

13. ANTIDESMA Burman ex Linnaeus, Sp. Pl. 2: 1027. 1753.

五月茶属 wu yue cha shu

Li Bingtao (李秉滔 Li Ping-tao); Petra Hoffmann

Rhytis Loureiro; *Stilago* Linnaeus.

Trees or erect shrubs, dioecious; indumentum of simple hairs. Leaves alternate, eglandular; stipules small; petiole usually short; leaf blade simple, margin entire, venation pinnate. Inflorescences axillary, sometimes apparently terminal, or cauline, spikes or racemes, sometimes much branched. Male flowers: calyx 3–5(–8)-lobed, cup-shaped, lobes imbricate; petals absent; disk extrastaminal, annular or cushion-shaped (enclosing bases of stamens and pistillode), or consisting of free lobes; stamens (1–)3–5(–7), inserted inside/within disk or sinus of disk lobes, incurved in bud, afterward straight; filaments longer than sepals; anthers 2-locular, connectives U-shaped; thecae separate from each other, resembling swollen ends of U, raised at anthesis, dehiscing longitudinally; pistillode usually present. Female flowers: sepals as in male; disk annular surrounding ovary, entire; ovary longer than sepals, usually 1-locular; ovules 2 per locule, pendent; styles 2–4, short, terminal to lateral, apex usually bifid. Fruit a drupe, ovoid, ellipsoid, or lens-shaped, with many areoles when dry, crowned with persistent styles, usually 1-seeded. Seeds small, endosperm fleshy, cotyledon flattened and broad. $x = 13$.

About 100 species: mainly the tropics and subtropics of Asia but also in Africa (8 species), the Pacific islands (5–8 species), and Australia (5–7 species); 11 species (two endemic) in China.

Material of species no. 11, *Antidesma hontaushanense*, described from Taiwan (Lan Yu), has not been seen and the available description is too poor to include this taxon within the key to species.

- 1a. Leaf apex rounded, retuse, or obtuse.
 - 2a. Sepals free, pubescent outside; petiole 0.7–1 mm wide; fruiting pedicel 0–1 mm; male disk consisting of free pubescent lobes; leaf base cordate to rounded, rarely obtuse; ovary pubescent 1. *A. ghaesembilla*
 - 2b. Sepals fused for at least 2/3 of their length, glabrous or pubescent outside; petiole 1–2 mm wide; fruiting pedicel 1.5–3(–9) mm; male disk various but never consisting of free pubescent lobes; leaf base acute to rounded; ovary glabrous or pubescent.
 - 3a. Leaves papery, dull, (2–)5–10(–21) cm; domatia present; disk pubescent, at least in male flowers; stamens (1 or)2(or 3); rudimentary ovary absent or small; fruit 4–6 × 3–4 mm; female inflorescence and infructescence 2–5(–9) cm 2. *A. acidum*
 - 3b. Leaves leathery or thickly papery, shiny, (5–)10–18(–32) cm; domatia absent; disk glabrous; stamens 3 or 4(or 5); rudimentary ovary ca. 1 mm; fruit 5–11 × 4–7 mm; female inflorescence and infructescence (4–)10–18 cm 3. *A. bunius*
- 1b. Leaf apex acute, acuminate, or caudate.
 - 4a. Stipules 2–5(–7) mm wide, persistent; bracts subtending inflorescences and inflorescence branches conspicuous, resembling stipules; most of plant densely yellowish tomentose 4. *A. fordii*
 - 4b. Stipules 0.2–2(–3) mm wide or caducous; bracts subtending inflorescences and inflorescence branches inconspicuous, not resembling stipules; indumentum various.
 - 5a. Petiole 15–35 × 2–3 mm; sepals free, males 1–1.2 mm, females 1.5–1.8 mm; infructescence robust and usually unbranched, up to 17 cm 5. *A. nienkui*
 - 5b. Petiole 0–15(–20) × 0.5–1.5 mm; sepals free or partially fused, either less than 1 mm (males) or ca. 1.5 mm (females), or fused for at least 2/3 of their length; infructescence unbranched or branched, mostly much shorter than 17 cm.
 - 6a. Fruit with lateral styles inserted at ca. 1/4 of fruit length; stipules needlelike, ca. 0.2 mm wide, persistent; leaves usually bullate; disk and ovary hairy 6. *A. hainanense*
 - 6b. Fruit and ovary with terminal styles (rarely subterminal in *A. japonicum*); stipules triangular-lanceolate, at least 0.5 mm wide or caducous; leaves not bullate; disk and ovary various.
 - 7a. Sepals fused for more than 1/2 of their length.
 - 8a. Fruit 5–11 × 4–7 mm, laterally compressed; male calyx 1–1.5 mm, flowers sessile; leaf blade (5–)10–23(–32) cm, without domatia, completely glabrous or abaxially pubescent; inflorescence axes robust, usually unbranched 3. *A. bunius*
 - 8b. Fruit 3–6 × 2–4 mm, laterally compressed or terete; male calyx 0.3–0.5 mm, flowers sessile to pedicellate; leaf blade (2–)5–10(–21) cm, usually with domatia, pilose at least along major veins; inflorescence axes moderately thick to slender, usually branched.
 - 9a. Leaf blade obovate to elliptic-oblong, drying yellowish green, whitish pubescent to glabrous, higher venation not conspicuously tessellated; calyx glabrous outside; male pedicel 1–1.5 mm; male disk cushion-shaped, enclosing filaments, pubescent; stamens (1 or)2(or 3); rudimentary ovary absent or minute; stigmas 3 or 4 2. *A. acidum*

