BKF); 03-1-09 : 3.1 (BKF); 03-1-10 : 1.9 (BKF); 03-1-11 : 2.22 (BKF); 03-1-12 : 1.9 (BKF); 03-1-13 : 2.2 (BKF); 03-1-14 : 1.9 (BKF); 03-1-15 : 2.22 (BKF); 03-1-16 : 3.11 (BKF); 03-1-28 : 2.9 (BKF); 03-1-29 : 1.9 (BKF); 03-1-30 : 2.9 (BKF); 03-1-31 : 2.9 (BKF); 03-1-32 : 2.9 (BKF); 03-1-33 : 1.1 (BKF); 03-1-34 : 1.1 (BKF); 03-1-35 : 2.9 (BKF); 03-1-36 : 3.23 (BKF); 03-1-37 : 1.32 (BKF); 03-1-38 : 2.9 (BKF); 03-1-39 : 2.9 (BKF); 03-1-40 : 2.9 (BKF); 03-1-41 : 2.16 (BKF); 03-1-44 : 3.2.2 (BKF); 03-1-45 : 3.4 (BKF); 03-1-46 : 2.9 (BKF); 03-1-47 : 2.9 (BKF); 03-1-55 : 3.4 (BKF); 03-1-56 : 2.25 (BKF); 03-1-57 : 3.4 (BKF); 03-1-59 : 1.1 (BKF); 03-1-60 : 1.32 (BKF); 03-1-61 : 3.15 (BKF); 03-1-62 : 3.4 (BKF); 03-1-63 : 3.4 (BKF); 03-1-64 : 3.3 (BKF); 03-1-65 : 3.4 (BKF); 03-1-66 : 3.3 (BKF); 03-1-67 : 2.13 (BKF); 03-1-68 : 2.13 (BKF); 03-1-69 : 3.6 (BKF); 03-1-70 : 2.16 (BKF); 03-1-71 : 3.2.1 (BKF); 03-1-72 : 2.16 (BKF); 03-1-73 : 3.1 (BKF); 03-1-74 : 1.9 (BKF); 03-1-75 : 1.1 (BKF); 03-1-76 : 2.93 (BKF); 03-1-77 : 1.25 (BKF); 03-1-78 : 2.16 (BKF); 03-1-79 : 2.7 (BKF); 03-1-80 : 1.9 (BKF); 03-1-81 : 2.25 (BKF); 03-1-82 : 2.16 (BKF); 03-1-88 : 1.32 (BKF); 03-1-89 : 1.32 (BKF); 03-1-90 : 1.32 (BKF); 03-1-91 : 2.22 (BKF); 03-1-92 : 2.22 (BKF); 03-1-93 : 2.16 (BKF); 03-2-01 : 2.27 (BKF); 03-2-02 : 3.3 (BKF); 03-2-03 : 3.15 (BKF); 03-2-09 : 1.17 (BKF); 03-3-10 : 1.17 (BKF); 03-3-11 : 1.17 (BKF); 03-3-12 : 1.1 (BKF); 03-3-13 : 1.7 (BKF); 03-3-16 : 1.17 (BKF); 03-3-17 : 2.9 (BKF); 03-3-18 : 3.20 (BKF); 03-3-19 : 3.9 (BKF); 03-3-20 : 3.29 (BKF); 03-3-21 : 1.25 (BKF); 03-3-22 : 1.7 (BKF); 03-3-23 : 2.53 (BKF); 03-3-24 : 1.7 (BKF); 03-3-25 : 1.4 (BKF); 03-3-29 : 1.1 (BKF); 03-3-30 : 2.54 (BKF); 03-3-31 : 2.53 (BKF); 03-3-32 : 2.54 (BKF); 03-3-33 : 2.12 (BKF); 03-3-34 : 2.39 (BKF); 03-3-35 : 2.53 (BKF); 03-3-36 : 1.25 (BKF); 03-3-37 : 2.47 (BKF); 03-3-38 : 3.6 (BKF); 03-3-39 : 3.6 (BKF); 03-3-40 : 2.39 (BKF); 03-3-41 : 1.25 (BKF); 03-3-42 : 1.11 (BKF); 03-3-43 : 2.39 (BKF); 03-3-44 : 1.9 (BKF); 03-3-45 : 3.10 (BKF); 03-3-46 : 1.25 (BKF); 03-3-59 : 1.17 (BKF); 03-3-60 : 1.10 (BKF); 03-7-04 : 1.26 (BKF); 03-8-02 : 2.6 (BKF); 03-8-03 : 2.20 (BKF); 03-8-04 : 1.1 (BKF); 03-8-06 : 3.23 (BKF); 03-8-07 : 2.6 (BKF); 03-8-08 : 2.53 (BKF); 03-8-09 : 3.25 (BKF); 03-8-12 : 1.1 (BKF); 03-8-15 : 2.25 (BKF); 03-8-16 : 1.32 (BKF); 03-8-17 : 1.1 (BKF); 03-8-18 : 2.25 (BKF); 03-9-07 : 2.18 (BKF); 03-9-09 : 1.24 (BKF); 03-9-21 : 2.7 (BKF); 03-9-21A : 2.7 (BKF); 03-10-01 : 1.12 (BKF); 03-10-03 : 3.6 (BKF); 03-10-01 : 1.12 (BKF); 03-10-03 : 3.6 (BKF); 03-10-01 : 1.12 (BKF); 03-10-03 : 3.6 (BKF); 03-10-05 : 3.10 (BKF); 03-10-06 : 2.47 (BKF); 03-10-07 : 2.16 (BKF); 03-10-09 : 2.39 (BKF); 03-10-10 : 2.16 (BKF); 03-10-11 : 2.25 (BKF); 03-10-12 : 2.16 (BKF); 03-10-13 : 1.2 (BKF); 03-10-14 : 2.16 (BKF); 03-10-15 : 1.18 (BKF); 03-10-16 : 3.6 (BKF); 03-10-18 : 2.25 (BKF); 03-10-19 : 2.16 (BKF); 03-10-20 : 2.16 (BKF); 03-10-21 : 2.47 (BKF); 03-10-22 : 2.47 (BKF); 03-10-24 : 1.4 (BKF); 03-10-25 : 1.18 (BKF); 03-10-26 : 2.16 (BKF); 03-10-28 : 1.12 (BKF); 03-10-29 : 1.12 (BKF); 03-10-31 : 1.32 (BKF); 03-10-32 : 1.32 (BKF); 03-10-33 : 2.16 (BKF); 03-10-34 : 2.47 (BKF); 03-10-35 : 2.12 (BKF); 03-10-36 : 1.32 (BKF); 03-10-37 : 4.1 (BKF); 04-1-01 : 3.4 (BKF); 04-1-05 : 3.10 (BKF); 04-1-06 : 1.12 (BKF); 04-1-07 : 1.12 (BKF); 04-1-08 : 3.11 (BKF); 04-1-11 : 1.1 (BKF); 04-1-13 : 3.22 (BKF); 04-1-15 : 1.17 (BKF); 04-1-17 : 2.12 (BKF); 04-1-18 : 2.9 (BKF); 04-1-22 : 3.25 (BKF); 04-1-24 : 1.11 (BKF); 04-1-26 : 3.23 (BKF); 04-1-27 : 1.1 (BKF); 04-1-28 : 2.52 (BKF); 04-1-30 : 1.17 (BKF); 04-1-32 : 1.17 (BKF); 04-1-35 : 3.1 (BKF); 04-1-38 : 3.17 (BKF); 04-1-43 : 1.17 (BKF); 04-1-44 : 1.12 (BKF); 04-1-47 : 1.10 (BKF); 04-1-49 : 2.12 (BKF); 04-1-50 : 1.26 (BKF); 04-1-52 : 3.17 (BKF); 04-5-04 : 2.16 (BKF); 04-5-05 : 1.2 (BKF); 04-5-06 : 2.12 (BKF); 04-5-32 : 3.6 (BKF); 04-5-34 : 1.10 (BKF); 04-5-37 : 1.3 (BKF); 04-5-41 : 1.2 (BKF); 04-5-54 : 1.3 (BKF); 04-5-55 : 1.4 (BKF); 04-5-56 : 1.10 (BKF); 04-5-57 : 1.10 (BKF); 04-5-59 : 3.6 (BKF); 04-5-63 : 1.9 (BKF); 04-5-67 : 1.4 (BKF); 04-5-71 : 1.12 (BKF); 04-5-75 : 2.22 (BKF); 04-5-76 : 1.4 (BKF); 04-5-79 : 2.2 (BKF); 04-5-81 : 3.9 (BKF); 04-5-84 : 3.6 (BKF); 04-5-90 : 3.2.2 (BKF); 04-5-92 : 1.9 (BKF); 04-5-93 : 1.10 (BKF); 04-5-101 : 2.9 (BKF); 04-5-102 : 1.2 (BKF); 04-6-3 : 1.12 (BKF); 04-6-4 : 1.12 (BKF); 04-6-10 : 1.12 (BKF); 04-7-10 : 2.12 (BKF); 04-7-11 : 2.12 (BKF); 04-7-13 : 1.24 (BKF); 04-7-14 : 2.25 (BKF); 04-7-15 : 1.24 (BKF); 04-7-21 : 1.11 (BKF).

- Yahara T. et al.** T-49870 : 2.1 (BKF, KYO); T-49872 : 2.13 (BKF, KYO); T-49989 : 1.17 (BKF, KYO); T-50020 : 3.22 (BKF, KYO); T-50021 : 1.4 (BKF, KYO); T-50023 : 2.47 (BKF, KYO); T-50024 : 2.49 (BKF, KYO); T-50037 : 3.3 (BKF, KYO); T-50139 : 2.7 (BKF, KYO); T-50145 : 2.47 (BKF, KYO); T-50149 : 2.12 (BKF, KYO); T-50150 : 2.16 (BKF, KYO); T-50151 : 2.16 (BKF, KYO); T-50152 : 2.16 (BKF, KYO); T-50158 : 3.10 (BKF, KYO); T-50159 : 1.12 (BKF, KYO); T-50160 : 1.1 (BKF, KYO); T-50162 : 3.16.1 (BKF, KYO); T-50165 : 3.10 (BKF, KYO); T-50166 : 3.9 (BKF, KYO); T-50167 : 1.12 (BKF, KYO).
- Yasothon Ch.** 2 : 2.47 (BKF); 3 : 3.11 (BKF); 18 : 3.16.1 (BKF); 19 : 3.10 (BKF); 20 : 2.25 (BKF); 22 : 2.23 (BKF); 23 : 2.47 (BKF); 25 : 1.12 (BKF); 26 : 3.9 (BKF); 27 : 2.12 (BKF); 28 : 2.39 (BKF); 29 : 3.23 (BKF); 30 : 3.20 (BKF); 31 : 2.12 (BKF); 32 : 2.22 (BKF); 32A : 2.50 (BKF); 33 : 2.49 (BKF); 34 : 1.17 (BKF); 35 : 2.16 (BKF); 36 : 1.24 (BKF).