

EBENACEAE

柿科 shi ke

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Trees or erect shrubs, occasionally with spine-tipped branchlets. Leaves alternate, rarely opposite, entire; stipules absent. Flowers actinomorphic, usually unisexual, dioecious, or polygamous, rarely bisexual. Staminate flowers often in cymes, sometimes in clusters or solitary; pistil rudimentary or absent. Pistillate flowers often solitary, axillary, imperfect or without stamens. Calyx 3–7-lobed, persistent and often becoming enlarged in pistillate or bisexual flowers; lobes valvate or overlapping in bud. Corolla 3–7-lobed; lobes convolute, rarely overlapping or valvate. Stamens hypogynous or at base of corolla, 2–4 × as many as corolla lobes, rarely as many as corolla lobes and alternate with them; filaments free or united in pairs. Ovary superior, 2–16-locular; ovules 1 or 2 per locule. Styles 2–8, free or basally united; stigmas entire or 2-lobed. Fruit ± fleshy, few- to several-seeded berry. Seeds usually oblong; endosperm sometimes ruminant; hilum small.

Three genera and ca. 500 species: mostly in the tropics; one genus and 60 species (43 endemic) in China.

Lee Shu-kang. 1987. Ebenaceae. Fl. Reipubl. Popularis Sin. 60(1): 84–154.

1. DIOSPYROS Linnaeus, Sp. Pl. 2: 1057. 1753.

柿属 shi shu

Maba J. R. Forster & G. Forster.

Trees or shrubs, deciduous or evergreen. Terminal buds absent. Branchlet tips sometimes forming a spine. Leaves alternate, occasionally minutely translucent dotted or with gland pits. Flowers dioecious or polygamous. Staminate flowers in axillary cymes, rarely solitary, usually on basal part of current year's branchlets, deciduous soon after anthesis; stamens 4 to numerous, often paired and forming 2 whorls; ovary rudimentary. Pistillate flowers usually solitary, axillary; staminodes 0–16; stigma often 2-cleft. Calyx usually 3–5(–7)-lobed, sometimes truncate; corolla urceolate, campanulate, or tubular, 3–5(–7)-lobed, deciduous. Berry fleshy to somewhat leathery, usually with an enlarged persistent calyx. Seeds 1–10(or more), often laterally compressed.

About 485 species: pantropical and extending into temperate regions; 60 species in China, most abundant in SE and SW China, several incompletely known and of uncertain status.

The following key is primarily to fruiting material because the flowers of many Chinese species are not known.

- 1a. Branchlets usually tipped with slender inconspicuous spines; reticulate veins of leaves slender, slightly raised but never conspicuous.
 - 2a. Leaf blade base shallowly cordate, less often rounded to truncate; corolla glabrous outside; berry black when mature, glabrous; fruiting sepals strongly recurved, hard, rigid, ca. 0.7 cm, veins not visible 5. *D. diversilimba*
 - 2b. Leaf blade base cuneate to attenuate, rarely subrounded; corolla hairy outside; berry ± yellow when mature, hairy at least at base of style; fruiting sepals spreading to slightly reflexed, stiff papery to ± leathery, 0.9–2.5 cm, veins several and subparallel, prominent.
 - 3a. Corolla outside not uniformly hairy but with longer hairs restricted to 4 ridges and sometimes with much smaller hairs adjacent; leaf blade rhombic-obovate; short stout spines often present on branchlets 3. *D. rhombifolia*
 - 3b. Corolla outside uniformly densely puberulent; leaf blade elliptic to narrowly elliptic, sometimes rhombic-oblong to slightly oblong; short stout spines never present.
 - 4a. Fruiting pedicel 2.4–4(–6) cm; corolla 5–7 mm; fruiting sepals (1–)1.2–2(–2.5) cm 1. *D. cathayensis*
 - 4b. Fruiting pedicel 1.1–2 cm; corolla 4–5 mm; fruiting sepals 0.9–1.1 cm 2. *D. armata*
- 1b. Branches never spine-tipped; reticulate veins of leaves varying from flat to conspicuously raised.
 - 5a. Leaf blades 2–6 cm, mostly less than 4 cm.
 - 6a. Fruiting pedicel 8–11 mm.
 - 7a. Leaf blade abaxially without scattered concave glands, reticulate veins inconspicuous;

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- calyx 4-lobed 6. *D. howii*
- 7b. Leaf blade abaxially with scattered concave glands, reticulate veins prominent; calyx 5-lobed 7. *D. oliviformis*
- 6b. Fruiting pedicel to 5 mm, sometimes \pm obsolete.
 - 8a. Leaf blade uniformly hairy.
 - 9a. Corolla glabrous; leaf apex clearly acuminate; petiole 6–10 mm, subglabrous 9. *D. esquirolii*
 - 9b. Corolla outside with 4 distinct longitudinal lines of hairs; leaf apex not clearly acuminate; petiole 2–6 mm, hairy.
 - 10a. Ovary densely yellow strigose; calyx lobes mostly less than half as long as corolla; leaf blade smooth; fruit pilose, glabrescent, apex mucronate; petiole 2–3(–5) mm 10. *D. dumetorum*
 - 10b. Ovary glabrous except at apex; calyx lobes about as long as or longer than corolla; leaf blade very minutely rugulose-papillate; fruit glabrous, apex rounded; petiole (2–)4–16 mm.
 - 11a. Petiole (5–)10–16 mm; pistillate corolla tube shorter than lobes; calyx lobes 3.5–5 mm wide 12. *D. balfouriana*
 - 11b. Petiole (2–)4–6 mm; corolla tube longer than lobes; calyx lobes 2–2.5 mm wide 11. *D. yunnanensis*
 - 8b. Leaf blade glabrous except, sometimes when young, for pilose margin and abaxially puberulent midrib.
 - 12a. Leaf apex rounded; flowers irregularly 3–5-merous; calyx lobes rounded, ca. 1/2 as long as tube, erect; berry ellipsoid 60. *D. ferrea*
 - 12b. Leaf apex subacute to bluntly acuminate; flowers regularly 4-merous; calyx lobes triangular to lanceolate, longer than tube; berry globose.
 - 13a. Leaves drying gray-green, margin often conspicuously ciliate-pilose when young 8. *D. vaccinioides*
 - 13b. Leaves drying dark brown to \pm blackish, margin never conspicuously hairy.
 - 14a. Leaf blade very minutely rugulose-papillate, dull, lateral veins 4–6 per side 11. *D. yunnanensis*
 - 14b. Leaf blade smooth, often glossy, lateral veins 6–18 per side.
 - 15a. Lateral veins of leaves 12–18 per side; berry 1–1.2 cm 13. *D. nitida*
 - 15b. Lateral veins of leaves 6–8 per side; berry 1.3–1.5 cm 14. *D. kotoensis*
- 5b. At least some leaf blades more than 7 cm.
 - 16a. Leaf blade abaxially with reticulate veinlets not raised but clearly defined, dark.
 - 17a. Calyx tube well developed, partly enclosing young fruit; leaf blade lateral veins 3 or 4 per side 22. *D. tsangii*
 - 17b. Calyx deeply divided, never partly enclosing fruit; leaf blade lateral veins 5–10 per side.
 - 18a. Leaf blade abaxially glaucous gray-green.
 - 19a. Fruiting calyx lobes (4–)6–8 \times ca. 6 mm; petiole 1.2–2.5 cm 19. *D. japonica*
 - 19b. Fruiting calyx lobes 9–15 \times 7–10 mm; petiole to 1.4 cm.
 - 20a. Leaves glabrous; fruiting calyx lobes 12–15 \times ca. 10 mm 20. *D. sichourensis*
 - 20b. Leaves hairy; fruiting calyx lobes ca. 9 \times 7 mm 21. *D. kintungensis*
 - 18b. Leaf blade abaxially green to pale brown.
 - 21a. Berry 1–2 cm in diam., bluish black with a glaucous bloom when ripe 18. *D. lotus*
 - 21b. Berry 2–8.5 cm in diam., yellow, orange, or red when ripe.
 - 22a. Leaves abaxially glabrous or with very scattered pubescence; calyx much shorter than corolla; fruiting calyx ca. 1.4 cm in diam. 23. *D. oldhamii*
 - 22b. Leaves abaxially hairy, sometimes adaxially glabrescent; calyx \pm as long as corolla; fruiting calyx 3–4 cm in diam.
 - 23a. Young branchlets, leaves, and calyx outside brown pubescent, often glabrescent; petiole 8–20 mm; leaf blade with 5–7 pairs of lateral veins 24. *D. kaki*
 - 23b. Young branchlets, leaves, and calyx outside densely grayish-yellow pubescent; petiole 6–10 mm; leaf blade with 7–9 pairs of lateral veins 25. *D. oleifera*
 - 16b. Leaf blade abaxially with reticulate veinlets inconspicuous or, if clearly defined, pale and/or raised.
 - 24a. Branchlets with hairs \pm overlapping and concealing much of epidermis.
 - 25a. Fruiting calyx tube inflated, baglike, and almost or entirely covering fruit, lobes

- short and inconspicuous, incurved 59. *D. inflata*
- 25b. Fruiting calyx tube much shorter than fruit, lobes well-developed, erect, spreading or recurved to reflexed or calyx with conspicuous spreading undulately plicate limb.
- 26a. Berry to 2.5 cm in diam.
- 27a. Leaf blade abaxially with numerous minute globose glands between reticulate veinlets 45. *D. punctilimba*
- 27b. Leaf blade without such glands between reticulate veinlets, rarely occasional glandular pits at junctions of veinlets.
- 28a. Young shoots pubescent or puberulent.
- 29a. Leaf lateral veins 4–6 per side; fruiting pedicel 3–4 mm 17. *D. unisemina*
- 29b. Leaf lateral veins 5–7(–10) per side; fruiting pedicel ca. 10 mm.
- 30a. Leaf blade subelliptic-rhombic; berry globose, densely pubescent 4. *D. saxicola*
- 30b. Leaf blade elliptic-rhombic, elliptic-oblong, or oblanceolate; berry ovoid, glabrescent 6. *D. howii*
- 28b. Young shoots rusty strigose, yellowish brown, or brown tomentose.
- 31a. Flowers and young fruit subtended by ovate bracts as long or longer than calyx tube; fruit globose to ovoid, 0.5–1(–1.5) cm wide, sessile; leaves abaxially drying grayish, brown, or blackish.
- 32a. Leaf blade rounded to cuneate at base, lateral veins 4–7(or 8) per side 46. *D. eriantha*
- 32b. Leaf blade truncate to cordate at base, lateral veins 7–10 per side 47. *D. strigosa*
- 31b. Flowers and fruit not subtended by prominent bracts; fruit globose, (0.8–)1.8–2.5 cm wide, pedicellate; leaves drying gray-green.
- 33a. Leaf blade lateral veins 10–15 per side; inflorescences always 1-flowered; fruiting pedicel 1–1.6 cm 51. *D. xishuangbannaensis*
- 33b. Leaf blade lateral veins 4–10 per side; inflorescences usually 2- or more flowered; fruiting pedicel ca. 0.4 cm.
- 34a. Leaf blade lateral veins 4–6 per side, densely appressed yellowish brown pubescent when young, adaxially glabrescent; pedicel and calyx indumentum similar in color to stem indumentum 48. *D. xianguiensis*
- 34b. Leaf blade lateral veins 7–10 per side, glabrescent except for midrib which is densely rusty strigose; pedicel and calyx indumentum distinctly paler than stem indumentum, often grayish 49. *D. kerrii*
- 26b. Berry 2.5 cm or more in diam.
- 35a. Winter buds and young shoots with prominent dark brown to almost black hairs 54. *D. hainanensis*
- 35b. Winter buds and young shoots with pale or yellow to reddish brown hairs.
- 36a. Fruiting pedicel to 6(–10) mm.
- 37a. Leaf blade lateral veins 4–7 per side; fruiting calyx lobes flat, appressed to berry and overlapping 53. *D. chunii*
- 37b. Leaf blade lateral veins (6 or)7–14 per side; fruiting calyx lobes with recurved to strongly reflexed margins, not overlapping.
- 38a. Leaf blade abaxially with small but sharply delimited sunken glands scattered along leaf blade between lateral veins and 3–12 mm from midrib, lateral veins 10–14 per side; berry ca. 8 cm in diam., densely and persistently villose 52. *D. philippensis*
- 38b. Leaf blade without sunken glands, lateral veins (6 or)7–10 per side; berry 3–3.5 cm in diam., glabrescent 55. *D. ehretioides*
- 36b. Fruiting pedicel more than 8 mm.
- 39a. Fruiting calyx 5- or 6-lobed 26. *D. hexamera*

- 39b. Fruiting calyx 4-lobed.
- 40a. Lobes of fruiting calyx unequal, 2 broad lobes alternate with 2 narrow lobes 57. *D. anisocalyx*
- 40b. Lobes of fruiting calyx equal.
- 41a. Fruiting pedicel 3–4 cm 39. *D. miaoshanica*
- 41b. Fruiting pedicel 1.2–2 cm.
- 42a. Leaf blade glabrous except for abaxially tawny puberulent midvein and lateral veins 36. *D. reticulineris*
- 42b. Leaf blade abaxially tawny pilose or sparsely strigose on midvein.
- 43a. Young shoots yellow pubescent; leaf blade abaxially tawny pilose, densely so on veins; lobes of fruiting calyx outside slightly pilose, inside glabrous 37. *D. sunyiensis*
- 43b. Young shoots puberulent; leaf blade abaxially sparsely strigose on midvein; lobes of fruiting calyx glabrous on both surfaces 38. *D. sutchuensis*
- 24b. Branchlets glabrous to inconspicuously pubescent.
- 44a. Seeds 1.5–3.5 cm; reticulate veinlets of leaf blades always conspicuous, raised on both surfaces (Guangxi or Hainan).
- 45a. Fruiting calyx ca. 2 cm wide, clearly reflexed between lobes only; seeds 1.5–2 cm; petioles blackish in contrast to green leaf blades, inconspicuously articulate at base 30. *D. susarticulata*
- 45b. Fruiting calyx 2.5–3.5 cm wide, flat or with reflexed lobes; seeds 2–3.5 cm; petioles similar in color to leaf blades, not articulate at base.
- 46a. Fruiting calyx reflexed, ca. 2.5 cm in diam., lobes clearly defined; berry longer than broad; seeds 3–3.5 × 0.8–0.9 cm; petiole 0.5–1 cm 31. *D. maclurei*
- 46b. Fruiting calyx a fleshy slightly reflexed undulate disc, 2.5–3.5 cm in diam., lobes inconspicuous; berry broader than long; seeds 2–2.5 × 9–1.5 cm; petiole 1–1.5 cm 32. *D. metcalftii*
- 44b. Seeds to 1.6 cm; reticulate veinlets of leaf blades varying from almost invisible to very prominently raised (widely distributed).
- 47a. Leaf blade abaxially with 2–4 small but sharply delimited sunken gland patches close to base; fruiting calyx lobes 4, sharply reflexed so as to be ± transversely folded when dry; corolla 3- or 4-lobed 58. *D. maritima*
- 47b. Leaf blade with gland patches absent or more than 4 and scattered throughout leaf; fruiting calyx lobes 4 or 5, subrevolute, often ± undulately plicate, never transversely folded; corolla 4-lobed.
- 48a. Calyx often 5- or more lobed, lobes sometimes reduced to small teeth; fruiting calyx very shallowly divided and reflexed between lobes so as to be undulately plicate, often strongly longitudinally 4- or 5-ridged at base.
- 49a. Reticulate veinlets of leaf blades well defined, dense, prominently raised on both surfaces 29. *D. longibracteata*
- 49b. Reticulate veinlets of leaf blades inconspicuous, lax, flat or sometimes abaxially slightly raised.
- 50a. Branchlets at first yellowish green; fruiting calyx only slightly undulately plicate, slightly reflexed between spreading lobes; staminate flowers not known 33. *D. corallina*
- 50b. Branchlets brown or blackish brown; fruiting calyx strongly undulately plicate, clearly reflexed between lobes; staminate flowers tubular or cup-shaped, calyx lobes reduced to small teeth.
- 51a. Staminate calyx tubular, 4- or 5-mucronate-dentate; stamens ca. 12; leaf blade lanceolate to oblong-lanceolate; berry black when mature, depressed globose, 2.5–3 cm in diam., glabrous, glossy 27. *D. nigricortex*
- 51b. Staminate calyx cupular, 5–7-denticulate; stamens ca. 24; leaf blade elliptic to oblong; mature fruit not known 28. *D. forrestii*

