

### 13. EMPETRUM Linnaeus, Sp. Pl. 2: 1022. 1753.

岩高兰属 yan gao lan shu

Min Tianlu (闵天禄 Ming Tien-lu); Arne Anderberg

Shrubs evergreen, small or creeping. Leaves densely verticillate, subverticillate, or decussate, sessile, margin entire; stipules absent. Inflorescences axillary on upper part of branchlets, 1–3-flowered; bracts (2–)4 or 5(or 6), scalelike. Flowers small, inconspicuous, unisexual (plants monoecious or dioecious). Sepals 3–6, imbricate in bud, petaloid. Petals absent. Stamens 3(–6), exerted; anthers 2-celled, longitudinally dehiscent. Ovary superior, subglobose, apically depressed, 6–9-loculed; ovules 1 per locule; style 1, short or indistinct; stigma 6–9(–12)-lobed. Fruit globose or subglobose, drupaceous; pericarp red, purple, or black when ripe, fleshy. Pyrenes 1 per locule, 1-seeded.

Two to several species: N temperate regions, South America (Andes), S Atlantic Islands (Falkland Islands, Tristan da Cunha); one species in China.

**1. *Empetrum nigrum* Linnaeus var. *japonicum* K. Koch, Hort. Dendr. 89. 1853.**

东北岩高兰 dong bei yan gao lan

*Empetrum nigrum* var. *asiaticum* Nakai ex H. Itô; *E. sibiricum* V. N. Vassiljev var. *japonicum* (K. Koch) Tzvelev.

Plants 20–50(–100) cm tall, much branched. Branchlets reddish brown; young branchlets puberulous. Leaves linear, 4–5 × 1–1.5 mm, glabrous, adaxially shiny and rugulose with im-

pressed midvein, margin slightly reflexed, glandular ciliate at first, apex obtuse. Bracts ovate, ca. 1 mm, margin ciliate. Flowers sessile. Sepals 6; outer sepals ovate-orbicular, ca. 1.5 mm; inner sepals dark red, petaloid, lanceolate, as long as outer ones, apically involute. Stamens 3; filaments linear, ca. 4 mm; anthers small. Ovary ca. 0.6 × 0.8 mm, glabrous; style very short; stigma radially 6–8-lobed. Fruit subglobose, ca. 5 mm in diam., purplish red to black when ripe.

Forests, stony hills; 700–1500 m. N Heilongjiang, E Nei Mongol (Da Hinggan Ling) [Japan, Korea, Mongolia, E Russia].

### 14. CASSIOPE D. Don, Edinburgh New Philos. J. 17: 157. 1834.

锦绦花属 jin tao hua shu

Fang Ruizheng (方瑞征 Fang Rhui-cheng); Peter F. Stevens

Shrubs evergreen, dwarf. Stems procumbent or ascending. Leaves decussate, sessile, appressed and crowded, imbricate, usually 4-ranked. Leaf blade small, entire or fimbriate-ciliate, veinless, 1-channeled on back, sometimes plane or convex. Flowers solitary, axillary, pendulous. Pedicel slender, base bracteate; bracteoles absent. Flowers usually 5-merous. Calyx lobes imbricate, subfree. Corolla white or pink, campanulate, lobed or cleft; lobes recurved. Stamens included; filaments straight, flattened; anthers ovate, with two long recurved awns. Ovary superior, glabrous, with many ovules per locule. Capsule depressed-globose, each valve 2-cleft at apex. Seeds many, minute, wingless.

About 17 species: circumboreal, extending south into China, the Himalayan region, Japan, Russia, and W North America; 11 species (six endemic) in China.

- 1a. Leaf blade not furrowed abaxially.
  - 2a. Leaf blade plane, margin incrassate, setulose ..... 3. *C. palpebrata*
  - 2b. Leaf blade abaxially convex, margin hyaline membranous.
    - 3a. Leaf blade elliptic, abaxially densely setulose, apex with a membranous acumen much shorter than blade ..... 1. *C. myosuroides*
    - 3b. Leaf blade elliptic to suborbicular, abaxially subglabrous, apex with a membranous acumen ca. as long as or longer than blade ..... 2. *C. membranifolia*
- 1b. Leaf blade ± deeply furrowed abaxially.
  - 4a. Furrow only to 1/3–1/2 blade length ..... 4. *C. abbreviata*
  - 4b. Furrow reaching near apex of leaf blade.
    - 5a. Leaf blade with membranous margin.
      - 6a. Leaf blade abaxially sparsely silvery pubescent, margin rust-brown colored, membranous and brown flattened-setulose; pedicels 5–25 mm ..... 7. *C. argyrotricha*
      - 6b. Leaf blade abaxially glabrous, margin silvery, membranous and ciliate; pedicels 1–7 mm.
        - 7a. Leaf blade 4–6 mm, 0.5–1 mm apiculate ..... 5. *C. fastigiata*
        - 7b. Leaf blade 2.5–4 mm, apex obtuse, not apiculate ..... 6. *C. fujianensis*
    - 5b. Leaf blade without membranous margin.
      - 8a. Leaves sometimes lax; leaf blade ovate-triangular, 2–3 mm, margin fringed with woolly hairs and glabrescent ..... 8. *C. selaginoides*

- 8b. Leaves densely imbricate; leaf blade oblong, (2–)4–7 mm, margin barbellate or setulose.
- 9a. Leaf blade with densely setulose margin, hairs solitary or 2 or 3 together, to 2–3 mm, each with scattered short stiff barbules, adaxially ± plane ..... 9. *C. wardii*
- 9b. Leaf blade with rigidly pubescent, barbellate margin, adaxially concave.
- 10a. Leaf blade oblong-elliptic, 2–4 mm, base arching, abaxially with shallow subtriangular glabrous furrow ..... 10. *C. nana*
- 10b. Leaf blade oblong-linear, 5–7 mm, base 2-lobed, abaxially with deep narrow densely puberulous furrow ..... 11. *C. pectinata*

**1. *Cassiope myosuroides*** W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 19. 1917.

鼠尾锦缘花 *shu wei jin tao hua*

Shrubs 4–7 cm tall, rarely to 12 cm. Stems suberect, glabrous. Leaves assurgent; leaf blade elliptic, 2–2.5 × ca. 1.2 mm, leathery, abaxially convex, densely setulose, adaxially ?convex, glabrous, base truncate, margin 0.3–0.4 mm wide and membranous, apex acute. Flower nutant. Pedicel 0.7–2 cm, densely crisped-tomentose. Calyx dark purple; lobes oblong to elliptic, 2.5–3 mm, abaxially glabrous, margin membranous and ciliate. Corolla white, tinged with red, campanulate, 5–8 mm, glabrous; lobes erect, broadly triangular, 1.5–2 mm. Stamens 10, ca. 2 mm; filaments pilose; awns ca. 1 mm. Ovary ca. 1.5 mm in diam. Capsule globose, ca. 3 mm in diam., ± enclosed by persistent corolla. Fl. May–Sep, fr. Jun–Oct.

Alpine meadows, open slopes, rocks and boulders; 4000–4500 m. NW Yunnan [Myanmar].

**2. *Cassiope membranifolia*** R. C. Fang, Novon 9: 162. 1999.

膜叶锦缘花 *mo ye jin tao hua*

Shrubs. Stems procumbent, ca. 26 cm long, slender, glabrous. Leaves assurgent; leaf blade suborbicular, rarely elliptic, 1.2–1.8 × 1–1.5 mm, leathery, abaxially convex, glabrous or sometimes pilose at base, adaxially concave, glabrous, base arched, margin distinctly membranous, apex an elongated-triangular hyaline acumen ca. as long as or longer than blade. Flower nutant. Pedicel 1–2.5 cm, densely crisped-tomentose. Calyx purple; lobes oblong, ca. 2.5 mm, glabrous, margin membranous and fimbriate. Corolla white, campanulate, 5–7 mm, abaxially glabrous; lobes erect, ovate, ca. 2 mm. Stamens ca. 1.5 mm; filaments pilose or glabrous; awns ca. 1 mm. Ovary ca. 1 mm in diam. Capsule ca. 2.5 mm in diam., enclosed by persistent corolla. Fl. Aug.

