

**7. CYCLOBALANOPSIS** Oersted, Vidensk. Meddel. Dansk Naturhist. Foren.  
Kjøbenhavn 1866: 77. 1867, nom. cons.

青冈属 qing gang shu

*Quercus* Linnaeus subgen. *Cyclobalanopsis* (Oersted) C. K. Schneider.

Trees or rarely shrubs, evergreen. Trunk bark usually smooth, rarely deeply splitting. Winter buds ovoid-globose, ovoid-conical, or rarely ovoid-ellipsoid; scales many, imbricate. Stipules extrapetiolar. Leaves spirally arranged. Male inflorescences pendulous; flowers loosely arranged or clustered on rachis; perianth usually 5- or 6-lobed; stamens as many as perianth lobes, sometimes less, filament slender; pistil rudimentary. Female inflorescences with a solitary flower or spiciform; cupules with 1 flower; perianth 5- or 6-lobed; staminodes sometimes present, small; ovary 3-loculed; styles (2 or)3(or 4); stigmas capitate or dilated. Cupules solitary; bracts scalelike, whorled, connate, in rings or spirally fused. Nut usually 1 per cupule; abortive ovule persisting in subapical, lateral, or basal part of seed. Germination hypogeal.

About 150 species: mainly in tropical and subtropical Asia; 69 species (43 endemic) in China.

*Cyclobalanopsis* is often treated as a subgenus of *Quercus*, with all other species of *Quercus* belonging to subgenus *Quercus*.

Species of *Cyclobalanopsis* are among the main components of broad-leaved evergreen forests in China's southern provinces N to the Qinling Mountains and the Huai He basin. In general, *Cyclobalanopsis* has a more southern distribution and *Quercus* a more northern distribution.

- 1a. Leaf blade margin entire, crenate, repand, or apically with 1–4 or rarely more shallow serrations, or indistinctly serrulate.
- 2a. Leaf blade 12 cm or more.
- 3a. Cupules 1–1.5 cm in diam.
- 4a. Petiole 0.5–1 cm, not sulcate.
- 5a. Leaf blade abaxially glabrous, midvein impressed; cupules outside tomentose, enclosing ca. 1/3 of nut ..... 17. *C. sessilifolia*
- 5b. Leaf blade abaxially slightly farinose, midvein raised; cupules outside glabrous or puberulent, enclosing ca. 1/2 of nut ..... 18. *C. augustinii*
- 4b. Petiole 2–5 cm, adaxially sulcate.
- 6a. Branchlets and leaves glabrous; cupules cupular ..... 1. *C. jenseniana*
- 6b. Branchlets and leaves hairy; cupules bowl-shaped ..... 23. *C. tomentosinervis*
- 3b. Cupules 1.5–4 cm in diam.
- 7a. Branchlets glabrous.
- 8a. Secondary veins 6–8 on each side of midvein ..... 15. *C. albicaulis*
- 8b. Secondary veins 9–12 on each side of midvein.
- 9a. Cupules bowl-shaped, enclosing ca. 2/3 of nut; nuts oblate, scar 2–2.5 cm in diam. .... 5. *C. tenuicupula*
- 9b. Cupules campanulate to obconic, enclosing less than 1/2 of nut; nuts ellipsoid, scar ca. 0.8 cm in diam. .... 20. *C. saravanensis*
- 7b. Branchlets tomentose.
- 10a. Petiole and leaves glabrous.
- 11a. Nuts subglobose, ca. 1.7 cm, sericeous ..... 3. *C. camusiae*
- 11b. Nuts oblong-ellipsoid, 3.5–4 cm, pilose ..... 4. *C. semiserrata*
- 10b. Petiole and leaves tomentose.
- 12a. Leaf blade midvein adaxially slightly raised; cupules campanulate to cylindric, enclosing ca. 2/3 of nut ..... 2. *C. fleuryi*
- 12b. Leaf blade midvein adaxially impressed or flat; cupules bowl-shaped to discoid, enclosing base to 1/2 of nut.
- 13a. Midvein adaxially flat; cupule covering only base of nut, bracts in 4–6 rings; nut scar 0.7–1 cm in diam. .... 14. *C. hui*
- 13b. Midvein adaxially impressed; cupule covering 1/3–1/2 of nut, bracts in 8–10 rings; nut scar 1.2–1.4 cm in diam. .... 27. *C. helferiana*
- 2b. Leaf blade less than 12 cm.
- 14a. Leaf blade apex obtuse, rounded, retuse, or with a short, blunt tip.

- 15a. Nuts oblate, subglobose, or broadly ovoid.  
16a. Leaf blade midvein adaxially flat; cupule covering only base of nut; nuts tomentose ..... 14. *C. hui*  
16b. Leaf blade midvein slightly impressed to impressed; cupule enclosing 1/3–1/2 of nut; nuts glabrous or glabrescent.  
17a. Petiole 0.2–0.8 cm; cupule bracts in 7–9 rings; nuts glabrous, scar 5–8 mm in diam. 10. *C. obovatifolia*  
17b. Petiole 0.8–1.5 cm; cupule bracts in 4–7 rings; nuts hairy when young, scar 4–5 mm in diam. 12. *C. championii*
- 15b. Nuts ellipsoid to oblong-ellipsoid, or obovoid.  
18a. Petiole 1–1.5 cm; cupules 2–2.5 cm in diam.; nuts 1.7–2 cm in diam. .... 6. *C. dinghuensis*  
18b. Petiole less than 0.5 cm; cupules 1–1.5 cm in diam.; nuts 1–1.6 cm in diam.  
19a. Cupules saucer-shaped to cupular, 1.3–1.5(–1.8) cm in diam., covering only base of nut 11. *C. neglecta*  
19b. Cupules bowl-shaped, 1–1.2 cm in diam., enclosing ca. 1/3 of nut ..... 7. *C. litseoides*
- 14b. Leaf blade apex acute, acuminate, or caudate.  
20a. Leaf blade abaxially hairy.  
21a. Leaf blade abaxially stellate or stellate tomentose at least when young.  
22a. Nuts ellipsoid, ovoid-ellipsoid, or globose ..... 65. *C. poilanei*  
22b. Nuts oblate to subglobose.  
23a. Petiole 0.2–0.8 cm; secondary veins 5–8 on each side of midvein; nuts glabrous, scar 5–8 mm in diam. .... 10. *C. obovatifolia*  
23b. Petiole (0.5–)1–2 cm; secondary veins 10–15 on each side of midvein; nuts velutinous, scar ca. 10 mm in diam. .... 13. *C. chungii*
- 21b. Leaf blade abaxially woolly, villous, or tomentose at least when young.  
24a. Petiole 2–3.5 cm; leaf blade apex caudate, midvein abaxially impressed ..... 23. *C. tomentosinervis*  
24b. Petiole 0.5–1.4 cm; leaf blade apex acute to acuminate, midvein abaxially flat.  
25a. Petiole triangular in cross section; nut scar slightly convex ..... 22. *C. hypophaea*  
25b. Petiole not triangular in cross section; nut scar flat or impressed.  
26a. Branchlets light brown woolly; petiole 0.6–0.8 cm; leaf blade tertiary veins inconspicuous; nuts ovoid-ellipsoid to ellipsoid ..... 8. *C. tiaoloshanica*  
26b. Branchlets orangish brown tomentose; petiole 1–1.4 cm; leaf blade tertiary veins slender but evident; nuts oblate ..... 14. *C. hui*
- 20b. Leaf blade abaxially glabrous at least when old or only puberulent.  
27a. Nuts oblate or subglobose, scar 1–2.5 cm in diam.  
28a. Leaf blade leathery; nuts oblate, ca. 1.7 cm in diam., scar ca. 1 cm in diam. .... 3. *C. camusiae*  
28b. Leaf blade papery; nuts subglobose, 2.5–3 cm in diam., scar 2–2.5 cm in diam. .... 5. *C. tenuicupula*
- 27b. Nuts not oblate nor subglobose, scar 0.4–0.8 cm in diam.  
29a. Cupules campanulate to obconic or bowl-shaped, 2–3 cm in diam.  
30a. Leaf blade papery, pubescent when young; cupules campanulate to obconic, outside puberulent ..... 15. *C. albicaulis*  
30b. Leaf blade subleathery, glabrous; cupules bowl-shaped, outside villous ..... 20. *C. saravanensis*
- 29b. Cupules cupular, 0.8–1.8 cm in diam.  
31a. Leaf blade apex acute to acuminate.  
32a. Leaf blade abaxially glabrous, midvein impressed; cupules outside tomentose, enclosing ca. 1/3 of nut ..... 17. *C. sessilifolia*  
32b. Leaf blade abaxially slightly farinose, midvein raised; cupules outside glabrous or puberulent, enclosing ca. 1/2 of nut ..... 18. *C. augustinii*
- 31b. Leaf blade apex caudate.  
33a. Petiole 0.5–0.8 cm; nuts 0.6–0.8(–1.5) cm in diam. .... 19. *C. chevalieri*  
33b. Petiole 1–2 cm; nuts 1–1.5 cm in diam.  
34a. Leaf blade papery; cupules 1.6–1.8 cm in diam., enclosing ca. 1/3 of nut; nuts ellipsoid, ca. 1.5 cm in diam., velutinous at least apically ..... 16. *C. delicatula*  
34b. Leaf blade subleathery; cupules ca. 1.5 cm in diam., enclosing ca. 1/2 of nut; nuts ovoid-conical, 1–1.3 cm in diam., glabrous ..... 21. *C. motuoensis*
- 1b. Leaf blade margin serrate or serrulate on at least apical 1/3.  
35a. Leaf blade 14 cm or more.  
36a. Leaf blade margin serrate or serrulate on apical 1/2 or less.

- 37a. Leaf blade secondary veins 18–22 on each side of midvein ..... 24. *C. rex*
- 37b. Leaf blade secondary veins 8–14 on each side of midvein (sometimes to 16 in *C. thorelii*).
- 38a. Leaf blade less than  $2.5 \times$  as long as wide.
- 39a. Leaf blade apex shortly acute to  $\pm$  caudate; cupules enclosing  $1/2$ – $2/3$  of nut.
- 40a. Leaf blade papery; cupules enclosing ca.  $2/3$  of nut ..... 5. *C. tenuicupula*
- 40b. Leaf blade leathery; cupules enclosing to  $1/2$  of nut ..... 34. *C. kiukiangensis*
- 39b. Leaf blade apex with a short, blunt tip; cupules enclosing  $1/4$ – $1/3$  of nut.
- 41a. Petiole 1–1.8 cm; leaf blade margin serrate; cupule bracts in 8–12 rings; nut scar 0.8–1 cm in diam. .... 37. *C. phanera*
- 41b. Petiole 2–3 cm; leaf blade margin serrulate; cupule bracts in 6–8 rings; nut scar ca. 0.7 cm in diam. .... 38. *C. edithiae*
- 38b. Leaf blade  $3 \times$  or more as long as wide.
- 42a. Cupules discoid or cupular.
- 43a. Leaf blade pubescent when young; cupules 2.5–3 cm in diam.; nuts oblate, 2.2–3 cm in diam., scar 1–1.4 cm in diam. .... 35. *C. bella*
- 43b. Leaf blade glabrous; cupules 1–1.2 cm in diam.; nuts ellipsoid to ovoid-ellipsoid, 1–1.2 cm in diam., scar ca. 0.5 cm in diam. .... 56. *C. elevaticostata*
- 42b. Cupules semiglobose, campanulate, or cylindrical.
- 44a. Nuts ellipsoid, oblong-ellipsoid, or obovoid, 1.2–1.6 cm in diam., scar 0.5–0.7 cm in diam. 63. *C. pachyloma*
- 44b. Nuts cylindrical-ellipsoid, 2–3 cm in diam., scar 1.2–1.5 cm in diam.
- 45a. Leaf blade midvein adaxially slightly raised; pistillate inflorescences 2.5–3.5 cm; cupule bracts in 10–13 rings, margin subentire; nut scar ca. 1.2 cm in diam. .... 2. *C. fleuryi*
- 45b. Leaf blade midvein adaxially flat; pistillate inflorescences ca. 1.5 cm; cupule bracts in 8 or 9 rings, margin dentate; nut scar ca. 1.5 cm in diam. .... 39. *C. kouangsiensis*
- 36b. Leaf blade margin serrate or serrulate at least on apical  $2/3$ .
- 46a. Leaf blade abaxially with stellate or furcate hairs.
- 47a. Cupules oblate to semiglobose, 3–5 cm in diam., enclosing  $2/3$ – $4/5$  of nut; nuts 3–4 cm in diam. .... 25. *C. lamellosa*
- 47b. Cupules cupular or discoid, 1.5–2.5 cm in diam., covering base to  $1/2$  of nut; nuts 1.5–2.8 cm in diam.
- 48a. Petiole 1–2 cm; cupules discoid, 2–2.5 cm in diam.; nuts oblate, 2–2.8 cm in diam., scar 1–2 cm in diam. .... 26. *C. kerrii*
- 48b. Petiole 2.5–4 cm; cupules cupular, 1.5–2 cm in diam.; nuts ovoid to ellipsoid, 1.2–1.7 cm in diam., scar ca. 0.8 cm in diam.
- 49a. Leaf blade abaxially densely pale brown stellate tomentose; nuts hairy, glabrescent 28. *C. gambleana*
- 49b. Leaf blade abaxially pruinose to whitish farinose and with adnate simple and furcate hairs but soon glabrescent; nuts glabrous or rarely pilose at apex ..... 29. *C. oxyodon*
- 46b. Leaf blade abaxially simple hairs or glabrous.
- 50a. Nuts oblate.
- 51a. Leaf blade barbate in vein axils, midvein impressed; cupules oblate, 3.5–5 cm in diam. 43. *C. sichourensis*
- 51b. Leaf blade not barbate in vein axils, midvein raised to slightly so; cupules saucer-shaped, bowl-shaped, or cupular, 1.5–3 cm in diam.
- 52a. Petiole glabrous when young; cupules covering only base of nut; nuts glabrous or basally pilose ..... 42. *C. chapensis*
- 52b. Petiole hairy when young; cupules covering most of nut; nuts tomentose.

- 53a. Cupules ca. 3 cm in diam., bract margins subentire; nuts 2.5–3 cm in diam., scar ca. 2 cm in diam. .... 40. *C. thorelii*
- 53b. Cupules 1.5–1.8 cm in diam., bract margins dentate; nuts 1.3–1.8 cm in diam., scar ca. 1.2 cm in diam. .... 54. *C. austrocochinchinensis*
- 50b. Nuts ovoid to ellipsoid.
- 54a. Leaf blade base ± truncate to somewhat auriculate ..... 32. *C. yonganensis*
- 54b. Leaf blade base cuneate to subrounded.
- 55a. Leaf blade apex with a short, blunt tip; cupule bracts in 9–12 rings ..... 33. *C. litoralis*
- 55b. Leaf blade apex acute to acuminate; cupule bracts in 5–7 rings.
- 56a. Cupules 2–3 cm in diam., covering only base of nut; nuts 1.5–3 cm in diam. .... 36. *C. blakei*
- 56b. Cupules 1–1.5 cm in diam., covering 1/3–1/2 of nut; nuts 1–1.2 cm in diam.
- 57a. Cupule bracts in 6 or 7 rings, margin subentire; nuts ca. 1 cm in diam., scar 3–5 mm in diam. .... 31. *C. multinervis*
- 57b. Cupule bracts in 5 rings, margin dentate; nuts ca. 1.2 cm in diam., scar ca. 7 mm in diam. .... 46. *C. pentacycla*
- 35b. Leaf blade less than 14 cm.
- 58a. Leaf usually less than 2.5(–3) × as long as wide.
- 59a. Leaf blade abaxially with stellate hairs at least when young.
- 60a. Leaf blade margin serrate on no more than apical 1/2.
- 61a. Cupules 3–3.5 cm in diam.; nuts ca. 2.5 cm in diam. .... 41. *C. chingsiensis*
- 61b. Cupules 1–1.8 cm in diam.; nuts 1–1.5 cm in diam.
- 62a. Leaf blade elliptic to obovate-elliptic; pistillate inflorescences 1–2 cm, with 3–7 cupules 65. *C. poilanei*
- 62b. Leaf blade oblong to ovate-elliptic; pistillate inflorescences ca. 4 cm, with 2 or 3 cupules 66. *C. delavayi*
- 60b. Leaf blade margin serrate on apical ca. 2/3.
- 63a. Leaf blade margin bluntly serrate ..... 26. *C. kerrii*
- 63b. Leaf blade margin sharply serrate.
- 64a. Leaf blade secondary veins 9–11 on each side of midvein; cupules 2–3 cm in diam.; nuts oblate, 2.5–2.8 cm in diam. .... 57. *C. patelliformis*
- 64b. Leaf blade secondary veins 13–16 on each side of midvein; cupules ca. 1.5 cm in diam.; nuts broadly ovoid, ca. 1.2 cm in diam. .... 64. *C. lobbii*
- 59b. Leaf blade abaxially with simple hairs or glabrous.
- 65a. Mature leaf blades abaxially glabrous or subglabrous.
- 66a. Leaf blade margin serrate for apical 2/3.
- 67a. Leaf blade secondary veins 7–9 on each side of midvein; cupules obconic ..... 33. *C. litoralis*
- 67b. Leaf blade secondary veins 11–17 on each side of midvein; cupules discoid, bowl-shaped, or cupular.
- 68a. Leaf blade secondary veins 11–13 on each side of midvein, midvein adaxially impressed; cupules discoid, covering only base of nut ..... 53. *C. disciformis*
- 68b. Leaf blade secondary veins 13–17 on each side of midvein, midvein adaxially raised; cupules bowl-shaped to cupular, enclosing 1/3 to most of nut.
- 69a. Branchlets with stellate hairs when young; leaf blade midvein adaxially raised; cupules ca. 3 cm in diam., enclosing almost all of nut; nuts 2.5–3 cm in diam. .... 40. *C. thorelii*
- 69b. Branchlets glabrous; leaf blade midvein adaxially impressed; cupules ca. 1.5 cm in diam., enclosing 1/3–1/2 of nut; nuts 1.2–2 cm in diam. .... 50. *C. lungmaiensis*
- 66b. Leaf blade margin serrate from middle to apex or only apically.
- 70a. Cupule bracts adherent to wall ..... 19. *C. chevalieri*
- 70b. Cupule bracts not adherent to wall.
- 71a. Nuts 1–1.8 cm in diam.
- 72a. Petiole 0.5–0.8 cm; leaf blade apex with a short, blunt tip; cupule enclosing ca. 1/3 of nut, bracts in 5 or 6 rings; nut scar 3–5 mm in diam. .... 9. *C. daimingshanensis*