- 48b. Calyx always clearly 4-lobed, usually deeply divided; fruiting calyx usually deeply divided, not reflexed between lobes though lobes sometimes revolute or reflexed.
- 52a. Fruiting calyx ± square, lobes flat; leaves adaxially drying brown, reticulate veinlets very inconspicuous.
- 53a. Mature fruit 1.5–2.2(–2.9) cm in diam. (widespread in S China) 15. *D. morrisiana*
- 53b. Mature fruit 2.5–3 cm in diam. (Yunnan, Marlipo Xian) 16. *D. fengii*
- 52b. Fruiting calyx variously lobed, lobes recurved, strongly reflexed, or revolute; leaves drying gray-green to ± black or, if adaxially ± brownish, reticulate veinlets conspicuously raised.
- 54a. Leaf blade hairy between lateral veins on 1 or both surfaces.
- 55a. Fruit base glabrous 12. *D. balfouriana*
- 55b. Fruit base densely appressed yellowish tomentose.
- 56a. Fruiting calyx lobes ca. 2 cm, broadly ovate 43. *D. zhenfengensis*
- 56b. Fruiting calyx lobes ca. 0.8 cm, narrowly triangular 36. *D. reticulineris*
- 54b. Leaf blade glabrous except sometimes for abaxially appressed villose main veins or appressed pubescence when young.
- 57a. Berry glabrous or hairy only at apex; leaves drying blackish.
- 58a. Lateral veins of leaves 12–18 per side; berry 1–1.2 cm 13. *D. nitida*
- 58b. Lateral veins of leaves 6–8 per side; berry 1.3–1.5 cm 14. *D. kotoensis*
- 57b. Berry hairy at least at base when young, sometimes glabrescent; leaves not drying blackish.
- 59a. Berry sessile or subsessile, always globose.
- 60a. Leaf blade lateral veins 10–13 per side; fruiting calyx lobes spreading, inside brown sericeous; fruit 2–2.8 cm in diam. 34. *D. siderophylla*
- 60b. Leaf blade lateral veins 6–8 per side; fruiting calyx lobes strongly recurved, conspicuously tomentose on both surfaces; fruit 1–1.5 cm in diam. 56. *D. rubra*
- 59b. Berry with pedicel 5 mm or more, globose or ovoid.
- 61a. Leaf blade lateral veins 5 or 6 per side 40. *D. tutcheri*
- 61b. Leaf blade lateral veins 7–12 per side.
- 62a. Berry densely black pubescent at base; fruiting calyx sparsely black pubescent 50. *D. hasseltii*
- 62b. Berry appressed rusty or yellowish brown hairy, glabrescent when ripe; fruiting calyx puberulent.
- 63a. Fruiting pedicel 0.5–1 cm; reticulate veinlets of leaf blade thick, dense, conspicuously pale and raised on adaxial surface 35. *D. caloneura*
- 63b. Fruiting pedicel 1.1–2.5 cm; reticulate veinlets of leaf blade slender, often lax.
- 64a. Leaf blade stiff papery, lateral veins not united to form a marginal vein; fruit ovoid 41. *D. potingensis*
- 64b. Leaf blade nearly leathery, lateral veins (at least apical ones) united to form a marginal vein; fruit globose or depressed globose.

- 65a. Fruiting pedicel
3.3–4.7 cm 44. *D. longshengensis*
- 65b. Fruiting pedicel 0.5–2.5 cm.
- 66a. Leaf base broadly
cuneate, lateral veins
9 per side; fruit
globose, ca. 3 cm
in diam. 42. *D. fanjingshanica*
- 66b. Leaf base rounded,
lateral veins 10–12
per side; fruit depressed
globose, ca. 2.6 cm
in diam. 43. *D. zhenfengensis*

1. *Diospyros cathayensis* Steward, J. Arnold Arbor. 35: 86. 1954.

乌柿 wu shi

Diospyros cathayensis var. *foochowensis* (F. P. Metcalf & L. Chen) S. Lee; *D. fochowensis* F. P. Metcalf & L. Chen; *D. sinensis* Hemsley (1889), not Blume ex Naudin (1880).

Trees to 10 m tall, evergreen or nearly so. Trunk to 80 cm d.b.h. Branchlets brown, slender, pubescent, glabrescent, usually tipped with slender inconspicuous spines. Petiole 2–4 mm, puberulent; leaf blade elliptic, 4–9(–11) × 1.5–3.6 cm, thin leathery, abaxially paler and ± pubescent along veins, adaxially dark green and lustrous, base cuneate to attenuate, apex acute to slightly blunt; lateral veins 10–12 per side, reticulate veinlets slender and raised on both surfaces. Flowers solitary or staminate usually in cymes. Staminate flowers: pedicel 6–11 mm, pubescent; calyx deeply divided, densely pubescent; calyx lobes 4, triangular, 1.5–3 mm; corolla pale yellow, urceolate, 5–7 mm, pubescent on both surfaces; lobes 4, ovate, ca. 1 mm, reflexed; stamens 16, villose. Pistillate flowers: calyx lobes 4, ovate, ca. 1 cm, puberulent; corolla white, tube ca. 5 mm, lobes 4; staminodes 6; ovary villose. Fruiting pedicel 2.5–4(–6) cm, slender. Fruiting calyx divided to near base, subglabrous; lobes lanceolate, (1–)1.2–2(–2.5) cm × 5–9(–11) mm, ± leathery, apex obtuse, veins several, subparallel, and prominent. Berry yellow, globose to ovoid, 1.5–3 cm, sparsely hairy. Seeds 4 or more, to 1.5 cm. Fl. Apr–May, fr. Aug–Oct.

* Forests in ravines, sometimes cultivated; 600–1500 m. S Anhui, Fujian, Guizhou, W Hubei, Hunan, C and E Sichuan, NE Yunnan.

Collections from Fuzhou in Fujian Province show great variability in leaf size and shape, but the variation seems too continuous to justify formal recognition of any variant.

Diospyros cathayensis, *D. armata*, and *D. rhombifolia* are rather similar to *D. reticulimervis*, *D. caloneura*, and *D. tucheri* in the raised leaf venation, long slender pedicels, and conspicuously veined, spreading, and papery calyx lobes. This resemblance perhaps suggests a relationship not expressed in the present sequence of taxa.

2. *Diospyros armata* Hemsley in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 69. 1889.

瓶兰花 ping lan hua

Trees 5–13 m tall, semi-evergreen to deciduous. Trunk to 50 cm d.b.h. Branchlets densely puberulent, with a few much longer hairs, usually tipped with slender inconspicuous spines. Petiole 3–4 mm; leaf blade narrowly elliptic, sometimes rhombic-oblongate, 1.5–6.5 × 1.5–3 cm, thin leathery to leathery, translucent dotted, abaxially very sparsely pilose on veins, adaxially dark green and lustrous, base cuneate, margin very narrowly revolute, apex obtuse, rounded, or acute; lateral veins 7 or 8 per side, adaxially raised, reticulate veinlets lax and inconspicuous. Staminate flowers in small corymbose cymes, fragrant; corolla white, urceolate, 4–5 mm, tomentose. Fruiting calyx divided to near base, abaxially sparsely strigose, adaxially glabrous; lobes 4, spreading to slightly reflexed, lanceolate to ovate, 0.9–1.2 cm × 4–5 mm, margin slightly revolute. Berry yellow, globose, ca. 2 cm in diam., strigose. Fl. Apr–May, fr. Aug–Dec

* Scarce in forests; ca. 300 m. W Hubei, E Sichuan.

3. *Diospyros rhombifolia* Hemsley in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 70. 1889.

老鸦柿 lao ya shi

Trees to 8 m tall, deciduous. Branchlets pubescent, usually with inconspicuous slender spiny tips, sometimes also with short thick lateral spines. Petiole 2–4 mm, slender, puberulent; leaf blade, 4–8.5 × 1.8–3.8 cm, papery, abaxially paler and scattered appressed pubescent, adaxially dark green, yellowish brown pubescent on veins, glabrescent, and minutely pustulate, base cuneate, margin ciliate, apex acute to acuminate; lateral veins 5–7 per side, reticulate veinlets slender, lax, raised on both surfaces, sometimes pale or inconspicuous. Staminate flowers: pedicel ca. 7 mm; calyx lobes 4, triangular; corolla urceolate, ca. 4 mm, both surfaces slightly pubescent; stamens 16. Pistillate flowers: pedicel ca. 1.8 cm, pubescent; calyx lobes 4, divided nearly to base, lanceolate, ca. 1 cm; corolla urceolate, with 4 white villose ridges; corolla lobes 4, reflexed; ovary densely villose. Fruiting pedicel 1.5–2.5 cm, slender. Fruiting calyx lobes 4, spreading to slightly reflexed, oblong-lanceolate, 1.6–2 cm × ca. 5 mm; veins several, subparallel, slightly raised. Berry orange, solitary, globose, ca. 2 cm in diam., glabrous, shiny. Seeds 2–4, brown, ca. 1 cm. Fl. Apr–May, fr. Sep–Oct.

* Thickets on slopes, forests beside streams; 300–800 m. Anhui, Fujian, Jiangsu, Jiangxi, Zhejiang.

Unripe fruit of *Diospyros rhombifolia* yield persimmon lacquer used for waterproofing fishing nets, oilcloths, etc.

Plants are often with short stout leafless spines which distinguish sterile and fruiting material from *Diospyros cathayensis* and *D. armata*.

4. *Diospyros saxicola* Miao, Acta Sci. Nat. Univ. Sunyatseni 32(4): 63. 1993.

石生柿 shi sheng shi

Shrubs to 1.5 m tall. Older branches black, glabrescent; lenticels many, circular, splitting longitudinally, young branchlets slender, terete, dirty yellow, twisted pubescent. Winter buds small, conical, densely dirty yellow pubescent. Petiole ca. 3 mm, densely dirty yellow pubescent; leaf blade subelliptic-rhombic, rarely obovate, 2.7–8.5 1.6–3.5 cm, leathery, glabrous except for densely pubescent adaxial veins, base cuneate, margin slightly revolute, apex obtuse to rarely rounded; lateral veins 6–10 per side, reticulate veinlets adaxially distinct. Flowers not seen. Fruiting pedicel ca. 1.1 cm, dirty yellow pubescent. Fruiting calyx subglabrous, both sides slightly more densely hairy toward base; lobes 4, ovate-lanceolate, ca. 1.5 cm 6 mm, apex narrowly obtuse. Berry drying yellow, globose, ca. 1.2 cm in diam., densely pubescent. Fr. Jun.

* Guangdong.

Diospyros saxicola is known only from the protolog. The fruiting pedicels, calyces, and berry suggest a relationship to *D. cathayensis* and allies, particularly *D. rhombifolia*, a species it resembles in having rhombic leaf blades. However, in the protolog for *D. saxicola* there is no mention of the spines characteristic of that species group.

5. *Diospyros diversilimba* Merrill & Chun, Sunyatsenia 2: 300. 1935.

光叶柿 guang ye shi

Diospyros cordifolia Roxburgh var. *glabrifolia* Merrill.

Shrubs or trees, to 15 m tall. Trunk to 35 cm d. b. h. Branchlets yellowish brown, slender, grayish white pubescent, tipped with slender inconspicuous spines. Petiole 4–5 mm, slender, pubescent or glabrous; leaf blade elliptic to oblong, 3–9 × 1.5–3.3 cm, papery, glabrous, drying green with slender dark veinlets, base shallowly cordate, less often rounded to cordate, apex obtuse to obtusely acuminate or sometimes notched; lateral veins 4–6 per side, slender, reticulate veinlets lax and inconspicuous. Staminate flowers not seen. Pistillate flower solitary, fragrant; pedicel 5–10 mm, pubescent; calyx tube ca. 2 mm; lobes 4, ovate, (5–)8 × ca. 4 mm, puberulent; corolla campanulate, ca. 8 mm, tube ca. 4 mm; staminodes 8. Ovary glabrous. Fruiting pedicel 5–10 mm, slender, glabrescent. Fruiting calyx lobes 4, reflexed, oblong-ovate, ca. 7

4–5 mm. Berry black, globose, ca. 1.5 cm in diam., 4-locular, glabrous. Fl. Apr–May, fr. Oct.

* Open forests on hills, beside streams, thickets. SW Guangdong, Hainan.

6. *Diospyros howii* Merrill & Chun, Sunyatsenia 2: 299. 1935.

琼南柿 qiong nan shi

Diospyros changii Miao.

Trees to 15 m tall. Trunk to 50 cm d.b.h., bark gray to grayish black. Branchlets slender, appressed yellowish brown pubescent. Petiole 2(–3) mm, appressed yellowish brown pubescent; leaf blade elliptic, elliptic-oblong, or oblanceolate, 2–4.5(–7.7) × 1–2(–3.5) cm, thin leathery, abaxially paler, sparsely appressed pubescent, brown when dry, adaxially shiny dark green and grayish brown when dry, base cuneate, margin ciliate, apex obtusely acuminate; lateral veins 5–7(–10) per side, reticulate veinlets inconspicuous. Staminate flowers: pedicel slender, ca. 7 mm, sparsely pubescent; calyx campanulate, ca. 2.5 mm, very sparsely pubescent; calyx lobes 4, ovate, margin ciliate, apex rounded to subacute; corolla white, slender, at least 8 mm (not mature), with narrow lines of hairs; corolla lobes 4, oblong-elliptic, ca. 8 mm, apically reflexed; stamens 8, glabrous. Pistillate flowers: ovary sparsely appressed white pubescent; styles 2. Fruiting pedicel ca. 1 cm, slender, slightly pubescent. Fruiting calyx (5–)7 mm in diam., deeply divided; lobes 4, ± spreading, broadly ovate, (1.5–)2.5 × ca. 2.5 mm. Berry red, ovoid, 1.5–2.2(–2.5) × (1.1–)1.2–1.8 cm, glabrescent. Seeds dark brown, subcylindric, ca. 11 × 4.5 mm. Fl. Jun–Aug, fr. Oct–Dec.