- 9b. Leaf blade oblong to lanceolate, drying reddish brown, grayish, or olive green, yellowish pilose at least along veins abaxially, higher venation finely tessellated; calyx ± pubescent outside; male pedicel 0–1 mm; disk annular, sometimes divided into free alternistaminal lobes, glabrous; stamens 3 or 4; rudimentary ovary clavate to terete; stigmas 4–8 7. *A. sootepense*
- 7b. Sepals free to fused for up to 1/2 of their length.
- 10a. Ovary and fruit pubescent, laterally compressed; disk, at least in male flowers, pubescent; male disk consisting of free alternistaminal glands; stamens (4 or)5(–7); indumentum especially of young plant parts and inflorescences reddish to yellowish 1. *A. ghaesembilla*
- 10b. Ovary and fruit glabrous; disk glabrous; male disk cushion-shaped, fully or partially enclosing bases of filaments and pistillode; stamens 3–5; indumentum lacking or variously colored.
- 11a. Leaf blade ovate, apically long attenuate-acute; petiole (5–)8–15(–20) mm, not wider than 1 mm; female inflorescence and infructescence 2–5(–8) cm, axes reddish pubescent; Hainan 8. *A. maclurei*
- 11b. Leaf blade oblong or elliptic, apically acuminate; petiole 2–10(–20) mm, 0.5–2 mm wide; male inflorescence (1–)3–13 cm, female inflorescence 3–10 cm, infructescence 6–20 cm, axes whitish or yellowish pubescent; mainland China.
- 12a. Higher leaf venation finely tessellated, leaf blade often with domatia, yellowish pubescent at least along veins abaxially; calyx lobed for 1/4–1/2 of its length, margin never glandular-fimbriate, in female flowers pitcher-shaped; male disk annular, sometimes divided into free lobes alternating with stamens; fruit terete 7. *A. sootepense*
- 12b. Higher leaf venation not conspicuously tessellated, leaf blade without domatia, usually glabrous except for whitish pubescence along major veins, or completely glabrous; calyx lobed for at least 1/2 of its length to sepals free, margin often glandular-fimbriate, cup-shaped; male disk cushion-shaped, fully or partially enclosing bases of filaments and pistillode or annular and 3–5-lobed, lobes extending inward between filaments to pistillode; fruit laterally compressed or terete.
- 13a. Fruit distinctly laterally compressed; inflorescence, pedicels, and flowers slender, usually very regular; petiole 0.5–1 mm wide; sepals often free; leaves papery to subleathery, often conspicuously flat and shiny, to 13 × 4.5 cm, elliptic or oblong-elliptic to oblong-lanceolate 9. *A. japonicum*
- 13b. Fruit terete; inflorescence, pedicels, and flowers of moderate to robust build; petiole 0.7–2 mm wide; sepals nearly free to halfway fused; leaves membranous to leathery, not conspicuously shiny or flat, to 25 × 10 cm, of variable shape 10. *A. montanum*

1. *Antidesma ghaesembilla* Gaertner, Fruct. Sem. Pl. 1: 89. 1788.

方叶五月茶 fang ye wu yue cha

Trees up to 20 m tall; young twigs pubescent. Stipules needlelike, 3–6 × 0.5–1 mm, pubescent, caducous; petiole 4–10(–20) mm, pubescent; leaf blade oblong, more rarely ovate or obovate, (2–)3–7(–16) × (2–)3–5(–9) cm, papery to thinly leathery, pubescent to glabrous especially adaxially, often only major veins and margin pubescent, dull or shiny adaxially, dull abaxially, drying olive green to reddish green, base rounded to cordate, rarely obtuse, apex rounded, more rarely obtuse or acute, sometimes mucronate or retuse; domatia sometimes present; midvein flat adaxially, lateral veins 5–7 pairs, tertiary veins reticulate to weakly percurrent. Inflorescences axillary and terminal, axes reddish pubescent, males 4–8 cm, 10–20-branched, females 2–3 cm, (1–)10–20-branched; fruiting 4–7 cm. Male flowers sessile; sepals (4 or)5(–7), free, 0.5–1 mm, deltoid to oblong, pubescent outside, ± glabrous inside, apex acute to obtuse; disk consisting of 4–7 free alternistaminal

obconical lobes, pubescent; stamens (4 or)5(–7), 2–2.5 mm; rudimentary ovary obconical. Female including fruiting pedicels 0–1 mm; sepals as in male; disk glabrous to pubescent especially at margin; ovary pubescent; stigmas (2 or)3(–5). Drupes ellipsoid, laterally compressed, 3–4(–5) × 2.5–3(–3.5) mm, sparsely pubescent; style terminal to more rarely subterminal. Fl. Mar–Sep, fr. Jun–Dec. $x = 13$.