• Alpine meadows, moss-covered rocks; ca. 3600 m. NW Yunnan.

A reviewer (Gary D. Wallace) notes that this might be a minor variant of *Cassiope myosuroides*.

**3. *Cassiope palpebrata*** W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 8: 182. 1914.

朝天锦缘花 *chao tian jin tao hua*

*Cassiope pulvinalis* T. Z. Hsu.

Shrubs 2–6(–8) cm tall. Stems suberect or decumbent, glabrous. Leaves ± spreading; leaf blade elliptic or oblong, 1.5–3.4 × 0.6–1.2 mm, leathery, both surfaces glabrous and plane, sometimes midvein inconspicuously raised abaxially, base indistinguishable, margin incrassate, scarious, with several brown

setula. Flower nutant. Pedicel 1.5–2.5 cm, densely arachnoid-villose. Calyx purple; lobes elliptic or ovate, 2–3 mm, glabrous, margin membranous. Corolla white, campanulate, 5–8 mm, abaxially glabrous; lobes erect or subspreading, 1–3 mm. Stamens 8, ca. 2.5 mm; filaments pilose; awns 0.7–1.5 mm. Ovary ca. 1.5 mm in diam. Capsule ca. 3 mm in diam., enclosed by persistent corolla. Fl. May–Jul, fr. Jun–Oct.

Grassy mountain slopes, alpine moorlands, rocks, rock crevices; 3000–4300 m. NW Yunnan [Myanmar].

**4. *Cassiope abbreviata*** Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 62: 131. 1925.

短梗锦缘花 *duan geng jin tao hua*

Shrubs 15–20 cm tall. Stems initially decumbent or erect, slender, ultimately many branched, fastigiate, glandular. Leaves assurgent; leaf blade ovate or triangular-ovate, 2.5–3 × 1–1.2 mm, leathery, abaxially nitid, glabrous, deeply furrowed, furrow 1/3–1/2 length, subglabrous within, adaxially concave, glabrous, base lobed, margin membranous and fimbriate, apex acute, distinctly apiculate. Flower nutant. Pedicel 3–8 mm, densely crisped-tomentose. Calyx purple-red; lobes oblong or ovate, ca. 3 mm, margin membranous. Corolla white, campanulate, 5–7 mm; lobes erect, ovate-triangular, ca. 2 mm. Stamens ca. 2.5 mm; filaments pilose; awns ca. 1 mm. Ovary ca. 1 mm in diam. Capsule unknown. Fl. May–Aug.

• *Rhododendron* thicket margins, mossy and rocky places; 3800–4000 m. WC Sichuan (Baoping).

**5. *Cassiope fastigiata*** (Wallich) D. Don, Edinburgh New Philos. J. 17: 158. 1834.

扫帚锦缘花 *sao zhou jin tao hua*

*Andromeda fastigiata* Wallich, Asiat. Res. 13: 394. 1820.

Shrubs 8–20 cm tall. Stems initially decumbent, ultimately much branched, fastigiate, stiff white pubescent. Leaves densely imbricate; leaf blade ovate-triangular, 4–6 × 1.5–2 mm, leathery, abaxially deeply furrowed, furrow reaching near apex and diverging near base, furrow rim densely pubescent, adaxially concave, subglabrous, base divergent, 2-lobed, margin silvery, membranous, densely ciliate, apex with apicule 0.5–1 mm. Flower nutant. Pedicel 3–7 mm, densely crisped-tomentose. Calyx purple; lobes oblong-ovate, 4–5 mm, margin broadly membranous. Corolla white, broadly campanulate, 6–9 mm; lobes spreading, oblong, 2–4 mm. Stamens ca. 2.5 mm; filaments glabrous; awns ca. 1 mm. Capsule 2–3 mm in diam. Fl. May–Jul, fr. Jun–Sep.

Alpine thickets, rocky places; 3000–4500 m. S Xizang [Bhutan, ?Kashmir, Nepal, Pakistan, Sikkim].

One of us (Stevens) suggests that there exists a possible hybrid in

Xizang (see *H. Smith* 3823).

**6. *Cassiope fujianensis*** L. K. Ling & G. S. Hoo, Fl. Fujian. 4: 633. 1990.

福建锦缘花 fu jian jin tao hua

Subshrubs dwarf, 8–25 cm. Stems ascending or spreading. Leaves decussate, imbricate; leaf blade ovate or ovate-lanceolate, 2.5–4 × 1.5–2 mm, leathery, abaxially carinate, deeply furrowed, furrow reaching 3/4 leaf length, glabrous, adaxially concave, sparsely puberulous or subglabrous, base lobed, margin membranous, hyaline, 0.5–0.7 mm wide, ciliolate, apex obtuse. Flower nutant. Pedicel ca. 1 mm, densely white villous. Calyx lobes oblong, ca. 2 mm, glabrous, margin membranous. Corolla campanulate, ca. 1.5 mm; lobes oblong or obovate-oblong, ca. 1 mm. Stamens ca. 1 mm; filaments glabrous; awns ca. 0.3 mm. Ovary ca. 1 mm in diam. Capsule unknown. Fl. Sep.

- Rocky fissures; 1000–1100 m. Fujian.  
This is a post-glacial relict species.

**7. *Cassiope argyrotricha*** T. Z. Hsu, Acta Bot. Yunnan. 4: 263. 1982.

银毛锦缘花 yin mao jin tao hua

Shrubs 12–15 cm tall, much branched. Stems erect or decumbent. Leaves densely imbricate; leaf blade oblong, 4–5 × ca. 1.5 mm, leathery, abaxially convex, sparsely silvery pubescent, deeply furrowed, furrow nearly reaching apex and divergent towards base, adaxially concave, glabrous, base arching, margin rust-colored-brown, membranous, brown flattened-setulose, apex obtuse. Flower erect. Pedicel 5–25 cm, densely arachnoid-tomentose. Calyx glabrous; lobes elliptic, ca. 4.5 mm. Corolla white, campanulate, ca. 9 mm; lobes spreading, broadly triangular. Stamens ca. 3 mm; filaments pilose; awns ca. 1 mm. Ovary ca. 1 mm in diam. Capsule unknown. Fl. Sep.

- Rocks in forests, *Rhododendron* thickets; 3000–4400 m. NW Yunnan (Fugong).

**8. *Cassiope selaginoides*** J. D. Hooker & Thomson, Hooker's J. Bot. Kew Gard. Misc. 7: 126. 1855.

锦缘花 jin tao hua

*Cassiope mairei* H. Léveillé.

Shrubs 10–20 cm tall. Stems initially decumbent, ultimately erect, glabrous or pubescent. Leaves assurgent; leaf blade ovate-triangular, 2–3 × 1–1.5 mm, cymbiform, leathery, abaxially deeply furrowed, furrow nearly reaching apex and divergent near base, furrow rim densely pubescent, adaxially concave, glabrous, margin not membranous, fringed with woolly hairs, glabrescent. Flower nutant. Pedicel 0.5–1.6 cm, densely crisped-tomentose. Calyx crimson or reddish brown; lobes oblong to elliptic, ca. 3.8 mm, glabrous or puberulous, margin membranous, inconspicuously ciliolate. Corolla pure white, reddish within at base, broadly campanulate, 6–8 mm; lobes erect, oblong, 2.5–3 mm. Stamens ca. 2.5 mm; filaments pilose; awns ca. 0.9 mm. Capsule 2–3 mm in diam. Fl. May–Jul, fr. Jun–Sep.

*Rhododendron* thickets, alpine grasslands, rocky slopes, cliffs; 3000–4200(–4500) m. W Sichuan, SE Xizang, NE Yunnan [Bhutan, Myanmar, Nepal, Sikkim].