* Mixed forests or forested ravines. Hainan.

Although authentic material of *Diospyros changii* has not been seen by the authors, the plant appears to be an unusually vigorous form of *D. howii*. The former resembles the Indochinese *D. eugenii* Lecomte, a species reported to have staminate flowers with 16 stamens.

7. *Diospyros oliviformis* Miao, Acta Sci. Nat. Univ. Sunyatseni 32(4): 65. 1993.

榄果柿 lan guo shi

Trees to 8 m tall. Older branches grayish black, terete; young branches slightly slender, densely grayish black pubescent. Petiole 1.5–3 mm, densely pubescent; leaf blade oblong, 3–6 × 1.5–2 cm, ± leathery, abaxially with scattered distinct concave glands and drying brownish, adaxially glabrous except for hairs along midrib and drying dull grayish brown, base narrowly cuneate, margin sometimes revolute, apex obtuse, obtusely acuminate, or rarely retuse; lateral veins 6–8 per side, slender, abaxially distinctly raised, adaxially inconspicuous, reticulate veinlets abaxially prominent. Flowers not seen. Fruiting pedicel ca. 8 mm, apically thickened. Fruiting calyx ca. 6 mm in diam., spreading, puberulent; lobes 5, orbicular-ovate, ca. 2 mm, apex rounded to subobtuse. Berry solitary, ellipsoid, ca. 2 × 1.2 cm, apex apiculate, pilose. Seeds 1, blackish brown, ca. 1.5 cm. Fr. Dec.

* Hainan.

No authentic material of *Diospyros oliviformis* has been seen by the authors.

8. *Diospyros vaccinioides* Lindley in Hooker, Exot. Fl. 2: 139. 1825.

小果柿 xiao guo shi

Diospyros vaccinioides var. *oblongata* Merrill & Chun.

Shrubs 1–2 m tall, evergreen, much branched, rusty pilose-pubescent on young branchlets, leaves, and winter buds. Branches glabrescent. Petiole 1 mm, glabrescent; leaf blade elliptic to obovate, 2–4 × 0.9–1.5 cm, leathery, abaxially pubescent along midrib when young but glabrous when mature, adaxially lustrous, base obtuse to rounded, margin often pilose, apex subacute and mucronate; lateral veins ca. 5 or 6 per side, veins inconspicuous or slightly impressed. Flowers solitary or staminate also in cymes, subsessile. Staminate flowers: calyx divided nearly to base, ± as long as corolla; calyx lobes 4, narrowly lanceolate, brown pilose; corolla campanulate, ca. 4.5 mm; lobes 4, spreading, ovate, as long as tube, midrib sparsely pilose, apex acuminate; stamens 16. Pistillate flowers: calyx and corolla similar to staminate flowers; staminodes 4–8, linear; ovary glabrous. Fruiting pedicel 1–2 mm, puberulent. Fruiting calyx deeply divided, glabrous; lobes 4, spreading to gently recurved, triangular-lanceolate, ca. 5 mm. Berry black, globose, ca. 1 cm in diam., glabrous. Seeds (1 or)2(or 3), dark brown, ± semiglobose with a small beak, ca. 8 × 6 × 4 mm, minutely rugulose. Fl. May, fr. autumn and winter.

* Guangdong, Guangxi, Hainan.

9. *Diospyros esquirolii* H. Léveillé, Fl. Kouy-Tchéou 145. 1914–1915.

贵阳柿 gui yang shi

Trees 12–24 m tall. Branchlets dark purplish brown, with large pale lenticels, glabrous except for a few apical hairs. Petiole 6–10 mm; leaf blade elliptic, 5–5.5 × 1.9–2.2 cm, papery, uniformly pubescent, abaxially paler, base cuneate, apex acuminate; lateral veins 6–8 per side, not raised, reticulate veinlets inconspicuous. Staminate flowers in small, subsessile clusters; pedicel ca. 0.5 mm; calyx 1.5–2 mm, sparsely appressed pilose; calyx lobes 4, triangular, ca. 1.3 × 1.3 mm, apex acute; corolla urceolate, ca. 4 mm, tube ca. 3 mm, glabrous; corolla lobes 4, reflexed, ca. 1 mm, apex rounded; stamens 16, about as long as corolla tube; anthers dorsally pilose. Pistillate flowers and fruit not known. Fl. May.

* Guizhou (Guiyang Shi).

10. *Diospyros dumetorum* W.W. Smith, Notes Roy. Bot. Gard. Edinburgh 9: 104. 1916.

岩柿 yan shi

Diospyros mairei H. Léveillé; *D. mollifolia* Rehder & E. H. Wilson.

Trees 5–6(–14) m tall. Branchlets slender, pale brown to almost white tomentose. Winter buds tomentose. Petiole 2–3(–5) mm, slender, densely tomentose; leaf blade elliptic to narrowly oblong, 2–3(–6) × 1–1.3(–2.5) cm, papery to thin leathery, densely pubescent to almost tomentose, base cuneate to rounded, apex obtuse to acute and cuspidate; lateral veins

3–5 per side, pale, abaxially raised, reticulate veinlets obscure. Staminate flowers 1–4 together; pedicel 1–4 mm; calyx 1.5–3(–6) mm, divided almost to base, densely pubescent; lobes 4, ovate; corolla white, urceolate, 4.5–5.5 mm, glabrous except for 4 conspicuous lines of appressed hairs on outside; corolla lobes 4, basally overlapping, ovate, 1.5 (–2.5) mm, apex acute; stamens 16; anthers glabrous. Pistillate flower solitary; calyx lobes 4, as long as corolla, appressed pilose; corolla urceolate, ca. 5 mm, with 4 white pilose ridges; staminodes absent; ovary densely strigose. Fruiting calyx appressed pubescent; lobes 4, spreading to reflexed, triangular, ca. 8 mm, apex acute. Berry purplish black, ovoid, 1.2–1.4 cm, pilose, glabrescent, apex mucronate. Seeds 1–4, compressed ovoid, with a small beak, 8–9 mm, ca. 4.5 × 2.5 mm, transversely wrinkled. Fl. Apr–May, fr. Oct–Feb.

Thickets on slopes, mixed woods, ravines or limestone hills; 700–2700 m. SW Guizhou, Sichuan, Yunnan [N Thailand].

Diospyros dumetorum was published in February 1916, while *D. mollifolia* was published on March 30 of the same year.

11. *Diospyros yunnanensis* Rehder & E. H. Wilson in Sargent, Pl. Wilson. 2: 592. 1916.

云南柿 yun nan shi

Trees 5–15 m tall. Branchlets slender, finely lenticellate, appressed rusty pilose when young, glabrescent. Winter buds small, pubescent, apex obtuse. Petiole (2–)4–6 mm, appressed pubescent; leaf blade narrowly elliptic to lanceolate, (2.4–)3.5–4.5(–6) × 1–3 cm, papery, minutely rugulose-papillate, glabrous or sparsely appressed pubescent when young, abaxially hairy along midrib at maturity, drying blackish, base rounded to broadly cuneate, apex acute to slightly acuminate; lateral veins 4–6 per side, reticulate veinlets almost invisible. Staminate flowers in 1–3-flowered cymes; pedicel slender, 1–2 mm; calyx 2–3.5 mm; calyx lobes 4, ovate; corolla urceolate, 4–5 mm, glabrous except for 4 lines of appressed hairs; corolla lobes 4, basally overlapping, ovate, ca. 1 mm, apex acute; stamens 16. Pistillate flower solitary; pedicel to 2 mm, pubescent; calyx lobes 4, lanceolate, 6–7 × ca. 2 mm, longer than corolla, subglabrous; corolla urceolate to subcampanulate, ca. 5 mm, with 4 white pilose ridges; corolla lobes 4, ovate, apex blunt; staminodes 5; ovary glabrous except at apex; styles 4, joined ± halfway; stigmas each slightly 2-lobed. Fruiting pedicel 2–4 mm. Fruiting calyx divided to near base, glabrescent; lobes 4, strongly recurved, lanceolate, ca. 6 × 3 mm, apex acute, veins inconspicuous. Berry subglobose to obovoid, ca. 1.2 cm in diam., glabrous. Seeds few, dark brown, compressed, 7–9 mm, rugulose. Fl. May, fr. Sep.

* Thickets, open or dense forests on slopes; 700–1600 m. S Yunnan.

12. *Diospyros balfouriana* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 209. 1912.

大理柿 da li shi

Shrubs or small trees, 1.5–8 m tall. Branchlets reddish brown to brown-black, glaucous. Winter buds narrowly ovate, 5–6 mm. Petiole (0.5–)1–1.6 cm, pubescent; leaf blade elliptic, (2.5–)6.5–12.5 × (1–)2.5–3.6 cm, thin leathery, abaxially villose but glabrescent, adaxially sparsely pubescent but denser on midrib, base cuneate, apex acuminate; lateral veins 6–9 per side, inconspicuous. Staminate flowers not seen. Pistillate flowers solitary; calyx lobes 4, broadly ovate, subequal, 4.5–6 × 3.5–5 mm; corolla green, tube ca. 1.5 mm, with 4 white villose ridges; corolla lobes 4, subovate, ca. 3 mm; staminodes 8; ovary sparsely pubescent at apex; styles 4, base sparsely pubescent, apex 2-cleft. Fruiting calyx outside glabrous, inside near base sericeous. Berry blackish when dry, slightly glaucous, subsessile. Fl. May–Jun, fr. Jul–Aug.

* Mixed forests; ca. 2000 m. Yunnan (Dali Xian).

The protolog of *Diospyros balfouriana* describes the calyx lobes as distinctively unequal, but the type specimen in E shows them to be equal.

13. *Diospyros nitida* Merrill, Bull. Bur. Forest. Philipp. Islands 35: 57. 1906.

黑柿 hei shi

Trees to 20 m tall. Trunk to 40 cm d.b.h. Branchlets gray to dark brown. Winter buds densely appressed yellow pubescent. Petiole 5–6 mm; leaf blade lanceolate to oblong-lanceolate, 5–9 × 1.5–3.3 cm, thin leathery, subglabrous, abaxially sparsely pubescent when young, drying blackish, base attenuate, margin narrowly revolute, apex bluntly acuminate; lateral veins 12–18 per side, reticulate veinlets slender, raised on both surfaces in older leaves. Staminate flowers in small dense cymes, less than 5 mm; pedicel ca. 1 mm, pubescent; calyx bowl-shaped, ca. 1.5 mm, glabrous; calyx lobes 4, flat at anthesis, triangular, erect, margin ciliate; corolla with globose basal swelling and narrowly cylindrical limb, ca. 6 mm, basal swelling minutely puberulent, otherwise glabrous; corolla lobes 4, ca. 2 mm. Pistillate flowers solitary; pedicel 2–3 mm; calyx lobes 4, subovate; corolla urceolate, tube ca. 3 mm; corolla lobes subovate, ca. 3 mm. Fruiting pedicel ca. 3 mm. Fruiting calyx ca. 1.4 cm in diam.; lobes 4, strongly recurved or reflexed, elliptic-ovate, apex rounded. Berry globose, 1–1.2 cm in diam., 4-locular, glabrous, ± rugulose. Seeds slightly compressed ovoid, 8–9 × 3–4.5 × 2.5–4 mm. Fl. Jul–Dec, fr. Sep–Dec.

Valleys or in low moist broad-leaved forests; below 400 m. SW Hainan [Philippines, Vietnam].

The wood of *Diospyros nitida* is dark gray, hard, and heavy and is suitable for construction and furniture.

The corollas of staminate flowers are apparently galled, and the description might not represent the true state.

14. *Diospyros kotoensis* T. Yamazaki, J. Jap. Bot. 49: 247. 1974.

兰屿柿 lan yu shi

Trees to 8 m tall. Branchlets glabrous. Petiole 3–5 mm; leaf blade oblong-elliptic to lanceolate, 4–6.7 × 1.5–3 cm, ±

leathery, glabrous, drying dull to blackish green, base cuneate, apex obtuse; lateral veins 6–8 per side, reticulate veinlets slightly raised, almost invisible. Staminate flowers in 3–5-flowered glabrous cymes; calyx glabrous; calyx lobes 4, ovate, ca. 1.5 × 1 mm, outside minutely ciliate; corolla urceolate, glabrous; corolla lobes 4; stamens 12; filaments glabrous. Pistillate flowers not known. Fruiting pedicel ca. 3 mm, glabrous. Fruiting calyx deeply divided, ca. 1 cm in diam., glabrous; lobes 4, strongly reflexed, ovate, ca. 5 × 4 mm. Berry solitary; globose to ovoid, 1.3–1.5 × 1.1–1.3 cm, glabrous. Seeds 2, brownish, slightly dorsiventrally compressed, ca. 9 × 4.5–5 × ca. 4 mm. Fr. Feb.

* Evergreen broad-leaved forests; near sea level to 500 m. Taiwan (Lan Yu).

15. *Diospyros morrisiana* Hance in Walpers, Ann. Bot. Syst. 3: 14. 1852.

罗浮柿 luo fu shi

Shrubs or trees 3–20 m tall, deciduous. Trunk to 30 cm d.b.h., bark peeling off in thin pieces, surface black. Young shoots puberulent. Winter buds conical, ca. 2 mm, puberulent. Petiole ca. 1 cm; leaf blade elliptic, 5–11.5 × 2.5–4.3 cm, thin leathery, abaxially drying brown, adaxially glossy dark green and drying grayish brown, base cuneate or obtuse, margin sometimes slightly undulate, apex acuminate to obtuse; lateral veins 4–8 per side, reticulate veinlets very slender, inconspicuous. Staminate flowers congested, cymose, nodding; pedicel ca. 2 mm; calyx lobes 4, brownish puberulent; corolla glabrous, white, urceolate, ca. 7 mm; corolla lobes 4, spreading, ovate, ca. 2 × 2 mm; stamens 16–20, hairy. Pistillate flowers solitary; pedicel ca. 2 mm; calyx lobes 4, divided to about middle; corolla nearly urceolate, ca. 7 mm; corolla lobes 4, ca. 3 × 3 mm, outside glabrous, inside densely brown sericeous; staminodes 6. Fruiting pedicel ca. 3 mm, stout. Fruiting calyx ± square, 6–8 mm wide, outside densely puberulent, inside sericeous; lobes 4, spreading, triangular. Berry yellow, globose, 1.5–2.2(–2.9) cm in diam., 8-locular, glabrous, apex sometimes apiculate. Seeds ca. 4, glossy dark olive-brown, laterally compressed, (8–)10–14 × 5–7 × (2–)3 mm. Fl. May–Jun, fr. Nov.