Sparse forests, open scrub, deciduous, evergreen, or mixed dry forests; 200–1100 m. Guangdong, Guangxi, Hainan, Yunnan [Bangladesh, ?Bhutan, Cambodia, India (including Nicobar Islands), Indonesia, Laos, Malaysia, Myanmar, Nepal, Papua New Guinea, Philippines, Sri Lanka, Thailand, Vietnam; N Australia].

The leaves are used as a medicine for headaches; the stem is used as a medicine to stimulate the menstrual flow. The fruit is eaten locally or used as a purgative.

2. *Antidesma acidum* Retzius, Observ. Bot. 5: 30. 1789.

西南五月茶 xi nan wu yue cha

Antidesma diandrum (Roxburgh) Roth; *A. lanceolarium*

(Roxburgh) Wallich; *A. wallichianum* C. Presl; *Stilago diandra* Roxburgh; *S. lanceolaria* Roxburgh.

Shrubs or treelets, up to 6(–10) m tall; young twigs pubescent. Stipules linear, 3–8 × 1–2 mm, pubescent; petiole 2–7(–10) mm, pubescent; leaf blade obovate to elliptic-oblong, (2–)5–10(–21) × (1.5–)2.5–4(–9) cm, papery, glabrous or rarely pilose adaxially, pubescent and rarely glabrous abaxially, dull, drying yellowish green, base acute to obtuse, rarely attenuate, apex rounded to acute or acuminate, sometimes mucronate; domatia present; midvein flat to impressed adaxially, lateral veins 4–9 pairs, tertiary veins reticulate. Inflorescences terminal to axillary, axes glabrous to pubescent, simple to branched twice at base, males 5–14 cm, females and fruiting 2–9 cm. Male flowers: pedicels 1–1.5 mm; calyx ca. 0.5 mm, cupular to globose, (3 or)4-lobed, divided for ca. 1/3, glabrous outside, pubescent inside with hairs often exceeding beyond calyx, margin erose, apex mainly rounded; disk cushion-shaped or annular and lobed between stamens, pubescent; stamens (1 or)2(or 3), 1.5–2 mm; rudimentary ovary terete or absent. Female flowers: pedicels 0.2–1.5 mm, 1.5–4 mm in fruit; calyx ca. 1 mm, cupular to nearly urceolate, 4- or 5-lobed, otherwise as in male; disk glabrous outside, glabrous to pilose inside; ovary glabrous; stigmas 3 or 4. Drupes ellipsoid, nearly terete to laterally compressed, 4–6 × 3–4 mm, glabrous; style terminal to slightly subterminal. Fl. May–Jul, fr. Jun–Nov. $x = 13$.

Open forests; 100–1500 m. Guizhou, Sichuan, Yunnan [Bangladesh, Bhutan, Cambodia, India (including Andaman and Nicobar Islands), Indonesia (Java), Laos, Myanmar, Nepal, Thailand, Vietnam].

In the southern part of the distribution range, pistillodes are always absent from the male flowers.

3. *Antidesma bunius* (Linnaeus) Sprengel, Syst. Veg. 1: 826. 1824.

五月茶 wu yue cha

Trees, rarely shrubs, up to 30 m tall; young twigs glabrous to very shortly pubescent. Stipules linear, 4–6 × 1.5–2 mm, caducous; petiole 3–10(–17) mm, glabrous to pubescent; leaf blade oblong, elliptic, or obovate, (5–)10–23(–32) × (2–)3–10 cm, leathery or thickly papery, glabrous except sometimes midvein pilose, or abaxially reddish pubescent, shiny, usually drying dark green (sometimes grayish or reddish) adaxially, slightly lighter abaxially, base acute to rounded, apex acute to rounded, sometimes slightly emarginate or acuminate, usually mucronate; domatia absent; midvein flat to impressed adaxially, lateral veins (5–)7–11 pairs, tertiary veins reticulate. Inflorescences axillary or terminal, axes glabrous to pubescent, robust, males 6–17(–25) cm, 3–8(–14)-branched, females and fruiting (4–)10–18 cm, unbranched or more rarely up to 4-branched. Male flowers sessile; calyx 1–1.5 mm, cup-shaped, 3- or 4(or 5)-lobed, divided for 1/4–1/3, glabrous to pubescent outside, reddish long pubescent at base inside, margin fimbriate, apex of lobes obtuse to rounded; disk annular, consisting of free lobes or enclosing stamens and pistillode, glabrous; stamens 3 or 4(or 5), 2–3 mm; rudimentary ovary clavate to cylindric. Female flowers: pedicels 0.5–1(–2) mm, 2–4(–9) mm in fruit; calyx 3-lobed, otherwise as in male; disk glabrous; ovary glabrous or pilose; stigmas 3 or 4(–6). Drupes

ellipsoid, laterally compressed, 5–11(–?18) × 4–7 mm, glabrous or pilose, red to black when ripe; style (sub)terminal. Fl. Mar–May, fr. Jun–Nov. $x = 13$.

