

54. MORINDA Linnaeus, Sp. Pl. 1: 176. 1753.

巴戟天属 *ba ji tian shu*

Chen Tao (陈涛); Charlotte M. Taylor

Rojoc Adanson.

Lianas, climbing shrubs, erect shrubs, or small trees, rarely dioecious, sometimes with spines; branching sometimes sylleptic with growth continued from an axillary or subapical node, with lateral branches sometimes surrounded at base by persistent leafless stipules. Raphides present. Leaves opposite, rarely ternate, or sometimes anisophyllous and apparently 1 at flowering nodes, sometimes with domatia in axils of secondary and occasionally tertiary veins, margins rarely sinuate-undulate or lyrate; stipules persistent or infrequently caducous, interpetiolar, united around stem, or fused to petioles, triangular, entire. Inflorescences terminal, axillary, or leaf-opposed, capitate with 1 to several hemispherical to subglobose heads, these fasciculate or cymose, few to many flowered, pedunculate or sessile, bracteate or bracts reduced. Flowers sessile, shortly to fully fused by their ovaries [to free or nearly so], bisexual and distylous, rarely bisexual and monomorphic, or rarely dioecious. Calyx limb truncate to sinuate or rarely in 1–3 flowers of an inflorescence with 1 petaloid calycophyll (*Morinda citrifolia*). Corolla white or pink, funnellform, salverform, or campanulate, inside glabrous or pubescent in throat, [tube sometimes fenestrate]; lobes 3–7, valvate in bud. Stamens 3–7, inserted in corolla throat or tube, exerted or included; filaments short; anthers dorsifixed, sometimes with connective prolonged into an apical appendage. Ovary 2-celled with ovules 2 in each cell, or incompletely to completely 4-celled due to secondarily formed false septa with ovules 1 in each cell, ovules attached to septum near base; stigmas 2, linear, exerted or included. Fruit multiple with entire fruiting heads comprising one fruit (i.e., drupeccetum) [sometimes fruit simple]; individual fruit drupaceous, fleshy, generally obovoid, blue to black, with calyx limb persistent; pyrenes 2–4, 1-locular, with 1 seed, cartilaginous or bony, subtrigonus to plano-convex, adaxially (i.e., ventrally) flat or sulcate; seeds medium-sized, subtrigonus or ellipsoid; endosperm abundant, corneous; embryo small; cotyledons oblong; radicle inferior.

About 80–100 species: widespread in tropical and subtropical regions worldwide; 27 species (18 endemic) in China.

Morinda includes a notable range of breeding systems (Johansson, Opera Bot. 122: 1–167. 1994), but most of the species are apparently distylous, with the anthers and stigmas separated and their positions reciprocal between the short-styled and long-styled form of the same species; however, this biology has been sometimes overlooked. Also, as noted by Johansson (loc. cit.), the position of the inflorescences, in particular terminal vs. leaf-opposed, deserves careful observation and aids identification of species. In particular, the leaf-opposed inflorescences often are produced on the terminal node, then later displaced by subsequent growth from the axil of that leaf, and can be confused with true terminal inflorescences that have two subtending leaves. The inflorescences with “fasciculate to umbellate” peduncles actually appear to be condensed cymes or racemes, with the peduncles arising from a very shortly prolonged structure at the stem apex that also bears several stipuliform bracts, usually one above the other. The twining Asian species apparently share having their lateral branches surrounded at the base (i.e., at the divergence from main stem) by persistent leafless stipules. Some species of *Morinda* have petaloid bracts or possibly calyx lobes; this character appears to vary within some individual species. Y. Z. Ruan’s (in FRPS 71(2): 179–202. 1999) taxonomy of *Morinda* distinguished species based on different characters, in particular pubescence, leaf shape, peduncle length compared across developmental stages, drying color and texture, pattern of tertiary leaf veins on dried specimens, and degree of fusion of flowers, than used by many other authors (e.g., Johansson, loc. cit.; Springate et al., Fl. Bhutan 2(2): 804. 1999).

- 1a. Erect trees or shrubs; inflorescences terminal, axillary, or leaf-opposed, 1 or 2 per node.
 - 2a. Plants of seashores and low elevations, 0–50 m; leaves with 5–7 pairs of secondary veins; fruit 2.5–5 cm in diam. 6. *M. citrifolia*
 - 2b. Plants of terrestrial inland habitats, 500–1400 m (exact elevation unknown in *M. leiantha*).
 - 3a. Inflorescences terminal and/or axillary.
 - 4a. Stems hirtellous, hispidulous, or subglabrous; leaves with secondary veins 5–8 pairs; peduncles 0.2–0.5 cm; corollas with tubes ca. 20 mm and lobes ca. 4 mm 13. *M. leiantha*
 - 4b. Stems glabrous or subglabrous; leaves with secondary veins 8–10 pairs; peduncles ca. 2 cm; corollas with tubes ca. 32 mm and lobes ca. 13 mm 15. *M. longissima*
 - 3b. Inflorescences leaf-opposed.
 - 5a. Stems glabrous to pubescent; leaves pubescent abaxially, with secondary veins 7–10 pairs; peduncles 0.1–0.3 cm 19. *M. persicifolia*
 - 5b. Stems glabrous; leaves glabrous abaxially, with secondary veins 9–24 pairs; peduncles 1–6 cm.
 - 6a. Leaves 4–5.5 cm wide, with secondary veins 12–24 pairs; corollas with tubes 15–18 mm, lobes 3–4 mm 26. *M. undulata*
 - 6b. Leaves 5–11 cm wide, with secondary veins 9–14 pairs; corollas with tubes 16–33 mm, lobes 4–15 mm.
 - 7a. Petioles 0.5–1 cm; corollas with tubes 16–33 mm, lobes 4–15 mm; fruit ca. 2.5 cm in diam. 1. *M. angustifolia*
 - 7b. Petioles 2–4 cm; corollas with tubes ca. 22 mm, lobes ca. 4 mm; fruit ca. 1 cm in diam. 21. *M. rosiflora*
 - 1b. Lianas, twiners, or subshrubs; inflorescences terminal, with heads solitary or in groups of 2–11.

- 8a. Calyx limb developed, 1–2.5 mm; leaves acute to obtuse, rounded, truncate, or cordulate at base.
- 9a. Stems and leaves glabrous 10. *M. howiana*
- 9b. Stems and leaves glabrous to densely hirtellous or pilosulous, with pubescence present at least on veins abaxially on young leaves.
- 10a. Stems and leaves sparsely to moderately puberulent to glabrescent; corollas with tubes and lobes ± equal, tube 3–4 mm, lobes 3–4 mm; fruit 0.5–1.1 cm in diam. 17. *M. officinalis*
- 10b. Stems and leaves abaxially densely hirtellous or pilosulous; corollas with lobes longer than tube, tube 1–2 mm, lobes 3–4.5 mm; fruit 1–2 cm in diam.
- 11a. Leaves with 7–10 pairs of secondary veins; corollas with tubes 1.5–2 mm and lobes 4–4.5 mm; calyx lobes narrowly triangular, acute 8. *M. cochinchinensis*
- 11b. Leaves with 10–13 pairs of secondary veins; corollas with tubes 1–1.2 mm and lobes 3–4 mm; calyx lobes rounded to obtuse 27. *M. villosa*
- 8b. Calyx limb reduced to shortly developed, less than 1 mm; leaves acute to cuneate, obtuse, or rounded at base.
- 12a. Leaves rugulose; corolla tube ca. 10 mm 22. *M. rugulosa*
- 12b. Leaves flat, smooth; corolla tube 1–3 mm or 12–25 mm.
- 13a. Corolla tube 12–25 mm.
- 14a. Corolla tube 12–20 mm.
- 15a. Young stems densely ferruginous hirtellous when dry; leaves drying leathery and abaxially whitened 5. *M. cinnamomifoliata*
- 15b. Young stems densely puberulent, strigillose, or hirtellous with pubescence drying colorless; leaves drying papery to membranous and abaxially golden yellow or brownish yellow 7. *M. citrina*
- 14b. Corolla tube ca. 25 mm.
- 16a. Leaves glabrous throughout 3. *M. brevipes*
- 16b. Leaves sparsely to densely pubescent at least abaxially on veins.
- 17a. Stems puberulent with trichomes drying colorless, to glabrescent 2. *M. badia*
- 17b. Stems densely hirtellous with trichomes drying golden brown 4. *M. callicarpifolia*
- 13b. Corolla tube 1–3 mm.
- 18a. Corollas with tubes and lobes ± equal in length, tube 2–2.5(–3) mm, lobes 2–2.5(–3) mm.
- 19a. Stems and leaves glabrous 12. *M. lacunosa*
- 19b. Stems and leaves puberulent to hirtellous at least when young.
- 20a. Leaves drying with gray to black cast 14. *M. litseifolia*
- 20b. Leaves drying with brown or yellow cast.
- 21a. Leaves drying with brown cast; corollas with tubes ca. 3 mm, lobes ca. 3 mm 24. *M. shuanghuaensis*
- 21b. Leaves drying with brown, grayish brown, or yellowish brown cast; corollas with tubes 2–2.5 mm, lobes 2–2.5 mm.
- 22a. Petioles 0.4–0.8 cm; leaves adaxially sparsely hispidulous to glabrescent 11. *M. hupehensis*
- 22b. Petioles 0.5–1.5 cm; leaves adaxially sparsely hirtellous, subglabrous, or glabrous 23. *M. scabrifolia*
- 18b. Corollas with lobes longer than tubes by 50% or more, tube 1–2 mm, lobes 2–4 mm.
- 23a. Leaves drying with gray to black cast; stems densely yellowish, clear, or ferruginous strigillose or hirtellous 9. *M. hainanensis*
- 23b. Leaves drying with green, brown, yellow, or reddish cast; stems moderately to sparsely hirtellous, hispidulous, or puberulent with colorless trichomes, to subglabrous.
- 24a. Leaves drying with yellow or reddish cast.
- 25a. Leaves 2–7 × 0.3–3 cm, cuneate to acute at base; corolla lobes 3–4 mm 18. *M. parvifolia*
- 25b. Leaves 7–13 × 2–4 cm, cuneate to obtuse or rounded at base; corolla lobes ca. 2 mm 20. *M. pubiofficinalis*
- 24b. Leaves drying with brown, grayish brown, or greenish cast.
- 26a. Leaves with secondary veins 4 or 5 pairs; peduncles 0.4–1.1 cm; fruit 0.4–0.8 cm in diam. 16. *M. nanlingensis*
- 26b. Leaves with secondary veins 5–7 pairs; peduncles 1–1.5 cm; fruit 0.7–1.2 cm in diam. 25. *M. umbellata*