Forest slopes, ravines, along streams; below 100–1000(–1400) m. Fujian, Guangdong, Guangxi, Guizhou, Sichuan, Taiwan, Yunnan, Zhejiang [Japan, Vietnam].

Unripe fruit of *Diospyros morrisiana* yield persimmon lacquer. The wood is used for furniture. The bark, leaves, and fruit are used for medicine.

16. *Diospyros fengii* C. Y. Wu in C. Y. Wu & H. W. Li, *Yunnan Redai Yaredai Zhiwu Quxi Yanjiu Baogao* (Rep. Stud. Pl. Trop. Subtrop. Yunnan) 1: 19. 1965.

老君柿 lao jun shi

Trees to 8 m tall. Branches dark green, glabrous; branchlets brown, slightly tawny puberulent or glabrescent. Petiole ca. 7 mm; leaf blade oblanceolate to oblong-lanceolate, 8–11.5 × 3–4.3 cm, ± leathery, abaxially pale green becoming reddish brown, adaxially glossy olive colored becoming grayish brown,

base cuneate, apex acuminate, midrib adaxially sparsely puberulent; lateral veins 5–8 per side, inconspicuous, reticulate veinlets slightly raised, almost invisible. Flowers not seen. Fruiting pedicel ca. 2 mm, rust colored puberulent. Fruiting calyx flat, ± square to somewhat star-shaped, 7–8 mm wide, rust colored puberulent on both surfaces; lobes 4, triangular. Berry green, 2.5–3 cm in diam., glabrous, at base of branchlets. Seeds 4, glossy dark olive-brown, laterally compressed, 1.2–1.4 cm × 6.5–7 mm. Fr. Oct.

* Mixed forests; 1300–1500 m. Yunnan (Malipo Xian).

17. *Diospyros unisemina* C. Y. Wu in C. Y. Wu & H. W. Li, *Yunnan Redai Yaredai Zhiwu Quxi Yanjiu Baogao* (Rep. Stud. Pl. Trop. Subtrop. Yunnan) 1: 18. 1965.

单子柿 dan zi shi

Trees to 12 m tall. Branches glabrous, dirty yellow pubescent when young. Petiole 5–8 mm; leaf blade elliptic to ovate-oblong, ca. 10 × 1.8–4 cm, thin leathery, abaxially with appressed hairs along midrib, adaxially puberulent along midrib, base cuneate to broadly cuneate, margin slightly revolute, apex short acuminate to short caudate; lateral veins 4–6 per side, very slender, reticulate veinlets abaxially slightly raised, almost invisible, sometimes slightly darkened. Flowers not seen. Fruiting pedicel 3–4 mm, densely dirty yellow strigose. Fruiting calyx shallowly cupular, ca. 8 mm in diam., outside sparsely dirty yellow strigose, inside densely brownish sericeous; lobes 4, reflexed. Berry solitary, drying glossy black, on basal part of young branchlets, ellipsoid, 1.5–1.8 × 1–1.2 cm. Style persistent, rusty strigose. Seeds 1 (or 2). Fr. Oct–Dec.

* Mixed forests; 1000–1700 m. SE Yunnan.

18. *Diospyros lotus* Linnaeus, Sp. Pl. 2: 1057. 1753.

君迁子 jun qian zi

Trees deciduous. Bark grayish black to grayish brown. Petiole 0.7–1.5 cm; leaf blade elliptic to ovate-oblong, 5–13 × 2.5–6 cm, submembranous, abaxially drying green or glaucous and with dark veinlets, base obtuse, broadly cuneate, or subrounded, apex acuminate to acute; lateral veins 7–10 per side, reticulate veinlets clearly defined, flat, dark. Staminate flowers 1–3 together; pedicel to 6 mm; calyx lobes 4 (or 5); corolla reddish to pale yellow, urceolate, ca. 4 mm; corolla lobes 4; stamens 16. Pistillate flowers sessile, pale green to reddish; calyx lobes 4; corolla urceolate, ca. 6 mm; corolla lobes 4 or rarely 5; staminodes 8; ovary 8-locular, glabrous except for apex; styles 4. Fruiting calyx lobes 4, ovate, apex obtuse. Berry pale yellow, becoming bluish black with a glaucous bloom, subglobose to ellipsoid, 1–2 cm in diam. Seeds brown, compressed, ca. 10 × 6 mm in diam. Fl. May–Jun, fr. Oct–Nov.

500–2500 m. Anhui, Gansu, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Liaoning, Shaanxi, Shandong, Shanxi, Sichuan, Xizang, Yunnan, Zhejiang [SW Asia, S Europe, naturalized in countries around the Mediterranean].

1a. Leaf blade glabrous or sometimes

abaxially pubescent 18a. var. *lotus*

1b. Leaf blade densely minutely

villose 18b. var. *mollissima*

18a. *Diospyros lotus* var. *lotus*

君迁子 (原变种) jun qian zi (yuan bian zhong)

Trees to 30 m tall. Trunk to 1.3 m d.b.h. Leaf blade glabrous or sometimes abaxially pubescent mainly on veins.

Thickets on slope or in ravine; 500–2500 m. Anhui, Gansu, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Liaoning, Shaanxi, Shandong, Shanxi, Sichuan, Xizang, Yunnan, Zhejiang [SW Asia, S Europe, naturalized in countries around the Mediterranean].

Fruit of *Diospyros lotus* are consumed fresh or preserved, used in Chinese traditional medicine, and brewed into wine or vinegar. Unripe fruit yield persimmon lacquer. The wood is hard and durable, with beautiful grain, and is used for fine furniture. This variety is used as a rootstock for *D. kaki*.

18b. *Diospyros lotus* var. *mollissima* C. Y. Wu in C. Y. Wu & H. W. Li, *Yunnan Redai Yaredai Zhiwu Quxi Yanjiu Baogao* (Rep. Stud. Pl. Trop. Subtrop. Yunnan) 1: 21. 1965.

多毛君迁子 dou mao jun qian zi

Trees to 13 m tall. Branchlets and both surfaces of leaf blade densely minutely villose.

* 1000–2500 m. Gansu, Shaanxi, Sichuan.

19. *Diospyros japonica* Siebold & Zuccarini, Abh. Math.-Phys. Königl. Bayer. Akad. Wiss. 4, 3: 136. 1846.

山柿 shan shi

Diospyros glaucifolia F. P. Metcalf; *D. glaucifolia* var. *brevipes* S. Lee; *D. glaucifolia* var. *pubescens* Ling.

Trees to 17 m tall, deciduous. Trunk to 50 cm d.b.h. Branchlets dark brown to blackish brown, glabrous. Winter buds ovate, 4–5 mm, glabrous. Petiole 1.2–2.5 cm; leaf blade elliptic to lanceolate, 7.5–17.5 × 3.5–7.5 cm, thin leathery, glabrous or sparsely appressed pubescent, abaxially glaucous, base rounded to truncate, apex acuminate; lateral veins 7 or 8 per side, reticulate veinlets dense, dark, not raised. Staminate flowers in cymes; pedicel ca. 1 mm; calyx lobes 4; corolla urceolate, lobes 4; stamens 16. Pistillate flowers solitary or in clusters of 2 or 3; calyx lobes 4, sparsely pubescent; corolla yellowish, urceolate, ca. 7 mm, tube ca. 5 mm; style 4-parted; stigma emarginate. Fruiting pedicel 2–3 mm. Fruiting calyx 1.3–1.6 cm in diam., divided to below middle, ± spreading, outside sparsely pubescent; lobes 4, triangular-ovate, (4–)6–8 × ca. 6 mm, appressed to fruit, margin sometimes revolute. Berry orange-yellow, becoming red, globose to depressed globose, 1.5–2(–3) cm in diam., 8-locular, glaucous. Seeds oblong, strongly compressed, 9–12 × 4.5–6.5 × 2–3 mm. Fl. Apr–Jul, fr. Sep–Nov.

Slopes, mixed forests or by streams in ravines; 600–1300 m. Anhui, Fujian, NW Guangdong, NE Guangxi, NW Guizhou, SW Hunan, Jiangxi, Sichuan, ?Yunnan, Zhejiang [Japan].

The ripe fruit of some forms of *Diospyros japonica*, particularly those included in *D. glaucifolia* var. *brevipes*, are edible and have a good flavor. *Diospyros japonica* has been suggested as rootstock for *D. kaki*. Unripe fruit yield persimmon lacquer, the fruiting calyx is medicinal, and the wood is used for furniture, etc.

Japanese specimens correspond more closely with *Diospyros glaucifolia* var. *brevipes* but vary sufficiently to obscure the differences in petiole length and leaf shape used to separate this from var. *glaucifolia*. *Diospyros glaucifolia* var. *pubescens* was based on specimens from Fujian with densely appressed pubescence along abaxial leaf veins, but the leaf indumentum varies even among the syntypes.

20. *Diospyros sichourensis* C. Y. Wu in C. Y. Wu & H. W. Li, *Yunnan Redai Yaredai Zhiwu Quxi Yanjiu Baogao* (Rep. Stud. Pl. Trop. Subtrop. Yunnan) 1: 21. 1965.

西畴君迁子 xi chou jun qian zi

Trees to 10 m tall. Branches and winter buds glabrous. Petiole 1.2–1.4 cm; leaf blade elliptic to oblong, 7–15 × 3–5.5 cm, papery, glabrous, abaxially drying gray green with dark veinlets, adaxially brown, base cuneate and decurrent into a winged petiole, apex acute; lateral veins 5–7 per side, slender, ± conspicuous on both surfaces, reticulate veinlets flat and clearly defined. Staminate flowers in 3-flowered cymes; peduncle, pedicel, and calyx with short rusty appressed hairs; calyx lobes 4; corolla subglabrous; corolla lobes twisted and with a ciliate margin; stamens 14. Pistillate flowers not seen. Fruiting pedicel ca. 2 mm. Fruiting calyx 2–3 cm in diam., divided to below middle, ± spreading, appressed rusty pubescent; lobes 4, ovate, 1.2–1.5 × ca. 1 cm, apex subacute. Berry solitary, globose, ca. 2.5 cm in diam. Seeds oblong, ca. 1.2 cm × 6 mm. Fl. May, fr. Sep.

* Mixed forests, by streams in valleys; 800–1700 m. SE Yunnan.

Except for the larger calyx and berry, *Diospyros sichourensis* hardly differs from *D. japonica* and it may prove to be conspecific.

21. *Diospyros kintungensis* C. Y. Wu in C. Y. Wu & H. W. Li, *Yunnan Redai Yaredai Zhiwu Quxi Yanjiu Baogao* (Rep. Stud. Pl. Trop. Subtrop. Yunnan) 1: 22. 1965.

景东君迁子 jing dong jun qian zi

Trees. Bark grayish black. Branchlets yellowish brown. Winter buds ovoid, ca. 4 mm, sparsely white or rusty pubescent, subglabrous. Petiole 1–1.3 cm, slender; leaf blade ovate-elliptic, obovate, or suborbicular, 11–17 × 5.5–7 cm, submembranous, sparsely appressed pubescent but glabrescent, abaxially drying pale gray-green with dark veinlets, adaxially blackish, base cuneate to rounded, apex acuminate; lateral veins 5–7 per side, reticulate veinlets flat, clearly defined. Flowers not seen. Fruiting calyx 1.8(–2) cm in diam., divided to below middle, spreading, appressed rusty pubescent; lobes 4, ovate, ca. 9 × 7 mm, apex obtuse. Berry yellow, solitary, subglobose, ca. 2.5 cm in diam., subsessile. Seeds ca. 5, brown, ± D-shaped, strongly compressed, 9–10 × 6–7 × ca. 2.5 mm. Fr. Oct–Nov. Fl. Apr–May, fr. Jan.

* Slopes; ca. 1500 m. Yunnan (Jingdong Xian).

22. *Diospyros tsangii* Merrill, *Lingnan Sci. J.* 13: 43. 1934.

延平柿 yan ping shi

Shrubs or small trees to 7 m tall, rusty pubescent on young branchlets, petioles, midveins, and adaxial lateral veins. Winter

buds minutely pubescent. Petiole confluent with leaf base; leaf blade narrowly elliptic-oblong to oblong, 4–9 × 1.5–3 cm, papery, abaxially appressed pilose when young, later glabrous except for midrib, drying gray-green with dark veinlets, adaxially blackish, base cuneate, margin ciliate when young, apex acuminate; lateral veins 3–5 per side, slender, reticulate veinlets flat, clearly defined. Flowers in 1-flowered cymes. Staminate flowers ca. 8 mm; calyx pubescent, lobes 4; corolla white, ca. 7 × 5 mm; corolla lobes 4, appressed pubescent; stamens 16. Pistillate flowers larger than staminate flowers; calyx deeply divided; calyx lobes 4, narrowly lanceolate, ca. 4.5 × 1.5 mm, both surfaces sparsely appressed pubescent; corolla white. Fruiting pedicel ca. 5 mm. Fruiting calyx tube ca. 0.6–1.2 cm, at first enclosing young fruit, minutely puberulent; lobes 4, erect, 1–1.2 cm ca. 8 mm. Berry yellow, depressed globose, 1–3.5 cm in diam., 8-locular, densely appressed pubescent, glabrescent. Fl. Feb–May, fr. Aug.

* Thickets, mixed broad-leaved forests. Fujian, Guangdong, Jiangxi.

23. *Diospyros oldhamii* Maximowicz, *Bull. Acad. Imp. Sci. Saint-Petersbourg* 31: 67. 1886.

红柿 hong shi

Diospyros hayatai Odashima; *D. oldhamii* Maximowicz var. *chartacea* Hayata; *D. taitoensis* Odashima.

Trees deciduous. Branchlets reddish brown, glabrous. Petiole 1–3 cm; leaf blade broadly lanceolate, 10–15 × 5–6 cm, submembranous, glabrous or very sparsely pubescent, abaxially drying with dark veinlets contrasting with paler background, adaxially brown, both ends acute to obtuse, margin sometimes inconspicuously crenulate; lateral veins 4–6(or 7) per side, most prominent ones extending to near leaf apex, reticulate veinlets flat, clearly defined. Staminate flowers in 1–7-flowered cymes; peduncle to 4 mm; pedicel ca. 5 mm, glabrous; calyx less than 1/2 as long as corolla, glabrous; calyx lobes 4, triangular, longer than tube, ca. 1.5 × 1 mm; corolla glabrous, urceolate, 8–10 mm; corolla lobes 4, 2–3 mm wide, apex rounded. Fruiting calyx nearly square, ca. 1.4 cm in diam., outside sparsely appressed white pubescent, inside densely chestnut brown sericeous; lobes 4. Berry solitary, depressed globose to ellipsoid, 2–3.5 × 2–2.8 cm, 8-locular, solitary, sessile, glabrous, apex cuspidate. Seeds brown, compressed oblong, ca. 1.1 cm. Fr. Oct.

Broad-leaved forests; ca. 1000 m. C and E Taiwan [Japan].