Forests; 200–1800 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Jiangxi, Yunnan, Xizang [India (including Andaman and Nicobar Islands), Indonesia, Laos, Myanmar, Nepal, Papua New Guinea, Philippines, Singapore, Sri Lanka, Thailand, Vietnam; NE Australia (including Christmas Island), Pacific islands (Hawaii, Tahiti)].

Antidesma bunius var. *bunius* is widely cultivated as a fruit tree, especially in Java and the Philippines. The fruits are used in syrups, jams, and jellies; made into wine, liqueur, or brandy; and used in sauces eaten with fish. The leaves are eaten as a vegetable, and the leaves and roots are used as medicine for traumatic injury.

The species is absent in Peninsular Malaysia and nearly absent from Borneo.

- 1a. Indumentum lacking or whitish; abaxial leaf surface glabrous or pilose only along midvein; ovary and fruit glabrous 3a. var. *bunius*
- 1b. Indumentum reddish; abaxial leaf surface pubescent all over; ovary and fruit pilose 3b. var. *pubescens*

3a. *Antidesma bunius* var. *bunius*

五月茶(原变种) wu yue cha (yuan bian zhong)

Stilago bunius Linnaeus, Mant. Pl. 1: 122. 1767; *Antidesma collettii* Craib; *A. thorelianum* Gagnepain.

Young twigs, petioles, and inflorescence axes glabrous to very shortly whitish pubescent. Leaf blade glabrous, or pilose only along midvein, often minutely white pustulate. Calyx glabrous to pubescent outside, reddish pubescent at base inside, hairs often exceeding calyx. Ovary and fruit glabrous.

Open forests; 200–1500 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Jiangxi, Xizang [India (including Andaman and Nicobar Islands), Indonesia, Laos, Myanmar, Nepal, Papua New Guinea, Philippines, Singapore, Sri Lanka, Thailand, Vietnam; NE Australia (including Christmas Island), Pacific islands (Hawaii, Tahiti)].

3b. *Antidesma bunius* var. *pubescens* Petra Hoffmann, Kew Bull. 54: 350. 1999.

毛叶五月茶 mao ye wu yue cha

Young twigs, petioles, and inflorescence axes densely reddish pubescent. Leaf blade adaxially glabrous, or reddish pubescent only along midvein, abaxially reddish pubescent, especially along veins. Calyx reddish pubescent on both sides. Ovary and fruit ± pilose.

Evergreen mixed forests; 700–1800 m. Yunnan [N Thailand].

See note under *Antidesma nienkui*.

4. *Antidesma fordii* Hemsley, J. Linn. Soc., Bot. 26: 430. 1894.

黄毛五月茶 huang mao wu yue cha

Antidesma yunnanense Pax & K. Hoffmann.

Treelets up to 7 m tall; young twigs, petioles, and inflo-

rescence axes densely yellow tomentose. Stipules ovate to lanceolate, 5–10(–18) × 2–5(–7) mm, yellow villous, usually persistent; petiole 10–30 mm; leaf blade oblong, sometimes elliptic, slightly ovate or obovate, 7–20(–25) × 3–10.5 cm, papery, adaxially sparsely yellow villous except for densely pubescent midvein to completely glabrous, abaxially more densely villous especially along veins, dull, drying olive green, base rounded to obtuse, sometimes truncate, apex acuminate to caudate; domatia sometimes present; midvein impressed adaxially, lateral veins (7–)9–11 pairs, tertiary veins mainly percurrent. Inflorescences terminal and axillary, 2–5(–15)-branched, rarely unbranched, males 10–15 cm, females and fruiting 5–15 cm. Male flowers: pedicels 0.5–1.5 mm; sepals (3 or)4–6, free, 0.7–0.8 mm, narrowly triangular to slightly ovate, pubescent on both sides, apex acute; disk annular and 4-lobed, lobes extending between filaments inward to pistillode, glabrous; stamens 4 or 5, 2–2.5 mm; rudimentary ovary terete, apically sometimes divided. Female flowers: pedicels ca. 0.5 mm (to 2 mm in fruit); sepals as in male; disk glabrous or pubescent; ovary pubescent; stigmas 3–5, variously divided, thicker relative to ovary than in other species. Drupes ellipsoid, laterally compressed, 5.5–7 × 3–4 mm, sparsely villous; style terminal. Fl. Mar–Jul, fr. Jul–Jan.

Dense forests; 200–2300 m. Fujian, Guangdong, Guangxi, Hainan, Yunnan [Laos, Vietnam].

5. *Antidesma nienkui* Merrill & Chun, *Sunyatsenia* 2: 263. 1935.