黄木巴戟 huang mu ba ji

Erect shrubs or small trees, ca. 6 m tall; branches quadrangular, glabrous. Leaves opposite, or solitary opposite an inflorescence; petiole 0.5–1 cm, glabrous; blade drying papery, matte on both surfaces, brownish green, elliptic-oblong, elliptic, oblong-lanceolate, or oblanceolate, 15–30 × 6–10 cm, adaxially glabrous, abaxially scabrous to glabrous or sometimes sparsely hirtellous on veins, base acute to attenuate, apex acute to acuminate; secondary veins 9–13 pairs; stipules interpetiolar, free or shortly united to petioles, triangular, 4.5–5 mm, acuminate or acute. Inflorescence solitary and leaf-opposed; peduncle 1.5–4 cm; flowering head 1, subglobose to cylindrical, many flowered, 0.8–2.5 cm (not including corollas); bracteoles subulate. Flowers fused only shortly at base, distylous. Calyx glabrous; limb truncate to denticulate, ca. 1 mm. Corolla white, salverform, outside glabrous; tube cylindrical to slenderly funnel-form, 16–33 mm; lobes 5, ovate-lanceolate, 4–15 mm, acute. Ovary 4-celled. Drupecetum mulberry-shaped, subglobose, or ellipsoid-oblong, to 2.5 cm in diam. Drupes partially fused to nearly separate, white or black, obovoid to subglobose, 10–15 mm. Fl. Apr–May, fr. summer–autumn.

Forests; 500–1400 m. S Yunnan [Bhutan, India, Laos, Myanmar, Nepal, Thailand].

The inflorescences are indeterminate and begin flowering with ± a dozen developed buds; the flowers continue to be produced through growth at the top of the spike while the fruit are developing on the lower parts, thus the older inflorescences become cylindrical or oblong in shape. Y. Z. Ruan (in FRPS 71(2): 185. 1999) described the inflorescence position as consistently leaf-opposed at the terminal node; however, inflorescences can also be found along the stem well below its apex (e.g., *Tsi Zhanhou 92-130*, MO), and the infructescences are usually found along the stem well below the apex (e.g., Puff et al., Rubiaceae of Thailand, 113. 2005).

2. *Morinda badia* Y. Z. Ruan, Fl. Reipubl. Popularis Sin. 71(2): 327. 1999.

栗色巴戟 li se ba ji

Lianas; branches at base with persistent leafless stipules, when young puberulent and terete, becoming glabrescent, angled, dark brown or purplish blue. Leaves opposite; petiole 4–8 mm, densely hirtellous; blade drying papery, adaxially brownish black, abaxially ferruginous, elliptic-oblong, elliptic-lanceolate, or oblanceolate, 7–12 × 2–4 cm, adaxially shiny and hirtellous or glabrescent, abaxially hirtellous at least along veins, base cuneate to attenuate, apex acuminate; secondary veins 4–6 pairs; stipules fused into a tube, 2–5 mm, truncate. Inflorescence terminal; peduncles 3–5, umbellate, 5–18 mm, hirtellous; heads 1 per peduncle, 3–10-flowered. Flowers fused at base, biology not noted. Calyx limb reduced, truncate or often with 1–3 teeth in outermost flowers of head. Corolla yellowish white; tube ca. 2.5 mm; lobes 4 or 5, narrowly oblong, apically thickened and rostrate. Drupecetum subglobose, 0.5–0.8 cm in diam. Drupes fused, orange. Fl. Jun, fr. Oct.

• Forests on mountains, thickets at watersides. Guangdong (Guangzhou), Guangxi, Hainan, Hunan.

3. *Morinda brevipes* S. Y. Hu, J. Arnold Arbor. 32: 399. 1951.

短柄鸡眼藤 duan bing ji yan teng

Lianas; young branches densely hirtellous or pilosulous, becoming glabrous, brown. Leaves opposite; petiole 3–10 mm, puberulent or hirtellous; blade drying papery or subleathery, adaxially straw-yellow or brownish black, abaxially olive-green, brownish yellow, or brownish red, obovate-oblong, obovate, oblanceolate, lanceolate, narrowly lanceolate, or linear-lanceolate, 5–10(–13) × 0.7–3(–4) cm, glabrous on both surfaces, shiny adaxially, matte abaxially, base cuneate to acute, apex acute or acuminate; secondary veins 5–7 pairs, with foveolate or pubescent domatia; stipules fused into a tube or spathe, 2–3 mm, puberulent, hispidulous, or hirtellous, truncate, on each side with 2 bristles 0.3–1 mm. Inflorescence terminal; peduncles 4–9, fasciculate to shortly racemiform, 4–10 mm, densely puberulent, as a group sometimes subtended by 2–4 stipuliform bracts; heads 1 per peduncle, conical or cylindrical to subglobose, 4–6 mm, 6–16-flowered. Flowers fused for ca. 1/2 length of hypanthium, biology not noted. Calyx puberulent to glabrescent; limb 0.3–0.5 mm, truncate to denticulate. Corolla white, campanulate, outside glabrous; tube ca. 2.5 mm; lobes 4 or 5, narrowly oblong, ca. 3 mm, apically thickened and rostrate. Drupecetum subglobose to cylindrical, 1–1.2 cm in diam. Drupes almost fully fused, orange, subglobose, 5–8 mm. Fl. Apr–May, fr. Jul–Dec.

• Hills, mountains; 200–800 m. Hainan.

- 1a. Leaf blade obovate-oblong, obovate, oblanceolate, or lanceolate, 5–10(–13) × 2–3(–4) cm 3a. var. *brevipes*
- 1b. Leaf blade narrowly lanceolate to lanceolate-linear, 7–11.5 × 0.7–1.4 cm 3b. var. *stenophylla*

3a. *Morinda brevipes* var. *brevipes*

短柄鸡眼藤(原变种) duan bing ji yan teng (yuan bian zhong)

Leaf blade obovate-oblong, obovate, oblanceolate, or lanceolate, 5–10(–13) × 2–3(–4) cm. Fl. Apr–May, fr. Jul–Dec.

• Hills, mountains; 200–800 m. Hainan.

3b. *Morinda brevipes* var. *stenophylla* Chun & F. C. How ex W. C. Ko, Fl. Hainan. 3: 581. 1974.