24. *Diospyros kaki* Thunberg, *Nova Acta Regiae Soc. Sci. Upsal.* 3: 208. 1780.

柿 shi

Trees to 27 m tall, deciduous. Young branchlets densely pubescent to glabrous, sometimes with reddish brown lenticels. Winter buds small, blackish. Petiole 0.8–2 cm; leaf blade lanceolate, elliptic, or ovate, occasionally obovate, 5–18 × 2.6–9 cm, papery, pubescent when young drying brown, adaxially often glabrescent when mature and paler with dark veinlets, base cuneate, subtruncate, or rarely cordate, apex

usually acuminate; lateral veins 5–7 per side, reticulate veinlets clearly defined, flat, dark. Staminate flowers in 3–5-flowered cymes; calyx ± as long as corolla, hairy on both sides; lobes 4; corolla white, yellowish white, or red, 6–10 mm; stamens (14–)16–24. Pistillate flowers solitary; calyx 3 cm or more in diam., lobes 4; corolla usually yellowish white, campanulate, (0.9–)1–1.6 cm; corolla lobes recurved, ovate; staminodes 8(–16); ovary glabrous or pubescent. Fruiting calyx 3–4 cm in diam. Berry yellow to orange, flattened globose to ovoid but usually globose, 2–8.5 cm in diam., 8-locular, glabrescent. Seeds dark brown, 1.3–1.6 cm × 7.5–9 × 4–5 mm. Fl. May–Jun, fr. Sep–Oct.

* Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shandong, Shanxi, Sichuan, Taiwan, Yunnan, Zhejiang [widely cultivated outside of China, particularly Japan, naturalized in some areas].

- 1a. Young branchlets glabrous, with prominent pale lenticels; staminate flowers 9–10 mm; calyx lobes linear lanceolate (pistillate plants not seen); corolla red 24c. var. *macrantha*
- 1b. Young branchlets densely brown pubescent to glabrous, obscurely lenticellate; staminate flowers 6–9 mm; calyx lobes ± ovate; corolla white, yellow-white, pink, or red.
- 2a. Leaf blade adaxially glabrous or glabrescent; berry 3.5–8.5 cm in diam., ± glabrous at maturity 24a. var. *kaki*
- 2b. Leaf blade adaxially densely pubescent to glabrescent; berry 2–5 cm in diam., densely brown pubescent to glabrescent 24b. var. *silvestris*

24a. *Diospyros kaki* var. *kaki*

柿 (原变种) shi (yuan bian zhong)

Diospyros kaki var. *domestica* Makino; *D. lobata* Loureiro; *D. schitze* Bunge; *D. sinensis* Blume ex Naudin.

Young branchlets densely brown pubescent to glabrous, obscurely lenticellate. Petiole glabrous or glabrescent; leaf blade adaxially glabrous or glabrescent, abaxially ± pubescent. Staminate corolla 6–9 mm. Pistillate calyx lobes ovate. Fruiting calyx outside glabrescent to glabrous. Berry 3.5–8.5 cm in diam., ± glabrous at maturity.

* Primary or secondary forests, in scrub on mountain slopes, or cultivated. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hubei, Jiangsu, Jiangxi, Shandong, Shanxi, Sichuan, Taiwan, Yunnan, Zhejiang [widely cultivated outside of China, particularly Japan, naturalized in some areas].

Diospyros kaki is native to the Chang Jiang valley but is now very widely cultivated, and it is often impossible to know if a given plant is native or escaped from cultivation. The species was described from material cultivated in Japan.

Extensively cultivated for its edible fruit. Propagation is mainly by grafting on *Diospyros japonica*, *D. lotus*, *D. oleifera*, or *D. rhombifolia*. The ripe fruit are prescribed as a stomachic. The persistent calyx is used to treat hiccups. The juice extracted from

unripe fruit is employed in hypertension and as a preservative of construction materials.

24b. *Diospyros kaki* var. *silvestris* Makino, Bot. Mag. (Tokyo) 22: 159. 1908.

野柿 ye shi

Diospyros argyi H. Léveillé; *D. trichocarpa* Miao.

Young branchlets densely brown pubescent, obscurely lenticellate. Petiole and leaf blade densely pubescent. Staminate corolla 6–9 mm. Pistillate calyx lobes ovate. Fruiting calyx outside densely pubescent to glabrescent. Berry 2–5 cm in diam., densely brown pubescent to glabrescent.

* Forests or thickets, on slopes; to 1600 m. Fujian, Hubei, Jiangsu, Jiangxi, Sichuan, Yunnan.

Diospyros kaki var. *silvestris* includes wild Chinese plants with smaller fruit and a denser indumentum. However, the variation within the species as a whole is considerable and a careful study of the relationships between the wild plants and the many cultivars could lead to a reassessment of the formal taxonomy of this complex.

24c. *Diospyros kaki* var. *macrantha* Handel-Mazzetti, Symb. Sin. 7: 802. 1936.

大花柿 da hua shi

Branchlets glabrous, with prominent pale lenticels. Leaves adaxially glabrous, abaxially very sparsely hairy. Staminate calyx lobes linear-lanceolate, to ca. 10 × 2.7 mm at anthesis, glabrous; corolla 9–10 mm; corolla lobes ca. 2 × 2.3 mm, outside glabrous; anther connective densely sericeous; ovary densely pubescent. Pistillate plant not seen.

* Hunan.

The staminate calyx, prominently lenticellate stems, and atypical anther indumentum suggest that var. *macrantha* might be better treated as a distinct species.

25. *Diospyros oleifera* Cheng, Contr. Biol. Lab. Chin. Assoc. Advancem. Sci., Sect. Bot. 10: 80. 1935.

油柿 you shi

Trees to 14 m tall, deciduous, many parts gray to grayish yellow to grayish brown pubescent. Bark dark gray to grayish brown, peeling in large thin flakes to reveal ± white bark below. Branches sparsely villose to glabrescent. Petiole 6–10 mm; leaf blade oblong to oblong-lanceolate, rarely obovate, 6.5–17 × 3.5–10 cm, papery, base rounded to subrounded and slightly oblique; lateral veins 7–9 per side. Flowers sometimes polygamous. Staminate flowers in 3–5(or more)-flowered cymes, ca. 8 mm; calyx lobes 4; corolla lobes 4, ciliate. Pistillate calyx divided to middle; corolla ca. 1.5 cm, pubescent, with 4 sparsely villous ribs; staminodes 12–14, villose; ovary densely villose. Berry dark yellow, ovoid to depressed globose, 4.5–7 × 5(–8) cm, 8(–10)-locular, with soft hairs. Fl. Apr–May, fr. Aug–Oct.

* Anhui, Fujian, Guangdong, Guangxi, Hunan, Jiangxi, Zhejiang.

A commonly cultivated fruit tree. The fruit are edible. The persistent calyx is used to treat hiccups.

26. Diospyros hexamera C. Y. Wu in C. Y. Wu & H. W. Li, *Yunnan Redai Yaredai Zhiwu Quxi Yanjiu Baogao* (Rep. Stud. Pl. Trop. Subtrop. Yunnan) 1: 17. 1965.

六花柿 liu hua shi

Trees to 20 m tall. Trunk to 40 cm d.b.h. Branches slender, glabrescent; young shoots tawny puberulent. Petiole ca. 1 cm, densely puberulent; leaf blade oblong-lanceolate, 8–18 × 2.7–5.5 cm, leathery, glabrous except for abaxially sparsely puberulent midrib, base broadly cuneate, apex acute to obtuse; lateral veins 5–8 per side, reticulate veinlets prominent on both surfaces. Flowers not seen. Fruiting pedicel 0.8–1.5 cm, brown puberulent, apical part slightly thickened. Fruiting calyx ca. 2.4 cm in diam., leathery; lobes 5 or 6, leaflike, incurved, apex acute and apiculate. Berry greenish brown, solitary, subglobose, ca. 2.5 cm in diam., densely rusty strigose-velutinous. Seeds 4, slightly 3-angled, ca. 1.5 × 1 cm. Fr. Dec.

* Moist places under forests; ca. 300 m. Yunnan (Hekou Yaozu Zizhixian).

27. Diospyros nigricortex C. Y. Wu in C. Y. Wu & H. W. Li, *Yunnan Redai Yaredai Zhiwu Quxi Yanjiu Baogao* (Rep. Stud. Pl. Trop. Subtrop. Yunnan) 1: 10. 1965.

黑皮柿 hei pi shi

Trees 10–20 m tall. Trunk to 40 cm d.b.h. Bark black. Branches brown, glabrous; branchlets ridged. Winter buds oblong-ovate, rusty puberulent. Petiole 5–10 mm, apically narrowly winged; leaf blade lanceolate to oblong-lanceolate, (7–)10–14 × 3–5 cm, thin leathery, base cuneate, apex acuminate; lateral veins 7–10 per side, very slender, ± raised on both surfaces, reticulate veinlets slightly raised, almost invisible. Staminate flowers in 2–8-flowered cymes; peduncle very short or absent; calyx tubular, 6–8 mm, glabrous, teeth 4; corolla white or pale yellow, tubular, 1.5–2.6 cm, tube 0.8–1.4 cm, lobes 7–12 mm; stamens 12. Pistillate flowers 1 or 2; peduncle and pedicel very short, rusty puberulent; calyx lobes 4 or 5, reflexed, outside subglabrous, inside rusty scurfy; corolla lobes 4, pyramidal in bud; staminodes 8; ovary glabrous; styles 4 or 5, base connate. Fruiting calyx 4- or 5-angular, discoid; lobes 4 or 5, undulately plicate. Berry black when mature, depressed globose, 2.5–3 cm in diam., glabrous, shiny. Seeds tawny-brown, ovate, compressed, ca. 1 cm. Fl. Apr–May, fr. Jul–Oct.

* Valleys or along streams, dense broad-leaved mixed forests, open woods, thickets on plains, shaded thickets at mountain summits; 500–1800 m. S Yunnan.

28. Diospyros forrestii J. Anthony, Notes Roy. Bot. Gard. Edinburgh 18: 196. 1934.

腾冲柿 teng chong shi

Trees 6–12 m tall. Branchlets blackish brown, glabrous. Petiole 1 cm; leaf blade narrowly elliptic to oblong, 10–15 × 2.5–4 cm, glabrous, base cuneate, margin very narrowly revolute, apex acuminate; lateral veins 12–15 per side, reticulate veinlets inconspicuous. Staminate flowers in congested 1–3-flowered cymes, fragrant; pedicel very short, pubescent; calyx cupular, 5–7 mm, very sparsely pubescent to subglabrous;

calyx lobes 5–7, reduced to minute glandlike teeth; corolla ca. 1.5 cm, tubular-campanulate; corolla tube 6–8 mm, glabrous; corolla lobes 5 or 6, ovate-lanceolate, 6–8 × 2.5–3.5 mm; stamens ca. 24, inserted at base of tube. Pistillate flowers not seen. Fruiting pedicel ca. 2 mm, stout, densely brown pubescent. Fruiting calyx ca. 1.6 cm in diam., glabrous; lobes 4 or 5, erect, reflexed between lobes, ovate, 6–8 × 9–10 mm, undulately plicate, apex acute and hard when dry. Immature berry globose, solitary, ca. 1.5 cm in diam., 5-locular, glabrous. Style short, persistent at apex. Fl. May–Jul, fr. Jul–Aug.

* Shaded ravines and thickets, mountains or by streams; 1800–2700 m. SW Yunnan.

29. Diospyros longibracteata Lecomte, Notul. Syst. (Paris) 4: 99. 1928.

长苞柿 chang bao shi

Trees 9–13 m tall. Trunk to 30 cm d.b.h. Branches darkish brown; young branches glabrous. Winter buds sparsely appressed pubescent. Petiole 1–1.2 cm; leaf blade elliptic, obovate, or oblong, 7–16 × 2–4 cm, leathery, glabrous, base cuneate, margin narrowly revolute, apex acuminate to obtusely acuminate; lateral veins 5–8 per side, reticulate veinlets dense, raised on both surfaces. Staminate flowers in 3–5-flowered pedunculate cymes, 0.8–1.2 cm; calyx campanulate, ca. 4 mm, densely appressed pubescent; lobes 4, erect, flat at anthesis, triangular, shorter than tube; corolla urceolate; corolla tube ca. 8 mm, outside densely sericeous; corolla lobes 4, ovate, ca. 3 mm, inside glabrous. Pistillate flowers solitary; calyx lobes 4 or 5, soon crownlike after anthesis, both surfaces minutely pubescent. Fruiting pedicel 2–4 mm. Fruiting calyx strongly undulately plicate, appressed puberulent to strigose; lobes 4, erect, triangular, 6–10 × 7–8 mm, base reflexed auriculate, margin subrevolute, apex acuminate. Berry subglobose, somewhat depressed, 2–3 cm in diam., densely dark red strigose, glabrescent. Fl. May–Jul, fr. Oct.

Evergreen broad-leaved forests, slopes, valleys; below 800 m. Hainan [Laos, Vietnam].

The wood of *Diospyros longibracteata*, which is generally called blackwood, is suitable for furniture and becomes dark after soaking in water. It is used for chopsticks and musical instruments.

Diospyros longibracteata, *D. susarticulata*, *D. maclurei*, and *D. metcalfii* form a rather distinct group. The vegetative differences between them seem very minor, but the flowers are not known for the last two. Their fruit show considerable variation in size and shape, but much of the herbarium material examined is not mature. It is very difficult to assess the significance of this variation.

30. Diospyros susarticulata Lecomte, Notul. Syst. (Paris) 4: 120. 1928.

过布柿 guo bu shi

Trees to 12 m tall. Trunk to 35 cm d.b.h., bark black to brownish black. Branches grayish black; young shoots yellowish green. Winter buds slender, 3–6 mm, densely appressed pale yellowish pubescent. Petiole often blackish, 6–10 mm, ± articulate near base; leaf blade oblong, 7.5–17 × 3.5–7 cm, thin leathery, glabrous, drying green, base cuneate, apex acuminate; lateral veins 8–11 per side, reticulate veinlets slender, raised on

both surfaces. Staminate flowers solitary, cymose, or short paniculate, appressed pubescent, rarely only 1 flower fertile; pedicel slender, 2–3 mm; calyx bowl-shaped, outside glabrous, inside densely yellow strigose; calyx lobes 4, ca. 2 × 2 mm, apex rounded; corolla white, urceolate, 7–8 mm, glabrous; corolla lobes 4, reflexed, ca. 2 mm; stamens 16. Pistillate flowers not seen. Fruiting pedicel 3–4(–8) mm. Fruiting calyx ± woody, reflexed between lobes, ± square, ca. 2 cm wide, outside sparsely pubescent, inside densely strigose; lobes 4, spreading, subtriangular. Berry orange-yellow, solitary depressed globose, 1.4–3 cm in diam., 6-locular, glabrous but appressed brown hirtellous around mucro, apex apiculate. Seeds dark brown, laterally compressed, oblong, 1.5–2 cm. Fl. Apr–Aug, fr. Aug–Oct.