大果五月茶 da guo wu yue cha

Trees up to 10 m tall; young twigs densely yellowish tomentose. Stipules lanceolate, ca. 7 mm, caducous; petiole 15–35 mm, densely yellowish tomentose; leaf blade oblong, more rarely oblong-elliptic or -obovate, (9–)11–19(–27) × (4–)5.5–7.5(–12) cm, papery, adaxially glabrous except for ± pubescent midvein, abaxially pubescent, particularly along veins, adaxially shiny or dull, drying reddish, abaxially dull, drying reddish or olive green, base obtuse, more rarely rounded or acute, apex acuminate or acute; domatia absent; midvein impressed adaxially, lateral veins 5–7(–9) pairs, tertiary veins mainly reticulate. Inflorescences terminal or axillary, axes yellowish tomentose, males 10–14 cm, 1- to 3-branched, females and fruiting 9–17(–28) cm, unbranched or 1-branched. Male flowers: pedicels 0.5–0.8 mm; sepals (3 or)4, free, 1–1.2 mm, deltoid, entire, pubescent on both sides, apex acute; disk annular and 4-lobed, lobes extending between filaments inward to pistillode, glabrous; stamens 4, ca. 2.5 mm. Female flowers: sepals 4, 1.5–1.8 mm, otherwise as in male; disk glabrous; stigmas (3 or)4. Fruiting pedicels (3–)5–7 mm; drupes ellipsoid, laterally compressed, 10–12 × 6–7 mm, sparsely pilose; style terminal. Fl. May–Aug, fr. Oct–Nov.

- Valley forests; 600–900 m. Guangdong, Hainan.

The second author has not seen any female flowering specimens, stipules, or any material from Guangdong province.

Specimens from Thailand referred to by Airy Shaw (*Kew Bull.* 26: 359. 1972) as *Antidesma* cf. *nienkui* Merrill & Chun are *A. bunius*

var. *pubescens*. Apart from the considerable geographic disjunction, *A. bunius* var. *pubescens* differs from *A. nienkui* in the shorter petioles and fused sepals. Both taxa, however, have a similar dense reddish indumentum in most parts, which distinguishes them from the nearly glabrous *A. bunius* var. *bunius*.

6. *Antidesma hainanense* Merrill, *Philipp. J. Sci.* 21: 347. 1922.

海南五月茶 hai nan wu yue cha

Antidesma fleuryi Gagnepain.

Shrubs up to 4 m tall; young twigs tomentose. Stipules needlelike, (3–)4–6 × ca. 0.2 mm, pubescent, persistent; petiole 3–6(–10) mm, tomentose; leaf blade oblong, more rarely elliptic, 7–15(–23) × 2.5–5.5(–6) cm, papery, glabrous adaxially (rarely with pubescent midvein), hirsute along veins abaxially, dull on both sides, drying grayish green to reddish adaxially, reddish or olive green abaxially, base obtuse, more rarely acute or rounded, apex acuminate, with a mucro; domatia sometimes present; midvein clearly impressed adaxially, all veins very strongly prominent abaxially so adaxial surface often bullate, lateral veins 7 or 8(–10) pairs, tertiary veins reticulate. Inflorescences and infructescences axillary, 2–3 cm, unbranched, axes pubescent. Male flowers: pedicels 0.3–0.4 mm; sepals 4, rounded, ca. 0.7 mm in diam.; stamens 4; filaments inserted at disk; disk cushion-shaped, pubescent [in bud: filaments inserted very close to rudimentary ovary, either embedded or surrounded by disk]; rudimentary ovary terete. Female flowers: pedicels ca. 0.7 mm, fruiting 1–1.5 mm; sepals 4(or)5, oblong to triangular, 1–1.2 mm; disk pubescent at margin; ovary pubescent; stigmas 3 or 4. Drupes ellipsoid, moderately compressed laterally with distinct abaxial and adaxial ridges, 4–6 × 3–5 mm; style lateral, inserted at ca. 1/4 fruit length. Fl. Apr–Jul, fr. Aug–Nov.

Dense forests; 300–1000 m. Guangdong, Guangxi, Hainan, Yunnan [Laos, Vietnam].

The second author has not seen mature male flowers and has seen only material from Hainan and Vietnam.

7. *Antidesma sootepense* Craib, *Bull. Misc. Inform. Kew* 1911: 463. 1911.