- 72b. Petiole 1.5–3 cm; leaf blade apex caudate; cupule enclosing ca. 1/2 of nut, bracts in 7 or 8 rings; nut scar ca. 10 mm in diam. .... 52. *C. morii*
- 71b. Nuts 2–3 cm in diam.
- 73a. Nuts semiglobose or oblate, scar more than 2 cm in diam. .... 5. *C. tenuicupula*
- 73b. Nuts cylindric-ellipsoid to broadly ovoid, scar less than 1 cm in diam.
- 74a. Leaf blade apex acuminate, margin with awnlike and incurved serrations; cupules enclosing ca. 1/2 of nut; nuts broadly ovoid, scar flat ..... 30. *C. austroglaucia*
- 74b. Leaf blade apex with a short, blunt tip, margin serrate to serrulate; cupules enclosing 1/4–1/3 of nut; nuts cylindric to ellipsoid, scar slightly convex.
- 75a. Petiole 1–1.8 cm; leaf blade margin serrate; cupule bracts in 8–12 rings; nut scar 0.8–1 cm in diam. .... 37. *C. phanera*
- 75b. Petiole 2–3 cm; leaf blade margin serrulate; cupule bracts in 6–8 rings; nut scar ca. 0.7 cm in diam. .... 38. *C. edithiae*
- 65b. Mature leaf blades abaxially pubescent.
- 76a. Leaf blade abaxially not pruinose.
- 77a. Leaf blade secondary veins 8–12 on each side of midvein; cupules 0.8–1.2 cm in diam., bracts in 6–8 rings; nuts 0.7–1 cm in diam. .... 68. *C. glaucoides*
- 77b. Leaf blade secondary veins 12–18 on each side of midvein; cupules 1.8–5 cm in diam., bracts in 9–11 rings; nuts 1.5–4 cm in diam.
- 78a. Petiole 2.5–3.5 cm, tomentose at least when young; leaf blade secondary veins 15–18 on each side of midvein; cupules oblate, 3.5–5 cm in diam.; nut 3–4 cm in diam. . 43. *C. sichourensis*
- 78b. Petiole 1–1.5 cm, glabrous; leaf blade secondary veins 12–14 on each side of midvein; cupules bowl-shaped, ca. 1.8 cm in diam.; nut ca. 1.5 cm in diam. .... 67. *C. jinpinensis*
- 76b. Leaf blade abaxially pruinose.
- 79a. Cupules obconic.
- 80a. Petiole 1.5–2 cm, glabrous; leaf blade base subrounded and slightly oblique, secondary veins 13–15 on each side of midvein; cupule bract margins dentate ..... 46. *C. pentacycla*
- 80b. Petiole 0.5–1 cm, puberulent; leaf blade base cuneate, secondary veins 8–10 on each side of midvein; cupule bract margins subentire ..... 69. *C. xanthotricha*
- 79b. Cupules saucer-shaped, bowl-shaped, or cupular.
- 81a. Leaf blade margin remotely serrulate ..... 49. *C. glauca*
- 81b. Leaf blade margin awnlike serrate.
- 82a. Cupule bract margins entire or subentire.
- 83a. Cupules cupular; nuts ca. 1 cm in diam., glabrous, scar 3–5 mm in diam. .... 31. *C. multinervis*
- 83b. Cupules bowl-shaped; nuts 1.1–1.4 cm in diam., loosely incanous, scar 6–7 cm in diam. .... 51. *C. annulata*
- 82b. Cupule bract margins of at least basal 1 or 2 denticulate or loosely dentate, others entire, subentire, or repand.
- 84a. Leaf blade secondary veins 13–17 on each side of midvein ..... 50. *C. lungmaiensis*
- 84b. Leaf blade secondary veins 10–13 on each side of midvein.
- 85a. Nut scar ca. 1 cm in diam., flat; stylopodium 4- or 5-ringed ..... 30. *C. austroglaucia*
- 85b. Nut scar ca. 0.8 cm in diam., convex; stylopodium 3-ringed ..... 34. *C. kiukiangensis*
- 58b. Leaf blade 3 × as long as wide.
- 86a. Leaf blade margin serrate on apical 1/2 or on subapical part.
- 87a. Leaf blade mostly broader from middle to apex.
- 88a. Mature leaf blades abaxially glabrous or glabrescent.
- 89a. Petiole 1.5–2 cm; cupule outside usually densely tawny tomentose, wall ca. 1.5 mm thick; nut densely tawny tomentose when young but glabrescent, scar slightly convex ..... 63. *C. pachyloma*
- 89b. Petiole 0.5–0.8(–1.2) cm; cupule outside glabrous, wall less than 1 mm thick; nut glabrous, scar flat ..... 19. *C. chevalieri*
- 88b. Mature leaf blades abaxially not glabrescent.
- 90a. Nuts oblate, 1.4–1.7 cm in diam., scar ca. 1 cm in diam. .... 13. *C. chungii*
- 90b. Nuts obovoid-ellipsoid, ovoid, or ellipsoid, 0.9–1.4 cm in diam., scar 0.5–0.6 cm in diam.

- 91a. Leaf blade abaxially with simple or lepidote hairs, margin remotely serrate ..... 49. *C. glauca*  
91b. Leaf blade abaxially stellate velutinous, margin with short, awnlike serrations ..... 62. *C. gilva*  
87b. Leaf blade mostly broader from base to middle.  
92a. Cupules 2.5–3.4 cm in diam.; nuts 2.2–3 cm in diam., scar 1–1.5 cm in diam.  
93a. Petiole glabrous; cupules discoid, covering only base of nut; nuts oblate ..... 35. *C. bella*  
93b. Petiole tomentose; cupules campanulate, enclosing more than 1/2 of nut; nuts cylindrical-ellipsoid ..... 39. *C. kouangsiensis*  
92b. Cupules 0.6–1.8 cm in diam.; nuts 0.8–1.7 cm in diam., scar 0.4–0.8 cm in diam.  
94a. Cupules obconic ..... 69. *C. xanthotricha*  
94b. Cupules saucer-shaped, bowl-shaped, or cupular.  
95a. Leaf blade abaxially pruinose; secondary veins inconspicuous.  
96a. Leaf blade margin conspicuously serrate; cupule bracts connate at apex; nut scar slightly convex ..... 18. *C. augustinii*  
96b. Leaf blade margin serrulate; cupule bracts not connate at apex; nut scar flat ... 61. *C. myrsinifolia*  
95b. Leaf blade abaxially not pruinose; secondary veins evident.  
97a. Petiole 0.5–0.8 cm ..... 19. *C. chevalieri*  
97b. Petiole 1–3 cm.  
98a. Leaf blade glabrous; cupule enclosing ca. 1/3 of nut ..... 56. *C. elevaticostata*  
98b. Leaf blade abaxially variously pubescent; cupule enclosing ca. 1/2 of nut.  
99a. Branchlets and petioles stellate tomentose; leaf blade secondary veins 10–14 on each side of midvein; cupule bract margins shallowly denticulate ..... 66. *C. delavayi*  
99b. Branchlets and petioles glabrous; leaf blade secondary veins 7–10 on each side of midvein; cupule bract margins dentate.  
100a. Leaf blade brownish when dry, margin remotely and shallowly serrate; cupules cupular, outside whitish pilose but glabrescent ..... 59. *C. stewardiana*  
100b. Leaf blade not brownish when dry, margin serrate; cupules bowl-shaped, outside grayish brown tomentose ..... 60. *C. longinux*  
86b. Leaf blade margin serrate at least on apical 2/3.  
101a. Leaf blade abaxially with stellate or furcate hairs.  
102a. Cupules discoid or saucer-shaped, 2–3 cm in diam.  
103a. Cupules discoid, 2–2.5 cm in diam.; nuts oblate ..... 26. *C. kerrii*  
103b. Cupules saucer-shaped, ca. 3 cm in diam.; nuts ovoid-conical ..... 58. *C. yingjiangensis*  
102b. Cupules cupular, 1–1.8(–20) cm in diam.  
104a. Leaf blade margin glandular serrate ..... 45. *C. ningangensis*  
104b. Leaf blade margin remotely minutely serrate to serrate.  
105a. Leaf blade secondary veins 9–14 on each side of midvein, midvein flat, margin remotely minutely serrate ..... 44. *C. argyrotricha*  
105b. Leaf blade secondary veins 16–24 on each side of midvein, midvein impressed, margin serrate.  
106a. Leaf blade abaxially densely pale brown stellate tomentose; nuts hairy, glabrescent 28. *C. gambleana*  
106b. Leaf blade abaxially pruinose to whitish farinose and with adnate simple and furcate hairs but soon glabrescent; nuts glabrous or rarely pilose at apex ..... 29. *C. oxyodon*  
101b. Leaf blade abaxially with simple hairs or glabrous.  
107a. Nuts ovoid to ellipsoid.  
108a. Leaf blade base ± truncate to somewhat auriculate ..... 32. *C. yonganensis*  
108b. Leaf blade base cuneate to subrounded.  
109a. Cupules 2–3 cm in diam., covering only base of nut ..... 36. *C. blakei*  
109b. Cupules 1–1.5 cm in diam., covering 1/3–1/2 of nut.  
110a. Cupules outside puberulent or velutinous.  
111a. Cupules outside puberulent, bract margins subentire; nuts ca. 1 cm in diam. 31. *C. multinervis*  
111b. Cupules outside velutinous, bract margins dentate; nuts ca. 1.5 cm in diam. 47. *C. stenophylloides*  
110b. Cupules outside tomentose.  
112a. Cupules 1–1.3 cm in diam.; nuts ellipsoid, ca. 1 cm in diam. .... 48. *C. gracilis*  
112b. Cupules ca. 1.5 cm in diam.; nuts broadly ovoid to oblate, 1.2–2 cm in diam. 50. *C. lungmaiensis*

- 107b. Nuts oblate.
- 113a. Cupules covering only base of nut.
- 114a. Petiole glabrous when young; leaf blade secondary veins 15–20 on each side of midvein 42. *C. chapensis*
- 114b. Petiole tomentose when young; leaf blade secondary veins 11–13 on each side of midvein ..... 53. *C. disciformis*
- 113b. Cupules covering 1/3 to nearly all nut.
- 115a. Leaf blade midvein impressed ..... 50. *C. lungmaiensis*
- 115b. Leaf blade midvein raised to slightly so.
- 116a. Cupules 1.5–1.8 cm in diam.; nuts 1.3–1.8 cm in diam., scar ca. 1.2 cm in diam. .... 54. *C. austrocochinchinensis*
- 116b. Cupules ca. 3 cm in diam.; nuts 2.5–3 cm in diam., scar 1.8–2 cm in diam.
- 117a. Leaf blade secondary veins 13–16 on each side of midvein; fruit maturing during current year ..... 40. *C. thorelii*
- 117b. Leaf blade secondary veins 17–22 on each side of midvein; fruit maturing on 1-year-old branchlets ..... 55. *C. subhinoidea*

**1. *Cyclobalanopsis jenseniana*** (Handel-Mazzetti) W. C. Cheng & T. Hong ex Q. F. Zheng, Fl. Fujianica 1: 406. 1982.

大叶青冈 da ye qing gang

*Quercus jenseniana* Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 59: 52. 1922; *Cyclobalanopsis pinbianensis* Y. C. Hsu & H. W. Jen; *Lithocarpus dunnii* F. P. Metcalf; *Q. pinbianensis* (Y. C. Hsu & H. W. Jen) C. C. Huang & Y. T. Chang.

Trees to 35 m tall. Branchlets thick, sulcate, glabrous, densely lenticellate; lenticels pale brown. Petiole 3–5 cm, adaxially sulcate, glabrous; leaf blade elliptic, oblong-elliptic, or obovate-oblong, 12–20(–30) × 6–8(–13) cm, subleathery to leathery, glabrous, base cuneate, broadly cuneate, or subrounded, margin entire, apex caudate to acuminate; midvein abaxially prominent, adaxially impressed; secondary veins 12–18 (–24) on each side of midvein, curving near margin; tertiary veins abaxially slender, evident. Female inflorescences 3–5(–9) cm; rachis lenticels grayish brown, oblong. Infructescences 5–10 cm. Cupule cupular, 0.8–1 × 1.3–1.5 cm, enclosing 1/3–1/2 of nut, outside and inside with thick orangish brown indument but outside glabrescent, wall less than 1 mm thick; bracts in 6–9 rings, margin denticulate. Nut oblong-ovoid, obovoid, or ovoid-conical, 1.7–2.2 × (0.8–)1.3–1.5 cm, yellowish velutinous, glabrescent; scar (3–)6 mm in diam., raised; stylopodium persistent. Fl. Apr–Jun, fr. Oct–Nov of following year.

• Mixed mesophytic forests on mountain slopes, valleys, and along rivers; 300–1700 m. Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Yunnan, Zhejiang.

**2. *Cyclobalanopsis fleuryi*** (Hickel & A. Camus) Chun ex Q. F. Zheng, Fl. Fujianica 1: 404. 1982.

饭甑青冈 fan zeng qing gang

*Quercus fleuryi* Hickel & A. Camus, Bull. Mus. Natl. Hist. Nat. 29: 600. 1923; *Cyclobalanopsis austroyunnanensis* Hu; *C. nengpulaensis* H. Li & Y. C. Hsu; *Q. tsoi* Chun ex Menitsky.

Trees to 25 m tall. Branchlets densely orangish brown tomentose, glabrescent and densely lenticellate. Petiole 2–6 cm, tawny tomentose when young; leaf blade oblong-elliptic to ovate-elliptic, 14–27 × 4–9 cm, leathery, densely orangish brown tomentose when young but glabrescent, abaxially whitish, base cuneate, margin entire or apically undulate and serrulate, apex acute to shortly acuminate; midvein adaxially slightly raised; secondary veins 10–12(–15) on each side of midvein; tertiary veins abaxially conspicuous. Male inflorescences 10–15 cm, tawny tomentose. Female inflorescence solitary in leaf axils toward apex of branchlets, 2.5–3.5 cm, rachis thick and densely orangish brown tomentose; cupules 4 or 5. Infructescence rachis short, ca. 7 mm thick, thicker than branchlet. Cupule campanulate to cylindrical, 3–4 × 2.5–4 cm, enclosing ca. 2/3 of nut, outside and inside with feltlike orangish brown indumentum, wall to 6 mm thick; bracts in 10–13 rings, margin subentire. Nut cylindrical-ellipsoid, 3–4.5 × 2–3 cm, densely tawny tomentose; scar ca. 1.2 cm in diam., convex; stylopodium persistent, 5–8 mm. Fl. Mar–Apr, fr. Oct–Dec.

Dense forests in mountains; 500–1500 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, Jiangxi, Yunnan [Laos, Vietnam].

**3. *Cyclobalanopsis camusiae*** (Trelease ex Hickel & A. Camus) Y. C. Hsu & H. W. Jen, J. Beijing Forest. Univ. 15(4): 44. 1993.

法斗青冈 fa dou qing gang

*Quercus camusiae* Trellease ex Hickel & A. Camus in Lecomte, Fl. Indo-Chine 5: 957. 1929; *Cyclobalanopsis faadoouensis* Hu; *Q. geminata* Hickel & A. Camus (1923), not Small (1897).

Trees to 15 m tall. Branchlets brown tomentose when young, sparsely hairy with age. Petiole 2–3 cm, glabrous; leaf blade green, elliptic-lanceolate to oblanceolate, (9–)11–17 × 3–5 cm, leathery, glabrous, base cuneate to oblique, margin entire or rarely apically

2- or 3-serrulate, apex acuminate to shortly caudate; midvein adaxially raised; secondary veins 8–12 on each side of midvein; tertiary veins abaxially evident. Infructescence ca. 2 cm. Cupule shallowly bowl-shaped, ca. 8 mm × 2–2.5 cm, enclosing 1/2–2/3 of nut, outside and inside tawny tomentose, wall ca. 3 mm thick; bracts in 5–7 rings, margin entire. Nut subglobose, ca. 1.7 cm, pale brown sericeous; scar ca. 1 cm in diam., convex; stylopodium persistent, ca. 2 mm in diam. Fr. Sep.

Dense broad-leaved evergreen forests in mountains; 1400–2000 m. SE Yunnan [Vietnam].

**4. *Cyclobalanopsis semiserrata*** (Roxburgh) Oersted, Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1866: 79. 1867.