Evergreen broad-leaved mixed forests, thickets, along streams, valleys, slopes; low or medium altitudes. Hainan [Laos, Vietnam].

The fruit of *Diospyros susarticulata* are used by the national minorities as a black dye for cloth.

31. *Diospyros maclurei* Merrill, Philipp. J. Sci. 23: 259. 1923.

琼岛柿 qiong dao shi

Trees to 30 m tall. Trunk to 50 cm d.b.h., bark black. Branches gray; young shoots greenish brown, soon glabrescent. Winter buds needlelike, ca. 2 mm, appressed pale brown puberulent. Petiole 5–10 mm; leaf blade oblong to obovate, rarely elliptic, 8–14.5 × 2.5–6 cm, leathery to thick papery, glabrous, base cuneate, apex obtusely short acuminate; lateral veins 7–9 per side, looped before margin, reticulate veinlets abaxially raised, adaxially inconspicuous. Flowers not seen. Inflorescences fascicles or short racemes. Fruiting pedicel 8–10 mm, densely puberulent. Fruiting calyx ca. 2.5 cm in diam., reflexed, rusty tomentose, glabrescent; lobes 4, apex subrounded. Berry orange-red, cylindrical to subglobose, 4–5 cm, densely rusty tomentose, glabrescent. Seeds few, blackish brown, oblong, 3–3.5 × 0.8–0.9 × 0.4–0.5 cm. Fr. Oct–Feb.

* Slopes or in dense evergreen mixed broad-leaved forests in valleys; below 800 m. Hainan.

In the absence of well-developed fruit and seeds, it is difficult to distinguish *Diospyros maclurei* from *D. metcalfii*.

32. *Diospyros metcalfii* Chun & L. Chen, Sunyatsenia 3: 119. 1936.

圆萼柿 yuan e shi

Trees to 15 m. Bark grayish black. Branches grayish black; current year's branchlets brown, inconspicuously pubescent. Winter buds lanceolate-subulate, densely appressed pubescent. Petiole 1–1.5 cm, glabrous; leaf blade oblong, 10–13 × 4–6 cm, papery, abaxially sparsely strigose, glabrous, or glabrescent, slightly paler than adaxial surface, and yellowish when dry, adaxially dull dark green and lustrous, base cuneate to broadly cuneate, apex acute; lateral veins 6–10 per side, reticulate veinlets dense, raised on both surfaces. Flowers not seen. Fruiting pedicel 5–8 mm, thick, sparsely pubescent. Fruiting calyx almost flat, 2.5–3.5 cm in diam., margin entire and undulate, outside

glabrous, inside densely strigose; lobes inconspicuous. Berry green, solitary, globose to depressed globose, 3.5–4 × 5–6 cm, 10-locular, apically appressed pubescent. Seeds brown, bean-shaped, (1.5–)2–2.5 × (0.8–)1–1.5 × (0.5–)1–1.2 cm. Fr. Aug.

* Mixed forests by stream; low altitudes. Guangxi, Hainan.

33. *Diospyros corallina* Chun & L. Chen, Sunyatsenia 3: 120. 1936.

五蒂柿 wu di shi

Trees to 8 m tall. Branchlets of current year slender, yellowish green, becoming blackish brown. Winter buds conical, ca. 2 mm. Petiole 5–8 mm; leaf blade oblong, 15–20 × 5–8 cm, thin leathery, base broadly cuneate and sometimes with 2–4 small sunken glands, apex acute to short acuminate; lateral veins 8–10 per side, slightly raised on both surfaces, reticulate veinlets slightly raised, almost invisible. Flowers not seen. Fruiting calyx ca. 2 cm in diam., leathery when dry; lobes (4 or)5, broadly triangular-ovate, apex obtuse. Berry red, solitary, depressed globose, ca. 2 cm in diam., 8-locular, subsessile, apex cuspidate. Seeds blackish brown, elliptic-oblong, 1–1.2 cm. Fr. Oct.

* Evergreen broad-leaved mixed forests in ravines. Hainan (Yai Xian).

34. *Diospyros siderophylla* H. L. Li, J. Arnold Arbor. 24: 450. 1945.

山榄叶柿 shan lan ye shi

Trees 4–6(–15) m tall. Bark blackish brown. Branches blackish when dry; branchlets brown, glabrous except when young. Winter buds caudate, 7–10 mm, densely appressed brownish yellow pubescent. Petiole 5–10 mm; leaf blade oblong-lanceolate, 6.5–20 × 2–6 cm, leathery, glabrous, drying abaxially pale to glaucous green, adaxially darker, base cuneate, margin narrowly revolute, apex bluntly acuminate; lateral veins 10–14 per side, reticulate veinlets inconspicuous, abaxially slightly raised. Staminate flowers solitary or 2 to several in clusters, sessile; calyx campanulate, 4-ridged, both surfaces brown tomentose, lobes 4; corolla ca. 8 mm, 4-ridged, outside densely brown tomentose, inside glabrous; corolla lobes 4, convolute; stamens 16. Pistillate flowers not seen. Fruiting calyx ca. 2 cm in diam., outside densely short appressed hirsute, inside densely pale brown sericeous; lobes 4, spreading, triangular-ovate, margin revolute, ca. 6 × 7 mm. Berry brown, solitary, globose, 2–2.8 cm in diam., 8-locular, subsessile, densely short appressed hirsute. Seeds dark brown, compressed oblong, ca. 8 mm. Fl. Jun, fr. Oct–Nov.

* Forests, limestone hills or ravines; 400–500 m. S, SW, and W Guangxi.

A meal of ground leaves mixed with tea leaves has been used as a farm pesticide.

35. *Diospyros caloneura* C. Y. Wu in C. Y. Wu & H. W. Li, Yunnan Redai Yaredai Zhiwu Quxi Yanjiu Baogao (Rep. Stud. Pl. Trop. Subtrop. Yunnan) 1: 14. 1965.

美脉柿 mei mai shi

Trees 4–5 m tall. Young branchlets glabrous or appressed rusty pubescent, apically glabrescent. Petiole 5–10 mm, margins hairy; leaf blade lanceolate to oblong-elliptic, 4.5–15 × 2–5 cm, thin leathery, glabrous, base broadly cuneate to subrounded, apex bluntly acuminate; lateral veins 6–10 per side, reticulate veinlets dense, conspicuously pale, raised on both surfaces. Cymes lax, 3-flowered. Staminate flowers: calyx glabrous, lobes 4; corolla urceolate, ca. 6 mm, both surfaces densely yellowish brown puberulent; corolla lobes reflexed; stamens 16; filaments puberulent. Pistillate flowers: calyx lobes 4; corolla broadly urceolate, slightly shorter than calyx, tube ca. 5 mm; corolla lobes reflexed, oblong-ovate, ca. 3.5 × 1.7 mm, both surfaces hairy; staminodes 16, in 2 whorls, well developed, glabrous; ovary densely dirty yellow tomentose; style glabrous. Fruit in lax cymes, peduncle ca. 8 mm. Fruiting pedicel 7–10 mm. Fruiting calyx deeply divided, appressed pubescent on both surfaces; lobes 4, spreading, narrowly lanceolate, 0.9–1.4 cm 4–6 mm, conspicuously veined. Berry oblong, 2–2.7 cm in diam., densely brownish hispidulous. Fl. Mar–Apr, fr. Aug.

* Grassy slopes or under forests; 1800–1900 m. Yunnan (Jingdong Xian, Weishan Xian).

36. *Diospyros reticulineris* C. Y. Wu in C. Y. Wu & H. W. Li, *Yunnan Redai Yaredai Zhiwu Quxi Yanjiu Baogao* (Rep. Stud. Pl. Trop. Subtrop. Yunnan) 1: 12. 1965.

网脉柿 wang mai shi

Trees to 6 m tall; most parts dirty yellow pubescent. Petiole ca. 8 mm; leaf blade elliptic to oblong, 9–13.5 × 3.5–4.5 cm, leathery, base rounded, apex acuminate; lateral veins 7–9 per side, raised on both surfaces, reticulate veinlets dense, conspicuously raised on both surfaces. Staminate flowers: calyx brown strigose, lobes 4; corolla urceolate-tubular, ca. 6 mm, outside densely yellowish brown puberulent; stamens 16; pistillode densely rusty bearded at apex. Pistillate flowers not seen. Fruiting pedicel 3–12 mm, sometimes bracteate near base; bracts linear, 3–4.5 mm. Fruiting calyx lobes 4, reflexed, narrowly triangular, ca. 8 mm. Berry brown, ca. 2.5 cm in diam., base densely appressed yellowish tomentose. Fr. Nov.

* 1100–1600 m. Yunnan.

- 1a. Young branchlets puberulent;
fruiting pedicel ca. 12 mm 36a. var. *reticulineris*
1b. Young branchlets glabrescent;
fruiting pedicel 3–12 mm 36b. var. *glabrescens*

36a. *Diospyros reticulineris* var. *reticulineris*

网脉柿(原变种) wang mai shi (yuan bian zhong)

Trees to 6 m tall. Young branchlets dirty yellow puberulent. Flower unknown. Fruiting pedicel ca. 1.2 cm. Persistent calyx lobes narrowly triangular, ca. 8 mm, reflexed. Berry brown, ca. 2.5 cm in diam., base densely appressed yellowish tomentose. Fr. Nov.

* Dense forests in valleys; ca. 1100 m. Yunnan (Yanshan Xian).

36b. *Diospyros reticulineris* var. *glabrescens* C. Y. Wu in C. Y. Wu & H. W. Li, *Yunnan Redai Yaredai Zhiwu Quxi Yanjiu Baogao* (Rep. Stud. Pl. Trop. Subtrop. Yunnan) 1: 13. 1965.

无毛网脉柿 wu mao wang mai shi

Young branchlets glabrescent. Peduncle of staminate inflorescences, pedicels, corolla limbs inside, bracts abaxially dirty yellow puberulent. Staminate inflorescences cymose, 3-flowered. Staminate flower calyx 4-parted, smaller than pistillate calyx, brown strigose; corolla urceolate-tubular, ca. 6 mm, outside densely yellowish brown puberulent; stamens 16. Fruiting peduncle 5–8(–12) mm, with subapical bract scars; pedicel 3–4 mm, sometimes recurved, bracteate near base; bracts linear, 3–4.5 mm. Berry solitary. Fl. Mar–Apr, fr. Nov.

* Ca. 1600 m. SE Yunnan.

37. *Diospyros sunyiensis* Chun & L. Chen, *Sunyatsenia* 3: 21. 1935.

信宜柿 xin yi shi

Shrubs or small trees, 4–6 m tall. Branches grayish black, with irregular longitudinal crevices; young branchlets densely dull yellow tomentose, glabrescent. Petiole 6–8 mm; leaf blade oblong-obovate, 10–19 × 3.5–7 cm, stiff papery, abaxially tawny pilose and more densely hairy along midrib, adaxially glabrous except for puberulent main veins and drying gray green, base rounded to shallowly cordate or rarely broadly cuneate, margin slightly revolute, apex acuminate; lateral veins 7–9(or 10) per side, reticulate veinlets dense, raised on both surfaces. Flowers not seen. Fruiting pedicel (1.2–)2 cm, dull yellow tomentose. Fruiting calyx outside somewhat pubescent, inside glabrous; lobes 4, spreading, ovate to ovate-lanceolate, 1.5(–2) × (0.8–)1(–1.3) cm, with numerous parallel veins. Berry solitary, globose, 3–3.5 cm in diam., 7-locular, dull yellow pubescent to densely yellowish brown strigose, glabrescent. Seeds 7, oblong, 1.3–1.6 cm × 6–8 × ca. 4.5 mm. Fr. Aug.

* Mixed forests; low altitudes. Guangdong (Xinyi Xian), Guangxi (Jingxi Xian).

38. *Diospyros sutchuensis* Yang, J. W. *China Border Res. Soc.*, ser. B, 15: 89. 1945.

川柿 chuan shi

Trees 7–8 m tall. Bark gray, rugose. Branches glabrous or sparsely puberulent; branchlets puberulent. Petiole 6–10 mm, densely pubescent; leaf blade elliptic to oblong-elliptic, 8–12 × 2.8–4.7 cm, papery, adaxially deep green and shiny, base rounded to subrounded, apex acute to rarely acuminate, midrib hairy on both surfaces; lateral veins 6–8 per side, abaxially raised, adaxially impressed. Flowers not seen. Fruiting pedicel 1.2–2 cm, densely pubescent. Fruiting calyx pubescent on both surfaces; lobes 4, ovate, 1.2–1.8 × 1–1.4 cm, veined. Berry yellowish green, solitary, subglobose, 3–4 cm in diam., densely pubescent. Seeds 3–7, chestnut brown, glossy, subreniform, 1.6–1.8 × 1.1–1.2 cm. Fr. Oct.

* Forests; ca. 1300 m. Sichuan (E of Sichuan Basin).

39. *Diospyros miaoshanica* S. Lee, *Guihaia* 3: 288. 1983.

苗山柿 miao shan shi

Shrubs or small trees. Bark dark brown to yellowish brown. Older branches glabrescent; young branchlets yellow tomentose. Petiole ca. 1.2 cm; leaf blade lanceolate to oblong-lanceolate, 7–17 × 3–5.5 cm, abaxially glabrous except for midrib and lateral veins, adaxially shiny and glabrous except for midrib when young, base broadly cuneate to subrounded, apex acuminate to acute; lateral veins 7 or 8 pairs, reticulate veinlets closely spaced, conspicuous on both surfaces. Flowers not seen. Fruiting pedicel 3–4 cm, slender, grayish yellow tomentose when young, glabrescent. Fruiting calyx appressed pubescent; lobes 4, ovate, 1.6–1.8 cm × 8–10 mm, with several parallel veins. Berry on basal part of young branchlets, orange-yellow, globose, 2.8–3.5 cm in diam., densely appressed pubescent, glabrescent. Seeds ca. 1.5 × 1 cm. Fr. Oct.

* Forests on slopes, open forests in valleys; ca. 900 m. N Guangxi, W Hunan.

40. *Diospyros tutcheri* Dunn, *Bull. Misc. Inform. Kew* 1913: 354. 1913.

岭南柿 ling nan shi

Diospyros taamii Merrill.

Trees to ca. 6 m tall. Bark rough. Branches gray and black; young branchlets yellowish brown, glabrous except for some hairs at base. Winter bud scales outside densely appressed pubescent. Petiole 5–10 mm, minutely pubescent when young; leaf blade elliptic, elliptic-lanceolate, or oblong-lanceolate, 8–12 × 2.4–4.5 cm, thin leathery, glabrous, drying gray-green when young, darker when older, base obtuse to subrounded, margin slightly revolute, apex acuminate; lateral veins 5 or 6 per side, reticulate veinlets dense, conspicuously raised on both surfaces. Staminate flowers: calyx lobes 4; corolla urceolate, 7–8 mm, both surfaces hairy; stamens 16; filaments pubescent. Pistillate flowers solitary, sometimes grouped on short racemelike lateral branches; calyx lobes 4; corolla broadly urceolate, ca. 5 mm. Fruiting pedicel 1–1.8 (–2.2) cm, pubescent. Fruiting calyx deeply divided, glabrescent; lobes 4, spreading, ovate-lanceolate, ca. 1.5 × 1.1 cm, papery, reticulate veined. Berry globose, ca. 2.5 cm in diam., densely strigose, glabrescent. Fl. Apr–May, fr. Aug–Oct.