泰北五月茶 tai bei wu yue cha

Trees or shrubs up to 9 m tall; young twigs usually densely yellowish tomentose. Stipules needlelike, 1–3 × 0.2–0.5 mm, caducous; petiole 2–4(–11) mm, pubescent, glabrescent; leaf blade oblong to lanceolate, (3–)5–10(–12.5) × (1–)1.5–3(–4.2) cm, papery, glabrous except along midvein adaxially, yellowish pilose to glabrous all over but pubescent along veins abaxially, dull to moderately shiny, drying reddish brown, grayish green, or olive green, base acute, rarely obtuse or rounded, apex acuminate-mucronate; domatia often present; major veins impressed adaxially, lateral veins (5 or)6 or 7(–9) pairs, tertiary veins reticulate to weakly percurrent, highest venation finely tessellated. Inflorescences axillary and terminal, axes pubescent, males 4–11 cm, unbranched to 4-branched, females 3–8 cm, unbranched (to 2-branched), fruiting 6–14 cm. Male flowers: pedicels 0–1 mm; calyx 0.3–0.5 mm, cup- to

bowl-shaped, 3- or 4-lobed, divided for 1/4–1/2 length, ± pubescent outside, glabrous to pubescent inside, with hairs especially at base, margin fimbriate, apex of lobes acute to rounded; disk annular, sometimes divided into free alternistaminal lobes, glabrous; stamens 3 or 4, 1.5–2.5 mm; rudimentary ovary clavate to terete. Female flowers: pedicels 0.2–1 mm, (1–)2–4 mm in fruit; calyx ca. 0.8 mm, cup- to pitcher-shaped, (3 or)4(or 5)-lobed, ± pubescent outside, glabrous inside but with long hairs at base, margin erose, otherwise as in males; disk glabrous; ovary glabrous; stigmas 4–8. Drupes ellipsoid, terete, abaxially and adaxially ridged, 3–5 × 2–3.5 mm, glabrous; style (sub)terminal. Fl. May–Jul, fr. Aug–Oct.

Mixed deciduous forests; 800–1200 m. S Yunnan [Laos, Myanmar, Thailand (not peninsular)].

8. *Antidesma maclurei* Merrill, Philipp. J. Sci. 23: 248. 1923.

多花五月茶 duo hua wu yue cha

Trees up to 10 m tall; young twigs pubescent, glabrescent. Stipules caducous; petiole (5–)8–15(–20) mm, pubescent to glabrous; leaf blade lanceolate or oblong-lanceolate, 7–10(–12) × (1.5–)2–4 cm, thinly papery, glabrous on both surfaces or only veins slightly pubescent abaxially, shiny and drying grayish or reddish on both sides, base rounded or obtuse, apex long acuminate to long acute, mucronate; domatia sometimes present; midvein slightly impressed to flat adaxially, lateral veins 4–7 pairs, tertiary veins mainly reticulate. Inflorescences axillary or terminal, 3–8 cm, 2–6-branched, axes reddish pubescent. Male flowers: sepals 4, triangular, apex acute or more rarely obtuse to rounded, 0.5–0.7 mm, sparsely pubescent outside, margins ciliate, pubescent at base inside, otherwise glabrous inside; stamens 4, filaments ca. 1.5 cm, inserted inside disk; disk annular. Female flowers: fruiting pedicels 0.5–1.5 mm; sepals as in male; disk glabrous; ovary glabrous; stigmas 3 or 4. Drupes ellipsoid, terete, 5–6 × 3–4 mm, glabrous; styles (sub)terminal. Fl. Mar–Jun, fr. May–Oct.

Dense evergreen forests; 300–800 m. Hainan [Vietnam].

The second author has not seen any male material of this species.

9. *Antidesma japonicum* Siebold & Zuccarini, Abh. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. 4(3): 212. 1846.

酸味子 suan wei zi

Antidesma acutisepalum Hayata; *A. ambiguum* Pax & K. Hoffmann; *A. delicatulum* Hutchinson; *A. filipes* Handel-Mazzetti; ?*A. gracillimum* Gage; *A. hiiranense* Hayata; *A. japonicum* var. *acutisepalum* (Hayata) Hurusawa; *A. japonicum* var. *densiflorum* Hurusawa; *A. neriifolium* Pax & K. Hoffmann; *A. pentandrum* Merrill var. *hiiranense* (Hayata) Hurusawa.

Shrubs or small trees 2–8 m tall; young twigs delicate, pubescent when young, glabrescent. Stipules linear, 2–5 × 0.7–1 mm, caducous; petiole 2–10 mm, pubescent to glabrous; leaf blade elliptic or oblong-elliptic to oblong-lanceolate, rarely obovate, 3.5–13 × (1–)1.5–4.5 cm, papery to subleathery, glabrous except for midvein sometimes pubescent, shiny and

drying light olive to grayish green on both sides, base acute, obtuse, or rounded, apex acuminate or acute, sometimes caudate, mucronulate; midvein impressed or flat adaxially, lateral veins 5–12 pairs, tertiary veins weakly percurrent to reticulate. Inflorescences terminal or axillary, slender, lax-flowered, 2–6 cm, fruiting 4–10 cm, males unbranched to 6-branched, females unbranched or 2-branched at most, axes glabrous to puberulent. Male flowers: pedicels (0.5–)1–1.5 mm, fruiting (2–)3–6 mm, puberulent to glabrous; sepals 3–5, free or nearly so, 0.4–0.7 mm, ovate to triangular, glabrous; disk cushion-shaped, fully or partially enclosing bases of filaments and pistillode, glabrous; stamens 3–5, 1–2 mm; rudimentary ovary absent, flat, clavate, cylindric, or 3-fid. Female flowers: calyx as in male; disk glabrous; ovary glabrous; stigmas 2–5. Drupes ellipsoid, laterally compressed, 5–6(–8) × 4–6(–8) mm; style (sub)terminal. Fl. Apr–Aug, fr. Jun–Sep.