**9. *Cassiope wardii*** C. Marquand, J. Linn. Soc., Bot. 48: 199. 1929.

长毛锦缘花 chang mao jin tao hua

Shrubs 10–20 cm tall. Stems initially decumbent; twigs erect, glandular and setose. Leaves assurgent; leaf blade linear-oblong, 5–7 × ca. 2 mm, cymbiform, leathery, abaxially deeply furrowed, furrow reaching near apex and divergent near base, furrow rim densely pubescent, adaxially concave, glabrous, with densely setulose margin, hairs solitary or 2 or 3 together,

to 3 mm. Flower nutant. Pedicel 0.5–1.6 cm, densely crisped-tomentose. Calyx crimson or reddish brown; lobes oblong to elliptic, ca. 3.8 mm, glabrous or puberulous, margin membranous, ciliate. Corolla pure white, reddish within at base, broadly campanulate, 6–8 mm; lobes ± recurved, ovate, 2.5–3 mm. Stamens (8 or)10, ca. 2.5 mm; filaments pilose; awns ca. 0.9 mm. Capsule 2–3 mm in diam. Fl. May–Jul, fr. Jun–Sep.

• Open *Rhododendron* moorlands, rocky places; 3900–4200 m. SE Xizang.

**10. *Cassiope nana*** T. Z. Hsu, Acta Bot. Yunnan. 4: 265. 1982.

矮小锦绦花 ai xiao jin tao hua

Shrubs 3–10 cm tall. Stems decumbent or erect. Leaves assurgent; leaf blade oblong-elliptic, 2–4 × 0.8–1.2 mm, leathery, abaxially shallowly furrowed, furrow subtriangular, nearly reaching apex, glabrous, adaxially concave, glabrous, base arched, margin not membranous, inconspicuously denticulate, rigidly pubescent-barbellate, apex obtuse. Flower usually erect. Pedicel 1–2 cm, crisped-tomentose, base with 3 fringed bracts. Calyx lobes 5, ovate or oblong, 2–3 mm, glabrous, margin ciliate. Corolla white, campanulate, ca. 6 mm; lobes erect, oblong, ca. 1.5 mm. Stamens 8 or 9, ca. 2 mm; filaments pilose; awns ca. 1 mm. Ovary ca. 2.5 mm in diam. Capsule ca. 3 mm in diam. Fl. Jun, fr. Aug.

• Margins of woods, mountain slopes, meadows; 2000–3800 m. NW Yunnan (Dêqên, Gongshan).

**11. *Cassiope pectinata*** Stapf, Bot. Mag. 149: t. 9003(B). 1924.

篦叶锦绦花 bi ye jin tao hua

*Cassiope dendrotricha* Handel-Mazzetti; *C. macrantha* Handel-Mazzetti.

Shrubs 6–18(–46) cm tall. Stems initially decumbent, ultimately much branched, fastigiate, glandular and shortly pubescent. Leaves assurgent; leaf blade linear-oblong, 5–7 × 1–1.2 mm, boat-shaped, leathery, abaxially nitid or dull, deeply furrowed, furrow nearly reaching apex and divergent near base, densely puberulous within, adaxially strongly concave, glabrous, base 2-lobed, margin not membranous, inconspicuously denticulate, rigidly pubescent-barbellate, apex obtuse, apiculate. Flower nutant. Pedicel 0.9–1.8(–2.5) cm, densely crisped-tomentose, base with 4 fringed bracts. Calyx purple-red; lobes oblong or ovate, 2–3 mm, glabrous, margin membranous. Corolla white, campanulate, 6–7 mm, glabrous; lobes erect, oblong, 2–3 mm. Stamens 2–2.5 mm; filaments pilose; awns ca. 1.2 mm. Capsule ca. 2.5 mm in diam. Fl. Jun–Aug, fr. Jul–Aug.

*Rhododendron* scrub, alpine moorlands, meadows, rocks, crevices; 3600–4100 m. SW Sichuan, E Xizang, NW Yunnan [Myanmar].

**15. LEUCOTHOË** D. Don, Edinburgh New Philos. J. 17: 159. 1834.

木藜芦属 mu li lu shu

Fang Ruizheng (方瑞征 Fang Rhui-cheng); Peter F. Stevens

Shrubs evergreen. Leaves petiolate, serrulate or subentire. Inflorescences axillary, racemose, glabrous. Flowers 5-merous. Calyx lobes short. Corolla white, suburceolate to tubular; lobes recurved, short. Stamens much shorter than corolla tube; filaments straight, flattened; anthers oblong, thecae separate above, each opening by a terminal pore and with a slender awn. Ovary superior, glabrous, with many ovules per locule. Stigma capitate, 5-lobed. Capsule loculicidal, depressed globose. Seeds flattened, angled; testa smooth, shiny, reticulate.

Six species: E Asia, North America (SE United States); two species in China.

- 1a. Leaf base broadly cuneate, margin subentire, inconspicuously denticulate near apex; inflorescences 4–6 cm ..... 1. *L. griffithiana*
- 1b. Leaf base obtuse-rounded, margin denticulate; inflorescences 3–5 cm ..... 2. *L. tonkinensis*

**1. *Leucothoë griffithiana*** C. B. Clarke in J. D. Hooker, Fl. Brit. India 3: 460. 1882.

尖基木藜芦 jian ji mu li lu

*Pieris cavaleriei* H. Léveillé & Vaniot.

Shrubs 2–3 m tall. Twigs often flexuous, glabrous. Petiole 6–12 mm, glabrous; leaf blade elliptic or elliptic-lanceolate, 9–16 × 2.6–6 cm, leathery, abaxially glabrous or scattered shortly setaceous, adaxially glabrous, base broadly cuneate, margin subentire, inconspicuously denticulate apically, apex acuminate or caudate-acuminate. Inflorescence 4–6 cm; bracts broadly ovate, ca. 2 mm, apex acuminate. Pedicel 3–6 mm. Calyx lobes triangular-ovate, ca. 1.5 mm. Corolla white, suburceolate to tubular, 6–7 mm; lobes triangular-ovate, ca. 1 mm. Filaments ca. 2 mm. Capsule 4–6 mm in diam. Seeds elliptic to suborbicular, ca. 1 mm. Fl. Apr–May, fr. Jun–Oct.

Scattered in forests; 1000–2500(–3400) m. Guizhou, SE Xizang, NW Yunnan [Bhutan, Myanmar].

**2. *Leucothoë tonkinensis*** Dop in Lecompte, Fl. Indo-Chine 3: 730. 1930.

圆基木藜芦 yuan ji mu li lu

Shrubs to 4 m tall. Twigs slender, glabrous. Petiole 0.8–1.5 cm, glabrous; leaf blade ovate-elliptic or broadly elliptic, 5–11 × 3.5–4.5 cm, leathery, abaxially scattered shortly setaceous, adaxially glabrous, base obtuse-rounded, margin denticulate, apex caudate-acuminate. Inflorescence 3–5 cm; bracts broadly ovate, ca. 2.5 mm, glabrous. Pedicel 4–7 mm. Calyx lobes ovate, ca. 3 mm. Corolla white, suburceolate, 5–6 mm; lobes shortly triangular. Filaments ca. 2 mm. Capsule 4–6 mm in diam. Seeds ellipsoid, 1.2–1.6 mm. Fl. Mar, fr. Jun–Nov.

Forests, thickets on dry slopes; 2000–2300 m. Guizhou, SE Yunnan [N Vietnam].

**16. CRAIBIODENDRON** W. W. Smith, Rec. Bot. Surv. India 4: 276. 1911.

假木荷属 *jia mu he shu*

Fang Ruizheng (方瑞征 Fang Rhui-cheng); Peter F. Stevens

Shrubs or trees, evergreen. Twigs glabrous. Buds often superimposed, with 2–4 imbricate scales. Leaf petiole often reddish when young; leaf blade leathery, margin entire. Inflorescences axillary, paniculate or racemose. Pedicel short. Flowers small, 5-merous. Corolla campanulate or urceolate to tubular. Stamens much shorter than corolla; filaments geniculate, swollen near base, lacking appendages; anthers ± ovoid, dehiscing by introrse-terminal elliptic pores. Ovary superior, with many ovules per locule. Capsule depressed-globose, thick-walled, loculicidal. Seeds large; testa unilaterally winged.