* Along streams in valleys, slopes of mountains, open forests in moist places. Guangdong, S Guangxi, SW Hunan.

41. *Diospyros potingensis* Merrill & Chun, *Sunyatsenia* 5: 164. 1940.

保亭柿 bao ting shi

Trees 5–7 m tall. Branches dark brown; young branchlets glabrous to sparsely hirsute. Winter buds conical, scaly, abaxially appressed pubescent, margins ciliate. Petiole 5–8 mm, glabrous or sparsely hirsute; leaf blade lanceolate to lanceolate-elliptic, 7–14 × 2.5–5 cm, papery, glabrous or midrib abaxially with a few long appressed hairs, drying slightly

brownish abaxially, adaxially grayish, base usually rounded, apex acuminate; lateral veins 7–11 per side, indistinctly looped, reticulate veinlets dense, slender, pale, sharply raised on both surfaces. Flowers not seen. Fruiting pedicel 1.5–2.5 cm, sparsely hairy. Fruiting calyx deeply divided, very sparsely hairy; lobes 4, spreading, ovate-lanceolate, 1.5–2 × ca. 1.2 cm, papery, reticulate veined, often lost on ripe fruit. Berry yellow, solitary, ovoid to depressed globose, 2–3 cm, 8-locular, densely hispidulous, glabrescent. Seeds suboblong, ca. 1.5 cm × 6 mm. Fr. Jul–Aug.

Thickets, forests in valleys. SW Guangxi, Hainan [Vietnam].

42. *Diospyros fanjingshanica* S. Lee, *Guihaia* 3: 285. 1983.

梵净山柿 fan jing shan shi

Shrubs or small trees. Young branchlets glabrous or slightly appressed hairy at base, sometimes obscurely spine tipped. Petiole ca. 8 mm; leaf blade oblong to elliptic-oblong, 7–12.5 × 2–4 cm, thin leathery, glabrous except for adaxially puberulent midrib of young leaves, base broadly cuneate, apex acuminate to short caudate; lateral veins ca. 9 per side, reticulate veinlets conspicuous on both surfaces. Flowers not seen. Fruiting pedicel ca. 2 cm, puberulent. Fruiting calyx puberulent on both surfaces; lobes 4, ca. 2 × 1 cm. Berry on basal part of young branchlets, solitary, globose, ca. 3 cm in diam., appressed hispidulous, glabrescent. Seeds 4. Fr. Dec.

* Dense forests in valleys; ca. 500 m. NE Guizhou (Fanjing Shan).

The relationship between *Diospyros fanjingshanica*, *D. zhenfengensis*, and *D. longshengensis* needs further study, and the three are distinguished by fairly minor quantitative characters.

43. *Diospyros zhenfengensis* S. Lee, *Guihaia* 3: 286. 1983.

贞丰柿 zhen feng shi

Trees to 13 m tall. Bark dark grayish, with irregular longitudinal fissures. Young branchlets puberulent to appressed hirsute near base. Winter buds yellowish brown hirsute. Petiole ca. 1 cm, adaxially puberulent; leaf blade elliptic, 11–18 × 3.2–5.6 cm, adaxially sometimes scattered long strigose, base rounded, apex acuminate; lateral veins 10–12 per side. Flowers not seen. Fruiting pedicel 1.6–2.5 cm, dirty yellow pubescent. Fruiting calyx ± appressed pubescent; lobes 4, broadly ovate, ca. 2 × 1.2–1.5 cm. Berry on basal parts of young branchlets, depressed globose, ca. 2.6 cm in diam., strigose, glabrescent. Fr. Oct.

* Thickets. Guizhou (Zhenfeng Xian).

44. *Diospyros longshengensis* S. Lee, *Guihaia* 3: 286. 1983.

龙胜柿 long sheng shi

Shrubs to 3 m tall. Bark dark grayish. Branches glabrous, rarely slightly puberulent. Petiole 6–8 mm; leaf blade narrowly elliptic, 8–14 × 2.5–4.4 cm, thin leathery, abaxially usually glabrous except for scattered long appressed hairs along midrib, base broadly cuneate to subrounded, margin sometimes with sparse long appressed hairs when young, apex caudate.

Flowers not seen. Fruiting pedicel 3.3–4.7 cm, slender, apically densely minutely pubescent. Fruiting calyx ca. 5.3 cm in diam., outside with appressed hairs; lobes 4, ovate-lanceolate, ca. 2.5 cm, unequal. Berry yellowish green to yellow, solitary, globose, ca. 3 cm in diam., densely yellowish brown strigose. Fr. Jul–Aug.

* Scarce in dense forests in valleys. Guangxi (Longsheng Xian).

45. *Diospyros punctilimba* C. Y. Wu in C. Y. Wu & H. W. Li, *Yunnan Redai Yaredai Zhiwu Quxi Yanjiu Baogao* (Rep. Stud. Pl. Trop. Subtrop. Yunnan) 1: 16. 1965.

点叶柿 dian ye shi

Trees to 10 m tall. Older branches strigose; young branchlets brown, angular, densely rusty pubescent. Petiole 3–6 mm; leaf blade elliptic to ovate, 2.5–8(–13) × 1.5–3.5 cm, leathery, glabrous, abaxially with minute globose glands each sunken in a pit, base cuneate to subrounded, margin revolute, apex short acuminate; lateral veins 10–20 per side, reticulate veinlets abaxially raised, enclosing groups of glands. Flowers not seen. Fruiting pedicel ca. 5 mm, robust, densely rusty tomentose. Fruiting calyx disc-shaped, both surfaces densely minutely yellowish to rusty tomentose; lobes 4, ± triangular-ovate, thick, ca. 7 × 7 mm. Berry globose, ca. 2 cm in diam., densely rusty tomentose, glabrescent. Fr. May.

* Ca. 1100 m. Yunnan (Yuan Jiang valley).

46. *Diospyros eriantha* Champion ex Bentham, Hooker's J. Bot. Kew Gard. Misc. 4: 302. 1852.

乌材 wu cai

Trees or shrubs 2.5–15 m tall, evergreen, many parts rusty strigose. Trunk to 30 cm d.b.h. Branches glabrescent. Winter buds ovoid, scales brown strigose with a glabrous margin. Petiole 5–6 mm, densely brown strigose; leaf blade oblong-lanceolate, 5–15 × 1.8–4 cm, papery, glabrous except for brown strigose hairs on midrib and abaxially on larger veins, drying abaxially brown and adaxially often blackish or grayish, base rounded to cuneate, apex acuminate; lateral veins 4–7(or 8) per side, reticulate veinlets mostly transverse, abaxially inconspicuously raised to ± invisible. Staminate flowers in 1–3-flowered cymes, subsessile; calyx base concealed by overlapping ovate bracts, lobes 4; corolla white, narrowly urceolate, 1–1.2 cm overall, outside densely strigose, inside glabrous; corolla lobes 4, lanceolate, 4–5 × ca. 2.5 mm, apex long acuminate to caudate; stamens 14–16. Pistillate flowers solitary; calyx ca. 5 mm; calyx lobes 4, both surfaces strigose; corolla creamy white, salverform; corolla lobes 4, outside strigose, inside glabrous; staminodes 4–8; ovary densely strigose; styles strigose at base. Fruiting calyx 0.8–1.2 cm, sparsely strigose; lobes 4, erect to spreading, lanceolate to ovate, 6–8 × 4.5–7 mm, apex subacute. Berry purple, ovoid, 1.2–1.8 cm × 5–8 mm, 4-locular, strigose, slightly glabrescent. Seeds 4. Fl. Jul–Aug, fr. Oct–Feb.

Open to dense forests, slopes or in valleys; below 500 m. Guangdong, Guangxi, Hainan, Taiwan [Indonesia, Japan, Laos, Malaysia, Vietnam].

A gum derived from unripe fruit, called persimmon lacquer, is used to waterproof material such as oilcloths, fishing nets, etc. The wood is hard, heavy, durable, and maintains a permanent shape. It is used for construction, turnery, agricultural implements, and furniture.

47. *Diospyros strigosa* Hemsley, Bull. Misc. Inform. Kew 1910: 193. 1910.

毛柿 mao shi

Diospyros cardiophylla Merrill.

Shrubs or small trees, to 8 m tall, many parts conspicuously rusty strigose to pilose. Bark dark brown. Petiole 2–4 mm; leaf blade oblong, 5–14 × 2–6 cm, papery to thick papery, abaxially reddish brown pilose on all veins and on margin, adaxially glabrous and usually drying gray brown but sometimes blackened, base truncate to cordate, apex acute to acuminate; lateral veins 7–10 per side, abaxially impressed, reticulate veinlets transverse, abaxially raised. Flowers solitary. Calyx lobes 4. Corolla salverform, 7–10 mm, inside glabrous; lobes 4. Staminate flowers with 12 stamens. Pistillate flowers with filiform staminodes; ovary strigose; styles 2. Fruiting calyx lobes 4, lanceolate, 7–10 × 3–4 mm, apex acute. Berry brown when dry, globose to ovoid, 1–1.5 cm, sessile, 4-locular, brown pilose. Seeds 1–4, dark brown, ± 3-sided, ca. 8 × 3.7 × 3.2 mm, tip extended into a beak. Fl. Jun–Aug, fr. winter.

* Dense to open forests. Hainan (Leizhou peninsula).

48. *Diospyros xianguiensis* S. Lee, Guihaia 3: 287. 1983.

湘桂柿 xiang gui shi

Shrubs or small trees, 3–8 m tall, evergreen. Bark gray to dark gray. Branches glabrous; young branchlets yellowish brown tomentose. Winter buds elliptic, densely and somewhat appressed yellowish brown pubescent. Petiole ca. 5 mm; leaf blade elliptic, 5–10 × 1.7–4 cm, thick papery, densely appressed yellowish brown pubescent when young, adaxially glabrescent and drying slightly grayish; lateral veins 4–6 per side. Staminate flowers in short 3–5-flowered cymes; calyx lobes 4; corolla campanulate, lobes 4; stamens 14–16. Pistillate flowers solitary; corolla subcampanulate, lobes 4; staminodes ca. 10; ovary appressed yellowish brown pubescent. Style base connate. Berry subglobose, ca. 1.8 cm in diam., with densely appressed hairs, glabrescent. Seeds 4. Fl. Apr, fr. Nov.

* Open forests, limestone hills, by streams. Guangxi (Guilin Shi, Lingchuan Xian), Hunan (Yichang Xian).

49. *Diospyros kerrii* Craib, Bull. Misc. Inform. Kew 1911: 408. 1911.

傣柿 dai shi

Trees to 12(–20) m tall, evergreen, many parts rusty strigose. Branchlets brown, glabrescent. Winter buds ovoid, apex acute. Petiole 5–8 mm; leaf blade obovate, 4–10.5 × 2–4 cm, thick papery, glabrescent except for abaxially densely strigose midrib and margin, drying abaxially pale gray and adaxially dark gray, base broadly cuneate to cuneate, margin narrowly but distinctly revolute, apex acuminate; lateral veins

ca. 8 pairs, reticulate veinlets lax, indistinct. Staminate flowers in 3–7(or more)-flowered cymes, to 1.5 cm; pedicel ca. 2 mm, densely reddish brown pubescent to tomentose; calyx deeply divided, densely gray to pale yellow appressed pubescent; calyx lobes 4, ovate, 2.5–3 × ca. 1.8 mm, apex subacute; corolla white, acute in bud, urceolate; tube 6–7 mm, outside densely pubescent; corolla lobes 4, ca. 2 × 1.5 mm. Pistillate flowers not seen. Fruiting pedicel ca. 4 mm, slightly reflexed. Fruiting calyx outside more densely hairy; lobes 4, lanceolate, 8–10 × ca. 5 mm, apex acute. Berry solitary, globose, 8 (–20) mm, glabrescent. Fr. Nov.

Thickets, mixed forests; 900–1600 m. Yunnan (Xishuangbanna Daizu Zizhizhou) [Thailand].

50. *Diospyros hasseltii* Zollinger, Tijdschr. Ned. Indie 14: 159. 1857.

黑毛柿 *hei mao shi*

Diospyros atrotricha H. W. Li; *D. horsefieldii* Hiern.

Shrubs or small trees, 2–4 m tall. Older branches grayish brown, asperous. Winter buds dark, glabrous. Petiole 0.8–1.2 cm; leaf blade ovate, 16–17 × 5.5–7 cm, leathery, glabrous, base cuneate, apex short acuminate; lateral veins ca. 10 per side, adaxially raised. Flowers not seen. Infructescences flat topped, usually 3-fruited, 1.5–3.5 cm (excluding fruit), densely dark pubescent. Fruiting pedicel 1–2 cm, apically slightly thickened. Fruiting calyx slightly dark pubescent; lobes 4, ovate-triangular, leaflike, ca. 1.2 × 1.2 cm. Berry globose, ca. 2.2 cm in diam., densely appressed blackish pubescent at base, glabrescent. Seeds dark brown, ca. 1.1 cm × 5 mm. Fr. May.

Forests on limestone hills. Yunnan (Xishuangbanna Daizu Zizhizhou) [Cambodia, Indonesia (Java), Laos, Malaysia, Thailand, Vietnam].

51. *Diospyros xishuangbannaensis* C. Y. Wu & H. Chu, Novon 5: 296. 1995.

版纳柿 *ban na shi*

Trees to 20 m tall. Branchlets densely brown hairy. Petiole 2–3 mm; leaf blade oblong to oblong-lanceolate, 8–18 × 3–4.5 cm, stiff papery to almost leathery, abaxially pubescent, adaxially pubescent on veins, glabrescent, base rounded to subcordate, apex acuminate; lateral veins 10–15 per side, reticulate veinlets abaxially conspicuous. Flowers solitary. Staminate flowers: pedicel 8–10 mm; calyx 6–7 mm; calyx lobes 4, linear-lanceolate, outside appressed sericeous, inside glabrous; corolla salverform, ca. 1.6 cm; corolla tube ca. 7 mm, outside appressed hairy, inside glabrous; corolla lobes 4, narrowly lanceolate, ca. 9 mm; stamens 8; filaments glabrous; pistillode sparsely villous. Pistillate flowers: pedicel 1–1.6 cm; calyx and corolla similar to staminate flowers but lobes 5, ovary 4-locular, hairy. Fruiting pedicel 1–1.6 cm. Fruiting calyx lobes 5, recurved. Berry globose, 2–2.5 cm in diam., 4-locular, densely sericeous. Seeds 4.

* Forests. Yunnan (Mengla Xian).