Open forests in humid valleys, rarely in scrub on limestone; 300–1700 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangsu, Jiangxi, Qinghai, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Japan, Malaysia, Thailand, Vietnam].

The seeds yield up to 48% oil.

Antidesma ambiguum is a new synonym here. In the key accompanying the protologue, the two species are solely distinguished by pubescent vs. glabrescent young twigs; both of these occur in *A. japonicum*.

The concept of *Antidesma pentandrum* (here treated as a synonym of *A. montanum*) in some respects bridges the gap between *A. japonicum* and *A. montanum*. Further studies in the northern geographic range of the genus might show the need to subsume *A. japonicum* under *A. montanum*.

Sometimes 1 or 2 staminodes may be found in female flowers. This occurs in some other species of *Antidesma* but is very rare.

The Chinese material all belongs to *Antidesma japonicum* var. *japonicum*; *A. japonicum* var. *robustius* Airy Shaw differs most obviously by the midrib which is distinctly raised adaxially; it is endemic to Thailand.

10. *Antidesma montanum* Blume, Bijdr. 1124. 1826–1827.

山地五月茶 shan di wu yue cha

Shrubs or trees up to 15(–20) m tall; young branches pubescent, glabrescent. Stipules linear to lanceolate, 2–7(–13) × 0.5–1.5 mm, pubescent, caducous or persistent; petiole 2–10(–20) mm, pubescent, glabrescent; leaf blade elliptic, oblong, lanceolate, or linear, more rarely slightly ovate or obovate, (1.5–)3–25 × (0.4–)1.5–10 cm, membranous to leathery, glabrous except midvein and lateral veins pubescent on one or both surfaces, sometimes pubescent along margin, rarely abaxially slightly pubescent throughout, shiny and drying olive green to grayish green on both sides, often lighter abaxially, base acute or obtuse, rarely rounded, apex acuminate, acute, or obtuse, mucronate or not; domatia sometimes present; major veins impressed or flat adaxially, lateral veins 6–12 pairs, tertiary venation weakly percurrent or reticulate. Inflorescences axillary or terminal, males 1–13 cm, unbranched to 10(–40)-branched, females 1–10 cm, unbranched to 6-branched, fruiting 2.5–20 cm, axes glabrous or pubescent. Male flowers sessile to pedicellate; pedicels to 1.5(–2) mm, glabrous to pubescent; calyx shallowly cup-shaped; sepals 3 or 4(or 5), free to fused

for ca. 1/2 of their length, 0.5–0.8 mm, broadly ovate or rounded to obtuse, rarely acute, pubescent to glabrous outside, glabrous inside but often with long hairs at base, margin usually glandular-fimbriate to lacerate; disk cushion-shaped, fully or partially enclosing bases of filaments and pistillode or annular and 3–5-lobed, lobes extending inward between filaments to pistillode, glabrous, very rarely with some hairs; stamens 3–5(or 6), 1–2 mm; rudimentary ovary clavate, hemispheric, or terete, apex obtuse, sometimes obscurely lobed. Female flowers: pedicel 0.2–1.5 mm, fruiting 1–4 mm, glabrous to pubescent; calyx cup-shaped; sepals 3–5(or 6), 0.3–1 mm, triangular to ovate, otherwise as in males; disk glabrous, very rarely with some hairs; ovary glabrous, very rarely with some hairs; stigmas 2–6. Drupes ellipsoid, terete, (3–)5–6(–8) × 2.5–4(–6) mm, glabrous; styles terminal, very rarely slightly subterminal.

Forests, along rivers; 100–1500 m. Guangdong, Guangxi, Guizhou, Hainan, Hunan, Sichuan, Taiwan, Xizang, Yunnan [Bangladesh, Bhutan, Cambodia, India, Indonesia, Japan, Laos, Malaysia, Myanmar, Philippines, Thailand, Vietnam; Australia].

- 1a. Plants not growing along rivers; leaf blade (2–)2.5–3.5(–6.6) × longer than wide, elliptic to oblong, average size 9–25 × 3–10 cm, apex mostly acuminate 10a. var. *montanum*
- 1b. Plants growing along rivers; leaf blade 4–10 × longer than wide or less than 2 cm wide, lanceolate to linear, average size 3–6 × 0.4–1.5 cm, apex acute or obtuse 10b. var. *microphyllum*

10a. *Antidesma montanum* var. *montanum*

山地五月茶(原变种) shan di wu yue cha (yuan bian zhong)

Antidesma apiculatum Hemsley; *A. barbatum* C. Presl; *A. calvescens* Pax & K. Hoffmann; *A. chonmon* Gagnepain; *A. costulatum* Pax & K. Hoffmann; *A. gracile* Hemsley; *A. henryi* Hemsley; *A. henryi* Pax & K. Hoffmann (1922), not Hemsley (1894); *A. kotoense* Kanehira; *A. moritzii* (Tulasne) Müller Argoviensis; *A. paxii* F. P. Metcalf; *A. pentandrum* (Blanco) Merrill; *A. pentandrum* var. *barbatum* (C. Presl) Merrill; *A. pentandrum* var. *rotundisepalum* (Hayata) Hurusawa; *A. pubescens* Roxburgh var. *moritzii* Tulasne; *A. rotundisepalum* Hayata.