Five species: Cambodia, China, India, Laos, Myanmar, Thailand, Vietnam; four species in China.

*Craibiodendron forrestii* W. W. Smith (Notes Roy. Bot. Gard. Edinburgh 5: 160. 1912), described from W Yunnan (Nujiang valley), is a species of *Quercus*.

- 1a. Corolla urceolate to tubular, abaxially glabrous; inflorescence raceme- or paniclelike, branches with up to 6 flowers.
  - 2a. Leaf apex abruptly acute to shortly acuminate, rarely retuse; inflorescence racemelike; capsule 1.7–2.5 cm in diam. .... 1. *C. scleranthum*
  - 2b. Leaf apex long acuminate; inflorescence paniclelike; capsule 8–9 mm in diam. .... 4. *C. yunnanense*
- 1b. Corolla campanulate, abaxially glabrous to densely pubescent; inflorescence usually paniclelike, branches with 6–30 flowers.
  - 3a. Leaf apex rounded to retuse ..... 2. *C. stellatum*
  - 3b. Leaf apex long acuminate to acuminate, rarely acute ..... 3. *C. henryi*

**1. *Craibiodendron scleranthum*** (Dop) Judd var. **kwangtungense** (S. Y. Hu) Judd, J. Arnold Arbor. 67: 457. 1986.

广东假木荷 *guang dong jia mu he*

*Craibiodendron kwangtungense* S. Y. Hu, J. Arnold Arbor. 35: 198. 1954; *C. kwangtungense* var. *frutescens* S. Y. Hu.

Trees or shrubs, 10–12 m tall. Petiole 8–10 mm; leaf blade elliptic or lanceolate, 6–8 × 1.8–3.7 cm, glabrous, glandular punctate, secondary veins 18–20 pairs, fine veins adaxially conspicuous and reticulate, base cuneate, apex acute to shortly acuminate. Inflorescences racemose; rachis 4–5 cm, pubescent. Pedicel 2–3 mm, pubescent. Calyx lobes suborbicular, both surfaces pubescent. Corolla urceolate to tubular, abaxially pubescent, lobes much smaller than tube. Filaments glabrous. Capsule ca. 1.4 × 1.7–2.5 cm, woody, with 12–14 seeds per locule. Seeds ca. 2 × 2 mm. Fl. May–Jun, fr. Jul–Aug.

• Mixed forests, open thickets, montane areas; above 600 m. Guangdong, S Guangxi.

*Craibiodendron scleranthum* var. *scleranthum* is endemic to Vietnam.

**2. *Craibiodendron stellatum*** (Pierre) W. W. Smith, Bull. Misc. Inform. Kew 1914: 129. 1914.

假木荷 *jia mu he*

*Schima stellata* Pierre, Fl. Forest. Cochin. 1: t. 122. 1887; *Craibiodendron shanicum* W. W. Smith.

Trees or shrubs, 3–8 m tall. Petiole ca. 5 mm; leaf blade elliptic, 6–13 × 3.5–6 cm, thickly leathery, glabrous or sparsely pubescent on midvein, abaxially sparsely black-glandular punctate, secondary veins 14–18 pairs, fine veins conspicuous and reticulate, base obtuse to subrounded, margin entire and revolute, apex rounded to retuse. Inflorescences paniculate; rachis 15–20 cm, ± gray puberulous. Pedicel 2–6 mm, ± gray puberulous. Flowers fragrant. Calyx lobes broadly ovate-triangular, abaxially pubescent. Corolla white, campanulate, 3–4 mm, abaxially pubescent; lobes subequal to tube. Filaments pilose.

Ovary densely pubescent. Capsule ca. 1 × 1.5 cm, ± pubescent. Seeds 5–10 mm. Fl. Jul–Oct, fr. Oct–Apr.

Forests, thickets; (200–)700–1600(–2700) m. Guangdong, Guangxi, Guizhou, Yunnan [Cambodia, Laos, Myanmar, Thailand, Vietnam].

**3. *Craibiodendron henryi*** W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 5: 158. 1912.

柳叶假木荷 *liu ye jia mu he*

*Craibiodendron mannii* W. W. Smith

Trees or shrubs, 8–15 m tall. Petiole 0.5–1.5 cm; leaf blade ± elliptic to ovate, 10–15 × 2–5 cm, glabrous, sometimes mid-

vein sparsely pubescent, abaxially sparsely black-glandular punctate, secondary veins 10–14 pairs, raised abaxially, fine veins inconspicuous and reticulate, base cuneate, apex acuminate to long acuminate. Inflorescences paniculate; rachis 15–25 cm, glabrous. Pedicel 1–7 mm, glabrous. Calyx lobes broadly ovate, abaxially subglabrous. Corolla white, campanulate, 2–3 mm, abaxially glabrous; lobes much longer than tube. Filaments glabrous. Ovary glabrous to pubescent. Capsule ca. 8 × 10 mm, glabrous. Seeds ca. 4 mm.

Forests, thickets; 1200–2800 m. SE Xizang, S and W Yunnan [India, N Myanmar, N Thailand].

**4. Craibiodendron yunnanense** W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 5: 159. 1912.

云南假木荷 yun nan jia mu he

Trees or shrubs, 3–6 m tall. Petiole 2–6 mm; leaf blade elliptic-lanceolate, 4–5(–8) × 1.6–2(–3) cm, glabrous, abaxially sparsely black glandular punctate, secondary veins 5–11 pairs, raised, fine veins conspicuous, base cuneate to broadly cuneate, apex acuminate with obtuse end. Inflorescences paniculate; rachis 4–20 cm, glabrous. Pedicel robust, ca. 2 mm. Calyx lobes broadly ovate, 1–2 mm, abaxially glabrous. Corolla cream-colored, urceolate, 4–6 mm, abaxially glabrous; lobes much shorter than tube. Filaments puberulous. Capsule 8–9 × ca. 6 mm, glabrous. Seeds 5–6 mm.

Forests, *Pinus* forest margins, thickets, open and dry slopes; 1200–3200 m. Xizang, Yunnan [Myanmar].

### 17. PIERIS D. Don, Edinburgh New Philos. J. 17: 159. 1834.

马醉木属 ma zui mu shu

Fang Ruizheng (方瑞征 Fang Rhui-cheng); Peter F. Stevens

Shrubs or trees, evergreen [or woody vines in E North America]. Leaves spirally arranged or pseudovercillate [or in whorls of 3 in NE Asia], petiolate; leaf blade leathery, margin entire to strongly toothed. Inflorescences terminal or axillary, paniculate or racemose. Pedicels ± pubescent and with glandular hairs. Flowers 5-merous. Calyx valvate, abaxially glandular, adaxially pubescent. Corolla white, urceolate to tubular-urceolate, shortly 5-lobed. Stamens included; filaments swollen at base, straight or geniculate; anthers on back with a pair of spurs at anther-filament junction, dehiscing by introrse-terminal and elliptic pores. Ovary superior, with many ovules per locule. Stigma truncate. Capsule loculicidal, with 5 unthickened sutures. Seeds small.

Seven species: E Asia, Caribbean Region, E North America; three species (one endemic) in China.