狭叶鸡眼藤 xia ye ji yan teng

Leaf blade narrowly lanceolate to lanceolate-linear, 7–11.5 × 0.7–1.4 cm. Fl. May.

• Wet places in forests on hills. Hainan.

4. *Morinda callicarpifolia* Y. Z. Ruan, Fl. Reipubl. Popularis Sin. 71(2): 325. 1999 [*“callicarpaefolia”*].

紫珠叶巴戟 zi zhu ye ba ji

Lianas or subshrubs; branches at base with persistent leafless stipules, when young densely golden hirtellous, becoming sparsely pubescent or subglabrous, terete or angled, brown or purplish black. Leaves opposite; petiole 7–10 mm, densely

golden hirtellous; blade drying papery, adaxially brownish black, abaxially brown, obovate-oblong, oblong-lanceolate, or elliptic, 7–14 × 2.5–4 cm, adaxially sparsely hirtellous or hispidulous, abaxially sparsely hispidulous or hirtellous, or glabrous, on both surfaces pubescence denser along midrib, base cuneate to acute, apex acuminate, long acuminate, or obtuse then abruptly mucronate; secondary veins 5–7 pairs, with pilosulous domatia; stipules fused into a tube, 3–4 mm, densely golden hispidulous or -hirtellous, subtruncate, on each side with 1 or 2 bristles. Inflorescence terminal; peduncles 4–7, umbellate or fasciculate, 6–15 mm, densely hirtellous, as a group often subtended by 1 subulate bract; heads 1 per peduncle, 2–8-flowered. Flowers fused at base, biology not noted. Calyx puberulent; limb reduced, truncate or sometimes with 1 subulate tooth. Corolla white, tubular; tube ca. 2.5 mm, densely villous inside; lobes 4, lanceolate. Drupecetum globose, 4–8 mm in diam. Drupes fused. Fl. Jun–Jul, fr. winter.

• Forests on mountains, thickets at roadsides, ditch sides, hill slopes. Guizhou, Sichuan, Yunnan.

5. *Morinda cinnamomifoliata* Y. Z. Ruan, Fl. Reipubl. Popularis Sin. 71(2): 336. 1999.

樟叶巴戟 zhang ye ba ji

Lianas or subshrubs; branches at base with persistent leafless stipules, when young densely ferruginous hirtellous or -pilosulous, becoming glabrescent, angled, gray or indigo. Leaves opposite; petiole 5–10 mm, densely hirtellous; blade drying leathery, adaxially grayish black, abaxially whitened, narrowly elliptic-oblong, oblong-lanceolate, or obovate-oblong, 8–11 × 2.5–3.5 cm, adaxially ± ferruginous pilosulous, abaxially hispidulous to hirtellous, base cuneate or rounded, apex acuminate or obtuse then abruptly mucronulate; secondary veins 4 or 5 (or 6) pairs; stipules united into a tube. Inflorescence terminal; peduncles 6–10, umbellate or fasciculate, 5–10 mm, ferruginous pilosulous; heads 1 per peduncle, 5–7-flowered. Flowers fused at base, biology not noted. Calyx limb reduced, truncate or denticulate. Corolla white, outside glabrescent; tube ca. 2 mm, inside densely villous; lobes 4, linear-oblong, ca. 3 mm. Drupecetum subglobose. Drupes fully fused. Fl. Jul, fr. winter.

• Thickets on slopes near villages. SE Guangxi.

6. *Morinda citrifolia* Linnaeus, Sp. Pl. 1: 176. 1753.

海滨木巴戟 hai bin mu ba ji

Morinda bracteata Roxburgh.

Evergreen shrubs or small trees, to 5 m tall, often fleshy; branches subquadrangular, glabrous. Leaves opposite or solitary opposite an inflorescence; petiole 5–20 mm, glabrous; blade fleshy, drying papery, elliptic-oblong, elliptic, or ovate, 10–25 × 5–13 cm, glabrous and shiny on both surfaces, base acute or acuminate, apex acute to obtuse; secondary veins 5–7 pairs, with pubescent domatia; stipules interpetiolar, free or shortly fused to petioles, broadly triangular to ovate, 4–16 mm, obtuse or rounded. Inflorescence solitary and leaf-opposed; peduncle 1–1.5 cm; head 1, oblong to subglobose, 5–10 mm in diam., many flowered; bracts absent. Flowers with hypanthia partially fused, distylous. Calyx glabrous or puberulent; limb subtruncate

to truncate, 0.2–0.5 mm, sometimes in 1 to numerous flowers of a head with 1(–3) calycophylls, these white, narrowly elliptic to oblanceolate, 5–16 mm, obtuse to acute. Corolla white, funnel-form, outside glabrous; tube ca. 15 mm, densely villous in throat; lobes 5, ovate-lanceolate, ca. 6 mm. Drupecetum white, irregularly ovoid to subglobose, 2.5–5 cm. Drupes not distinguishable individually. Fl. and fr. year-round.

Flat land on seashores, sparse forests; below 100 m. Guangdong, Hainan, Taiwan [?Cambodia, India, Indonesia, Japan (Bonin and Ryukyu Islands), Malaysia, Myanmar, Papua New Guinea, Philippines, Sri Lanka, Thailand, Vietnam; N Australia, Solomon Islands; introduced in tropical America and Pacific islands].

The distinctive form called *Morinda bracteata* has well-developed white calycophylls that give the plants a markedly different appearance and may function in pollination, but these two forms have generally been considered conspecific. Nelson and Elevitch (Noni, 42–43. 2006) noted that plants with bracteate inflorescences produce smaller fruit and that the cultivated plants with variegated leaves are called *M. citrifolia* ‘Potteri.’ Both of these forms are found in Taiwan (e.g., Yang & Chuang 11410, MO, ‘*citrifolia*’ form; Yang & Chuang 12060, MO, ‘*bracteata*’ form). The fruit of this species are edible (though not particularly palatable) and said to have medicinal and/or tonic value; they are sold by natural food vendors under the name “noni” or “nona.” This species is increasingly widely cultivated, as detailed by Nelson and Elevitch (loc. cit.).

7. *Morinda citrina* Y. Z. Ruan, Fl. Reipubl. Popularis Sin. 71(2): 331. 1999.

金叶巴戟 jin ye ba ji

Lianas; branches at base with persistent leafless stipules, when young densely puberulent, strigillose, or hirtellous, becoming glabrescent, angled, brown, purplish blue, or purplish black. Leaves opposite; petiole 2–6 mm, densely puberulent, hirtellous, or pilosulous; blade drying membranous to papery, adaxially gray, abaxially golden yellow or brownish yellow, matte on both surfaces, ovate-lanceolate, oblong-linear, or elliptic, 5–12 × 1.5–3 cm, adaxially sparsely to moderately puberulent, strigillose, hispidulous, or hirtellous, abaxially moderately to sparsely strigillose, puberulent, or hirtellous especially along principal veins, base cuneate to acute, apex acuminate or acute; secondary veins 4–6 pairs, with pilosulous domatia; stipules fused into a tube or spathe, 2.5–4 mm, moderately to densely strigillose to pilosulous, truncate, on each side with 1 or 2 bristles 0.3–1 mm. Inflorescence terminal; peduncles 2–5, fasciculate or umbellate, 6–8 mm, densely puberulent to pilosulous, as a group subtended by 1 or 2 stipuliform bracts; heads 1 per peduncle, hemispherical, 4–5 mm in diam., 1–5-flowered. Flowers fused at base or for up to half of hypanthium, biology not noted. Calyx strigillose, puberulent, or glabrescent; limb 0.3–0.5 mm, truncate. Corolla white, salverform, outside densely puberulent; tube 1.2–2 mm, inside villous; lobes 4 (or 5), narrowly oblong to lanceolate, 2.5–3 mm, apically thickened and rostrate. Drupecetum subglobose to oblate, 8–12 mm in diam. Drupes fully fused, orange, subglobose, 3–5 mm. Fl. Apr–Jul, fr. Oct–Nov.

• Forests or thickets on mountains; 500–1300 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hunan, Jiangxi, Zhejiang.

1a. Older leaves usually drying greenish, sometimes brown, or rarely yellow,

usually not hirsutulous but rather thin
and sparsely hairy along midrib 7a. var. *chlorina*
1b. Older leaves usually drying golden
yellow or brownish yellow, hirtellous
especially along midrib 7b. var. *citrina*

7a. *Morinda citrina* var. *chlorina* Y. Z. Ruan, Fl. Reipubl. Popularis Sin. 71(2): 332. 1999.