无齿青冈 wu chi qing gang

*Quercus semiserrata* Roxburgh, Fl. Ind. ed. 1832, 3: 641. 1832; *Cyclobalanopsis semiserratoidea* Y. C. Hsu & H. W. Jen; *Q. semiserratoidea* (Y. C. Hsu & H. W. Jen) C. C. Huang & Y. T. Chang.

Trees to 10 m tall. Branchlets tomentose when young, glabrescent. Petiole 1–2 cm, glabrous; leaf blade ovate-oblong to obovate-oblong, 13–25 × 3–7 cm, thinly papery, glabrous, base cuneate, margin entire, apex acuminate to obtuse; midvein and secondary veins abaxially prominent and adaxially slightly raised or flat; secondary veins 9–12 on each side of midvein, curving near margin. Cupule bowl-shaped, ca. 1.2 × 2.5 cm, enclosing 1/2–2/3 of nut, outside brown velutinous, inside brownish tomentose, wall thin; bracts in 6–9 rings, margin undulately denticulate. Nut oblong-ellipsoid, 3.5–4 × ca. 2.2 cm, pilose, apex rounded; scar ca. 1.5 cm in diam., convex; stylopodium persistent.

Wet broad-leaved evergreen forests in valleys; 400–500 m. SE Xizang, Yunnan [Bangladesh, NE India, Myanmar, Thailand].

**5. *Cyclobalanopsis tenuicupula*** Y. C. Hsu & H. W. Jen, Acta Bot. Yunnan. 1(1): 147. 1979.

薄斗青冈 bao dou qing gang

*Quercus tenuicupula* (Y. C. Hsu & H. W. Jen) C. C. Huang.

Trees to 30 m tall. Branchlets whitish, glabrous, slightly sulcate, densely lenticellate; lenticels whitish. Petiole 2–4 cm, black when dry, glabrous; leaf blade oblong to obovate-elliptic, 10–25 × 5–10 cm, papery, glabrous, abaxially grayish green, adaxially glossy-green, base broadly cuneate, margin entire to remotely crenate and apically serrate, apex somewhat caudate; midvein adaxially impressed; secondary veins 9–12 on each side of midvein, abaxially prominent, parallel; tertiary veins abaxially slender, evident. Female inflorescence 2–6 cm; cupules 3–5. Infructescence ca. 10 cm, with 1–5 fruit. Cupule bowl-shaped, ca. 1.5 × 2–4 cm, enclosing ca. 2/3 of nut, outside thinly grayish velutinous, wall ca. 1 mm thick; bracts in 6 or 7 rings, margin undulately

denticulate. Nut oblate, 2–2.5 × 2.5–3 cm, apex depressed; scar 2–2.5 cm in diam., flat; stylopodium persistent, slightly raised. Fl. Apr. fr. Sep.

• 900–1000 m. Yunnan (Jinping Xian).

Very close if not identical to *Cyclobalanopsis sichouensis*; it may no longer be possible to maintain them as separate when additional collections are available.

**6. *Cyclobalanopsis dinghuensis*** (C. C. Huang) Y. C. Hsu & H. W. Jen, J. Beijing Forest. Univ. 15(4): 44. 1993.

鼎湖青冈 ding hu qing gang

*Quercus dinghuensis* C. C. Huang, Acta Phytotax. Sin. 16 (4): 74. 1978.

Trees to 8 m tall. First-year branchlets grayish brown, sulcate, waxy, tawny woolly-tomentose; 2nd-year branchlets dark ashy, glabrescent. Petiole 1–1.5 cm; leaf blade oblong-elliptic, 8–9 × 2–2.5 cm, pale brown tomentose, glabrescent, abaxially grayish green, adaxially dark green, base cuneate to narrowly rounded, margin entire and slightly recurved, apex rounded; secondary veins 12 or 13 on each side of midvein. Infructescences on terminal new shoots, less than 1 cm, usually 2-fruited. Cupule bowl-shaped, ca. 1.8 × 2–2.5 cm, enclosing ca. 1/3 of nut, outside grayish brown tomentose but glabrescent, wall ca. 4 mm and hard; bracts in 4 or 5 rings, margin entire. Nut ellipsoid, 3–3.5 × 1.7–2 cm; scar ca. 5 mm in diam., slightly convex; stylopodium persistent, evident.

• Broad-leaved evergreen forests in mountains; ca. 1000 m. Guangdong (Dinghu Shan).

**7. *Cyclobalanopsis litseoides*** (Dunn) Schottky, Bot. Jahrb. Syst. 47: 658. 1912.

木姜叶青冈 mu jiang ye qing gang

*Quercus litseoides* Dunn, J. Bot. 47: 377. 1909.

Trees to 10 m tall. Branchlets sparsely tomentose, glabrescent. Leaves sessile; leaf blade obovate-oblong to narrowly elliptic, 2.5–7 × 0.8–3 cm, glabrous, abaxially grayish green, adaxially dark green, base cuneate, margin entire, apex obtuse; secondary veins 6–9 on each side of midvein. Female inflorescences ca. 1 cm; cupules 2, apical. Cupule bowl-shaped, 5–6 × ca. 10 mm, enclosing ca. 1/3 of nut, outside, remotely grayish brown tomentose; bracts in 5–7 rings, margin entire or denticulate. Nut ellipsoid, 1.5–1.8 × ca. 1 cm, apex pubescent; scar flat; stylopodium persistent, evident.

• Sparse forests in mountains; 700–1000 m. SE Guangdong, SW Guangxi.

**8. *Cyclobalanopsis tiaoloshanica*** (Chun & W. C. Ko) Y. C. Hsu & H. W. Jen, Acta Bot. Yunnan. 1(1): 148. 1979.

吊罗山青冈 diao luo shan qing gang

*Quercus tiaoloshanica* Chun & W. C. Ko in Chun & F. C. How, Acta Phytotax. Sin. 7: 42. 1958.

Trees to 12 m tall. First-year branchlets minutely angular, with light brown woolly floss; 2nd-year branchlets indistinctly lenticellate. Leaves crowded apically on branchlets; petiole 6–8 mm, pale brown woolly when young; leaf blade oblong to obovate-



elliptic, 4–10 × 1.2–3 cm, leathery, concolorous, abaxially light brown floccose-tomentose when young, base cuneate, margin entire or apically 2–5-crenate, apex acute; midvein adaxially flat; secondary veins 5–7 on each side of midvein; tertiary veins inconspicuous. Female inflorescences 5–15 mm; cupules 2 or 3. Cupule cupular, ca. 1.2 cm in diam., enclosing ca. 1/3 of nut, outside grayish brown pubescent, inside brown villous, wall ca. 1 mm thick; bracts in 6 or 7 rings, margin of basal ones denticulate, apical 2 or 3 ones narrow and with margin entire. Nut ovoid-ellipsoid to ellipsoid, 2–2.2 × 1.4–1.6 cm, puberulent, glabrescent but apically remaining puberulent with age; scar 6–9 mm in diam., flat or impressed; stylopodium persistent, slightly raised. Fl. Jan–Feb, fr. Oct–Dec.

• Broad-leaved evergreen forests in mountains; 900–1400 m. Hainan (Diaoluo Shan).

Very close to *Cyclobalanopsis hui*.

**9. *Cyclobalanopsis daimingshanensis*** S. Lee in Y. C. Hsu & H. W. Jen, *Acta Bot. Yunnan.* 1(1): 147. 1979.

大明山青冈 da ming shan qing gang

*Quercus daimingshanensis* (S. Lee) C. C. Huang.

Trees to 15 m tall. Branchlets glabrous. Petiole 5–8 mm, glabrous; leaf blade obovate-elliptic to elliptic, 4–7 × 1.5–3 cm, glabrous, abaxially whitish, adaxially dark green, base cuneate, margin apically remotely serrulate, apex with a short, blunt tip; secondary veins 7–9 on each side of midvein, abaxially slightly raised, adaxially inconspicuous; tertiary veins abaxially slender, evident. Female inflorescence ca. 1 cm; cupules 3–5. Cupule bowl-shaped, ca. 5 mm × 1.2 cm, enclosing ca. 1/3 of nut, outside whitish velutinous; bracts in 5 or 6 rings, margin of apical 2 denticulate, others entire. Nut oblong-ellipsoid, 2–2.2 × ca. 1.3 cm, glabrous; scar 3–5 mm in diam., flat; stylopodium persistent, evident. Fl. Mar–Apr, fr. Oct.

• Mixed mesophytic forests in mountains; ca. 1000 m. C Guangxi (Daming Shan).

**10. *Cyclobalanopsis obovatifolia*** (C. C. Huang) Q. F. Zheng, *Acta Phytotax. Sin.* 17(3): 118. 1979.

倒卵叶青冈 dao luan ye qing gang

*Quercus obovatifolia* C. C. Huang, *Acta Phytotax. Sin.* 16 (4): 75. 1978; *Cyclobalanopsis meihuashanensis* Q. F. Zheng; *Q. meihuashanensis* (Q. F. Zheng) C. C. Huang.

Trees or shrubs (2–)5–11 m tall. Petiole 2–8 mm, hairy when young, glabrescent; leaf blade narrowly obovate to oblong-elliptic, 2.5–6(–9) × 1.5–2.5(–3.5) cm, abaxially pruinose and loosely covered with stellate hairs but glabrescent, adaxially dark green, base cuneate, margin entire or apically slightly repand, apex rounded to sometimes shortly acute or shortly acuminate; midvein and secondary veins abaxially prominent, adaxially slightly impressed; secondary veins 5–8 on each side of midvein; tertiary veins abaxially obscure. Infructescences 1–2 cm, with 1–3

fruit. Cupules with a stalk 3–8 mm, bowl-shaped, 6–10 mm × (1.1–)1.5–2 cm in diam., enclosing ca. 1/3 of nut, outside grayish brown velutinous, inside grayish brown sericeous; bracts in 7–9 rings, margin of basal and apical ones denticulate, others dentate. Nut obovate to subglobose, 0.8–2 × 1–1.6 cm, glabrous; scar 5–8 mm in diam., flat; stylopodium persistent, umbonate. Fr. Nov.

• Broad-leaved evergreen forests on mountain slopes and peaks; 1600–1800 m. Fujian, Guangdong, S Hunan.

**11. *Cyclobalanopsis neglecta*** Schottky, *Bot. Jahrb. Syst.* 47: 650. 1912.

竹叶青冈 zhu ye qing gang

*Cyclobalanopsis bambusifolia* (Hance) Chun ex Y. C. Hsu & H. W. Jen; *Quercus bambusifolia* Hance (1875), not Fortune (1860) nor T. M. Masters (1874); *Q. neglecta* (Schottky) Koidzumi.

Trees to 20 m tall. Branchlets grayish brown sericeous, glabrescent. Leaves crowded toward branchlet apex; petiole 2–5 mm, glabrous; leaf blade narrowly lanceolate to elliptic-lanceolate, 3–11 × 0.5–1.8 cm, subleathery, abaxially whitish and glabrous or basally villous, base cuneate, margin entire or indistinctly 1- or 2-crenate toward apex, apex rounded; midvein adaxially slightly raised or flat; secondary veins 7–14 on each side of midvein, inconspicuous; tertiary veins abaxially inconspicuous to obscure. Female inflorescences 5–10 mm, rachis grayish brown tomentose when young; cupules 2–many. Infructescences 5–10 mm, usually 1-fruited. Cupule saucer-shaped to cupular, 5–10 mm × 1.3–1.5(–1.8) cm, covering base of nut, outside grayish brown velutinous, inside brown tomentose, wall ca. 1 mm thick; bracts in 4–6 rings, margin entire or triangular denticulate. Nut obovoid to ellipsoid, 1.5–2.5 × 1–1.6 cm, puberulent, glabrescent; scar 5–7 mm in diam., slightly convex; stylopodium persistent, evident. Fl. Feb–Mar, fr. Aug–Nov.

Dense forests in mountains; 500–2200 m. Guangdong, Guangxi, Hainan [Vietnam].

**12. *Cyclobalanopsis championii*** (Benth) Oersted, *Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn* 1866: 79. 1867.

岭南青冈 ling nan qing gang

*Quercus championii* Benth, *Hooker's J. Bot. Kew Gard. Misc.* 6: 113. 1854.

Trees to 20 m tall; trunk to 1 m d.b.h.; bark dark ashly and slice splitting. Branchlets sulcate, densely grayish brown stellate tomentose. Leaves crowded toward branchlet apex; petiole 0.8–1.5 cm, densely pale orangish brown tomentose; leaf blade obovate, sometimes oblong-elliptic, 3.5–10(–13) × 1.5–4.5 cm, thickly leathery, abaxially pale orangish brown mealy and densely stellate tomentose, hairs pale orangish

brown when young but darker with age, adaxially dark green and glabrous, base cuneate, margin recurved and entire or rarely undulate-crenate toward apex, apex with a short, blunt tip to rarely retuse; midvein and secondary veins adaxially impressed; secondary veins 6–10 on each side of midvein; tertiary veins abaxially obscure. Female inflorescences to 4 cm, brown velutinous; cupules 3–10. Cupule bowl-shaped, 4–10 mm × 1–1.3(–2) cm, enclosing 1/3–1/2 of nut, outside brown to brownish velutinous, inside densely pale yellowish brown tomentose, wall ca. 1 mm thick; bracts in 4–7 rings, margin usually entire or sometimes basal 1 or 2 undulately denticulate. Nut broadly ovoid to oblate, 1.5–2 × 1–1.5(–1.8) cm, hairy when young, glabrescent, base and apex rounded; scar 4–5 mm in diam., flat. Fl. Dec–Mar, fr. Nov–Dec.

• Broad-leaved evergreen forests in mountains; 100–1700 m. Fujian, Guangdong, Guangxi, Hainan, Taiwan, Yunnan.

**13. *Cyclobalanopsis chungii*** (F. P. Metcalf) Y. C. Hsu & H. W. Jen ex Q. F. Zheng, *Fl. Fujianica* 1: 405. 1982.

福建青冈 fu jian qing gang

*Quercus chungii* F. P. Metcalf, *Lingnan. Sci. J.* 10: 481. 1931.

Trees to 15 m tall. Branchlets densely brown velutinous, glabrescent. Petiole (0.5–)1–2 cm, grayish brown velutinous; leaf blade elliptic to rarely obovate-elliptic, 6–10(–12) × 1.5–4 cm, subleathery, abaxially densely grayish brown stellate tomentose (hairs 8–10-forked), base broadly cuneate to subrounded, margin serrulate toward apex or rarely entire but not recurved, apex acute to somewhat caudate; midvein and secondary veins abaxially prominent, adaxially flat; secondary veins 10–15 on each side of midvein, abaxially raised; tertiary veins abaxially conspicuous. Female inflorescences 1.5–2 cm, rachis and bracts densely brown tomentose, cupules 2–6. Infructescences 1.5–3 cm. Cupule saucer-shaped, 5–8 mm × 1.5–2.3 cm, covering base of nut, outside and inside grayish brown tomentose, wall ca. 2 mm thick; bracts in 6 or 7 rings, margin of basal 2 denticulate, others entire. Nut oblate, ca. 1.5 × 1.4–1.7 cm, velutinous, apex rounded; scar ca. 1 cm in diam., flat or depressed.

• Broad-leaved evergreen forests on mountain slopes and in valleys; 200–800 m. Fujian, Guangdong, Guangxi, Hunan, Jiangxi.

**14. *Cyclobalanopsis hui*** (Chun) Chun ex Y. C. Hsu & H. W. Jen, *J. Beijing Forest. Univ.* 15(4): 45. 1993.

雷公青冈 lei gong qing gang

*Quercus hui* Chun, *J. Arnold Arbor.* 9: 126. 1928.

Trees 10–15(–20) m tall. Branchlets densely curly orangish brown tomentose, glabrescent, lenticellate; lenticels minute. Petiole 1–1.4 cm, woolly when young; leaf blade oblong-elliptic, oblanceolate, or elliptic-

lanceolate, 7–13 × 1.5–3(–4) cm, subleathery, abaxially pale brown tomentose but glabrescent, base cuneate and slightly oblique, margin recurved and entire or indistinctly serrulate toward apex, apex acuminate to obtuse; midvein and secondary veins abaxially prominent, adaxially flat; secondary veins 6–10 on each side of midvein; tertiary veins abaxially slender, evident. Female inflorescences 1–2 cm; cupules 2–5, apical. Infructescence ca. 1 cm; fruit 1 or 2. Cupule shallowly bowl-shaped to deeply discoid, 4–10 mm × 1.5–3 cm, covering base of nut, outside and inside densely feltlike tawny tomentose, wall ca. 1 mm thick; bracts in 4–6 rings, margin denticulate. Nut oblate, 1.5–2 × 1.5–2.5 cm, densely tawny tomentose, glabrescent; scar 7–10 mm in diam., impressed; stylopodium raised. Fl. Apr–May, fr. Oct–Dec.

• Mixed or dense wet broad-leaved evergreen forests in mountains; 300–1200 m. Guangdong, Guangxi, Hunan.

**15. *Cyclobalanopsis albicaulis*** (Chun & W. C. Ko) Y. C. Hsu & H. W. Jen, *J. Beijing Forest. Univ.* 15(4): 45. 1993.

白枝青冈 bai zhi qing gang

*Quercus albicaulis* Chun & W. C. Ko in Chun & F. C. How, *Acta Phytotax. Sin.* 7: 33. 1958.