- 1a. Capsule densely to moderately pubescent, placentae central to nearly basal; style sunken into apex of ovary ..... 3. *P. swinhoei*
- 1b. Capsule glabrous, placentae ± subapical; style only slightly sunken into apex of ovary.
  - 2a. Margin of leaf blade conspicuously toothed from base to apex; secondary and fine veins clearly visible, impressed adaxially ..... 1. *P. formosa*
  - 2b. Margin of leaf blade with a few apical teeth only to distinctly toothed except near base; secondary and fine veins ± inconspicuous, not impressed adaxially ..... 2. *P. japonica*

**1. Pieris formosa** (Wallich) D. Don, Edinburgh New Philos. J. 17: 159. 1834.

美丽马醉木 mei li ma zui mu

*Andromeda formosa* Wallich, Asiat. Res. 13: 395. 1820; *Lyonia formosa* (Wallich) Handel-Mazzetti; *Pieris bodinieri* H. Léveillé; *P. formosa* var. *forrestii* (Harrow) Airy Shaw; *P. formosa* f. *longiracemosa* Fang; *P. forrestii* Harrow; *P. huana* W. P. Fang; *P. japonica* (Thunberg) D. Don ex G. Don subsp. *formosa* (Wallich) Kitamura.

Shrubs or small trees, (2–)3–5(–10) m tall. Twigs glabrous to densely pubescent. Leaves scattered or pseudovercillate, often reddish when young; petiole 1–1.5 cm; leaf blade lanceolate, elliptic, or oblong, rarely oblanceolate, 3–14 × ca. 1.4 cm, abaxially glabrous, adaxially puberulous to glabrescent, secondary and fine veins conspicuous on both surfaces, base cuneate to obtuse, margin conspicuously toothed from base to apex, apex acuminate or acute. Inflorescences paniculate or racemose; rachis 4–10(–20) cm. Pedicel 1–3 mm. Calyx lobes lanceolate, ca. 4 mm. Corolla tubular-urceolate or urceolate, 5–8 mm; lobes broadly triangular. Filaments straight, ca. 4 mm, pubescent. Ovary depressed-globose; style slightly sunken into apex. Capsule ovoid, ca. 4 mm in diam., glabrous. Seeds spindle-shaped, 2–3 mm. Fl. May–Jun, fr. Jul–Sep.  $2n = 24$ .

Thickets, open slopes; (500–)900–2300(–3800) m. Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Shaanxi, Sichuan, Xizang, Yunnan, Zhejiang [Bhutan, NE India (Assam), Myanmar, Nepal, Vietnam].

**2. Pieris japonica** (Thunberg) D. Don ex G. Don, Gen. Hist. 3: 832. 1834.

马醉木 ma zui mu

*Andromeda japonica* Thunberg in Murray, Syst. Veg., ed. 14, 407. 1784; *Lyonia polita* (W. W. Smith & Jeffrey) Chun; *L. popowii* (Palibin) Chun; *Pieris japonica* var. *taiwanensis* (Hayata) Kitamura; *P. polita* W. W. Smith & Jeffrey; *P. popowii* Palibin; *P. taiwanensis* Hayata.

Shrubs or small trees, (1–)4(–10) m tall. Twigs glabrous or puberulous. Leaves scattered or clustered towards shoot apices; petiole 3–8 mm; leaf blade oblanceolate or obovate to lanceolate-oblong, 3–10 × 1–2.5 cm, leathery, glabrous, midvein strongly raised or obscure on both surfaces, secondary and fine veins inconspicuous, base cuneate-attenuate, margin entire except for few apical teeth to 1/2 margin or crenulate except near base, apex acuminate. Inflorescences paniculate or racemose; rachis 6–15 cm, puberulous. Pedicel 1.5–6 mm. Calyx lobes tri-

angular-ovate, 3–4 mm. Corolla urceolate, ca. 8 mm; lobes sub-orbicular. Filaments straight, 2.5–4.5 mm, villous. Ovary sub-globose, glabrous; style slightly sunken into apex. Capsule ovoid to depressed-globose, 3–5 mm in diam., glabrous. Seeds spindle-shaped, 2–3 mm. Fl. Feb–May, fr. Jul–Oct.

Thickets; 800–1200(–1900) m. Anhui, Fujian, Hubei, Jiangxi, Taiwan, Zhejiang [Japan].

**3. *Pieris swinhoei*** Hemsley, J. Linn. Soc., Bot. 26: 17. 1889.

长萼马醉木 *chang e ma zui mu*

Shrubs 2–3 m tall. Twigs sparsely pubescent. Leaves pseudoverticillate; petiole 2–7 mm; leaf blade narrowly lanceolate to elliptic, 4–12 × ca. 1.2 cm, both surfaces with sparse glandular

hairs, midvein prominently raised abaxially and adaxially, secondary and fine veins reticulate, raised abaxially, inconspicuous and slightly raised or flat adaxially, base narrowly cuneate, margin toothed or inconspicuously so on upper half, apex acute. Inflorescences racemose, erect; rachis 15–20 cm, sometimes with basal branches. Pedicel ca. 5 mm. Calyx lobes narrowly triangular, 5–7(–13) mm. Corolla tubular-urceolate, 8–10 mm; lobes broadly triangular. Filaments geniculate, ca. 6 mm, pubescent. Ovary conical, densely fulvous hairy; style strongly sunken into apex. Capsule subglobose, ca. 5 mm in diam., pubescent. Seeds angled-ovoid, 1–1.5 mm. Fl. Apr–Jun, fr. Jul–Sep.

• Stream-sides in forests, thickets, low hills; ca. 700 m. Fujian, Guangdong.

**18. LYONIA** Nuttall, Gen. N. Amer. Pl. 1: 266. 1818, nom. cons., not Rafinesque (1808).

珍珠花属 *zhen zhu hua shu*

Fang Ruizheng (方瑞征 *Fang Rhui-cheng*); Peter F. Stevens

*Xolisma* Rafinesque.

Shrubs or trees, deciduous or evergreen, often from underground woody burl or producing thickened horizontal underground rhizomes. Buds flattened, conical or ovoid, usually with 2 large imbricate glabrous scales. Leaves spirally arranged, petiolate; leaf blade entire [toothed in United States]. Inflorescences axillary, racemose. Flowers [4- or]5[–8]-merous. Calyx with variously estimated lobes, usually valvate in bud. Corolla white [to red], tubular or urceolate; lobes short. Filaments flattened, geniculate, with or without 1 pair of spurs at anther-filament junction; anthers dehiscing by introrse-terminal elliptic pores. Ovary superior, with many ovules per locule; stigma truncate. Capsule loculicidal, with pale ± thickened sutures sometimes separating from valves in dehiscence. Seeds oblong-ovoid or spindle-shaped to shortly linear, minute, ends often truncated.

Thirty-five species: E Asia, North America; five species (two endemic) in China.

- 1a. Capsule with slightly thickened sutures; leaves 1.5–7 × 0.6–4 cm, apex obtuse, mucronate.
  - 2a. Filaments with 2 spurs near apex; inflorescences 6–15 cm; rachis sparsely to densely pubescent; ovary pubescent ..... 4. *L. compta*
  - 2b. Filaments without spurs; inflorescences 1–4(–7) cm; rachis densely fulvous-pubescent; ovary glabrous to pubescent ..... 5. *L. villosa*
- 1b. Capsule with much thickened sutures; leaves 4–20 × 2.5–12 cm, apex acuminate to abruptly acuminate.
  - 2a. Calyx lobes 6–11 mm; filaments without spurs; inflorescences 2–7 cm; leaf blade usually leathery ..... 3. *L. macrocalyx*
  - 2b. Calyx lobes 2–6 mm; filaments with 2 spurs near apex; inflorescences 5–20 cm; leaf blade usually papery.
    - 3a. Rachis of inflorescences, pedicels, and abaxial surface of calyx pubescent; leaf blade apically usually acuminate ..... 1. *L. ovalifolia*
    - 3b. Rachis of inflorescences, pedicels, and abaxial surface of calyx glabrous; leaf blade apically usually abruptly acuminate ..... 2. *L. doyonensis*

**1. *Lyonia ovalifolia*** (Wallich) Drude in Engler & Prantl, Nat. Pflanzenfam. 4(1): 44. 1889.

珍珠花 *zhen zhu hua*

Shrubs or trees, deciduous or evergreen, 1–4 m tall. Twigs glabrous or pubescent. Buds narrowly ovoid, (1–)3–9(–11.5) mm, glabrous. Petiole 4–9 mm, glabrous or pubescent; leaf blade ovate, narrowly to broadly elliptic, lanceolate, or sub-orbicular, 3–20 × 2–12 cm, papery to thinly leathery, both surfaces ± with white or brown hairs, rarely abaxially densely white villous on midvein or subglabrous, veins prominently raised to slightly depressed or nearly obscure, base obtuse, cuneate, or sometimes cordate, apex acuminate. Inflorescences 5–20 cm, pubescent; lower 1–3(or 4) bracts leaflike or not. Pedicel 2–10 mm, densely pubescent. Calyx lobes oblong or triangular, 2–6 mm, densely or sometimes sparsely pubescent. Corolla tubular, 8–11 mm, abaxially densely pubescent; lobes ca. 1 mm. Filaments 5–8 mm, pilose, with 2 spurs at apex.