白蕊巴戟 bai rui ba ji

Older leaves usually drying greenish, sometimes brown, or rarely yellow, usually not hirsutulous but rather thin and sparsely hairy along midrib.

• Forests or thickets on mountains. Anhui, Fujian, Guangxi, Guizhou, Hunan, Jiangxi, Zhejiang.

7b. *Morinda citrina* var. *citrina*

金叶巴戟(原变种) jin ye ba ji (yuan bian zhong)

Older leaves usually drying golden yellow or brownish yellow, hirtellous especially along midrib. Fl. Apr–Jul, fr. Oct–Nov.

• Sparse or dense forests on mountains; 500–1300 m. Guangdong, Guangxi, Guizhou, Hunan.

8. *Morinda cochinchinensis* Candolle, Prodr. 4: 449. 1830.

大果巴戟 da guo ba ji

Morinda trichophylla Merrill.

Lianas; branches at base with persistent leafless stipules, when young densely ferruginous- or yellow villosulous, terete to weakly quadrangular. Leaves opposite; petiole 3–10 mm, densely villosulous; blade drying papery, yellowed, matte to shiny adaxially, matte abaxially, elliptic, elliptic-oblong, obovate-oblong, or oblanceolate, 5.5–14 × 2–6 cm, adaxially sparsely strigose to strigillose, abaxially densely ferruginous- or yellow hirtellous to villosulous with pubescence denser along veins, base rounded to truncate, subcordate, or cordulate, apex caudate-acuminate or shortly acuminate; secondary veins 7–10 pairs, with pilosulous domatia; stipules fused into a tube or spathe, 5–9 mm, densely hispidulous to hispid, broadly triangular to truncate, on each side with 2 bristles 1–4 mm, usually quickly deciduous. Inflorescence terminal; peduncles 3–12, fascicled or umbellate, 1–3 cm, densely ferruginous- or yellow hirtellous, as a group subtended by 2 to several bracts 1–3 mm, 2- to several lobed; heads 1 per peduncle, subglobose, 5–6 mm in diam., 5–15-flowered; bracteoles linear, 0.2–1 mm. Flowers with hypanthia partially fused, biology not noted. Calyx with hypanthium portion densely strigose to strigillose; limb 1–2.5 mm, puberulent to strigillose, lobed for ca. half, lobes 4 or 5, narrowly triangular, 1–2 mm, sometimes unequal on an individual flower, often reflexed. Corolla white, rotate to salverform, outside hirtellous, pilosulous, or glabrescent, inside densely villous throughout tube and onto lobes; tube 1.5–2 mm; lobes 4 or 5, narrowly oblong to lanceolate, 4–4.5 mm, apically thickened and rostrate. Drupecetum subglobose, oblong-globose, or irregular, 1–2 cm in diam., with peduncles elongating to 4 cm. Drupes mostly fused, orange-yellow to orange-red,

subglobose, 4–6 mm. Fl. May–Jul, fr. Jul–Nov.

Forests or thickets on mountain slopes, in valleys, or at stream-sides or roadsides; 100–1200 m. Fujian, Guangdong, Guangxi, Hainan [Vietnam].

The names *Morinda umbellata* and *M. villosa* were synonymized with *M. cochinchinensis* by Merrill and Chun (Sunyatsenia 1(1): 80–81. 1930) but were separated by Y. Z. Ruan (in FRPS 71(2): 187, 190. 1999) as provisionally treated here.

9. *Morinda hainanensis* Merrill & F. C. How, Sunyatsenia 5: 188. 1940.

海南巴戟 hai nan ba ji

Lianas; branches at base with persistent leafless stipules, when young densely yellow-, clear-, or ferruginous strigillose to -hirtellous, becoming scabrous to glabrescent, brownish gray. Leaves opposite; petiole 5–11 mm, densely villosulous to hirtellous; blade drying papery, matte and gray on both surfaces, narrowly elliptic, elliptic-oblong, oblong-lanceolate, or linear-lanceolate, 5–9 × 1.2–2.5 cm, adaxially sparsely strigillose to hirtellous, abaxially densely villosulous, pilosulous, or sericeous, base acute or attenuate, apex acute to acuminate; secondary veins 6–9 pairs, with pilosulous domatia; stipules fused into a tube or spathe, 2.5–6 mm, pilosulous to hirtellous, on each side with 2 bristles 0.2–1 mm. Inflorescence terminal; peduncles 3–9, fasciculate to umbellate, 5–10 mm, densely sericeous to strigillose, as a group sometimes subtended by 1 or 2 linear bracts 0.5–1 mm; heads 1 per peduncle, hemispherical, 3–4 mm in diam., 3–8-flowered. Flowers fused at base, apparently distylous. Calyx with hypanthium puberulent to densely strigillose; limb 0.5–0.8 mm, glabrescent, truncate. Corolla salverform, outside puberulent to pilosulous, inside densely villous in upper part of tube and onto lobes; tube ca. 1 mm; lobes 4, narrowly lanceolate, ca. 2 mm, apically thickened and rostrate. Drupecetum subglobose or compressed globose, 6–8 mm in diam. Drupes fully fused, subglobose, ca. 3 mm. Fl. May, fr. May.

• Wet places under dense forests on hills; ca. 900 m. Hainan.

10. *Morinda howiana* S. Y. Hu, J. Arnold Arbor. 32: 400. 1951.

糠藤 kang teng

Lianas; branches at base with persistent leafless stipules, glabrous, terete, drying brown. Leaves opposite; petiole 6–10 mm, glabrous to puberulent; blade drying thinly to thickly papery, adaxially shiny and reddish dark brown, abaxially matte to somewhat shiny and reddish brown, elliptic, elliptic-lanceolate, or oblong, 6–14 × 2–6 cm, glabrous, base rounded, cuneate, or acute, apex acute to acuminate; secondary veins 6–9 pairs, with pilosulous domatia; stipules fused into a tube, 5–15 mm, puberulent to glabrous, truncate, on each side with 2 bristles 0.2–1 mm. Inflorescence terminal; peduncles 5–10, fasciculate to umbellate, 8–18 mm, puberulent, as a group subtended by several triangular to bifid bracts 1–2 mm; heads 1 per peduncle, subglobose to hemispherical, 4–6 mm in diam., 4–12-flowered. Flowers fused only shortly at base, biology not noted. Calyx puberulent to glabrescent; limb ca. 1 mm, truncate, sinuate, or shallowly lobed; lobes rounded, ciliolate. Corolla subcampan-

ulate, puberulent outside; tube ca. 2 mm, inside densely villous in upper part and throat; lobes 4 or 5, narrowly oblong to lanceolate, ca. 2 mm, apically thickened and rostrate. Drupecetum subglobose to obovate, 8–14 mm in diam. Drupes fully fused, subglobose, 4–5 mm. Fl. Apr–May, fr. Jul–Oct.

• Forests in valleys and at streamsides, thickets at roadsides or on hill slopes; 300–700 m. Guangdong (Yangjiang), Hainan.

The protologue commented that “the presence of bristles on the glabrous capitulum is also very characteristic,” but these bristles are apparently small bracts, which are now also known from several other Chinese species of *Morinda*.

11. *Morinda hupehensis* S. Y. Hu, J. Arnold Arbor. 32: 400. 1951.

湖北巴戟 hu bei ba ji

Lianas; branches at base surrounded by persistent leafless stipules, when young densely white hirtellous, white puberulent, ferruginous hirtellous, or glabrescent, becoming angled, purplish blue. Leaves opposite; petiole 4–8 mm, densely hirtellous; blade drying papery, matte on both surfaces, adaxially greenish brown, abaxially coffee-colored or brownish black, oblanceolate, elliptic-lanceolate, elliptic-oblong, or linear-oblong, 5–9 × 1.5–3 cm, adaxially sparsely hispidulous to glabrescent, abaxially ferruginous hirtellous, yellow hirtellous, or brownish gray hirtellous, base cuneate, obtuse, or acute, apex acuminate or sometimes obtuse then abruptly mucronulate; secondary veins 5–7 pairs, with pilosulous domatia; stipules frequently deciduous through fragmentation, fused into a tube or spathe, 2.5–5 mm, pilosulous to hirtellous, truncate, on each side with 2 bristles 0.2–0.5 mm. Inflorescence terminal; peduncles 4–9, fasciculate to umbellate, 5–15 mm, densely puberulent to pilosulous, as a group subtended at base by 1–4 stipuliform bracts; heads 1 per peduncle, 4–7-flowered. Flowers with hypanthia partially fused, biology not noted. Calyx puberulent to glabrescent; limb reduced, truncate or sinuate-undulate. Corolla white; tube ca. 2.5 mm, densely villous inside; lobes 4 or 5, ca. 2.5 mm. Drupecetum subglobose, 4–10 mm in diam. Drupes fully fused, red, subglobose, 4–5 mm. Fl. Jul–Aug, fr. Oct–Nov.