The original publication of this species (Acta Bot. Yunnan. 12: 375. 1990) was invalid because it indicated more than one type (for both flowering and fruiting states).

52. *Diospyros philippensis* (Desrousseau) Gürke in Engler & Prantl, Nat. Pflanzenfam. 4(1): 164. 1891.

异色柿 *yi se shi*

Cavanillea philippensis Desrousseau in Lamarck, Encycl. 3: 663. 1792; *Diospyros discolor* Willdenow; *D. utilis* Hemsley.

Trees to 20 m, evergreen. Bark dark brown. Branchlets green when young, sericeous, becoming gray and glabrous. Winter buds sericeous. Petiole 0.5–1.7 cm, robust, densely pubescent; leaf blade oblong to oblong-elliptic, (7.5–)20–30 × (3.5–)7–11 cm, leathery, abaxially sericeous to appressed pubescent when young, becoming glaucous, glabrous, with small sharply delimited sunken glands scattered between lateral veins and 3–12 mm from midrib, adaxially glabrous, drying abaxially grayish and adaxially brown, base rounded to shallowly cordate, apex acuminate, acute, or rarely obtuse; lateral veins 10–14 or more per side, inconspicuous, reticulate veinlets almost invisible. Staminate flowers in sericeous (1–) 3–7-flowered cymes or racemes, fragrant; pedicel 1–7 mm, densely villous; calyx densely villous; calyx lobes 4, oblong; corolla white, urceolate, outside slightly hairy; corolla lobes 4, reflexed; stamens 24. Pistillate flowers solitary, similar to staminate flowers, subsessile; staminodes apparently absent; style apparently 3-cleft. Fruiting calyx 1.4–2.8 cm in diam., outside densely sericeous; lobes 4, recurved, oblong, 1–1.5 cm, villous. Berry red to pink, solitary, globose, ca. 8 cm, 8–10-locular, densely rusty, yellowish, or gray villose. Seeds dark brown with thin pale skin, 3-sided, ca. 2.7 × 1.4 × 1.4 cm. Fl. Mar–May, fr. Nov.

Coastal forests; near sea level to 200 m. Taiwan (Guishan Dao, Hengchun peninsula, Lanyu) [Indonesia, Philippines].

Diospyros philippensis is cultivated throughout tropical Asia and tropical America. The fruit are edible after removing hairs and skin but do not taste good. The wood is hard, tough, fine textured, similar to ebony, and is used for furniture, crafts, and exterior work.

53. *Diospyros chunii* F. P. Metcalf & L. Chen, Lingnan Sci. J. 14: 618. 1935.

崖柿 *ya shi*

Shrubs or small trees, to 4–7 m tall. Older branches dark to gray brown; young branchlets pale rusty to yellowish brown tomentose, glabrescent. Winter buds short caudate, brownish yellow tomentose. Petiole 5–9 mm; leaf blade oblong to oblong-lanceolate, 7–7.5 × 2–3.3 cm, thin leathery, abaxially glabrescent except for brownish tomentose midrib and pubescent veins, adaxially sparsely pubescent, base obtuse, margin tomentose, apex acute; lateral veins 4–7 per side, reticulate veinlets slender, ± prominent on both surfaces. Flowers not seen. Fruiting pedicel ca. 4 mm, yellowish brown tomentose. Fruiting calyx divided to near base, outside yellow tomentose, inside glabrous; lobes 4, overlapping, broadly ovate, ca. 6 × 7 mm. Berry greenish yellow, subglobose, ca. 3 cm in diam., 4-locular, glabrescent, apex acu-

minate, appressed pubescent. Seeds 4, oblong, compressed, ca. 1.2 cm × 8 mm. Fr. Feb.

* Evergreen broad-leaved forests, thickets in moist places. Hainan (Ya Xian).

54. *Diospyros hainanensis* Merrill, Philipp. J. Sci. 23: 258. 1923.

海南柿 hai nan shi

Trees to 20 m tall. Trunk to 60 cm d.b.h. Branches pale gray; young shoots dark brown to almost black hispidulous. Petiole 1–1.5(–2) mm; leaf blade narrowly elliptic, elliptic, or lanceolate, 10–19 × 3.5–7.5 cm, leathery, glabrescent, adaxially ± glossy, base broadly cuneate, apex obtuse to obtusely acuminate; lateral veins 9 or 10 per side, reticulate veinlets dense, abaxially raised. Staminate flowers solitary or crowded in cymes; calyx campanulate, ca. 0.8 × 1–1.2 cm in diam., dark brown strigose; calyx lobes 4, shorter than tube, erect, flat; corolla white, campanulate, glabrous, tube as long as calyx; corolla lobes 4 or 5; stamens 40. Pistillate flowers solitary; calyx bowl-shaped, ca. 1 × 1.5 cm, lobes 4; corolla campanulate, ca. 1.6 cm; corolla lobes 4, recurved, 5–8 × 6–7 mm. Fruiting pedicel 5–7 mm, robust. Berry black, ovoid to subglobose, 3–5 cm in diam., usually 8-locular, glabrescent when ripe. Fl. Mar–May, fr. Aug–Jan.

* Evergreen broad-leaved forests in moist places; below 800 m. Hainan.

The wood is hard, heavy, and suitable for construction, furniture, and agricultural tools.

55. *Diospyros ehretioides* Wallich ex A. de Candolle, Prodr. 8: 231. 1844.

红枝柿 hong zhi shi

Trees to 16 m tall; young branchlets, winter buds, petioles, inflorescences, and immature fruit brownish tomentose. Trunk to 1.5 m d.b.h. Petiole ca. 1 cm; leaf blade oblong-elliptic to elliptic, 8–20 × 6.5–9 cm, leathery, abaxially pubescent and denser on midrib, adaxially pubescent, glabrescent except for hairs along midrib, base broadly cuneate to rounded, apex acute to rounded; lateral veins (6 or) 7–10 per side, reticulate veinlets lax, slender, raised on both surfaces. Staminate flowers in 3-flowered cymes, usually on current year's branchlets, small; calyx brownish villous, lobes 4; corolla ca. 2 × as long as calyx, outside densely pubescent, margin ciliate; stamens glabrous. Pistillate flowers in pedunculate cymes; pedicel much shorter than peduncle, often only 1 forming fruit; calyx outside densely brownish pubescent, inside at base densely brownish sericeous; ovary densely brownish pubescent. Fruiting peduncle plus pedicel 1–2 cm, robust. Fruiting calyx deeply divided, 1.5–1.8 cm in diam.; lobes some eventually strongly reflexed, ca. 7 × 6 mm, often unequal, pubescent. Berry globose, to 3(–3.5) cm in diam. Seeds compressed, oblong, ca. 1.5 cm; endosperm ruminant.

Dense to open forests, on slopes or in valleys. Hainan [Cambodia, India, Myanmar, Thailand].

Collections from Hainan have small inflorescences and larger fruit than those from India and Thailand. Perhaps their status needs reassessment.

56. *Diospyros rubra* Lecomte, Atlas Bois Indochine 188. 1925.

青茶柿 qing cha shi

Trees to 7 m tall. Trunk to 60 cm d.b.h. Winter buds brownish appressed pubescent. Petiole 0.6–1.5 cm; leaf blade elliptic to narrowly elliptic, 10–14 × 3.5–5 cm, papery, drying brownish abaxially and green adaxially, base broadly cuneate to subrounded, apex obtuse; lateral veins 6–8 per side, reticulate veinlets dense, raised on both surfaces. Flowers not seen. Fruiting calyx densely tomentose on both surfaces; lobes 4(–8), strongly recurved, 3.5–5 mm. Berry orange, solitary, globose, 1–1.5 cm in diam., sessile, strigose, glabrescent except at apex. Seed usually 1, subglobose to ellipsoid, ca. 1 cm. Fr. Sep–Dec.

Mixed broad-leaved forests on mountains, forests on plains. SW and W Hainan [Cambodia, Thailand, Vietnam].

The wood is used for construction, agricultural tools, and furniture.

57. *Diospyros anisocalyx* C. Y. Wu in C. Y. Wu & H. W. Li, *Yunnan Redai Yaredai Zhiwu Quxi Yanjiu Baogao* (Rep. Stud. Pl. Trop. Subtrop. Yunnan) 1: 9. 1965.

异萼柿 yi e shi

Trees to 8 m. Older branches with small conspicuous lenticels; branchlets densely yellow puberulent, almost tomentose. Petiole 5–12 mm; leaf blade oblong, 5–15 × 2.5–7 cm, thin leathery, drying brown but abaxially paler, base rounded, apex bluntly acute to acuminate; lateral veins 9–11 per side, adaxially impressed, reticulate veinlets raised, clearly defined. Staminate flowers in 3–7-flowered cymes at base of young branchlets; calyx outside sparsely pubescent, inside glabrous, lobes 4; corolla lobes 4; stamens 16, pubescent only at apex; pistillode densely dirty yellow strigose. Pistillate flowers solitary. Fruiting pedicel ca. 1.8 cm (immature). Fruiting calyx 3–4.5 cm in diam.; lobes 4, unequal, larger ca. 2 × 1.3 cm, smaller ca. 1.2 × 0.8–1.2 cm. Young berry densely dirty yellow strigose. Mature fruit not seen. Fl. Apr–May, fr. May–Jun.

* Forests on limestone hills; 500–1000 m. Yunnan (Funing Xian).

58. *Diospyros maritima* Blume, Bijdr. 669. 1826.

海边柿 hai bian shi

Diospyros kusanoi Hayata; *D. liukiuensis* Makino.

Trees 3–12 m tall, evergreen. Young shoots yellowish brown, glabrous. Winter buds sericeous. Petiole ca. 1 cm; leaf blade oblong-elliptic to lanceolate-oblong, 7–17 × 3–8 cm, leathery, glabrous except sometimes pubescent abaxially when young, base obtuse to somewhat attenuate, with 2(–4) gland patches near petiole, apex obtusely acuminate; lateral veins ca. 7 per side, reticulate veinlets slender, inconspicuous. Inflorescences bracteate at base. Staminate flowers in 2- or 3-flowered cymes; pedicel short, thick; calyx

ca. 3.5 mm, densely sericeous throughout; calyx lobes 4, triangular, slightly longer than tube; corolla urceolate, ca. 1.6 cm; corolla tube ca. 9 mm, outside densely appressed hairy; corolla lobes 3 or 4, oblong, ca. 7×4 mm, outside with half densely sericeous, otherwise subglabrous, apex rounded; stamens 16; filaments hirsute; pistillode hirsute. Pistillate flowers solitary, sessile; calyx lobes 4, both surfaces sericeous; corolla outside sericeous, inside glabrous; staminodes present; ovary 8-locular, rusty hairy. Fruiting calyx ca. 2 cm in diam.; lobes 4, poorly defined, reflexed. Berry orange colored, depressed globose, 1.5–3 cm in diam., 8-locular, glabrous when ripe except for base of style.

Usually scattered in thickets along seashore. N and S Taiwan, Yunnan [Cambodia, Indonesia, Japan (Ryukyu Islands), Laos, Philippines, Vietnam; Australia, New Guinea, Pacific Islands].

The fruit and bark contain an anesthetic substance. The wood is used for furniture and rifle butts.

59. *Diospyros inflata* Merrill & Chun, Sunyatsenia 5: 163. 1940.

囊萼柿 nang e shi

Trees to 15 m tall; branchlets, winter buds, and petioles densely strigose. Bark black to grayish black. Branches grayish black to grayish brown, glabrescent. Petiole 0.8–1.4 cm; leaf blade elliptic, 12–22 \times 4.5–10 cm, leathery, abaxially light brown, strigose on veins and sometimes with small scattered sunken glands especially toward base, adaxially lustrous, sparsely pubescent or glabrous, base broadly cuneate, margin densely ciliate when young, apex abruptly acuminate; lateral veins 7–12 per side, reticulate veinlets slender, lax, abaxially raised, adaxially indistinctly raised. Staminate flowers in 2- to several-flowered cymes or panicles, 1–2.5 cm; calyx urceolate, ca. 6 mm, outside appressed pubescent, lobes 3; corolla outside densely appressed pubescent; calyx lobes 4 or 5, inside glabrous. Pistillate flowers solitary or clustered. Fruiting pedicel ca. 1 cm, densely brown strigose. Fruiting calyx ovoid when young, almost entirely enclosing fruit, ca. 3 \times 2.5 cm, densely strigose especially inside; lobes indistinct. Young berry light brown to reddish brown, ovate, 4-locular, strigose. Fl. Apr, fr. Sep–Oct.

* Dense forests. Hainan.

The inflated calyx readily distinguish *Diospyros inflata* from any other Chinese species.

60. *Diospyros ferrea* (Willdenow) Bakhuizen, Gard. Bull. Straits. Settle., ser. 3, 7: 162. 1933.

象牙树 xiang ya shu

Ehretia ferrea Willdenow, Phytographia 1: 4. 1794; *Diospyros ferrea* var. *buxifolia* (Rottboell) Bakhuizen; *Maba buxifolia* (Rottboell) Jussieu; *M. ferrea* (Willdenow) Aubr 関 ille; *Pisonia buxifolia* Rottboell.

Trees evergreen, sometimes procumbent. Branchlets grayish, pubescent to hirsute, glabrescent. Winter buds appressed brownish pubescent to hirsute. Petiole 4–5 mm; leaf blade oblong, oblong-oblongate, or elliptic, occasionally obovate, 2–4(–8) \times 1–2(–3) cm, leathery, glabrous or nearly so, base attenuate to obtuse, apex rounded to emarginate; lateral veins 5–7 per side, usually inconspicuous, reticulate veinlets almost invisible and sometime adaxially \pm raised. Staminate inflorescences 1–3-flowered, densely appressed pubescent. Staminate flowers with pedicel very short to almost absent; calyx cupular, 2.5–3.5 mm, densely pubescent; calyx lobes 3, erect, flat, ca. 1/2 as long as tube, apex rounded; corolla urceolate, 6–8.5 mm; corolla tube 4–5 mm, outside partly densely sericeous, inside glabrous; corolla lobes 3, spreading, 2–3.5 \times 1.5–2 mm, apex rounded; stamens (5–)8, often partly exerted from tube; pistillode densely hirsute. Pistillate flowers sessile or subsessile; calyx lobes 3–5, ciliate, outside tomentose; ovary 3-locular, densely hirsute, rarely glabrescent. Fruiting calyx bowl-shaped, ca. 3–6 mm, pubescent or glabrous; lobes 3(–5), shorter than tube, apex rounded. Berry solitary, ellipsoid, 8–13 \times ca. 8 mm, subsessile, 3-locular, finely puberulent, glabrous when mature. Seeds 1–3, almost black, cylindrical, often flat on 1 side, ca. 8 \times 3.5 mm. Fr. Sep.

Evergreen broad-leaved forests along coast; near sea level to 500 m. Taiwan (Hengchun peninsula, Huoshao Dao, Lanyu) [Cambodia, India, Japan, Laos, Malaysia, Thailand; Australia].

Cultivated in Taipei. The wood is used for walking sticks and for ornamental carvings.