Ovary glabrous or pubescent. Capsule globose or ovoid, 3–5 mm in diam., with thick sutures or not, glabrous to densely pubescent. Fl. May–Jun, fr. Jul–Sep. *2n* = 24\*.

Forests, forest margins, thickets, mountains, open and dry slopes, near hot springs, ravines; 200–3400 m. Anhui, Fujian, S Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Bangladesh, Bhutan, Cambodia, India, Japan, Laos, Malaysia, Myanmar, Nepal, Pakistan, Sikim, Thailand, Vietnam].

The leaf blade shape and indumentum are highly variable.

- 1a. Ovary and capsule densely pubescent.
  - 2a. Twigs, petioles, and leaf blades abaxially and inflorescences ± pubescent .... 1e. var. *hebecarpa*
  - 2b. Twigs, petioles, and leaf blades abaxially and inflorescences densely tomentose ..... 1f. var. *tomentosa*

- 1b. Ovary and capsule glabrous.
  - 3a. Leaf blade abaxially white villous, especially densely so on midvein, base rounded or cuneate to cordate ..... 1d. var. *elliptica*
  - 3b. Leaf blade abaxially ± sparsely white or brown pubescent, base narrowly cuneate to cordate.
    - 4a. Filaments with inconspicuous spurs, 0.1–0.3 mm; inflorescences usually without leaflike bracts ..... 1b. var. *rubrovenia*
    - 4b. Filaments with distinct spurs, ca. 0.5 mm; inflorescence with leaflike bracts.
      - 5a. Leaves ovate or elliptic, rarely suborbicular; calyx lobes triangular ..... 1a. var. *ovalifolia*
      - 5b. Leaves elliptic-lanceolate to lanceolate; calyx lobes lanceolate ..... 1c. var. *lanceolata*

**1a. *Lyonia ovalifolia* var. *ovalifolia***

珍珠花(原变种) zhen zhu hua (yuan bian zhong)

*Andromeda ovalifolia* Wallich, *Asiat. Res.* 13: 391. 1820; *Pieris ovalifolia* (Wallich) D. Don; *Xolisma ovalifolia* (Wallich) Rehder.

Leaf blade ovate or elliptic, (4–)8–10(–21) × (2–)4–6 (–11.5) cm, abaxially white pubescent or brown strigose, base obtuse to cordate, apex acuminate. Inflorescences with leaflike bracts. Filaments with 2 distinct spurs ca. 0.5 mm. Capsule sutures often quite thick.  $2n = 24$ .

Forests, forest margins, thickets, open and dry slopes; 700–3400 m. Fujian, S Gansu (Wenxian), Guangdong, Guangxi, Guizhou, Hubei, Hunan, Shaanxi, Sichuan, Xizang, Yunnan [Bangladesh, Bhutan, Cambodia, India, Laos, Malaysia, Myanmar, Nepal, Pakistan, Sikkim, Thailand, Vietnam].

**1b. *Lyonia ovalifolia* var. *rubrovenia*** (Merrill) Judd, *J. Arnold Arbor.* 60: 491. 1979.

红脉珍珠花 hong mai zhen zhu hua

*Pieris rubrovenia* Merrill, *Philipp. J. Sci.* 23: 256. 1923; *Lyonia annamensis* (Dop) Merrill; *L. rubrovenia* (Merrill) Chun; *P. annamensis* Dop.

Leaf blade elliptic, oblong, or lanceolate, 3–10 × (0.8–)1–3 cm, abaxially veins rust-colored, apex obtuse to acute. Inflorescences without leaflike bracts. Filaments with very short spurs 0.1–0.3 mm. Capsule with slightly thickened sutures.

Forests; 1000–1900 m. Guangdong, Guangxi, Hainan [Vietnam].

**1c. *Lyonia ovalifolia* var. *lanceolata*** (Wallich) Handel-Mazzetti, *Symb. Sin.* 7: 788. 1936.

狭叶珍珠花 xia ye zhen zhu hua

*Andromeda lanceolata* Wallich, *Asiat. Res.* 13: 390. 1820; *Lyonia compta* (W. W. Smith & Jeffrey) Handel-Mazzetti var. *stenantha* Handel-Mazzetti; *L. obliquinervis* (Merrill & Chun) Chun ex P. C. Tam; *Pieris kouyangensis* H. Léveillé; *P. lanceolata* (Wallich) D. Don; *P. obliquinervis* Merrill & Chun; *P.*

*ovalifolia* var. *lanceolata* (Wallich) C. B. Clarke; *P. ulbrichii* H. Léveillé; *Vaccinium mairei* H. Léveillé; *Xolisma compta* (W. W. Smith & Jeffrey) Rehder; *X. ovalifolia* var. *lanceolata* (Wallich) Rehder.

Leaf blade elliptic-lanceolate to lanceolate, 5–13(–14.5) × 2–5(–7) cm, base narrowly cuneate to broadly cuneate, apex acuminate. Inflorescences with leaflike bracts. Calyx lobes lanceolate. Filaments with 2 distinct spurs ca. 0.5 mm. Capsule sutures quite thick.

Forests, forest margins, thickets, open and dry slopes; 700–2400 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Sichuan, Xizang, Yunnan [India, Myanmar].

**1d. *Lyonia ovalifolia* var. *elliptica*** (Siebold & Zuccarini) Handel-Mazzetti, *Symb. Sin.* 7: 788. 1936.

小果珍珠花 xiao guo zhen zhu hua

*Andromeda elliptica* Siebold & Zuccarini, *Abh. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss.* 4: 126. 1846; *Lyonia ovalifolia* var. *formosana* (Komatsu) T. Yamazaki; *Pieris elliptica* (Siebold & Zuccarini) Nakai; *P. formosana* Komatsu; *P. ovalifolia* var. *elliptica* (Siebold & Zuccarini) Rehder & E. H. Wilson; *P. pilosa* Komatsu; *Xolisma elliptica* (Siebold & Zuccarini) Nakai; *X. formosana* (Komatsu) Nakai; *X. formosana* var. *pilosa* (Komatsu) Nakai; *X. ovalifolia* var. *elliptica* (Siebold & Zuccarini) Rehder.

Leaf blade elliptic or ovate, 3.5–10.5 × 1.8–6 cm, abaxially villous, especially on midvein, base rounded to cordate or broadly cuneate, apex acute to long acuminate, sometimes curved. Inflorescences with leaflike bracts. Filaments with 2 distinct spurs. Capsule sutures quite thick.

Forests, forest margins, mountains, dry slopes, near hot springs; 1000–2700 m. Taiwan [Japan].

**1e. *Lyonia ovalifolia* var. *hebecarpa*** (Franchet ex Forbes & Hemsley) Chun, *Sunyatsenia* 4: 253. 1940.

毛果珍珠花 mao guo zhen zhu hua

*Pieris ovalifolia* var. *hebecarpa* Franchet ex Forbes & Hemsley, *J. Linn. Soc., Bot.* 26: 17. 1889; *P. henryi* H. Léveillé; *P. mairei* H. Léveillé; *P. mairei* var. *parvifolia* H. Léveillé; *Xolisma ovalifolia* var. *hebecarpa* (Franchet ex Forbes & Hemsley) Metcalf.