Trees to 30 m tall. Branchlets whitish, glabrous, cylindric when young, minutely sulcate and with papillate lenticels with age. Petiole 2–3.5 cm, glabrous; leaf blade oblong-elliptic, ovate, ovate-lanceolate, or lanceolate, 10–15(–18) × 3–6(–8) cm, subleathery, pruinose brown pubescent, glabrescent, base rounded to cuneate, decurrent along veins, and oblique, margin entire or shallowly crenate, apex long acuminate to caudate but sometimes shortly acuminate; midvein adaxially slightly impressed; secondary veins 6–8 on each side of midvein. Female inflorescences 2–3 cm. Infructescence rachis whitish, glabrous. Cupule bowl-shaped, 2–3 cm in diam., enclosing 1/3–1/2 of nut, outside pale brown puberulent; bracts in 6–8 rings, margin entire or middle ones crenulate. Nut oblong-ellipsoid, ca. 4 × 2–3 cm, glabrous; scar rounded; stylopodium persistent, umbonate. Fl. Oct, fr. Nov–Dec of following year.

• Mixed mesophytic forests; 200–600 m. Hainan (Ya Xian).

**16. *Cyclobalanopsis delicatula*** (Chun & Tsiang) Y. C. Hsu & H. W. Jen, *Acta Bot. Yunnan.* 1(1): 148. 1979.

上思青冈 shang si qing gang

*Quercus delicatula* Chun & Tsiang, *J. Arnold Arbor.* 28: 324. 1947.

Trees to 13 m tall. First-year branchlets ca. 2 mm thick, glabrous. Petiole slender, 1–2 cm, glabrous; leaf blade ovate, oblong-elliptic, or sometimes obovate-elliptic, 6–9 × 2–3.5 cm, papery, base cuneate, margin entire or shallowly crenate toward apex, apex caudate; secondary veins 7 or 8 on each side of midvein, abaxially slightly raised, glabrescent; tertiary veins abaxially inconspicuous to obscure. Infructescence ca. 1 cm, with

1 or 2 fruit. Cupule cupular, ca.  $1.5 \times 1.6$ – $1.8$  cm, enclosing ca.  $1/3$  of nut, outside and inside grayish brown and pubescent, wall ca. 1 mm thick; bracts in 7 or 8 rings, margin of apical 2 or 3 entire, others denticulate. Nut ellipsoid,  $2$ – $2.5 \times$  ca.  $1.5$  cm, at least apically velutinous, base and apex rounded; scar ca. 5 mm in diam., flat; stylopodium persistent, umbonate. Fl. Apr–May, fr. Oct–Nov.

• Mixed mesophytic forests in mountains; 300–700 m. Guangdong, Guangxi, Hunan.

**17. *Cyclobalanopsis sessilifolia*** (Blume) Schottky, Bot. Jahrb. Syst. 47: 652. 1912.

云山青冈 yun shan qing gang

*Quercus sessilifolia* Blume, Mus. Bot. 1: 305. 1850; *Cyclobalanopsis nubium* (Handel-Mazzetti) Chun ex Q. F. Zheng; *C. paucidentata* (Franchet ex Nakai) Kudo & Masamune; *Q. chingii* F. P. Metcalf; *Q. nubium* Handel-Mazzetti; *Q. paucidentata* Franchet ex Nakai.

Trees to 25 m tall. Branchlets waxy, glaucous, lenticellate; lenticels grayish brown, rounded, hairy, glabrescent. Petiole 5–10 mm, glabrous; leaf blade oblong-elliptic to lanceolate-elliptic,  $7$ – $15 \times 1.5$ – $4$  cm, leathery, subconcolorous, glabrous, base cuneate, margin entire or apically 2–4 serrate, apex acute to shortly acuminate; secondary veins 10–14 on each side of midvein, inconspicuous; tertiary veins abaxially obscure. Female inflorescence ca. 1.5 cm. Cupule cupular, 1–1.5 cm in diam., enclosing ca.  $1/3$  of nut, outside grayish brown tomentose, inside grayish brown feltlike tomentose, wall ca. 1 mm thick; bracts in 5–7 rings, margin of basal 2 or 3 denticulate, others subentire. Nut obovoid to ellipsoid-obovoid,  $1.7$ – $2.4 \times 0.8$ – $1.5$  cm, base with a few rings; scar 5–7 mm in diam., slightly convex; stylopodium persistent, raised. Fl. Apr–May, fr. Oct–Nov.

Mixed mesophytic forests in mountains; 1000–1700 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan, Zhejiang [Japan].

**18. *Cyclobalanopsis augustinii*** (Skan) Schottky, Bot. Jahrb. Syst. 47: 656. 1912.

窄叶青冈 zhai ye qing gang

*Quercus augustinii* Skan in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 507. 1899; *Pasania chiwui* Hu; *Q. augustinii* var. *angustifolia* A. Camus; *Q. augustinii* var. *rockiana* A. Camus.

Trees to 10 m tall. Branchlets sulcate, with orangish brown scalelike glands when young, glabrescent. Petiole 0.5–2 cm, glabrous; leaf blade ovate-lanceolate to elliptic-lanceolate,  $6$ – $12 \times 1$ – $4$  cm, abaxially slightly farinose, adaxially glabrous, base cuneate and usually oblique, margin slightly recurved and usually serrate in juvenile tree but entire or apically conspicuously serrate in mature tree, apex acuminate; midvein adaxially

raised; secondary veins 10–15 on each side of midvein, inconspicuous, usually not fusing; tertiary veins obscure to very slender, evident. Female inflorescences solitary in axil of new shoots, 3–4 cm; cupules 5–10. Cupule cupular,  $0.6$ – $1 \times 1$ – $1.3$  cm, enclosing ca.  $1/2$  of nut, outside glabrous or puberulent, inside grayish brown sericeous, wall less than 1 mm thick; bracts in 5–7 rings, margin entire to crenulate, basal ones somewhat spreading, apical ones connate or adherent to cupule wall. Nut ovoid to oblong-ovoid,  $1$ – $1.7 \times 0.8$ – $1.2$  cm, glabrous, apex rounded to somewhat depressed; scar ca. 6 mm in diam., slightly convex; stylopodium persistent. Fl. Apr–May, fr. Oct of following year.

Forests in mountains; 1200–2700 m. Guangxi, Guizhou, Yunnan [Vietnam]

**19. *Cyclobalanopsis chevalieri*** (Hickel & A. Camus) Y. C. Hsu & H. W. Jen, J. Beijing Forest. Univ. 15(4): 45. 1993.

黑果青冈 hei guo qing gang

*Quercus chevalieri* Hickel & A. Camus, Ann. Sci. Nat., Bot., sér. 10, 3: 380. 1921; *Cyclobalanopsis nigrinux* Hu.

Trees to 20 m tall. Branchlets slender and sulcate, with a whitish waxy layer by 2nd year. Petiole 5–8(–12) mm; leaf blade green, elliptic, obovate-elliptic, or lanceolate,  $6$ – $11 \times 2$ – $4$  cm, subleathery, puberulent or glabrous when young, base cuneate, margin entire to remotely repand and serrulate apically, apex caudate; midvein adaxially impressed; secondary veins 8–11 on each side of midvein, slender, evident. Infructescences 2–4 cm, with 2–5 fruit. Cupule cupular,  $0.5$ – $1.2 \times 0.8$ – $1.8$  cm, enclosing  $1/3$ – $1/2$  of nut, outside glabrous, inside brown sericeous, wall less than 1 mm thick; bracts in 5–7(–9) rings, margins dentate. Nut ovoid to oblong-ellipsoid,  $1$ – $1.5$ (– $2$ )  $\times 0.6$ – $0.8$  (– $1.5$ ) cm, glabrous; scar ca. 5 mm in diam., flat. Fr. Dec.

Mixed mesophytic and broad-leaved evergreen forests; 600–1500 m. Guangdong, Guangxi, Yunnan [Vietnam].

**20. *Cyclobalanopsis saravanensis*** (A. Camus) Hjelmquist, Dansk Bot. Ark. 23(4): 503. 1968.

薄叶青冈 bao ye qing gang

*Quercus saravanensis* A. Camus, Chênes, Atlas 1: 19. 1934; *Cyclobalanopsis kontumensis* (A. Camus) Y. C. Hsu & H. W. Jen; *Q. kontumensis* A. Camus.

Trees to 50 m tall. Branchlets slender, sulcate, glabrous. Leaf blade ovate-elliptic to oblong-elliptic,  $10$ – $14 \times 2.5$ – $4.5$  cm, papery, glabrous, abaxially grayish green, adaxially green, base cuneate, margin entire, apex caudate; midvein adaxially impressed; secondary veins (6–)9 or 10 on each side of midvein, inconspicuous. Cupule campanulate to obconic, ca.  $1.5 \times 2$  cm, enclosing less than  $1/2$  of nut, outside gray villous, inside orangish tomentose, wall 1–2 mm thick; bracts in 8 or 9 rings, margin entire. Nut ellipsoid,  $1.5$ – $2 \times 1.5$ – $2$  cm, glabrous; scar ca. 8 mm in diam., convex.

Wet forests in mountains; ca. 1700 m. Yunnan [Laos, Vietnam].

**21. *Cyclobalanopsis motuoensis*** (C. C. Huang) Y. C. Hsu & H. W. Jen, J. Beijing Forest. Univ. 15(4): 46. 1993.

墨脱青冈 mo tuo qing gang

*Quercus motuoensis* C. C. Huang in C. C. Huang & Y. T. Chang, Guihaia 12: 306. 1992.

Trees to 30 m tall. Branchlets dark, sulcate, densely lenticellate; lenticels whitish, rounded, glabrous. Petiole 1.5–2 cm, glabrous; leaf blade oblong to ovate-elliptic, 7–10 × 3–4 cm, subleathery, concolorous, glabrous, base rounded and slightly oblique, margin entire or apically remotely serrate, apex caudate; midvein adaxially impressed; secondary veins 7–9 on each side of midvein, slender, inconspicuous; tertiary veins obscure. Infructescences solitary in axil of a higher leaf, 2–4 cm, with 1 or 2 fruit. Cupule cupular, 0.8–1 × ca. 1.5 cm, enclosing ca. 1/2 of nut, outside glabrous, inside sericeous; bracts in 6 rings, margin remotely triangular-denticulate. Nut depressed globose, 1.4–1.8 × 1–1.3 cm, glabrous; scar ca. 4 mm in diam., slightly convex; stylopodium persistent, ca. 2 mm. Fr. Oct.

• Broad-leaved forests; ca. 1700 m. SE Xizang (Médog Xian).

**22. *Cyclobalanopsis hypophaea*** (Hayata) Kudo, J. Soc. Trop. Agric. 3: 389. 1931.

绒毛青冈 rong mao qing gang

*Quercus hypophaea* Hayata, Icon. Pl. Formosan. 3: 182. 1913; *Lithocarpus hypophaeus* (Hayata) Hayata; *Pasania hypophaea* (Hayata) H. L. Li.

Trees to 18 m tall. Branchlets slender, whitish hairy. Petiole .5–10 mm, triangular in cross section, densely gray tomentose; leaf blade narrowly elliptic-lanceolate, 5–9.5 × 1.5–2.3 cm, subleathery, abaxially whitish tomentose and hairs adnate, adaxially bright green, base cuneate, margin entire, apex acuminate; midvein abaxially prominent and adaxially flat; secondary veins 8–14 on each side of midvein, slender, evident, not fusing; tertiary veins abaxially obscure. Cupule saucer-shaped, 5–8 mm × 1–1.8 cm, outside whitish pubescent; bracts in 7–11 rings. Nut oblate to broadly ovoid, 1.7–2.1 × 1.2–1.8 cm; scar 5–8 mm in diam., slightly convex. Fl. Dec–Jan, fr. Jan–Feb of following year.

• Broad-leaved evergreen forests; near sea level to 1100 m. SE Taiwan.

**23. *Cyclobalanopsis tomentosinervis*** Y. C. Hsu & H. W. Jen, Acta Phytotax. Sin. 14(2): 84. 1976.

毛脉青冈 mao mai qing gang

*Quercus tomentosinervis* (Y. C. Hsu & H. W. Jen) C. C. Huang.

Trees to 20 m tall. Branchlets sulcate, villous when young, soon glabrescent. Petiole 2–3.5 cm, adaxially sulcate; leaf blade ovate to oblong-elliptic, 7–15 × 3–5 cm, leathery, abaxially grayish brown tomentose (denser so along veins), adaxially bright green and glabrous, base broadly cuneate to subrounded, margin entire or apically indistinctly serrulate, apex caudate;

midvein adaxially impressed; secondary veins 11–15 on each side of midvein; tertiary veins abaxially evident. Female inflorescences 5–7 cm; rachis villous. Cupule bowl-shaped, ca. 8 mm × 1.3–1.5 cm, enclosing ca. 1/3 of nut, outside pubescent, inside orangish brown sericeous, wall less than 1 mm thick; bracts in 6 or 7 rings, margin of apical 2 entire, others triangular denticulate. Nut ovoid-ellipsoid, 1.5–1.7 × 1.3–1.5 cm, glabrous; scar 5–8 mm in diam., convex; stylopodium persistent. Fr. Dec.

• Broad-leaved evergreen forests; ca. 2300 m. SE Guizhou, S to SE Yunnan.

**24. *Cyclobalanopsis rex*** (Hemsley) Schottky, Bot. Jahrb. Syst. 47: 651. 1912.

大果青冈 da guo qing gang

*Quercus rex* Hemsley, Hooker's Icon. Pl. 27: t. 2663. 1901.

Trees to 30 m tall. Branchlets pale brown tomentose, glabrescent. Leaves often crowded apically on branches; petiole 2–3 cm, brown tomentose; leaf blade obovate to obovate-oblongate, 15–20(–27) × (4–)6–9 cm, densely brown tomentose when young, glabrescent, base cuneate, margin apically remotely minutely serrate, apex shortly acuminate to acute; midvein and secondary veins abaxially prominent but adaxially impressed or flat; secondary veins 18–22 on each side of midvein; tertiary veins abaxially evident. Cupule saucer-shaped, 1.5–1.8 × 3.5–5(–6) cm, enclosing 1/3–1/2 of nut, outside and inside tawny tomentose, wall to 4 mm thick; bracts in 7 or 8 rings, margin entire or sinuate, basal ones free from wall. Nut oblate, 2.5–3.5 × 3.5–5 cm, pale grayish orange tomentose when young, apically and basally hairy with age, apex rounded to impressed; scar 2–2.5 cm in diam., depressed; stylopodium often deciduous. Fl. Apr–May, fr. Oct–Nov.

Dense forests in valleys; 1100–1800 m. S to W Yunnan [NE India, Laos, Myanmar, Vietnam].

**25. *Cyclobalanopsis lamellosa*** (Smith) Oersted, Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1866: 79. 1867.

薄片青冈 bao pian qing gang

*Quercus lamellosa* Smith in Rees, Cycl. 29: *Quercus* no. 23. 1814; *Cyclobalanopsis fengii* Hu & W. C. Cheng; *C. lamelloides* (C. C. Huang) Y. T. Chang; *C. nigrinervis* Hu; *Q. lamelloides* C. C. Huang.

Trees to 40 m tall. Branchlets tawny tomentose, glabrescent. Petiole 2–4 cm; leaf blade ovate-elliptic, 16–30(–39) × 6–8(–10) cm, leathery, abaxially pruinose or with pale brown, shortly stellate hairs and sometimes glabrescent, adaxially green and glabrous, base cuneate to subrounded, margin serrate or entire on basal 1/3, apex acuminate to caudate; midvein and secondary veins abaxially prominent but adaxially impressed; secondary veins 18–25(–33) on each side of midvein; tertiary veins abaxially conspicuous. Infructescences usually with 1–3 fruit. Cupule oblate to semiglobose, 2–3 × 3–5 cm, enclosing 2/3–4/5 or sometimes all nut,

outside and inside orangish tomentose, wall 2–5 mm on sides and 3–8 mm at base; bracts in 7–10 rings, thinly lamellate, margin subentire but denticulate when ripe. Nut oblate, 2–3 × 3–4 cm, tomentose, glabrescent, apex flat, rounded, or umbonate; scar 2–3 cm in diam., flat to slightly convex; stylopodium persistent, ca. 5 mm in diam. Fl. Apr–May, fr. Nov–Dec.

Mixed mesophytic forests in mountains; 1300–2500 m. W Guangxi, Xizang, Yunnan [Bhutan, NE India, N Myanmar, Nepal, Sikkim, N Thailand].

**26. *Cyclobalanopsis kerrii*** (Craib) Hu, Bull. Fan Mem. Inst. Biol., Bot. 10: 106. 1940.

毛叶青冈 mao ye qing gang

*Quercus kerrii* Craib, Bull. Misc. Inform. Kew 1911: 471. 1911; *Q. dispar* Chun & Tsiang.

Trees to 20 m tall. Branchlets densely tawny tomentose, glabrescent or rarely remaining hairy. Petiole 1–2 cm, tomentose; leaf blade oblong-elliptic, lanceolate, or oblong-oblancheolate, 9–18(–24) × 3–7(–9) cm, densely tawny tomentose when young, glabrescent, abaxially stellate hairy with age, base rounded to broadly cuneate, margin serrate on apical 2/3, apex obtuse to shortly acuminate; midvein flat or adaxially slightly raised; secondary veins 10–14 on each side of midvein; tertiary veins abaxially evident. Female inflorescences solitary, 2–5(–7) cm. Cupule discoid, 5–10 mm × 2–2.5(–3.8) cm, covering base to 1/2 of nut, outside grayish to pale brown tomentose, inside prostrate whitish puberulent, wall ca. 2 mm thick; bracts in 7–11 rings, margin denticulate or entire. Nut oblate, 0.7–1.2 × 2–2.8 cm, apex depressed to flat; scar 1–2 cm in diam., slightly convex; stylopodium persistent, umbonate, grayish sericeous-pubescent. Fl. Mar–May, fr. Oct–Nov.