• Forests, thickets at forest margins; 400–1000 m. Fujian, Guangxi, Guizhou, Hubei, Hunan, Sichuan.

12. *Morinda lacunosa* King & Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 73: 87. 1903.

长序羊角藤 chang xu yang jiao teng

Lianas, to 20 m tall; branches when young terete, glabrous, becoming angled, brownish gray. Leaves opposite; petiole 8–20 mm, glabrous; blade drying thinly papery or subleathery, adaxially brownish black, abaxially dark brownish red, elliptic, elliptic-lanceolate, or ovate-oblong, 10–16 × 3–7 cm, glabrous, base cuneate, apex acuminate or acute; secondary veins 6 or 7 pairs, with pilosulous foveolate domatia; stipules caducous, interpetiolar or fused into a spathe or tube, 3–17 mm, glabrous, obtuse, rounded, or truncate. Inflorescence terminal, pilosulous [to perhaps glabrous]; peduncles 1–3, 0.5–8 cm, terminating in 1 head or 6–20 rays 0.8–2 cm and subtended by linear bracts 1–3 mm; heads several, subglobose, 8–10 mm in diam., 6–20-flowered. Flowers fused for half or more of hypan-

thium, biology not noted. Calyx glabrous; limb reduced, truncate to shallowly 4-dentate. Corolla white, subcampanulate; tube 2–2.5 mm, villous in upper part inside; lobes 4, 2–2.5 mm. Drupecetum subglobose to obovate, 4–11 mm in diam. Fl. Jun, fr. Dec.

Shady places in forests at streamsides or roadsides; 1000–1100 m [to only ca. 700 m in Thailand]. Yunnan [Malaysia, Thailand].

13. *Morinda leiantha* Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 41: 313. 1872.

顶花木巴戟 ding hua mu ba ji

Erect shrubs or small trees; branches hirtellous or subglabrous, angled, dark brown. Leaves opposite; petiole 0.5–1(–3) cm; blade drying thinly papery, matte and dark brown on both surfaces, oblong-lanceolate, narrowly lanceolate, rhombic-lanceolate, or oblanceolate, 8–14(–20) × 2–5 cm, adaxially glabrous or pilosulous, abaxially scabrous, glabrous, or pilosulous along veins, base acute to attenuate, apex acuminate; secondary veins 5–8 pairs; stipules ovate-triangular to ovate-lanceolate, acute or 2-lobed. Inflorescence terminal or axillary; peduncle 2–5 mm, often with 2–4 branches, each with 1 capitulum; capitulum ellipsoid-oblong, many flowered. Flowers partially fused, each with 3–5 bracts in a whorl, biology not noted. Calyx limb truncate. Corolla white, salverform, outside glabrous; tube ca. 20 mm, inside glabrous; lobes 5, lanceolate, ca. 4 cm. Young drupelet mulberry-shaped. Fl. and fr. year-round.

Forests on hill slopes, shady thickets. S Yunnan [Myanmar].

14. *Morinda litseifolia* Y. Z. Ruan, Fl. Reipubl. Popularis Sin. 71(2): 335. 1999.

木姜叶巴戟 mu jiang ye ba ji

Lianas or subshrubs; branches at base surrounded by persistent leafless stipules, when young sparsely puberulent, becoming glabrescent, purplish black. Leaves opposite; petiole 4–6 mm, hirtellous; blade drying membranous or papery, adaxially gray, grayish green, or grayish black, abaxially brownish gray or greenish red, linear, oblong-linear, lanceolate-linear, oblanceolate, or elliptic-oblanceolate, 5–11 × 1.5–2(–3) cm, adaxially glabrous or sparsely pilosulous, abaxially usually glabrous except hirtellous along veins, base cuneate to acute, apex acuminate or acute; secondary veins 4–6; stipules fused into a spathe or tube, ca. 4 mm. Inflorescences terminal; peduncles 3–5, fasciculate or umbellate, ca. 7 mm, puberulent; heads 1 per peduncle, subglobose, 5–7-flowered. Flowers fused at base, biology not noted. Calyx limb reduced, truncate. Corolla yellowish white; tube ca. 2 mm, densely villous inside; lobes 4 or 5, ca. 2 mm. Drupecetum subglobose, 2–8 mm in diam. Drupes almost fully fused. Fl. Jul, fr. Oct–Nov.

• Sparse or dense forests on mountains; 700–1300 m. Fujian, Guangxi, Hunan, Jiangxi, Sichuan.

15. *Morinda longissima* Y. Z. Ruan, Fl. Reipubl. Popularis Sin. 71(2): 323. 1999.

大花木巴戟 da hua mu ba ji

Erect shrubs, to 2 m tall; branches glabrous or subglabrous, subquadrangular, green or pale green. Leaves opposite,

sometimes crowded at ends of branches; petiole 2–3 cm, glabrous or subglabrous; blade drying submembranous to membranous, pale green and matte on both surfaces, oblong-oblancoolate, oblong-lanceolate, or oblanceolate, 13–23 × 6–10 cm, glabrous or pilosulous abaxially, base cuneate to attenuate, margin sometimes weakly repand or sinuate, apex acuminate or obtuse then abruptly acuminate; secondary veins 8–10 pairs, apparently without domatia; stipules interpetiolar, ovate, semi-circular, or subcordate, acute or 2-lobed. Inflorescence terminal or axillary; peduncle 1, ca. 2 cm, glabrous; heads 1 per peduncle, subglobose, many flowered; bracts encircling flowers in 1 or 2 whorls, 3–6 per whorl, subulate. Flowers shortly fused at base, biology not noted. Calyx limb truncate to sinuate. Corolla white, slenderly funnelliform to salverform, glabrous outside; tube ca. 32 mm, glabrous inside; lobes 5, lanceolate to ligulate, ca. 13 mm. Infructescences and fruit unknown. Fl. Apr–May.

- Sparse forests, shady thickets; ca. 700 m. S Yunnan.

The bracts arranged in whorls subtending the flowers are notable and probably distinctive for the species; however, these bracts are not shown in the illustrations of this species in the protologue nor in the additional figure presented in the FRPS *Morinda* treatment (Y. Z. Ruan, loc. cit.: 184, t. 46, f. 5).

16. *Morinda nanlingensis* Y. Z. Ruan, Fl. Reipubl. Popularis Sin. 71(2): 329. 1999.

南岭鸡眼藤 nan ling ji yan teng

Lianas or subshrubs; branches surrounded at base by persistent leafless stipules, when young hirtellous or hispidulous, becoming glabrescent, angled, purplish blue. Leaves opposite; petiole 3–5 mm, hirtellous; blade drying papery, adaxially greenish brown or dark brown, abaxially brownish gray, obovate, elliptic-oblancoolate, elliptic, or rhombic-lanceolate, rarely dimorphic, 4–9(–12) × 1.5–3.5 cm, adaxially pilosulous to glabrescent, abaxially glabrous to densely hirtellous at least on principal veins, base cuneate, apex acute, acuminate, or obtuse then abruptly mucronulate; secondary veins 5–7 pairs; stipules fused into a tube, truncate. Inflorescence terminal; peduncles 7–10, umbellate or fasciculate, 10–15 mm, pilosulous; heads 1 per peduncle, 3–11-flowered. Flowers fused at base, biology not noted. Calyx limb reduced, truncate or perhaps sometimes with 1 calycophyll. Corolla campanulate, mealy puberulent outside; tube ca. 2 mm, internally densely bearded; lobes 4 or 5, sublancoolate, ca. 3 mm. Drupecetum subglobose, 4–8 mm in diam. Drupes orange or dark. Fl. Jun, fr. Oct.

- Shady places, forests, thickets on mountains, hills. Guangdong, Guangxi, Hunan, Yunnan, Zhejiang.