Leaf blade ovate to elliptic-ovate, 5–12(–15) × (2.3–)3–6(–8) cm, abaxially sparsely or densely pubescent, base rounded to cordate, apex acuminate to long acuminate. Inflorescences usually with leaflike bracts. Filaments with 2 distinct spurs. Capsule globose, 3–4 mm in diam., with thickened sutures, densely pubescent.

• *Pinus* and *Quercus* forests, forest margins, thickets, open and dry slopes; 200–3400 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Jiangsu, Jiangxi, Shaanxi, Sichuan, Yunnan, Zhejiang.

**1f. *Lyonia ovalifolia* var. *tomentosa*** (W. P. Fang) C. Y. Wu, *Index Fl. Yunnan.* 2: 1082. 1984.

绒毛珍珠花 rong mao zhen zhu hua

*Pieris ovalifolia* var. *tomentosa* W. P. Fang, *Contr. Biol.*

Lab. Chin. Assoc. Advancem. Sci., Sect. Bot. 10: 241. 1938.

Twigs, petioles, leaf blades abaxially, and inflorescences densely tomentose. Leaf blade elliptic, 4–8 × 2.5–5 cm, adaxially pubescent, base obtuse to rounded, apex abruptly acuminate. Inflorescences with leaflike bracts. Filaments with 2 ? distinct spurs. Capsule unknown.

- Ravines; ca. 1700 m. NC Yunnan (Yongren).

**2. *Lyonia doyonensis*** (Handel-Mazzetti) Handel-Mazzetti, Symb. Sin. 7: 789. 1936.

圆叶珍珠花 *yuan ye zhen zhu hua*

*Pieris doyonensis* Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 60: 185. 1923; *Lyonia ovalifolia* (Wallich) Drude var. *doyonensis* (Handel-Mazzetti) Judd.

Trees or shrubs, deciduous, 2–6(–15) m tall. Twigs glabrous, rarely puberulous. Buds (1–)4–7(–11) mm, glabrous. Petiole 0.8–1.5 cm, glabrous or pubescent; leaf blade orbicular, oblong-orbicular, or oblong-elliptic, 6–15 × 4–10 cm, papery to thinly leathery, abaxially brown appressed-pubescent, especially on midvein and secondary veins, adaxially subglabrous, veins strongly raised abaxially, slightly raised adaxially, base obtuse-rounded, often shallowly cordate, apex rounded then abruptly acuminate. Inflorescences 7–17 cm, glabrous; lower 2 or 3 bracts leaflike. Pedicel 2–4 mm, glabrous. Calyx lobes triangular, 2–3 mm, glabrous. Corolla tubular, 1–1.2 cm, abaxially densely pubescent; lobes ca. 1 mm. Filaments 6–8 mm, lower part pilose, with 2 spurs at apex. Ovary glabrous. Capsule depressed-globose, 4–5 mm in diam., with thick sutures, glabrous. Fl. Jul–Aug, fr. Aug–Nov.

- Evergreen forests, ravines; 2000–3000 m. NW Yunnan.

**3. *Lyonia macrocalyx*** (J. Anthony) Airy Shaw, Bot. Mag. 160: t. 9490. 1937.

大萼珍珠花 *da e zhen zhu hua*

*Pieris macrocalyx* J. Anthony, Notes Roy. Bot. Gard. Edinburgh 15: 241. 1927.

Shrubs or small trees, semievergreen to deciduous, 1–2(–4) m tall. Twigs puberulous, glabrescent. Buds flattened-ovoid, 7–9 mm, glabrous. Petiole 2–10 mm, pubescent; leaf blade ovate or elliptic, 4–10 × 2.5–5 cm, leathery, abaxially with short dense fulvous hairs, adaxially glabrous, veins raised abaxially, impressed adaxially, base obtuse-rounded to broadly cuneate or shallowly cordate, apex acuminate or obtuse-rounded. Inflorescences 2–7 cm, glabrous; bracts leaflike. Pedicel 5–10 mm, pubescent. Calyx 5(–8)-lobed; lobes broadly ovate, 6–11 mm, leathery, abaxially with sparse or dense fulvous hairs or subglabrous. Corolla urceolate, 6–10 mm, abaxially sparsely fulvous-pubescent; lobes 1–2 mm. Filaments 5–6 mm, pilose, without spurs. Ovary glabrous. Capsule globose, 5–7 mm in diam., with thick sutures, glabrous. Fl. Jul–Aug, fr. Aug–Sep.

*Abies* forests, cliffs in rain forests, forest margins, thickets; 1800–3500 m. SE Xizang, NW Yunnan [Myanmar].

**4. *Lyonia compta*** (W. W. Smith & Jeffrey) Handel-Mazzetti, Symb. Sin. 7: 790. 1936.

秀丽珍珠花 *xiu li zhen zhu hua*

*Pieris compta* W. W. Smith & Jeffrey, Notes Roy. Bot. Gard. Edinburgh 9: 116. 1916; *Xolisma compta* (W. W. Smith & Jeffrey) Rehder.

Shrubs evergreen, ca. 2 m tall. Twigs pubescent, glabrescent. Buds ovate, (1–)2–3(–4) mm, pubescent. Petiole 1–2 mm, pubescent; leaf blade elliptic, 1.5–3.5 × 0.6–1.1 cm, leathery, abaxially glaucous, sparsely pubescent or subglabrous, adaxially pubescent to glabrous, midvein and secondary veins inconspicuous, base broadly cuneate to rounded, apex obtuse, mucronate. Inflorescences terminal, sometimes also axillary, 6–15 cm, pubescent; bracts leaflike near base of raceme, smaller apically. Pedicel ca. 1 cm, pubescent, also with long headed hairs. Calyx lobes ovate-lanceolate, 1–2.5 mm, abaxially pubescent. Corolla urceolate, 4–6 mm, abaxially white pubescent; lobes ca. 0.8 mm. Filaments 0.5–2(–3.5) mm, pilose, with 2 spurs at apex. Ovary pubescent. Capsule subglobose, 3–4 mm in diam., with slightly thickened sutures, moderately to densely pubescent. Fl. Jun–Jul, fr. Aug–Oct.

- Forest margins, sunny thickets, marshy places; 1000–2500 m. Guizhou, Yunnan.

**5. *Lyonia villosa*** (Wallich ex C. B. Clarke) Handel-Mazzetti, Symb. Sin. 7: 789. 1936.

毛叶珍珠花 *mao ye zhen zhu hua*

Shrubs or small trees, deciduous, 1–3 m tall. Twigs pubescent, glabrescent. Buds narrowly ovoid, 1–13 mm, glabrous. Petiole 3–6 mm, pubescent; leaf blade obovate, oblong-obovate, or ovate, 1.5–7 × 1–4 cm, papery to subleathery, abaxially villous or pubescent on veins or sometimes subglabrous, adaxially sparsely pubescent on veins, otherwise glabrous, veins raised abaxially, midvein impressed adaxially, base broadly cuneate to rounded or subcordate, apex obtuse, rarely shortly acuminate, mucronate. Inflorescences (0.5–)1–4(–7) cm, densely fulvous-pubescent, rarely glabrous; bracts leaflike. Pedicel 3–5 mm, densely pubescent to glabrous. Calyx lobes oblong or narrowly lanceolate to linear, 3–4 mm, pubescent, also with glandular hairs. Corolla urceolate to tubular, 5–8 mm, abaxially pubescent; lobes ca. 0.5 mm. Filaments ca. 4 mm, pilose, without spurs. Ovary glabrous to pubescent. Capsule ovoid, with thick sutures, glabrous or rarely sparsely pubescent. Fl. May–Aug, fr. Sep–Oct.