Sparse forests in mountains; 100–1800 m. Guangxi, Guizhou, Hainan, Yunnan [N Thailand, Vietnam].

This species and *Cyclobalanopsis helferiana* are closely related, and the relationship between them and their distribution needs further study. As interpreted by Hjelmquist (Dansk Bot. Ark. 23(4): 505. 1968), only *C. helferiana*, and not *C. kerrii*, occurs in China.

**27. *Cyclobalanopsis helferiana*** (A. de Candolle) Oersted, Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1866: 79. 1867.

毛枝青冈 mao zhi qing gang

*Quercus helferiana* A. de Candolle, Prodr. 16(2): 101. 1864; *Q. prainiana* H. Léveillé.

Trees to 20 m tall. Branchlets densely pale brown tomentose, glabrescent by 3rd year. Petiole 1–2(–3) cm, pale brown tomentose; leaf blade oblong-elliptic, ovate, or elliptic-lanceolate, 12–15(–22) × 4–8(–9.5) cm, densely pale brown tomentose when young, abaxially pale grayish brown tomentose with age, adaxially glabrescent except for basal part of midvein, base broadly cuneate to rounded, margin crenate, apex acuminate to obtuse; midvein adaxially impressed; secondary veins 9–14 on each side of midvein.

Infructescences 1–2 cm; rachis ca. 2 mm thick, pubescent. Cupule discoid, 5–10 mm × 1.8–2.5 cm,

enclosing 1/3–1/2 of nut, outside pale brown tomentose, wall 1.2–2 mm thick; bracts in 8–10 rings, margin denticulate to subentire. Nut oblate, 1–1.6 × 1.5–2.2 cm, gray villous, apex depressed; scar 1.2–1.4 cm in diam., flat to concave at maturity. Fl. Mar–Apr, fr. Oct–Nov.

900–2000 m. Guangdong, Guangxi, S Guizhou, S to SW Yunnan [NE India, Laos, Myanmar, N Thailand, Vietnam].

**28. *Cyclobalanopsis gambleana*** (A. Camus) Y. C. Hsu & H. W. Jen, Acta Phytotax. Sin. 14(2): 78. 1976.

毛曼青冈 mao man qing gang

*Quercus gambleana* A. Camus, Bull. Soc. Bot. France 80: 354. 1933; *Cyclobalanopsis dulongensis* H. Li & Y. C. Hsu; *C. nanchuanica* (C. C. Huang) Y. T. Chang; *C. oxyodon* (Miquel) Oersted var. *tomentosa* Hu; *Q. nanchuanica* C. C. Huang.

Trees to 20 m tall. Branchlets tomentose, glabrescent, densely lenticellate; lenticels brown, raised. Petiole 3–4 cm, grayish stellate tomentose; leaf blade oblong-elliptic to elliptic-lanceolate, 12–20 × 2–5 cm, abaxially densely pale brown stellate tomentose, base rounded to broadly cuneate, margin serrate, apex acuminate; midvein abaxially prominent and adaxially impressed; secondary veins 16–24 on each side of midvein; tertiary veins abaxially obscure. Female inflorescences borne toward the apex of new shoots, axillary, solitary, ca. 1 cm, tomentose. Cupule cupular, ca. 1 × 1.5–1.8 cm, enclosing ca. 1/2 of nut, outside pale brown tomentose, inside pale brown sericeous, wall ca. 1 mm thick; bracts in 5–7 rings, margin denticulate. Nut ovoid to ellipsoid, ca. 2 × 1.5 cm, hairy, glabrescent; scar ca. 8 mm in diam., slightly convex. Fl. Apr–May, fr. Oct–Nov.

Mixed mesophytic forests in mountains; 1100–3000 m. Guizhou, Hubei, Sichuan, Xizang, Yunnan [NE India].

**29. *Cyclobalanopsis oxyodon*** (Miquel) Oersted, Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1866: 79. 1867.

曼青冈 man qing gang

*Quercus oxyodon* Miquel, Ann. Mus. Bot. Lugduno-Batavi 1: 114. 1863; *Cyclobalanopsis brevibradiata* W. C. Cheng ex Y. C. Hsu & H. W. Jen; *Q. fargesii* Franchet; *Q. lineata* Blume var. *grandifolia* Skan; *Q. lineata* var. *oxyodon* (Miquel) Wenzig.

Trees to 20 m tall. Branchlets tomentose, soon glabrescent. Petiole 2.5–4 cm; leaf blade elliptic to oblong-lanceolate, 12–22 × 3–8 cm, abaxially pruinose to whitish farinose and with adnate simple and furcate hairs but soon glabrescent, adaxially green, base rounded to broadly cuneate and usually oblique, margin serrate, apex acuminate to caudate; midvein abaxially prominent but adaxially impressed; secondary veins 16–24 on each side of midvein; tertiary veins abaxially inconspicuous. Female inflorescences 2–5 cm. Cupule

cupular, 1.5–2 cm in diam., enclosing ca. 1/2 of nut, outside thinly grayish brown tomentose, inside white sericeous, wall less than 1 mm thick; bracts in 6–8 rings, margin dentate. Nut ovoid to subglobose, 1.5–2.2 × 1.2–1.7 cm, glabrous or rarely pilose at apex; scar ca. 8 mm in diam., slightly convex; stylopodium ca. 4 mm in diam., with 3 or 4 rings. Fl. May–Jun, fr. Sep–Oct.

Mixed mesophytic forests on mountain slopes and in valleys; 700–2800 m. Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Shaanxi, Sichuan, SE Xizang, Yunnan, Zhejiang [Bhutan, NE India, Myanmar, Nepal].

**30. *Cyclobalanopsis austroglauca*** Y. T. Chang ex Y. C. Hsu & H. W. Jen, Acta Bot. Yunnan. 1(1): 147. 1979.

滇南青冈 dian nan qing gang

*Quercus austroglauca* (Y. T. Chang ex Y. C. Hsu & H. W. Jen) Y. T. Chang.

Trees to 10 m tall. Branchlets, glabrous, lenticellate; lenticels brownish, oblong to rounded. Petiole 1.5–2.5 cm, adaxially sulcate, glabrous; leaf blade oblong-elliptic to ovate-lanceolate, 10–14 × 3.5–4.5 cm, abaxially whitish and with prostrate simple hairs or glabrous, base cuneate to slightly oblique, margin with awnlike and incurved serrations apically, apex acuminate; secondary veins 10–12 on each side of midvein; tertiary veins abaxially conspicuous. Infructescences 4–5 cm, with 2 or 3 fruit. Cupule bowl-shaped, ca. 8 mm × 1–1.8 cm, enclosing ca. 1/2 of nut, outside pale grayish brown tomentose, walls ca. 1 mm thick; bracts in 7 rings, margin of apical 1 or 2 entire, others dentate. Nut broadly ovoid, 2–2.2 cm, apex conically acuminate; scar ca. 1 cm in diam., flat; stylopodium persistent, conspicuous, pale grayish brown tomentose, with 4 or 5 glabrous rings.

• Broad-leaved evergreen forests in mountains; 800–1500 m. SE Yunnan (Xichou Xian).

**31. *Cyclobalanopsis multinervis*** W. C. Cheng & T. Hong in W. C. Cheng & al., Sci. Silvae 8: 10. 1963.

多脉青冈 duo mai qing gang

*Cyclobalanopsis hypargyrea* (Seemen) Y. C. Hsu & H. W. Jen; *Quercus glauca* Thunberg var. *hypargyrea* Seemen; *Q. hypargyrea* (Seemen) C. C. Huang & Y. T. Chang.

Trees to 12 m tall. Branchlets sulcate, lenticellate. Petiole 1–2.7 cm; leaf blade oblong-elliptic to elliptic-lanceolate, 7.5–15.5 × 2.5–5.5 cm, abaxially grayish green, waxy, and with prostrate simple hairs but glabrescent, base cuneate to subrounded, margin apical 2/3 sharply serrate, apex acute to acuminate; secondary veins 10–15 on each side of midvein; tertiary veins abaxially obscure. Infructescences 1–2 cm, 2–6-fruited. Cupule cupular, ca. 8 mm × 1–1.5 cm,

enclosing less than 1/2 of nut, outside thinly grayish brown puberulent, inside whitish sericeous, wall less than 1 mm thick; bracts in 6 or 7 rings, margin subentire. Nut oblong-ovoid, ca. 1.8 × 1 cm, glabrous; scar 3–5 mm in diam., flat or convex; stylopodium persistent, ca. 1.5 mm in diam. Fr. Oct–Nov of following year from fl.

• Often in pure stands in mountains; 1000–2000 m. S Anhui, Fujian, NE Guangxi, W Hubei, Hunan, Jiangxi, Shaanxi, E Sichuan.

**32. *Cyclobalanopsis yonganensis*** (L. Lin & C. C. Huang) Y. C. Hsu & H. W. Jen, J. Beijing Forest. Univ. 15(4): 45. 1993.

永安青冈 yong an qing gang

*Quercus yonganensis* L. Lin & C. C. Huang in C. C. Huang, Guihaia 11: 10. 1991.

Trees to 20 m tall. Branchlets purplish brown, thick. Petiole 2.5–4 cm; leaf blade lanceolate to oblong, 13–18 × 4–6 cm, thickly papery, concolorous when young, abaxially glabrous but glaucous with age, base ± truncate to somewhat auriculate, margin serrulate, apex acuminate; midvein adaxially impressed; secondary veins 14–17 on each side of midvein; tertiary veins reticulate. Infructescence rachises basally ca. 5 mm thick. Cupule funnelform, 0.6–1.2 × 1.4–1.8 cm; bracts in 6 or 7 rings, margin of basal 2 or 3 rings irregularly denticulate but others entire, outside yellowish brown pilose and with scalelike trichomes, inside densely yellowish brown appressed tomentose. Nuts ovoid-ellipsoid to appressed orbicular, 1.2–1.8 × 1.4–1.8 cm; scar 6–11 mm in diam.

• Forests and forest margins in mountains; 1000–1400 m. Fujian (Yong'an Xian).

**33. *Cyclobalanopsis litoralis*** Chun & P. C. Tam ex Y. C. Hsu & H. W. Jen, Acta Bot. Yunnan. 1(1): 147. 1979.

尖峰青冈 jian feng qing gang

*Quercus hainanica* C. C. Huang & Y. T. Chang, invalid name; *Q. obconicus* Y. C. Hsu ex Z. K. Zhou.

Trees to 15 m tall; trunk to 40 cm d.b.h.; bark grayish brown. Branchlets thick, densely brown tomentose, glabrescent, lenticellate; lenticels minute, raised. Petiole 2.5–5 cm, densely brown tomentose when young but glabrescent; leaf blade elliptic, 10–20 × 5–10 cm, leathery, brown tomentose when young but glabrescent, abaxially grayish green but brownish when dry, base cuneate, margin remotely minutely serrate, apex with a short, blunt tip; midvein and secondary veins adaxially slightly raised; secondary veins 7–9 on each side of midvein; tertiary veins abaxially inconspicuous. Female inflorescences borne in axil of terminal leaf, 2–3 cm; cupules 3–5. Cupule obconic, 2–2.5 × 2.5–3.5 cm, enclosing less than 1/2 of nut, outside grayish brown tomentose, wall 3–5 mm thick; bracts in 9–12 rings, margin of basal ones entire, others denticulate and

incurved. Nut ellipsoid, ca.  $4.5 \times 2.5$ – $2.8$  cm; scar conically convex. Fl. Dec, fr. Jun–Jul of following year.

• Mixed mesophytic forests in mountains; 900–1000 m. Hainan (Dongfang Xian).

**34. *Cyclobalanopsis kiukiangensis*** Y. T. Chang ex Y. C. Hsu & H. W. Jen, Acta Phytotax. Sin. 14(2): 85. 1976.

依江青冈 qiu jiang qing gang

*Quercus kiukiangensis* (Y. T. Chang ex Y. C. Hsu & H. W. Jen) Y. T. Chang; *Cyclobalanopsis xizangensis* Y. C. Hsu & H. W. Jen; *Q. xizangensis* (Y. C. Hsu & H. W. Jen) C. C. Huang & Y. C. Chang.

Trees to 30 m tall. Branchlets thick, densely lenticellate; lenticels brownish, raised. Petiole 1.5–2.5 cm, glabrous; leaf blade oblong-elliptic, 10–18  $\times$  3.5–8.5 cm, leathery, abaxially whitish, and loosely covered with simple hairs, base rounded to broadly cuneate, margin apical 1/2 with awnlike and incurved serrations, apex shortly acute, acuminate, or caudate; midvein and secondary veins abaxially prominent but adaxially impressed; secondary veins 10–13 on each side of midvein, tertiary veins abaxially slender, evident to conspicuous, parallel. Infructescence ca. 3.5 cm; rachis ca. 4 mm thick. Cupule saucer- to bowl-shaped, 1.2–1.5  $\times$  1.8–2.2 cm, enclosing to 1/2 of nut, outside tomentose, inside whitish sericeous, wall 1.5–3 mm thick; bracts in 6–9 rings, yellowish brown tomentose, margin of basal ones loosely dentate but apical ones entire. Nut globose, ovoid, or conical, 1.5–1.7(–3)  $\times$  1.4–1.7 cm, glabrous; scar ca. 8 mm in diam., convex; stylopodium persistent, conspicuous, 3-ringed. Fr. Aug–Sep.

• Mixed mesophytic forests in mountains; 1300–2000 m. Xizang, NW Yunnan.

**35. *Cyclobalanopsis bella*** (Chun & Tsiang) Chun ex Y. C. Hsu & H. W. Jen, J. Beijing Forest. Univ. 15(4): 45. 1993.

榔榔青冈 bing lang qing gang

*Quercus bella* Chun & Tsiang, J. Arnold Arbor. 28: 326. 1947.

Trees to 30 m tall. Branchlets subangular, pubescent, glabrescent. Petiole 1–2 cm, glabrous; leaf blade oblong-elliptic to lanceolate, 8–15  $\times$  2–3.5 cm, subleathery, adnate pubescent when young, glabrescent and grayish green with age, base cuneate and slightly oblique, margin apical 1/2 serrate, apex acuminate; midvein and secondary veins adaxially flat; secondary veins ca. 12 on each side of midvein and abaxially raised; tertiary veins abaxially slender, evident. Female inflorescences 1–2 cm; cupules usually 2 or 3. Cupule discoid, ca. 5 mm  $\times$  2.5–3 cm, covering base of nut, outside pale grayish brown puberulent and glabrescent, inside pale orangish brown sericeous, wall ca. 1 mm thick; bracts in 6–8 rings, margin irregularly denticulate. Nut oblate, 1.5–2  $\times$  2.2–3 cm, pubescent when young, glabrescent; scar 1–1.4 cm in diam., depressed; stylopodium persistent, to 3 mm. Fl. Feb–Apr, fr. Oct–Dec.

• Wet forests in mountains and hills; 200–700 m. Guangxi, Hainan.

**36. *Cyclobalanopsis blakei*** (Skan) Schottky, Bot. Jahrb. Syst. 47: 649. 1912.

栎子青冈 li zi qing gang

*Quercus blakei* Skan, Hooker's Icon. Pl. 27: t. 2662. 1901; *Q. blakei* var. *parvifolia* Merrill.

Trees to 35 m tall. Branchlets glabrous; 2nd-year branchlets densely lenticellate. Petiole slender, 1.5–3 cm, glabrous; leaf blade narrowly ovate-elliptic to obovate-oblong, 7–19  $\times$  1.5–2 cm, subleathery, reddish tomentose when young, soon glabrescent, base cuneate, margin apical 2/3 serrate, apex acuminate; midvein adaxially raised; secondary veins 8–14 on each side of midvein and abaxially raised; tertiary veins abaxially slender, evident. Female inflorescences 1–2 cm; cupules 1 or 2. Cupules saucer-shaped to shallowly bowl-shaped, 5–10 mm  $\times$  2–3 cm, covering base of nut, outside pale grayish brown tomentose, inside orangish brown sericeous, wall ca. 1 mm thick; bracts in 6 or 7 rings, margin entire or dentate. Nut ellipsoid to ovoid, 2.5–3.5  $\times$  1.5–3 cm; scar 7–11 mm in diam., flat to depressed; stylopodium persistent, umbonate, base loosely pale grayish brown villous, late glabrescent. Fl. Mar, fr. Oct–Dec.

Dense forests on mountain valleys; 100–2500 m. Guangdong, Guangxi, Guizhou, Hainan [Laos, Vietnam].

Specimens from China that have been determined as *Cyclobalanopsis chrysoalyx* (Hickel & A. Camus) Hjelmquist are referable to *C. blakei*.

**37. *Cyclobalanopsis phanera*** (Chun) Y. C. Hsu & H. W. Jen, Acta Bot. Yunnan. 1(1): 148. 1979.

亮叶青冈 liang ye qing gang

*Quercus phanera* Chun, J. Arnold Arbor. 28: 242. 1947; *Q. basellata* Chun & W. C. Ko; *Q. insularis* Chun & P. C. Tam (1965), not Borzi (1911).