- 1a. Flowering heads with 3 or 4(–7) flowers; leaf blade rhombic-lanceolate, 4–7 × 1.5–2 cm 16b. var. *pauciflora*
- 1b. Flowering heads with 5–11 flowers; leaf blade obovate, elliptic-oblancoolate, or elliptic, 7–12 × 2–3.5 cm.
 - 2a. Leaf blade glabrous abaxially 16a. var. *nanlingensis*
 - 2b. Leaf blade densely pilosulous abaxially 16c. var. *pilophora*

16a. *Morinda nanlingensis* var. *nanlingensis*

南岭鸡眼藤(原变种) nan ling ji yan teng (yuan bian zhong)

Leaf blade obovate, elliptic-oblancoolate, or elliptic, 7–9(–12) × 2–3.5 cm, glabrous abaxially. Flowering heads 5–11-flowered. Fl. Jun, fr. Oct.

- Shady places at streamsides in forests, thickets on mountains. Guangdong, Guangxi, Hunan, Yunnan.

16b. *Morinda nanlingensis* var. *pauciflora* Y. Z. Ruan, var. nov.

少花鸡眼藤 shao hua ji yan teng

Type: China. Zhejiang: Hangzhou, X. Y. He 20528 (holotype, IBSC).

Validating Latin diagnosis: that of “*Morinda nanlingensis* Y. Z. Ruan va. [sic!] *pauciflora* Y. Z. Ruan” (Y. Z. Ruan in W. C. Chen, Fl. Reipubl. Popularis Sin. 71(2): 331. 1999).

Leaf blade rhombic-lanceolate, 4–7 × 1.5–2 cm. Flowering heads 3- or 4(–7)-flowered.

- Forests on hills. S Zhejiang.

This name was previously published by Y. Z. Ruan (loc. cit.) but not validly so because the herbarium in which the type is conserved was not specified (*Vienna Code*, Art. 37.7).

16c. *Morinda nanlingensis* var. *pilophora* Y. Z. Ruan, Fl. Reipubl. Popularis Sin. 71(2): 331. 1999.

毛背鸡眼藤 mao bei ji yan teng

Leaf blade obovate, elliptic-oblancoolate, or elliptic, 7–9(–12) × 2–3.5 cm, abaxially densely pilosulous. Flowering heads 5–11-flowered.

- Forests, shady thickets on mountains. Guangxi, Hunan.

17. *Morinda officinalis* F. C. How, Acta Phytotax. Sin. 7: 326. 1958.

巴戟天 ba ji tian

Lianas; branches surrounded at base by persistent leafless stipules, when young strigillose, hirtellous, or pilose, becoming glabrescent and scabrous, angled, brown or bluish black. Leaves opposite; petiole 4–11 mm, densely puberulent, strigillose, hirtellous, or hirsute to glabrescent; blade drying papery, on both surfaces brown to yellow-brown, shiny to matte adaxially, matte abaxially, ovate-oblong, obovate-oblong, or elliptic, 6–13 × 3–6 cm, adaxially sparsely strigillose, hirtellous, or hirsute to glabrescent, abaxially glabrous or sparsely hirtellous along principal veins, base obtuse, rounded, cuneate, or acute, apex acute, obtuse, or rounded and abruptly mucronulate; secondary veins (4 or) 5–7 pairs, with small pilosulous domatia; stipules fused into a spathe or tube, 3–5 mm, membranous, puberulent to hirtellous, truncate, on each side 2-denticulate. Inflorescence terminal; peduncles 1–7 or 15–25, umbellate or fasciculate, 0.1–1 cm, densely hirtellous to strigillose, as a group usually subtended by 1 or 2 stipuliform bracts; heads 1 per peduncle, subglobose to hemispherical, 5–7 mm in diam., 1–3- or 4–10-flowered. Flowers fused for ca. half of hypanthium, biology not noted. Calyx puberulent to glabrous; limb 1–1.5 mm, lobed for ca. 1/2; lobes 2–4, triangular, sometimes markedly unequal on

an individual flower, obtuse to acute. Corolla white, campanulate or urceolate, outside puberulent, hirtellous, or glabrescent; tube 3–4 mm, inside densely villosulous from middle of tube to throat; lobes (2–)4, lanceolate or narrowly oblong, 3–4 mm, apically thickened and rostrate. Drupecetum globose to obovate, 5–11 mm in diam. Drupes fully fused, red, subglobose, 4–5 mm. Fl. May–Jul, fr. Oct–Nov.

• Sparse or dense forests and thickets on mountains, also cultivated; 100–500 m. Fujian, Guangdong, Guangxi, Hainan.

According to the protologue, the species is apparently cultivated and used medicinally. The roots were described by Y. Z. Ruan (in FRPS 71(2): 199. 1999) as fleshy, irregularly intestine-like constricted, slightly purplish red, purplish blue when dry; they are illustrated in the protologue figure. The roots of almost no other *Morinda* species have been described by Y. Z. Ruan or any other authors seen.

- 1a. Flowering heads 15–25, each with 1(–3) flowers; peduncles ca. 2 mm; calyx lobes often becoming white 17c. ‘Uniflora’
- 1b. Flowering heads 1–10, each with 4–10 flowers; peduncles 1–10 mm; calyx lobes green.
- 2a. Young branches and leaf blades abaxially sparsely hirtellous, puberulent, or hirsute to glabrescent 17b. var. *officinalis*
- 2b. Young branches and leaf blades densely transparent villous 17a. var. *hirsuta*

17a. *Morinda officinalis* var. *hirsuta* F. C. How, Acta Phytotax. Sin. 7: 328. 1958.

毛巴戟天 mao ba ji tian

Young branches and leaf blade densely transparent villous. Flowering heads 1–10, 4–10-flowered; peduncles 1–10 mm. Calyx lobes green.

• Forests on mountains. Hainan.

17b. *Morinda officinalis* var. *officinalis*

巴戟天(原变种) ba ji tian (yuan bian zhong)

Young branches and leaf blades adaxially sparsely hirtellous, puberulent, or hirsute to glabrescent. Flowering heads 1–10, 4–10-flowered; peduncles 1–10 mm. Calyx lobes green. Fl. May–Jul, fr. Oct–Nov.

• Sparse or dense forests and thickets on mountains. Fujian, Guangdong, Guangxi, Hainan.

17c. *Morinda officinalis* ‘Uniflora’

密梗巴戟天 mi geng ba ji tian

Flowering heads 15–25, 1(–3)-flowered; peduncles ca. 2 mm. Calyx lobes often becoming white.

• Cultivated in Guangdong.

This taxon was originally published as a cultivar (Y. Z. Ruan in W. C. Chen, Fl. Reipubl. Popularis Sin. 71(2): 337. 1999), but it was not made clear if it is a well-known form that is deliberately selected and propagated or a wild-encountered form.

18. *Morinda parvifolia* Bartling ex Candolle, Prodr. 4: 449. 1830.

鸡眼藤 ji yan teng

Lianas, climbing, twining, or prostrate; branches surrounded at base by persistent leafless stipules, when young glabrous, puberulent, or densely hispidulous-hirtellous, becoming weakly angled, brown to slightly purplish blue. Leaves opposite; petiole 3–8 mm, glabrous, puberulent, or hispidulous-hirtellous; blade drying papery, on both surfaces matte and yellowish green, yellowish brown, or yellowish gray, obovate, linear-oblancheolate, sublancheolate, obovate-oblancheolate, oblancheolate, or obovate-oblong, 2–5(–7) × 0.3–3 cm, both surfaces glabrous or infrequently moderately to sparsely hirsute or hirtellous, base cuneate to acute, apex acute, obtuse, or rounded and shortly abruptly acuminate or mucronulate; secondary veins 3 or 4(–6) pairs, with pilosulous domatia; stipules fused into a spathe or tube, 2–4 mm, membranous, glabrous, puberulent, or hispidulous, truncate and on each side with 1 or 2, sometimes caducous bristles 0.5–1 mm. Inflorescence terminal; peduncles (2 or)3–9, umbellate to fasciculate, 0.6–2 cm, densely puberulent to hispidulous, as a group often subtended by 1 to several stipuliform bracts; heads 1 per peduncle, subglobose, obovate, conical, or rarely cylindrical, 5–8 mm in diam., 3–15(–17)-flowered, often with 1 to several linear bracts 0.5–1 mm. Flowers fused at base, biology not noted. Calyx puberulent to glabrescent; limb 0.5–0.8 mm, truncate to sinuate or denticulate. Corolla white, campanulate, outside puberulent to glabrous; tube 1.5–2 mm, inside densely villous from middle to throat; lobes 4 or 5, narrowly oblong, 3–4 mm, apically thickened and rostrate. Drupecetum subglobose to obovate, 6–15 mm in diam. Drupes fully fused, orange, subglobose, 4–5 mm. Fl. Apr–Jun, fr. Jun–Aug.