Petiole (2–)5–10(–20) mm; leaf blade elliptic to oblong, more rarely slightly ovate or obovate, (6–)9–25 × (2–)3–10 cm, papery or membranous, glabrous except midvein and lateral veins pubescent on one or both surfaces, rarely abaxially slightly pubescent throughout, shiny and drying olive green on both surfaces but often lighter abaxially, base acute or obtuse, rarely rounded, apex acuminate, more rarely acute, mucronate; domatia sometimes present; major veins impressed, rarely flat adaxially, lateral veins 7–10 pairs, tertiary venation weakly percurrent. Male inflorescences 3–13 cm, unbranched to 10(–40)-branched, females 4–10 cm, unbranched to 6-branched, fruiting 6–20 cm. Fl. Apr–Sep, fr. Jul–Nov.

Forests; 100–1500 m. Guangdong, Guangxi, Guizhou, Hainan, Taiwan, Xizang, Yunnan [Bangladesh, Bhutan, Cambodia, India (including Andaman and Nicobar Islands), Indonesia, Japan (Ryukyu Islands), Laos, Malaysia, Myanmar, Philippines, Thailand, Vietnam; Australia (Prince of Wales Island, N Queensland)].

This is the most variable, common, and widespread taxon in the entire genus.

Antidesma costulatum is a new synonym here. The syntype *Henry 13690* at Kew stands out only by its long petiole (up to 20 mm). There are several other specimens from Yunnan and Szechuan with similarly long petioles.

10b. *Antidesma montanum* var. *microphyllum* (Hemsley) Petra Hoffmann, Kew Bull. 54: 357. 1999.

小叶五月茶 xiao ye wu yue cha

Antidesma microphyllum Hemsley, J. Linn. Soc., Bot. 26: 432. 1894; *A. pseudomicrophyllum* Croizat; *A. seguinii* H. Léveillé; *Myrica darrisii* H. Léveillé.

Petiole 2–3(–5) mm; leaf blade lanceolate to linear, (1.5–)3–6(–10) × 0.4–1.5(–2) cm, papery or leathery, glabrous except for pubescent midvein on one or both surfaces and sometimes along margin, shiny and drying grayish green on both sides, base acute or obtuse, apex obtuse or acuminate, margins revolute when dry; domatia absent; major veins flat adaxially, lateral veins 6–12 pairs, nearly straight and parallel, tertiary venation reticulate. Inflorescences and infructescences 1–4 cm, males unbranched to 6-branched, females unbranched to 2-branched. Fl. Apr–Jun, fr. Jun–Nov.

Along rivers; 100–1200 m. Guangdong, Guangxi, Guizhou, Hainan, Hunan, Sichuan, Yunnan [Laos, Thailand, Vietnam].

Records of *Antidesma venosum* E. Meyer ex Tulasne from China (e.g., in FRPS 44(1): 63. 1994) are based on misidentifications of *A. montanum* var. *microphyllum*.

11. *Antidesma hontaushanense* C. E. Chang, Forest. J. For. Assoc. Taiwan Prov. Inst. Agric. Pintung 6: 2. 1964.

山头山五月茶 he tou shan wu yue cha

Shrubs; branches terete, gray-brown; branchlets, terminal bud, midvein, petioles, inflorescences, and sepals outside pubescent. Petiole 1–1.5 cm; leaf blade elliptic or ovate-elliptic, 8–13 × 3–7 cm, papery, glabrous on both surfaces, base rounded to obtuse, apex acuminate; midvein concave adaxially, convex abaxially, lateral veins 6 or 7 pairs, elevated on both surfaces, reticulate veins prominent. Flowers dioecious. Male flowers grouped into axillary, 8–12 cm panicle-like spikes; bractlets obovate, ca. 0.5 mm, apex obtuse; sepals 3 or 4, broadly ovate, ca. 1 mm wide; stamens 4; filaments ca. 0.8 mm, inserted outside disk; rudimentary ovary puberulent. Female flowers: sepals and disk as in male; ovary pubescent. Drupes subglobose, ca. 3 mm in diam., puberulent. Fl. May–Jul, fr. Aug–Oct.

- Sparse forests or scrub; ca. 300 m. Taiwan (Hetao Shan, Lan Yu).

Antidesma hontaushanense is known only from the type collection, which has not been seen. It is possible that it is conspecific with *A. pleuricum* Tulasne from the Philippines but the available information is inadequate to confirm that it is this or one of another, rather similar, species recorded from the Philippines.