Trees to 25 m tall. Branchlets tomentose, glabrescent. Petiole 1–1.8 cm; leaf blade bright green, oblong-elliptic to somewhat obovate, 5–15  $\times$  2–6 cm, thickly leathery, glabrous, base cuneate and oblique, margin apical 1/2 serrate, apex with a short, blunt tip; midvein abaxially prominent but adaxially flat; secondary veins 7–10 on each side of midvein; tertiary veins abaxially slender, evident. Female inflorescence ca. 5 mm, cupules usually 1. Infructescences ca. 1 cm; rachis thick, lenticellate. Cupule bowl-shaped, 1–1.5  $\times$  1.8–2.5 cm, enclosing ca. 1/4 of nut, outside pale grayish brown velutinous, inside brown tomentose, wall 2–3 mm thick; bracts in 8–12 rings, middle 4 or 5 wider and margin deeply dentate, apical 3 narrowest. Nut cylindrical to ellipsoid, 3–4  $\times$  2–2.5 cm, villous; scar 8–10 mm in diam., slightly convex; stylopodium persistent, ca. 3 mm in diam., base ringed. Fr. Dec–Jan.

• Mixed mesophytic forests in mountains; 900–2000 m. Guangxi, Hainan.

**38. *Cyclobalanopsis edithiae*** (Skan) Schottky, Bot. Jahrb. Syst. 47: 650. 1912.

华南青冈 hua nan qing gang

*Quercus edithiae* Skan, Hooker's Icon. Pl. 27: t. 2661. 1901; *Q. tephrosia* Chun & W. C. Ko.

Trees to 20 m tall. Branchlets slightly angular, glabrous; 2nd-year branchlets lenticellate; lenticels loose, small. Petiole 2–3 cm, glabrous; leaf blade oblong-elliptic to somewhat obovate, 5–16 × 2–6 cm, leathery, adaxially dark green, grayish, or whitish, base cuneate, margin apical 1/3 remotely serrulate, apex with a short, blunt tip; midvein adaxially flat; secondary veins 9–12 on each side of midvein, inconspicuous; tertiary veins abaxially conspicuous. Female inflorescences 1–2 cm; cupules 3 or 4. Infructescence rachis short, ca. 1 cm thick, with 1 or 2 fruit. Cupule bowl-shaped, 1.2–1.5 × 1.8–2.5 cm, enclosing 1/4–1/3 of nut, outside orangish brown velutinous, inside orangish brown prostrate villous, wall 2–3 mm thick; bracts in 6–8 rings, margin of basal 2 or 3 subtire, others denticulate. Nut ellipsoid to cylindrical-ellipsoid, 3–4.5 × 2–3 cm; scar ca. 7 mm in diam., slightly convex; stylopodium persistent, umbonate, puberulent. Fr. Oct–Dec.

Broad-leaved evergreen forests in mountains; 400–1800 m. Guangdong, Guangxi, Hainan [Vietnam].

**39. *Cyclobalanopsis kouangsiensis*** (A. Camus) Y. C. Hsu & H. W. Jen, Acta Phytotax. Sin. 14(2): 78. 1976.

广西青冈 *guang xi qing gang*

*Quercus kouangsiensis* A. Camus, Bull. Soc. Bot. France 84: 176. 1937; *Q. nemoralis* Chun.

Trees to 15 m tall. Branchlets sulcate, densely tawny velutinous. Petiole 1.5–3 cm, densely light brown tomentose; leaf blade oblong-elliptic to lanceolate, 12–20 × 3.5–5.5 cm, leathery, abaxially densely pale grayish brown stellate tomentose, base cuneate and usually oblique, margin apically serrate, apex acuminate; midvein and secondary veins abaxially prominent but adaxially flat; secondary veins 10–14 on each side of midvein; tertiary veins abaxially slender, conspicuous. Female inflorescence ca. 1.5 cm; rachis brown tomentose. Cupule campanulate, ca. 2.5 × 2.5–3.4 cm, enclosing more than 1/2 of nut, outside orangish brown tomentose, inside feltlike orangish tomentose, wall ca. 1.5 mm thick; bracts in 8 or 9 rings, margin dentate. Nut cylindrical-ellipsoid, ca. 5 × 2.5 cm, tomentose; scar ca. 1.5 cm in diam., slightly convex; stylopodium umbonate, ca. 3 mm. Fr. Oct.

• Wet, broad-leaved evergreen forests in mountains; 200–2000 m. Guangdong, Guangxi, Hunan, Yunnan.

**40. *Cyclobalanopsis thorelii*** (Hickel & A. Camus) Hu, Bull. Fan Men. Inst. Biol., Bot. 10: 106. 1940.

厚缘青冈 *hou yuan qing gang*

*Quercus thorelii* Hickel & A. Camus, Bull. Mus. Natl. Hist. Nat. 29: 599. 1923; *Q. hsiensiui* Chun & W. C. Ko. Trees to 30 m tall. Branchlets sulcate, densely with tawny stellate hairs when young, glabrescent, lenticellate; lenticels whitish, small. Petiole 1–3 cm, hairy, glabrescent; leaf blade ovate to oblong-elliptic, 12–17 × 3.5–7 cm, subleathery, light orangish brown tomentose when young, glabrescent, abaxially grayish

brown, adaxially bright green, base broadly cuneate to subrounded, margin entire near base but otherwise spinose serrate, apex acute to caudate; midvein adaxially raised; secondary veins 13–16 on each side of midvein, branching near margin; tertiary veins abaxially slender, evident. Cupule bowl-shaped to cupular, 1.5–2 × ca. 3 cm, enclosing most of nut and ca. 0.5 mm longer than it, apically incurved, outside and inside tawny tomentose, wall ca. 2 mm thick; bracts in 8 or 9(–12) rings, margin subtire. Nut oblate, 1–1.5 × 2.5–3 cm, densely light brown tomentose, apex depressed; scar ca. 2 cm in diam., flat. Fl. Apr, fr. Sep–Oct.

Broad-leaved evergreen forests in mountain valleys; 1000–1100 m. S Guangxi, S Yunnan [Laos, Vietnam].

**41. *Cyclobalanopsis chingsiensis*** (Y. T. Chang) Y. T. Chang in Y. T. Chang & Y. Q. Chen, Acta Phytotax. Sin. 34: 339. 1996.

靖西青冈 *jing xi qing gang*

*Quercus chingsiensis* Y. T. Chang, Acta Phytotax. Sin. 11: 258. 1966.

Trees to 15 m tall. Branchlets reddish brown, densely verrucose; lenticels brownish, elevated. Petiole slender, 1.5–2 cm; leaf blade broadly oblong-elliptic, 8–10 × 3–5 cm, subleathery, abaxially with an indument of fine yellowish brown stellate hairs when young but glabrescent, adaxially glabrous and shiny when dry, base obtusely rounded and oblique, margin subspinulose-serrate ± apically from middle, apex shortly acuminate; midvein basally canaliculate on adaxial surface; secondary veins 11–13 on each side of midvein. Cupules woody, saucer-shaped, ca. 1 × 3–3.5 cm, margin introrse, outside grayish yellow tomentose, inside densely sericeous-tomentose, wall ca. 3 mm thick; bracts in ca. 8 rings, margin subtire. Nut strongly depressed semiglobose, ca. 7 mm × 2.5 cm, densely puberulent, apex slightly concave; scar subconvex, ca. 2.2 cm in diam.; stylopodium conically rostrate.

• Guangxi (Jingxi Xian), SW Guizhou.

**42. *Cyclobalanopsis chapensis*** (Hickel & A. Camus) Y. C. Hsu & H. W. Jen, Acta Phytotax. Sin. 14(2): 78. 1976.

扁果青冈 *bian guo qing gang*

*Quercus chapensis* Hickel & A. Camus, Bull. Mus. Natl. Hist. Nat. 29: 598. 1923; *Cyclobalanopsis koumeii* Hu; *C. shiangpyngensis* Hu.

Trees to 20 m tall. Branchlets sulcate, villous or glabrous when young, lenticellate; lenticels grayish brown, oblong. Petiole 1–2.5 cm, glabrous; leaf blade oblong-elliptic to lanceolate, 9–20 × 2–4(–5) cm, leathery to thickly papery, glabrescent, base broadly cuneate to subrounded, margin apical 2/3 serrulate, apex acuminate; midvein and secondary veins abaxially prominent, adaxially slightly raised; secondary veins 15–20 on each side of midvein; tertiary veins abaxially



conspicuous. Cupule saucer-shaped, 5–12 mm × 2.5–3.5 cm, covering base of nut, outside sparsely orangish brown tomentose, inside orangish brown sericeous, wall 3–5 mm thick; bracts in 6–9 rings, margin dentate. Nut oblate, 1–2.2 × 1.5–2.7 cm, glabrous or basally pilose, base flat, apex rounded to slightly depressed; scar ca. 1.5 cm in diam., flat or depressed; stylopodium ca. 3 mm in diam., umbonate. Fr. Oct–Dec.

Wet broad-leaved evergreen forests in mountain valleys; 1300–2000 m. S to SE Yunnan [Vietnam].

**43. *Cyclobalanopsis sichourensis*** Hu, Acta Phytotax. Sin. 1: 152. 1951.

西畴青冈 xi chou qing gang

*Quercus sichourensis* (Hu) C. C. Huang & Y. T. Chang.

Trees to 20 m tall. Branchlets thick, slightly sulcate, sparsely hairy, lenticellate; lenticels grayish brown, rounded, raised. Petiole 2.5–3.5 cm, brown tomentose when young; leaf blade oblong to ovate-elliptic, 12–21 × 5–9 cm, thickly leathery, abaxially whitish, pilose, and barbate in vein axils, adaxially bright green, base rounded to broadly cuneate, margin beyond basal 1/4 remotely serrate, apex shortly acute; midvein adaxially impressed; secondary veins 15–18 on each side of midvein; tertiary veins abaxially conspicuous. Cupule oblate, ca. 2.5 × 3.5–5 cm, enclosing nearly all of nut, outside pale brown tomentose, inside pale orangish brown sericeous, wall ca. 1.5 mm thick; bracts in 9 or 10 rings, margin dentate. Nut oblate, ca. 2 × 3–4 cm, pale orangish tomentose, apex impressed and umbonate; scar slightly narrower than nut diam., convex.

• Broad-leaved evergreen forests in mountains; 800–1500 m. SE Yunnan.

**44. *Cyclobalanopsis argyrotricha*** (A. Camus) Chun & Y. T. Chang ex Y. C. Hsu & H. W. Jen, J. Beijing Forest. Univ. 15(4): 45. 1993.

贵州青冈 gui zhou qing gang

*Quercus argyrotricha* A. Camus, Bull. Mus. Natl. Hist. Nat., sér. 2, 3: 689. 1931.

Trees. Branchlets yellowish brown tomentose when young, glabrescent. Petiole 1–2 cm, tomentose when young, glabrescent; leaf blade ovate to obovate-elliptic, 6.5–12 × 2–4.5 cm, leathery, abaxially yellowish gray and with stellate velutinous hairs, adaxially bright green, base rounded and oblique, margin remotely minutely serrate, apex acuminate, mucronate; midvein and secondary veins adaxially flat; secondary veins 9–14 on each side of midvein; tertiary veins obscure on both surfaces. Infructescences less than 1 cm, 1-fruited. Cupule cupular, 5–7 mm × 1–1.7 cm, enclosing ca. 1/2 of nut, outside golden tomentose, inside yellowish brown sericeous, wall ca. 2 mm thick; bracts in 6 or 7(–9) rings. Nut broadly ovoid, 0.8–1.5 cm, golden tomentose, apex rounded; stylopodium persistent, 3-lobed.

• Broad-leaved evergreen forests on mountain slopes and in valleys; ca. 1600 m. Guizhou.

**45. *Cyclobalanopsis ningangensis*** W. C. Cheng & Y. C. Hsu in Y. C. Hsu & H. W. Jen, Acta Bot. Yunnan. 1(1): 146. 1979.

宁冈青冈 ning gang qing gang

*Quercus ningangensis* (W. C. Cheng & Y. C. Hsu) C. C. Huang.

Trees to 15 m tall. Branchlets gray, sparsely hairy. Petiole 1.5–3 cm, dark when dry, basally tomentose; leaf blade oblong-elliptic, elliptic, or ovate-lanceolate, 8–13 × 2–4 cm, abaxially densely with gray, shortly stellate hairs, base rounded to broadly cuneate, margin glandular serrate, apex acuminate to caudate; midvein impressed; secondary veins 13–15 on each side of midvein, adaxially slightly raised, fusing at serration. Female inflorescences borne in axil of a higher leaf, solitary, 1.5–2 cm, cupules 7–10 but usually only 2 or 3 fertile. Cupule cupular, ca. 5 mm × 1 cm, outside sparsely gray hairy, inside gray sericeous, wall ca. 1 mm thick; bracts in 6 or 7 rings. Nut tawny, oblong-ellipsoid, 1.5–2 × 0.8–1.2 cm, glabrous; scar ca. 5 mm in diam., subrounded; stylopodium persistent, conspicuous.

• Guangxi, Hunan, Jiangxi.

**46. *Cyclobalanopsis pentacycla*** (Y. T. Chang) Y. T. Chang ex Y. C. Hsu & H. W. Jen, Acta Phytotax. Sin. 14(2): 79. 1976.

五环青冈 wu huan qing gang

*Quercus pentacycla* Y. T. Chang, Acta Phytotax. Sin. 11: 256. 1966.

Trees to 15 m tall. Branchlets thick, grayish brown, glabrous, sparsely lenticellate; lenticels gray. Petiole 1.5–2 cm, sulcate, glabrous; leaf blade ovate-elliptic, 10–14 × 4–6 cm, leathery, abaxially whitish chaffy or with prostrate simple hairs, adaxially green and glabrous, base subrounded and slightly oblique, margin serrulate, apex acute to shortly acuminate; secondary veins 13–15 on each side of midvein; tertiary veins abaxially slender, evident. Cupule obconic, ca. 6 mm × 1.2 cm, enclosing 1/3–1/2 of nut, outside whitish tomentose, inside prostrate sericeous, wall ca. 1 mm thick; bracts in (4 or)5 rings, margin dentate. Nut reddish brown, ovoid-ellipsoid, ca. 1.7 × 1.2 cm, shiny; scar ca. 7 mm in diam., convex; stylopodium ca. 2.5 mm in diam. Fr. Nov.

• Mixed mesophytic forests in mountains; 1400–1500 m. SE Yunnan (Malipo Xian).

**47. *Cyclobalanopsis stenophylloides*** (Hayata) Kudo & Masamune in Kudo, Trans Nat. Hist. Soc. Taiwan 20: 162. 1930.

台湾窄叶青冈 tai wan zhai ye qing gang

*Quercus stenophylloides* Hayata, Icon. Pl. Formosan. 4: 21. 1914; *Cyclobalanopsis stenophylla* (Blume)

Schottky var. *stenophylloides* (Hayata) J. C. Liao; *Q. salicina* Blume var. *stenophylloides* (Hayata) S. S. Ying; *Q. stenophylla* (Blume) Makino var. *stenophylloides* (Hayata) A. Camus.

Trees to 17 m tall. Branchlets slender, gray, glabrous. Petiole 1.5–2 cm, glabrous; leaf blade oblong-elliptic to lanceolate, 7–12 × 1.5–3.5 cm, leathery, abaxially farinose and with prostrate simple hairs but usually glabrescent, adaxially green, base narrowly acute to rounded, margin with short, awnlike serrations, apex acuminate to caudate; secondary veins 11–13 on each side of midvein, extending into serration; tertiary veins abaxially inconspicuous to obscure. Female inflorescences 2–2.5 cm, cupules 6 or 7. Cupule cupular, 1–1.5 × ca. 1.2 cm, enclosing ca. 1/2 or less of nut, outside and inside grayish velutinous, wall less than 1 mm thick; bracts in 6 or 8 rings, margin dentate. Nut ellipsoid, 1.7–2 × ca. 1.5 cm, glabrous; scar ca. 5 mm in diam., flat; stylopodium persistent, conspicuous, 3-ringed. Fl. Apr–May, fr. Sep–Oct of following year.

• Broad-leaved evergreen forests in mountains; (500–)1100–2600 m. C to N Taiwan.

The Japanese *Cyclobalanopsis salicina* (Blume) Oersted has been reported in Taiwan (J. C. Liao, Fl. Taiwan, ed. 2, 2: 84. 1996). *Cyclobalanopsis salicina* and *C. stenophylloides* are very closely related, but the plants in Taiwan are apparently populations of *C. stenophylloides* growing on sandstone ridges at lower elevations than is typical for this species.

**48. *Cyclobalanopsis gracilis*** (Rehder & E. H. Wilson) W. C. Cheng & T. Hong in W. C. Cheng & al., Sci. Silvae 8: 11. 1963.

细叶青冈 xi ye qing gang

*Quercus glauca* Thunberg f. *gracilis* Rehder & E. H. Wilson in Sargent, Pl. Wilson. 3: 228. 1916;

*Cyclobalanopsis glauca* (Thunberg) Oersted var.

*gracilis* (Rehder & E. H. Wilson) Y. T. Chang; *C.*

*pseudoglauca* Y. K. Li & X. M. Wang; *C. shennongii*

(C. C. Huang & S. H. Fu) Y. C. Hsu & H. W. Jen; *Q.*

*ciliaris* C. C. Huang & Y. T. Chang; *Q. gracilis*

(Rehder & E. H. Wilson) Wuzhi (1976), not Korthals

(1844) nor Lange (1865); *Q. liboensis* Z. K. Zhou; *Q.*

*shennongii* C. C. Huang & S. H. Fu.