Thickets at roadsides or ditch sides, prostrate on bare land, thickets or forests on hills; sea level to 400 m. Fujian, Guangdong, Guangxi, Hainan, Jiangxi, Taiwan [Philippines, Vietnam].

Y. Z. Ruan (in FRPS 71(2): 194. 1999) commented that leaf shape in this species varies based to some degree on ecology, with obovate and dimorphic leaves in dry, sunny, bare habitat; linear-oblancheolate or sublancheolate leaves in shady, dry, bare habitat; and obovate-oblancheolate, oblancheolate, or obovate-oblong leaves when climbing on shrubs.

19. *Morinda persicifolia* Buchanan-Hamilton, Trans. Linn. Soc. London 13: 535. 1822.

短梗木巴戟 duan geng mu ba ji

Shrubs or small trees, to 11 m tall; branches quadrangular, pubescent or glabrous. Leaves opposite or solitary opposite an inflorescence; petiole 1–2 cm; blade drying papery, adaxially gray, abaxially pale green, oblong-lanceolate, lanceolate, oblancheolate, or linear-lanceolate, 6–18 × 2–12 cm, glabrous or sparsely pilosulous, base acute to attenuate, apex acute or shortly acuminate; secondary veins 7–10 pairs; stipules interpetiolar, triangular to broadly triangular, acute to subulate acuminate. Inflorescence solitary and leaf-opposed; peduncle 1, 1–3 mm; head 1, many flowered; bracteoles subulate. Flower biology not noted. Calyx limb truncate. Corolla white, salverform; tube ca. 16 mm, somewhat curved, inside glabrous; lobes 5, ca.

4 mm. Drupecetum mulberry-shaped or conical-oblong, 2–2.5 × 1.5–2 cm. Fl. and fr. summer–autumn.

Sparse forests on mountains. S Yunnan [Cambodia, NE India, Indonesia, Laos, Malaysia, Myanmar, Vietnam].

20. *Morinda pubiofficialis* Y. Z. Ruan, Fl. Reipubl. Popularis Sin. 71(2): 334. 1999.

细毛巴戟 xi mao ba ji

Lianas or subshrubs, 2–10 m tall; branches when young sparsely hirtellous, becoming subglabrous, weakly angled, brown or pale brownish purple. Leaves opposite; petiole ca. 4 mm, hirtellous or pilosulous; blade drying papery, adaxially shiny and dark brownish red or yellowish brown, abaxially pale brownish red or brownish yellow, oblong-lanceolate, linear-lanceolate, or ovate-oblong, 7–13 × 2–4 cm, adaxially glabrous or sometimes sparsely hirtellous when young, abaxially glabrous, base cuneate or rounded, apex acute to acuminate; secondary veins 5 or 6 pairs; stipules fused into a tube, ca. 4 mm, subtruncate. Inflorescence terminal; peduncles 2–5, umbellate, 7–11 mm; heads 1 per peduncle, 3- to many flowered. Flowers fused at base, biology not noted. Calyx limb reduced, truncate. Corolla white, campanulate to weakly urceolate, outside glabrous; tube ca. 1.2 mm, inside densely bearded; lobes 4 or 5, linear, ca. 2 mm. Drupecetum subglobose, 5–10 mm in diam. Drupes fully fused, red. Fl. May–Jun, fr. Oct–Nov.

• Forests in valleys or on mountains, thickets at watersides. Guangdong, Guizhou, Hunan.

The roots were described by Y. Z. Ruan as irregularly intestine-like constricted, with fleshy cortex.

21. *Morinda rosiflora* Y. Z. Ruan, Fl. Reipubl. Popularis Sin. 71(2): 324. 1999.

红木巴戟 hong mu ba ji

Erect shrubs, ca. 2.5 m tall; branches glabrous, quadrangular, purplish black. Leaves opposite or solitary opposite an inflorescence; petiole 2–4 cm; blade matte on both surfaces, adaxially purplish black or purplish red, abaxially dark brown, elliptic-oblong, elliptic, or oblong-oblong, 13–22 × 5–11 cm, adaxially glabrous, abaxially scabrous, base acute to attenuate, margin sometimes weakly sinuate, apex acuminate or mucronulate; secondary veins 10–14 pairs; stipules interpetiolar, triangular, ovate, or ovate-lanceolate, acute, acuminate, or bifid. Inflorescence leaf-opposed; peduncle 1(or 2), 1–2 cm, glabrous; heads 1 per peduncle, globose, many flowered; bracteoles 3–5, subulate. Flowers fused at base, biology not noted. Calyx limb truncate. Corolla pink, salverform, outside glabrous; tube ca. 22 mm, somewhat curved, glabrous inside; lobes 4 or 5, lanceolate, ca. 4 mm. Young drupelet globose, ca. 1 cm in diam. Young drupes dark red. Fl. summer, fr. autumn.

• Sparse forests on hill slopes; 500–800 m. S Yunnan.

The protologue gave the number of corolla lobes as 5, but the protologue figure shows 4 corolla lobes.

22. *Morinda rugulosa* Y. Z. Ruan, Fl. Reipubl. Popularis Sin. 71(2): 328. 1999.

皱面鸡眼藤 zhou mian ji yan teng

Lianas or subshrubs, to 6 m tall; branches when young pilosulous, becoming glabrescent. Leaves opposite; petiole 6–9 mm, hirtellous; blade drying papery, adaxially brownish black, abaxially ferruginous, obovate or obovate-lanceolate, 7–9 × 2.5–4 cm, adaxially rugulose and sparsely pilosulous to glabrescent, abaxially glabrous except hirtellous along midrib, base cuneate or attenuate, apex rounded, obtuse, or acute; secondary veins 5 or 6 pairs, with pilosulous domatia; stipules fused into a tube, 3–4 mm, truncate. Inflorescence terminal; peduncles 4–8, umbellate, 7–15 mm, pilosulous; heads 1 per peduncle, 5–12-flowered. Flowers fused in lower half of hypanthium, biology not noted. Calyx limb reduced. Corolla white, campanulate; tube ca. 1 mm, inside densely bearded; lobes 4, narrowly oblong, ca. 3 mm, apically rostrate. Drupecetum subglobose, 4–10 mm in diam. Drupes fully fused, red. Fl. Jul, fr. Dec.

• Forests at riversides and roadsides, thickets. N Guangxi, SW Hunan.

23. *Morinda scabrifolia* Y. Z. Ruan, Fl. Reipubl. Popularis Sin. 71(2): 332. 1999.

西南巴戟 xi nan ba ji

Lianas or shrubs; branches when young densely hirtellous, becoming glabrescent, angled, whitened, pale purplish blue, or brown. Leaves opposite; petiole 5–15 mm, hirtellous; blade drying papery or leathery, adaxially brownish yellow or brownish gray, abaxially pale brown, elliptic-oblong, oblong-lanceolate, or oblong-linear, 7–13 × 2–4 cm, adaxially sparsely hirtellous, subglabrous, or glabrous, abaxially glabrous or strigillose-pilosulous at least on principal veins, base cuneate or rounded, apex acute, acuminate, or obtuse then abruptly mucronulate; secondary veins 5–7 pairs; stipules 3–5 mm. Inflorescence terminal; peduncles 3–10, fasciculate or umbellate, 5–20 mm, puberulent, as a group sometimes subtended by 1 linear bract; heads 1 per peduncle, 5–10-flowered. Flowers fused at base, biology not noted. Calyx limb reduced, truncate. Corolla white, urceolate to campanulate, outside puberulent; tube ca. 2.5 mm, inside densely bearded; lobes 4 or 5, linear, ca. 2.5 mm. Drupecetum subglobose, ca. 1 cm in diam. Fl. Jun, fr. Sep–Oct.

• Forests or thickets on mountains, shady rock sides. Guangxi, Jiangxi, Sichuan, Yunnan.

24. *Morinda shuanghuaensis* C. Y. Chen & M. S. Huang, J. Trop. Subtrop. Bot. 16: 578. 2008.