Trees to 15 m tall. Branchlets tomentose when young, glabrescent. Petiole 1–1.5 cm; leaf blade oblong-ovate to ovate-lanceolate, 4.5–9 × 1.5–3 cm, abaxially whitish and with prostrate simple hairs, adaxially bright green, base cuneate to subrounded, margin apical 2/3 sharply serrulate, apex acuminate to caudate; secondary veins 7–13 on each side of midvein, slender, inconspicuous (especially near margin); tertiary veins abaxially inconspicuous. Female inflorescences 1–1.5 cm, rachis and bracts tomentose; cupules 2 or 3, borne apically. Cupule bowl-shaped, 6–8 mm × 1–1.3 cm, enclosing 1/3–1/2 of nut, outside and inside with prostrate grayish brown tomentose hairs; bracts in 6–9 rings, margin of basal 2 conspicuously dentate, others denticulate. Nut ellipsoid, 1.5–2 × ca. 1 cm, apex hairy; scar ca. 5 mm in diam., slightly convex; stylopodium persistent, short. Fl. Apr–Jun, fr. Oct–Nov.

• Mixed mesophytic forests in mountains; 500–2600 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, W Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Zhejiang.

Part of the *Cyclobalanopsis glauca* complex but with smaller leaves than is typical for that species, *C. gracilis* could nevertheless be treated as conspecific with *C. glauca*.

**49. *Cyclobalanopsis glauca*** (Thunberg) Oersted, Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1866: 78. 1867.

青冈 qing gang

*Quercus glauca* Thunberg in Murray, Syst. Veg., ed. 14, 858. 1784; *Cyclobalanopsis glauca* var. *kuyuensis* (J. C. Liao) J. C. Liao; *C. repandifolia* (J. C. Liao) J. C. Liao; *Q. glauca* var. *kuyuensis* J. C. Liao; *Q. longipes* Hu; *Q. repandifolia* J. C. Liao; *Q. sasakii* Kanehira; *Q. vaniotii* H. Léveillé.

Trees to 20 m tall. Branchlets glabrous. Petiole 1–3 cm; leaf blade obovate to oblong-elliptic, 6–13 × 2–5.5 cm, often wider apically from middle, leathery, abaxially often becoming pruinous and with prostrate white simple or scalelike hairs but glabrescent, adaxially glabrous, base rounded to broadly cuneate, margin apical 1/2 remotely serrate, apex acuminate to somewhat caudate; secondary veins 9–13 on each side of midvein; tertiary veins abaxially inconspicuous. Infructescences 1.5–3 cm, with 2 or 3 fruit. Cupule bowl-shaped, 6–8 mm × 0.9–1.4 cm, enclosing 1/3–1/2 of nut, outside white puberulent or glabrous, inside white sericeous; bracts in 5 or 6 rings, crowded, margin entire or denticulate. Nut ovoid, oblong-ovoid, or ellipsoid, 1–1.6 × 0.9–1.4 cm, glabrous or rarely hairy; scar ca. 5 mm in diam., flat or slightly convex. Fl. Apr–May, fr. Oct.

Broad-leaved evergreen forests and mixed mesophytic forests on mountain slopes or in valleys; below 100–2600 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Afghanistan, Bhutan, N India, Japan, Kashmir, Korea, Nepal, Sikkim, Vietnam].

*Cyclobalanopsis glauca* is part of a widespread complex, with a number of segregate species of uncertain status having been named. Additional studies are needed to clarify the relationships and specific limits within this complex. The status of *C. globosa* Lin & Liu (Bull. Taiwan For. Res. Inst. 110: 27. 1965), from Taiwan, is uncertain. It is very close to *C. glauca* and is probably not sufficiently distinct to be recognized as a separate species.

**50. *Cyclobalanopsis lungmaiensis*** Hu, Acta Phytotax. Sin. 1: 154. 1951.

龙迈青冈 long mai qing gang

*Quercus lungmaiensis* (Hu) C. C. Huang & Y. T.

Chang; *Cyclobalanopsis fulviseriaca* Y. C. Hsu & D. M.

Wang; *C. longifolia* Y. C. Hsu & Q. Z. Dong; *Q.*

*fulviseriaca* (Y. C. Hsu & D. M. Wang) Z. K. Zhou; *Q.*

*yongchunana* Z. K. Zhou.

Trees to 30 m tall. Branchlets conspicuously sulcate, glabrous. Petiole 2–2.5(–4) cm, adaxially sulcate,

glabrous; leaf blade green, oblong, obovate-elliptic, or ovate-lanceolate,  $9.5\text{--}11.5 \times 3\text{--}4$  cm, subleathery, abaxially grayish green and with simple hairs or glabrous, adaxially green and glabrous, base cuneate to subrounded, margin basally entire but apically awnlike serrate, apex acuminate to caudate; midvein abaxially prominent and adaxially impressed; secondary veins 13–17 on each side of midvein; tertiary veins abaxially conspicuous. Female inflorescences ca. 2.5 cm; rachis slender, sparsely tomentose. Cupule bowl-shaped,  $0.7\text{--}1 \times \text{ca. } 1.5$  cm, enclosing  $1/3\text{--}1/2$  of nut, outside sparsely tomentose; bracts in 7–9 rings, margin of basal ones 1 or 2 denticulate, others subentire to repand-dentate. Nut broadly ovoid to oblate,  $1.2\text{--}2$  cm, apex flat or depressed and velutinous; scar flat and rounded. Fl. Mar–Apr, fr. Oct.

• Rocky mountains; 1100–1300 m. SE Yunnan.

**51. *Cyclobalanopsis annulata*** (Smith) Oersted, Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1866: 70. 1867.

环青冈 huan qing gang

*Quercus annulata* Smith in Rees, Cycl. 29: *Quercus* no. 22. 1814; *Q. glauca* Thunberg var. *annulata* (Smith) A. Camus.

Trees to 15 m tall. Branchlets grayish brown, sulcate and convex lenticellate, cylindric and dark gray by 2nd year. Leaf blade oblong-elliptic, elliptic, or ovate-lanceolate,  $9\text{--}13 \times 3.5\text{--}5$  cm, abaxially whitish and veins grayish brown (whitish on tertiary veins) with prostrate simple hairs, adaxially smooth, base broadly cuneate to subrounded, margin awnlike serrate to sharply serrulate, apex acuminate to caudate; midvein and secondary veins adaxially impressed; secondary veins 10–14 on each side of midvein, often fusing at serration; tertiary veins abaxially prominent. Infructescences solitary, subapical on branchlet, 1–2 cm, 3–5-fruited. Cupule shallowly bowl-shaped,  $6\text{--}8$  mm  $\times$   $1.2\text{--}1.5$  cm, outside thinly grayish brown pubescent, inside grayish brown sericeous, wall ca. 1 mm thick; bracts in 7–9 rings, margin entire. Nut ovoid,  $1.2\text{--}1.5 \times 1.1\text{--}1.4$  cm, loosely incanous; stigmas 3 or 4, often separated; scar 6–7 mm in diam., convex; stylopodium persistent, often basally 4-ringed. Fl. Mar–Apr, fr. Oct–Nov.

Broad-leaved evergreen forests in mountains. W Sichuan, E Xizang, W to SW Yunnan [Nepal].

The type is from Nepal, and specimens from the Himalayas as well as from Vietnam have sometimes been included under this name. This species is questionably distinct from *Cyclobalanopsis glauca*, and further studies may show that they are conspecific.

**52. *Cyclobalanopsis morii*** (Hayata) Schottky, Bot. Jahrb. Syst. 47: 658. 1921.

台湾青冈 tai wan qing gang

*Quercus morii* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 293. 1911.

Trees to 30 m tall. Branchlets thick, glabrous or arachnoid hairy when young, conspicuously lenticellate. Petiole 1.5–3 cm, glabrous; leaf blade oblong to ovate-elliptic,  $6\text{--}10 \times 2.5\text{--}4$  cm, glabrous or sparsely sericeous when young, base subrounded to broadly cuneate and slightly oblique, margin apical  $1/2$  serrate, apex caudate; midvein and secondary veins abaxially prominent, adaxially flat or slightly impressed; secondary veins 8–11 on each side of midvein; tertiary veins abaxially slender, evident. Infructescence 2–3 cm; rachis glabrous, lenticellate. Cupule cupular to campanulate,  $1.4\text{--}1.8 \times 1.5\text{--}2$  cm, enclosing ca.  $1/2$  of nut, outside brown velutinous, inside brown tomentose, wall ca. 1 mm thick; bracts in 7 or 8 rings, basal ones divergent from cupule wall, apical ones with margin dentate and apex obtuse. Nut ovoid to cylindric,  $1.5\text{--}2.5 \times 1\text{--}1.8$  cm, glabrous or rarely hairy, apex rounded; scar ca. 1 cm in diam., flat or slightly convex; stylopodium persistent, ca. 1 mm in diam. Fl. Apr–May, fr. Oct–Nov of following year.

• Broad-leaved evergreen forests in mountains; 1600–2600 m. Taiwan.

**53. *Cyclobalanopsis disciformis*** (Chun & Tsiang) Y. C. Hsu & H. W. Jen, Acta Bot. Yunnan. 1(1): 148. 1979.

碟斗青冈 die dou qing gang

*Quercus disciformis* Chun & Tsiang, J. Arnold Arbor. 28: 324. 1947; *Q. shingjenensis* Y. T. Chang.

Trees 10–14 m tall. Branchlet tawny velutinous, glabrescent. Petiole ca. 2 cm, tawny tomentose when young, glabrescent; leaf blade oblong to obovate-elliptic,  $6\text{--}13 \times 2.5\text{--}4$  cm, subleathery, glabrescent, base broadly cuneate to subrounded and often oblique, margin serrations incurved and shortly aristate, apex acuminate to caudate; midvein abaxially prominent but adaxially impressed; secondary veins 11–13 on each side of midvein, slender, evident, curving; tertiary veins abaxially conspicuous. Infructescences ca. 5 mm. Cupule discoid, rim flat when ripe, 3–4 cm in diam., covering base of nut, outside densely prostrate grayish brown tomentose, inside with an erect orangish brown feltlike tomentum, wall ca. 4 mm thick; bracts in 8–10 rings, margin denticulate but apical 2 or 3 entire. Nut oblate,  $1.5\text{--}2 \times \text{ca. } 2$  cm, apex flattened; scar ca. 2 cm in diam., depressed; stylopodium persistent, raised, puberulent. Fl. Mar–Apr, fr. Aug–Dec of following year.

• Broad-leaved evergreen forests in mountains; 200–1500 m. SW Guangdong, Guangxi, Guizhou, Hainan, Hunan.

**54. *Cyclobalanopsis austrocochinchinensis*** (Hickel & A. Camus) Hjelmquist, Dansk Bot. Ark. 23(4): 503. 1968.

越南青冈 yue nan qing gang

*Quercus austrocochinchinensis* Hickel & A. Camus, Ann. Sci. Nat., Bot., sér. 10, 3: 386. 1921.

Trees to 15 m tall. Branchlets brownish, with stellate hairs, glabrescent, lenticellate; lenticels brownish, oblong. Petiole 1–2 cm, with stellate hairs, glabrescent; leaf blade green, oblong-elliptic to lanceolate, 10–17(–20) × 3–5 cm, thinly leathery, pubescent when young, glabrescent, base cuneate, margin beyond basal 1/3 remotely minutely serrate, apex shortly acute to acuminate; secondary veins 12–17 on each side of midvein, adaxially slightly raised; tertiary veins abaxially conspicuous. Cupule cupular, 1.3–1.5 × 1.5–1.8 cm, enclosing all but nut apex, outside and inside tawny tomentose, wall ca. 2 cm thick; bracts in 8–10 rings, margin dentate. Nut oblate, 1.1–1.4 × 1.3–1.8 cm, angular, yellowish brown tomentose, apex rounded; scar ca. 1.2 cm in diam., as large as nut base, flat; stylopodium persistent.

Sparse forests in mountain valleys and on river banks; 700–1000 m. Yunnan [Thailand, Vietnam].

**55. *Cyclobalanopsis subhinoidea*** (Chun & W. C. Ko) Y. C. Hsu & H. W. Jen ex Y. T. Chang in Y. T. Chang & Y. Q. Chen, *Acta Phytotax. Sin.* 34: 339. 1996.

鹿茸青冈 *lu rong qing gang*

*Quercus subhinoidea* Chun & W. C. Ko in Chun & F. C. How, *Acta Phytotax. Sin.* 7: 39. 1958.

Trees to 13 m tall. Branchlets with yellowish brown, 6–8-furcate, stellate tomentose hairs when young, soon glabrescent; dark brown and sparsely lenticellate with age. Petiole 1.5–2 cm, tomentose, glabrescent; leaf blade grayish green, oblong to lanceolate-elliptic, 7–12 × 2.5–4 cm, subleathery, glabrous, base broadly cuneate and sometimes oblique, margin sharply serrate with serrate points callose, apex acuminate to somewhat caudate; midvein adaxially raised; secondary veins (15–)17–22 on each side of midvein, fusing at serration; tertiary veins abaxially conspicuous. Cupule saucer-shaped, 1–1.5 × ca. 3 cm, outside velutinous; bracts in 8 or 9 rings, basal ones wider and erose, middle 3 or 4 denser, apical ones incurved at cupule rim. Nut oblate, 1–1.5 × 2.5–3 cm, apex impressed; scar ca. 1.8 cm in diam., convex; stylopodium persistent, umbonate, yellowish gray puberulent. Fr. Aug–Dec (on 1-year-old branchlets).

• Dense forests in mountain valleys; 300–500 m. Hainan (Ledong Xian).

**56. *Cyclobalanopsis elevaticostata*** Q. F. Zheng, *Acta Phytotax. Sin.* 17(3): 118. 1979.

突脉青冈 *tu mai qing gang*

*Quercus elevaticostata* (Q. F. Zheng) C. C. Huang. Trees to 20 m tall. Branchlets purple-brown, minutely sulcate, glabrous, sparsely lenticellate; lenticels whitish, small. Petiole 1–2.5 cm; leaf blade narrowly elliptic to elliptic-lanceolate, (5–)8–15 × (1.5–)2.5–4 cm (to ca. 20 × 5.5 cm in budding shoot), glabrous, abaxially grayish green, adaxially green, base cuneate and decurrent on petiole, margin from middle or apically remotely and sharply serrate and sometimes glandular at serration, apex acuminate; midvein and secondary

veins prominent; secondary veins 8–12 on each side of midvein. Cupule shallowly cupular, 6–8 mm × 1–1.2 cm, enclosing ca. 1/3 of nut, outside yellowish gray velutinous; bracts in (5–)7 or 8 rings, margin irregularly crenate-dentate but apical 2 or 3 entire. Nut ellipsoid to ovoid-ellipsoid, 1.5–2.2 × 1–1.2 cm, yellowish brown puberulent near apex; scar ca. 5 mm in diam., slightly convex; stylopodium persistent, 1–1.5 mm, 4- or 5-ringed, umbonate. Fr. Nov.

• 600–1000 m. Fujian.

**57. *Cyclobalanopsis patelliformis*** (Chun) Y. C. Hsu & H. W. Jen, *J. Beijing Forest. Univ.* 15(4): 45. 1993.

托盘青冈 *tuo pan qing gang*

*Quercus patelliformis* Chun, *J. Arnold Arbor.* 28: 241. 1947.

Trees to 15 m tall. Branchlets conspicuously angular when young; grayish brown, sparsely lenticellate by 2nd year, glabrous. Petiole 2–4.5 cm; leaf blade elliptic, oblong-elliptic, or ovate-lanceolate, 5–12 × 2.5–6 cm, leathery, abaxially grayish green and with stellate hairs when young but glabrescent, adaxially dark green, base cuneate to rarely subrounded and sometimes oblique, margin shortly and sharply serrate with serration somewhat incurved, apex acuminate; midvein adaxially flat; secondary veins 9–11 on each side of midvein; tertiary veins abaxially very slender, inconspicuous to evident. Female inflorescence 2–3 cm; cupules 3–5. Fruit solitary. Cupule shallowly cupular, 6–8 mm or rarely shallower, 2–3 cm in diam., enclosing ca. 1/3 of nut, outside pale grayish brown puberulent, inside pale orangish brown sericeous, wall ca. 3 mm thick; bracts in 8 or 9 rings, margin dentate but apical 2 or 3 entire. Nut oblate, 2–2.5 × 2.5–2.8 cm, grayish brown puberulent; scar 1.5–2 cm in diam., impressed or flat; stylopodium persistent, ca. 4 cm in diam. Fl. May–Jun, fr. Oct–Nov of following year.

• Wet broad-leaved evergreen forests in mountains; 400–1000 m. Guangdong, Guangxi, Hainan, S Jiangxi.

**58. *Cyclobalanopsis yingjiangensis*** Y. C. Hsu & Q. Z. Dong in Y. C. Hsu & B. S. Sun, *Acta Bot. Yunnan.* 5: 341. 1983.

盈江青冈 *ying jiang qing gang*

Trees to 20 m tall. Branchlets slender, dark purple when dry, slightly sulcate, subglabrous, lenticellate; lenticels gray. Petiole slender, 1–1.5 cm; leaf blade ovate-lanceolate, 9–12 × 3–4 cm, abaxially green, farinose, sparsely with stellate hairs, and glabrescent, base rounded to broadly cuneate and sometimes oblique, margin serrate, apex acuminate. Fruit solitary. Cupule saucer-shaped, ca. 3 cm in diam., wall ca. 2 mm thick. Nut ovoid-conical, ca. 2 × 3 mm.