假巴戟 jia ba ji

Lianas; branches when young hirtellous, becoming glabrescent, angled, bluish black. Leaves opposite; petiole 3–5 mm, hirtellous; blade drying papery or thinly papery and brown, elliptic, elliptic-oblong, or obovate-oblong, 4–10(–13) × 2.5–5 cm, adaxially hirsute to pubescent or sparsely hispidulous, abaxially glabrous or sparsely pilosulous along midrib, base rounded or cuneate, apex acute or mucronulate; secondary veins 5 or 6 pairs; stipules 3–5 mm, pilosulous, truncate. Inflorescence terminal; peduncles 4–8, umbellate, 3–15 mm, pubescent; heads 1 per peduncle, 3–8-flowered. Flowers fused at base, biology not noted. Calyx limb reduced, truncate or with 2 or 3 undulate teeth. Corolla white, urceolate, outside puberulent; tube

ca. 3 mm, inside densely bearded; lobes 3 or 4, narrowly oblong, ca. 3 mm, apically thickened and rostrate. Drupecetum compressed globose. Drupes red. Fl. May–Jul, fr. Oct.

- Forests on mountains. Fujian, Guangdong.

Y. Z. Ruan (in FRPS 71(2): 201. 1999) described the roots as irregularly intestine-like constricted, with cortex more or less fleshy.

25. *Morinda umbellata* Linnaeus, Sp. Pl. 1: 176. 1753.

印度羊角藤 yin du yang jiao teng

Lianas, climbing or twining; branches glabrous to puberulent or hispidulous, becoming weakly angled, often channeled, bluish black to reddish brown. Leaves opposite; petiole 4–6 mm, glabrous, puberulent, or sparsely hirsute; blade drying papery, leathery, or rigid-membranous, adaxially shiny and greenish, pale brown, or brownish black, abaxially matte, greenish, pale brown, or straw-colored, ovate, obovate-lanceolate, obovate-oblong, lanceolate, or linear-lanceolate, 6–9 × 2–3.5 cm, both surfaces glabrous or sometimes hirsute, hispidulous, or puberulent along principal veins, base acute or cuneate, apex acuminate or mucronulate; secondary veins 4 or 5 pairs, usually with pilosulous domatia; stipules fused into a tube, 2–6 mm, scarious to membranous, puberulent, broadly rounded to truncate, on each side with 2 bristles 0.5–1 mm, often caducous. Inflorescence terminal; peduncles 3–11, fasciculate, umbellate, or shortly racemiform, 4–11 mm, puberulent to glabrescent, subtended by 1 to several linear caducous bracts 1–2 mm; heads 1 per peduncle, subglobose to obovate, 1–10 mm in diam., 6–12-flowered. Flowers fused at base or for up to half of hypanthium, biology not noted. Calyx glabrous; limb 0.2–0.8 mm, truncate to denticulate. Corolla white, campanulate, outside glabrous to puberulent; tube 1.2–2 mm, inside densely villous from middle to throat; lobes 4 or 5, narrowly oblong to ligulate, 2.2–3 mm, apically thickened and hooked. Drupecetum subglobose or compressed globose, 7–12 mm in diam., glabrescent. Drupes mostly to fully fused, red, subglobose, 4–5 mm. Fl. Jun–Jul, fr. Oct–Nov.

Forests on mountains, sparse or dense thickets at streamsides and roadsides; 300–1200 m. Anhui, Fujian, Guangdong, Guangxi, Hainan, Hunan, Jiangsu, Jiangxi, Taiwan, Zhejiang [India, Japan, Sri Lanka, S Thailand].

This is the most commonly collected species of *Morinda* in China. This species is here circumscribed broadly and a bit differently from FRPS (71(2): 190–191. 1999); in particular, the species is restricted to glabrous plants there but pubescent plants are included here. There seems to be no other difference among these two sets of plants, and on specimens there is continuous variation in pubescence that cannot be clearly partitioned into separate states.

- 1a. Leaf blade drying papery or leathery, ovate, obovate-lanceolate, or obovate-oblong; petioles puberulent to sparsely hirsute 25a. subsp. *obovata*
- 1b. Leaf blade rigid-membranous, lanceolate to linear-lanceolate; petioles glabrous 25b. subsp. *umbellata*

25a. *Morinda umbellata* subsp. *obovata* Y. Z. Ruan, Fl. Reipubl. Popularis Sin. 71(2): 325. 1999.

羊角藤 yang jiao teng

Petiole puberulent to sparsely hirsute; leaf blade drying papery or leathery, ovate, obovate-lanceolate, or obovate-oblong. Fl. Jun–Jul, fr. Oct–Nov.

- Forests on mountains, sparse or dense thickets at streamsides and roadsides; 300–1200 m. Anhui, Fujian, Guangdong, Guangxi, Hainan, Hunan, Jiangsu, Jiangxi, Taiwan, Zhejiang.

25b. *Morinda umbellata* subsp. *umbellata*

印度羊角藤(原亚种) yin du yang jiao teng (yuan ya zhong)

Petiole glabrous; leaf blade drying rigid-membranous, lanceolate to linear-lanceolate. Fl. Jun–Jul, fr. Oct–Nov.

Forests on mountains, sparse or dense thickets at streamsides and roadsides; 300–1200 m. Anhui, Fujian, Guangdong, Guangxi, Hainan, Hunan, Jiangsu, Jiangxi, Taiwan, Zhejiang [India, Japan, Sri Lanka].

26. *Morinda undulata* Y. Z. Ruan, Fl. Reipubl. Popularis Sin. 71(2): 321. 1999.

波叶木巴戟 bo ye mu ba ji

Small trees, to 20 m tall; branches glabrous, subquadrangular, smooth, reddish brown. Leaves opposite or solitary opposite an inflorescence; petiole 1–2 cm, glabrous; blade drying yellowish brown, linear-oblong, linear-oblong-lanceolate, or slightly lyrate, 18–20 × 4–5.5 cm, glabrous and shiny on both surfaces, base cuneate, margin irregularly undulate to lyrate, apex acute or acuminate; secondary veins 12–24 pairs; stipules interpetiolar, triangular to broadly triangular, acute to obtuse. Inflorescence solitary and leaf-opposed; peduncle 1, 1–6 cm, glabrous; heads 1 per peduncle, ellipsoid-oblong to cylindrical, many flowered; bracts absent or subulate. Flowers with hypanthia fully fused, biology not noted. Calyx limb truncate. Corolla white, salverform; tube 15–18 mm, densely villous in upper part and throat; lobes 4 or 5, triangular to ligulate, 3–4 mm, acute. Drupecetum mulberry-shaped to cylindrical or oblong, 1–1.5 × 0.6–0.8 cm. Fl. autumn, fr. winter.

- About 900 m. S Yunnan (also cultivated in villages).

The protologue described the corolla lobes as 4, but the protologue figure shows 5 lobes.

27. *Morinda villosa* J. D. Hooker, Fl. Brit. India 3: 158. 1880.

须弥巴戟 xu mi ba ji

Woody lianas; branches surrounded at base by persistent leafless stipules, densely ferruginous- or yellow villous, weakly quadrangular. Leaves opposite; petiole 0.5–1.5 cm, shorter at upper nodes, densely ferruginous- or yellow hirtellous; blade drying papery, darkened, narrowly elliptic-oblong, obovate-lanceolate, or lanceolate, 8–12 × 2–6 cm, adaxially sparsely strigose or strigillose with pubescence denser along veins, abaxially densely ferruginous- or yellow hirtellous, base rounded, slightly oblique, or sometimes cordulate, apex caudate-acumi-

Fl. China 19: 220–230. 2011.

nate or shortly acuminate; secondary veins 10–13 pairs, with pilosulous domatia; stipules interpetiolar or partially fused into a tube, ovate to elliptic, 7–12 mm, pilosulous or hirtellous, acute, obtuse, or truncate. Inflorescences terminal; peduncles 2–10, fasciculate or umbellate, 0.9–2.2 cm, villosulous, as a group subtended by 2 to several bracts 4–6 mm with 2 to several subulate lobes; heads 1 per peduncle, subglobose, 5–6 mm in diam., 4–10-flowered; bracteoles linear, 0.2–0.5 mm. Flowers with hypanthia partially fused, biology not noted. Calyx villous, strigillose, or hirtellous; limb ca. 1 mm, with 4 or 5 rounded to obtuse teeth. Corolla greenish white, salverform, outside puberulent; tube 10–12 mm, densely barbate in throat; lobes 4 or 5, narrowly oblong, 3–4 mm, apically rostrate. Drupecetum compressed globose to subglobose, 1–1.5 cm in diam. Drupes fused at base, orange, obovoid, ca. 5 mm. Fl. May, fr. Jul–Sep.

Forests or thickets in valleys, at watersides, or at roadsides; 800–900 m. S Yunnan [N India, Thailand, Vietnam].

Fl. China 19: 220–230. 2011.