• Mountains; ca. 2500 m. W Yunnan (Yingjiang Xian).

**59. *Cyclobalanopsis stewardiana*** (A. Camus) Y. C. Hsu & H. W. Jen, *Acta Bot. Yunnan.* 1(1): 148. 1979.

褐叶青冈 *he ye qing gang*

*Quercus stewardiana* A. Camus, Chênes, Atlas 1: 12. 1934; *Cyclobalanopsis stewardiana* var. *longicaudata* Y. C. Hsu & al.

Trees to 12 m tall. Branchlets glabrous. Petiole 1.5–3 cm, glabrous; leaf blade elliptic-lanceolate to oblong-elliptic, 6–12 × 2–4 cm, sericeous and simple hairy when young, abaxially whitish (browning when dry) and sparsely hairy or glabrescent, adaxially dark green, base cuneate, margin apical 1/2 remotely shallowly serrate, apex acuminate to caudate; secondary veins 8–10 on each side of midvein, abaxially prominent, and adaxially inconspicuous; tertiary veins abaxially inconspicuous. Female inflorescences borne in axil of new shoots, solitary, ca. 2 cm; rachis and bracts brown tomentose. Cupule cupular, 6–8 mm × 1–1.5 cm, enclosing ca. 1/2 of nut, outside whitish pilose but glabrescent, inside grayish brown tomentose; bracts in 5–9 rings, loosely arranged, margin dentate. Nut broadly ovoid, 0.8–1.5 cm, glabrous; scar ca. 5 mm in diam., convex; stylopodium persistent, ca. 2 mm in diam. Fl. Jul, fr. Oct of following year.

• Mixed mesophytic forests on mountain tops and slopes; 1000–2800 m. Anhui, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, Yunnan, Zhejiang.

**60. *Cyclobalanopsis longinix*** (Hayata) Schottky, Bot. Jahrb. Syst. 47: 657. 1912.

长果青冈 chang guo qing gang

*Quercus longinix* Hayata, J. Coll. Sci. Univ. Tokyo 30(1): 292. 1911; *Cyclobalanopsis longinix* var. *kuoi* J. C. Liao; *C. longinix* var. *lativiolaefolia* J. C. Liao; *C. longinix* var. *pseudomyrsinifolia* (Hayata) J. C. Liao; *Q. pseudomyrsinifolia* Hayata; *Q. taichuensis* Hayata.

Trees. Branchlets glabrous, lenticellate; lenticels oblong. Petiole 1–2 cm, glabrous; leaf blade ovate-lanceolate to narrowly oblong-elliptic, 6–8 × 2–2.5 cm, abaxially farinose or with adnate simple hairs, adaxially bright green, base cuneate, margin apical 1/2 serrate, apex acuminate to caudate; secondary veins 7–9 on each side of midvein. Cupule bowl-shaped, 8–9 mm × 1–1.2 cm, enclosing ca. 1/2 of nut, outside grayish brown tomentose, wall thin; bracts in 6–8 rings, margin dentate. Nut ovoid to ovoid-ellipsoid, ca. 1.2 × 0.9 cm; scar convex; stylopodium persistent, short. Fl. Mar–May, fr. Sep–Nov.

• Broad-leaved evergreen forests in mountains; 300–2500 m. Taiwan.

**61. *Cyclobalanopsis myrsinifolia*** (Blume) Oersted, Skr. Vidensk.-Selsk. Christiania, Math.-Naturvidens 9(6): 387. 1871.

小叶青冈 xiao ye qing gang

*Quercus myrsinifolia* Blume, Mus. Bot. 1: 305. 1850; *Q. bambusifolia* Fortune.

Trees to 20 m tall. Branchlets glabrous, lenticellate; lenticels grayish brown, oblong, convex. Petiole 1–2.5 cm, glabrous; leaf blade ovate to elliptic-lanceolate, 6–11 ×

1.8–4 cm, abaxially whitish farinose but dark gray when dry, adaxially green and glabrous, base cuneate to subrounded, margin apical 1/2 serrulate, apex acuminate to shortly caudate; secondary veins 9–14 on each side of midvein, usually almost reaching margin but not fusing; tertiary veins abaxially inconspicuous. Female inflorescences 1.5–3 cm. Cupule cupular, 5–8 mm × 1–1.8 cm, enclosing 1/3–1/2 of nut, outside whitish pubescent, inside glabrous, wall less than 1 mm thick; bracts in 6–9 rings, margin entire. Nut ovoid to ellipsoid, 1.4–2.5 × 1–1.5 cm, glabrous, apex rounded; scar ca. 6 mm in diam., flat; stylopodium conspicuous, 5- or 6-ringed. Fl. Jun, fr. Oct.

Mixed mesophytic forests in mountain valleys; 200–2500 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Henan, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Taiwan, Yunnan, Zhejiang [Japan, Korea, Laos, N Thailand, Vietnam].

The occurrence of *Cyclobalanopsis myrsinifolia* in Taiwan as a native, rather than an introduced and cultivated species, is uncertain.

**62. *Cyclobalanopsis gilva*** (Blume) Oersted, Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1866: 78. 1867.

赤皮青冈 chi pi qing gang

*Quercus gilva* Blume, Mus. Bot. 1: 306. 1850; *Cyclobalanopsis hunanensis* (Handel-Mazzetti) W. C. Cheng & T. Hong; *Q. hunanensis* Handel-Mazzetti.

Trees to 30 m tall. Branchlets densely pale orangish brown to tawny stellate tomentose. Petiole 1–1.5 cm, puberulent; leaf blade oblanceolate to obovate-elliptic, 6–12 × 2–3.5 cm, abaxially pale brown stellate velutinous, base cuneate, margin apical 1/2 with short, awnlike serrations, apex acuminate; secondary veins 11–18 on each side of midvein, abaxially slightly raised; tertiary veins abaxially obscure. Female inflorescence ca. 1 cm, rachis and bracts densely pale orangish brown tomentose; cupules usually 2. Cupule bowl-shaped, 6–8 mm × 1.1–1.5 cm, enclosing ca. 1/4 of nut, outside and inside pale grayish brown puberulent, wall ca. 1 mm thick; bracts in 6 or 7 rings, margin entire or denticulate. Nut obovoid-ellipsoid, 1.5–2 × 1–1.3 cm, apex puberulent; scar 5–6 mm in diam., slightly raised; stylopodium persistent, puberulent. Fl. May, fr. Oct.

Broad-leaved evergreen forests in mountains; 300–1500 m. Fujian, Guangdong, Guizhou, Hunan, Taiwan, Zhejiang [Japan].

**63. *Cyclobalanopsis pachyloma*** (Seemen) Schottky, Bot. Jahrb. Syst. 47: 650. 1912.

毛果青冈 mao guo qing gang

*Quercus pachyloma* Seemen, Bot. Jahrb. Syst. 23(Beibl. 57): 54. 1897; *Cyclobalanopsis pachyloma* var.

*mubianensis* Y. C. Hsu & H. W. Jen; *C. pachyloma* var. *tomentosicupula* (Hayata) J. C. Liao; *Q. conduplicans* Chun; *Q. gracilentata* Chun; *Q. pachyloma* var. *mubianensis* (Y. C. Hsu & H. W. Jen) C. C. Huang; *Q. tomentosicupula* Hayata.

Trees to 17 m tall. Branchlets orangish brown tomentose, glabrescent. Petiole 1.5–2 cm; leaf blade

obovate, oblong-elliptic, or lanceolate, 7–14 × 2–5 cm, leathery, orangish woolly hairy when young, glabrescent, base cuneate, margin apical 1/2 remotely serrate, apex acuminate to caudate; secondary veins 8–11 on each side of midvein; tertiary veins abaxially slender, evident. Female inflorescences 1.5–3 cm, densely brown tomentose, with 2–5 cupules. Cupule semiglobose to campanulate, (1–)2–3 × 1.5–3 cm, enclosing ca. 1/3–2/3 of nut, outside usually densely tawny, tomentose, inside tawny thickly feltlike tomentose, wall ca. 1.5 mm thick; bracts in 7 or 8 rings, margin entire or dentate. Nut ellipsoid, oblong-ellipsoid, or obovoid, 1.2–1.6 cm in diam., densely tawny tomentose when young but glabrescent, apex rounded; scar 5–7 mm in diam., slightly convex; stylopodium persistent, 2–3 cm in diam. Fl. Mar, fr. Sep–Oct.

• Wet forests on mountain slopes and in valleys; 200–1000 m. Fujian, Guangdong, Guangxi, Guizhou, Hunan, Jiangxi, Taiwan, Yunnan.

**64. *Cyclobalanopsis lobbii*** (J. D. Hooker & Thomson ex Wenzig) Y. C. Hsu & H. W. Jen, Acta Bot. Yunnan. 1(1): 148. 1979.

滇西青冈 dian xi qing gang

*Quercus lineata* Blume var. *lobbii* J. D. Hooker & Thomson ex Wenzig, Jahrb. Königl. Bot. Gart. Berlin 4: 232. 1886; *Cyclobalanopsis lineata* (Blume) Oersted var. *lobbii* (J. D. Hooker & Thomson ex Wenzig) Schottky; *Q. lobbii* (J. D. Hooker & Thomson ex Wenzig) A. Camus.

Trees to 15 m tall. Branchlets glabrous, lenticellate; lenticels grayish brown, rounded. Petiole 1.5–2 cm, glabrous; leaf blade oblong-elliptic to rarely obovate, 7–13 × 3–5 cm, subleathery, abaxially whitish and with stellate hairs, adaxially glabrous, base narrowly rounded to cuneate, margin sharply serrate, apex acuminate; secondary veins 13–16 on each side of midvein, abaxially prominent, adaxially flat or slightly raised. Cupule bowl-shaped, ca. 8 mm × 1.5 cm, enclosing 1/3–1/2 of nut, outside whitish tomentose; bracts in 6–8 rings, margin dentate. Nut broadly ovoid, ca. 1.5 × 1.2 cm, glabrous, apex flat; scar slightly convex.

*Quercus* and *Pinus* forests in mountains; 2800–3300 m. W Yunnan [NE India].

**65. *Cyclobalanopsis poilanei*** (Hickel & A. Camus) Hjelmquist, Dansk Bot. Ark. 23(4): 508. 1968.

黄背青冈 huang bei qing gang

*Quercus poilanei* Hickel & A. Camus, Ann. Sci. Nat., Bot., sér. 10, 3: 384. 1921.

Trees to 16 m tall. Branchlets densely pale orangish brown feltlike tomentose. Petiole 1–1.5 cm, tawny tomentose when young, glabrescent; leaf blade elliptic to obovate-elliptic, 4–8 × 3–6 cm, tawny stellate tomentose when young, abaxially hairs persisting or glabrescent, adaxially glabrescent, base rounded to broadly cuneate, margin apically few serrulate or entire, apex acuminate to shortly caudate; secondary veins 10–

15 on each side of midvein, adaxially impressed; tertiary veins abaxially conspicuous to inconspicuous, ± parallel. Female inflorescences borne apically on new shoots, 1–2 cm; cupules 3–7. Cupule shallowly bowl-shaped, ca. 8 mm × 1.5–1.8 cm, enclosing 1/4–1/3 of nut, outside tawny to ashy tomentose, inside pale orangish brown sericeous, wall ca. 1.8 mm thick; bracts in 7 or 8 rings, margin entire or basal 1 or 2 denticulate and apical ones crenate. Nut ellipsoid, ovoid-ellipsoid, or globose, 1.5–2 × 1.3–1.5 cm; scar 5–7 mm in diam., flat. Fl. Apr, fr. Apr of following year.

Broad-leaved evergreen forests in mountains; below 1300 m. Guangxi [N Thailand, Vietnam].

**66. *Cyclobalanopsis delavayi*** (Franchet) Schottky, Bot. Jahrb. Syst. 47: 624. 1912.

黄毛青冈 huang mao qing gang

*Quercus delavayi* Franchet, J. Bot. (Morot) 13: 158. 1899.

Trees to 20 m tall; branchlets, petioles, young leaf blades densely, mature leaf blades abaxially, and inflorescences pale orangish brown stellate tomentose. Petiole 1–2.5 cm; leaf blade oblong to ovate-elliptic, 8–12 × 2–4.5 cm, subleathery, adaxially glabrescent, base broadly cuneate to subrounded, margin apical 1/2 serrate, apex acuminate to shortly acuminate; midvein abaxially prominent and adaxially impressed; secondary veins 10–14 on each side of midvein; tertiary veins abaxially inconspicuous. Female inflorescences axillary, solitary, ca. 4 cm, cupules 2 or 3. Cupule shallowly bowl-shaped, 5–8(–10) mm × 1–1.5(–1.9) cm, enclosing ca. 1/2 of nut, outside pale orangish brown tomentose, inside pale orangish brown sericeous, wall ca. 2 mm thick; bracts in 6 or 7 rings, margin shallowly denticulate. Nut ellipsoid to ovoid, ca. 1.8 × 1–1.5 cm, tomentose, glabrescent, apically indented; scar 6–8 mm in diam., convex; stylopodium persistent. Fl. Apr–May, fr. Sep–Oct of following year.

• Lauraceous or mixed *Quercus* and *Pinus* forests in mountains; 1000–2800 m. Guangxi, Guizhou, Hubei, Sichuan, Yunnan.

**67. *Cyclobalanopsis jinpinensis*** Y. C. Hsu & H. W. Jen, Acta Phytotax. Sin. 14(2): 85. 1976.

金平青冈 jin ping qing gang

Trees. Branchlets glabrous or pubescent when young. Petiole 1–1.5 cm, glabrous; leaf blade oblong-elliptic, 7–11 × 3–4.5 cm, abaxially with grayish brown simple hairs (more densely along veins), base narrowly rounded, margin shallowly serrate on apical 1/3, apex acuminate; secondary veins 12–14 on each side of midvein; tertiary veins abaxially slender, evident. Cupules solitary, sessile, bowl-shaped, ca. 1.5 × 1.8 cm, enclosing ca. 1/2 of nut, outside apically densely yellowish brown tomentose but middle and basal hairs relatively sparse; bracts in 9–11 rings, margin entire but most basal ones denticulate. Nut ovoid, ca. 1.8 × 1.5 cm, glabrous; scar ca. 1 cm in diam., flat.

- SE Yunnan (Jinping Xian).

**68. *Cyclobalanopsis glaucoides*** Schottky, Bot. Jahrb. Syst. 47: 657. 1912.

滇青冈 dian qing gang

*Quercus glaucoides* (Schottky) Koidzumi (1916), not M. Martens & Galeotti (1843); *Q. schottkyana* Rehder & E. H. Wilson.

Trees to 20 m tall. Branchlets grayish green, tomentose when young, glabrescent. Petiole 0.5–2 cm; leaf blade long elliptic to obovate-oblongate, 5–12 × 2–5 cm, leathery, abaxially grayish green and tawny woolly-tomentose but somewhat glabrescent, adaxially green, base cuneate to subrounded, margin beyond basal 1/3 serrate, apex acuminate to caudate; midvein abaxially prominent but adaxially impressed; secondary veins 8–12 on each side of midvein; tertiary veins abaxially conspicuous. Female inflorescences 1.5–2 cm. Cupule bowl-shaped, 6–8 × 8–12 mm, enclosing 1/3–1/2 of nut, outside pale brown tomentose, inside pale brown sericeous; bracts in 6–8 rings, margin subentire. Nut ellipsoid to ovoid, 1–1.4 × 0.7–1 cm, pubescent when young, glabrescent; scar 5–6 mm in diam., slightly convex; stylopodium persistent, short. Fl. May, fr. Oct.

- Broad-leaved evergreen forests in mountains; 1500–2500 m. Guizhou, Sichuan, Yunnan.

**69. *Cyclobalanopsis xanthotricha*** (A. Camus) Y. C. Hsu & H. W. Jen, J. Beijing Forest. Univ. 15(4): 45. 1993.

思茅青冈 si mao qing gang

*Quercus xanthotricha* A. Camus, Chênes, Atlas 2: 119. 1935–1936; *Cyclobalanopsis fuhsingensis* (Y. T. Chang) Y. T. Chang ex Y. C. Hsu & H. W. Jen; *Q.*

*djiringensis* A. Camus; *Q. fuhsingensis* Y. T. Chang. Trees to 8 m tall. Branchlets slender, dark purple, finely sulcate, sparsely lenticellate by 2nd year; lenticels white, small. Petiole 5–10 mm, puberulent; leaf blade narrowly elliptic to elliptic, 5–8 × 1.5–3 cm, subleathery, abaxially grayish green and with simple hairs and base of midvein with brown sericeous hairs, adaxially green, base cuneate, margin apical 1/2 remotely serrulate, apex acuminate; midvein adaxially slightly impressed; secondary veins 8–10 on each side of midvein, slender, evident; tertiary veins abaxially inconspicuous. Infructescences 2–5 cm. Cupule obconic, 4–6 × 6–10 mm, enclosing ca. 2/5 of nut, outside puberulent, inside pale brown sericeous, wall less than 1 mm thick; bracts in 5 or 6 rings, margin denticulate to subentire. Nut ovoid to ellipsoid, 0.9–1.3 × 0.7–1 cm; scar 4–6 mm in diam., convex; stylopodium persistent, raised, puberulent.

- Mixed mesophytic forests in mountains; 800–1300 m. Yunnan [Laos, Vietnam].