*Abies*, *Betula*, *Picea*, *Pinus*, *Rhododendron*, or mixed forests, thickets; 1000–3900 m. Guizhou, Sichuan, SE Xizang, Yunnan [Bhutan, NE India, Myanmar, Nepal, Sikkim].

- 1a. Inflorescences 1–7 cm; rachis and pedicels ± pubescent; corolla urceolate to tubular ..... 5a. var. *villosa*
- 1b. Inflorescences (0.5–)1–3 cm; rachis and pedicels usually glabrous or sparsely pubescent; corolla urceolate ..... 5b. var. *sphaerantha*

**5a. *Lyonia villosa* var. *villosa***

毛叶珍珠花(原变种) *mao ye zhen zhu hua* (*yuan bian zhong*)

*Pieris villosa* Wallich ex C. B. Clarke in J. D. Hooker, Fl. Brit. India 3: 461. 1882; *Lyonia villosa* var. *pubescens* (Franchet) Judd; *Pieris ovalifolia* (Wallich) D. Don var. *pubescens* Franchet; *P. villosa* var. *pubescens* (Franchet) Rehder & E. H. Wilson; *Xolisma villosa* (Wallich ex C. B. Clarke) Rehder; *X. villosa* var. *pubescens* (Franchet) Rehder.

Inflorescences 1–7 cm; rachis and pedicels ± pubescent. Corolla urceolate to tubular.

*Abies, Betula, Picea, Pinus, Rhododendron*, or mixed forests, thickets; 1000–3900 m. Guizhou, Sichuan, SE Xizang, Yunnan [Bhutan, NE India, Myanmar, Nepal, Sikkim].

**5b. *Lyonia villosa* var. *sphaerantha*** (Handel-Mazzetti) Handel-Mazzetti, Symb. Sin. 7: 789. 1936.

光叶珍珠花 *guang ye zhen zhu hua*

*Xolisma sphaerantha* Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 62: 131. 1925.

Inflorescences (0.5–)1–3 cm; rachis and pedicels usually glabrous or sparsely pubescent. Corolla urceolate.

*Abies, Betula, Picea, Pinus*, or *Rhododendron* forests, thickets; 2000–3800 m. Sichuan, SE Xizang, Yunnan [Myanmar].

### 19. CHAMAEDAPHNE Moench, Methodus 457. 1794, nom. cons., not Mitchell (1769).

地桂属 *di gui shu*

Fang Ruizheng (方瑞征 *Fang Rhui-cheng*); Peter F. Stevens

*Cassandra* D. Don.

Shrubs evergreen, lepidote. Stems arching. Leaf blade leathery, margin entire or inconspicuously denticulate. Inflorescences terminal, secund racemes; bracts leaflike. Flowers 5-merous. Corolla urceolate to tubular. Stamens included; filaments straight, subulate, lacking appendages, anthers dehiscent by terminal pores. Ovary superior, with many ovules per locule; stigma truncate. Capsule loculicidal; epicarp 5-valved, separating from 10-valved endocarp. Seeds many, small, wingless.

One species: China, N Japan, Mongolia, Russia (Siberia); NE Europe, North America.

**1. *Chamaedaphne calyculata*** (Linnaeus) Moench, Methodus 457. 1794.

地桂 *di gui*

*Andromeda calyculata* Linnaeus, Sp. Pl. 1: 394. 1753; *Cassandra calyculata* (Linnaeus) D. Don.

Shrubs erect, 0.3–1.5 m tall. Twigs fulvous, densely lepidote and pubescent. Leaf blade oblong or elliptic-oblong, 3–4 × 1–1.5 cm, both surfaces with brownish scales, especially abaxially, base cuneate to obtuse, margin entire or inconspicuously

denticulate, apex obtuse, mucronulate; upper leaves gradually smaller. Racemes 4–12 cm. Pedicel ca. 2 mm, densely pubescent; bracteoles apical. Petiole 1.5–2.5 mm. Flowers pendent. Calyx lobes ovate, 1.5–3 mm, pubescent and lepidote. Corolla white, tubular-urceolate, 5–6 mm; lobes recurved, ovate. Filaments glabrous. Capsule depressed-globose, 3–4 mm in diam. Fl. Jun, fr. Jul.  $2n = 22$ .

Coniferous forests, mossy moors; low elevations. Heilongjiang, Jilin, Nei Mongol [N Japan, Mongolia, Russia (Siberia); NE Europe, North America].

### 20. GAULTHERIA Kalm ex Linnaeus, Sp. Pl. 1: 395. 1753.

白珠树属 *bai zhu shu shu*

Fang Ruizheng (方瑞征 *Fang Rhui-cheng*); Peter F. Stevens

*Chiogenes* Salisbury.

Shrubs evergreen. Stems erect, creeping, or procumbent. Leaves spirally arranged, petiolate; leaf blade serrate or rarely entire. Flower usually 5-merous, sometimes 4-merous, in axillary or terminal racemes or panicles, or solitary; bracteoles variable in position. Calyx deeply divided. Corolla usually white, urceolate, campanulate, or tubular, shallowly lobed. Stamens included; filaments flattened, usually dilated towards base; anthers oblong, dehiscent by terminal pores, with 2–4 awns or minute projections. Ovary superior or semi-inferior, with many ovules per locule. Stigma truncate. Calyx at fruiting accrescent, fleshy; capsule dehiscent loculicidally or sometimes irregularly [fruit a berry]. Seeds small, unwinged.

About 135 species: E and S Asia, SE Australia (including Tasmania), North and South America, Pacific Islands (New Zealand); 32 species (15 endemic) in China.

1a. Flowers solitary, axillary; plant dwarf, usually a prostrate shrub; leaf blade small, to 1.1(–1.2) cm.

2a. Leaf blade abaxially densely or sparsely setulose.

3a. Flower 4-merous; leaf blade 3–7 × 2–5 mm ..... 24. *G. suborbicularis*

3b. Flower 5-merous; leaf blade 0.5–2 cm × 3–10(–16) mm.

4a. Leaf blade broadly ovate or suborbicular, sometimes ovate or elliptic, 5–10(–18) × 3–16 mm; corolla white, pink, or crimson, ca. 5 mm, lobes ca. 1 mm ..... 25. *G. nummularioides*

4b. Leaf blade obovate-elliptic or obovate-oblong, 1–2 × 0.5–1 cm; corolla white, 6–9 mm, lobes

3–6 mm ..... 31. *G. jingdongensis*

2b. Leaf blade abaxially glabrous, rarely scattered hispidulous.

- 5a. Leaves unequal in size; larger leaf blades usually obovate or oblong, less than 2 × as long as wide, 8–14 × 6–8 mm, apex obtuse to rounded ..... 27. *G. hypochlora*
- 5b. Leaves equal, or slightly unequal in size; leaf blade usually elliptic, elliptic-oblong, or linear, more than 2 × as long as wide, 5–16 × 1–7 mm, apex acute, obtuse, or acuminate.
- 6a. Twigs and often leaves glabrous; leaf blade obtuse or acuminate at apex ..... 32. *G. taiwaniana*
- 6b. Twigs and leaves ± hairy; leaf blade obtuse to acute at apex.
- 7a. Pedicel 5–9(–19) mm; leaf blade glabrous ..... 26. *G. dolichopoda*
- 7b. Pedicel 1–2 mm; leaf blade usually variously pubescent or hispidulous, and/or ciliate at margins.
- 8a. Leaf blade long ciliate along margin ..... 27. *G. trichophylla*
- 8b. Leaf blade not long ciliate along margin.
- 9a. Fruit usually white; leaf blade linear or oblong-linear, 5–16 × 1–4 mm; calyx lobes ovate, base slightly cordate ..... 28. *G. cardiosepala*
- 9b. Fruit usually dark blue; leaf blade elliptic or oblong, 6–16 × 2–6 mm; calyx lobes broadly ovate or ovate-triangular, base rounded ..... 30. *G. sinensis*
- 1b. Inflorescence racemose or corymbose; plant usually a taller shrub; leaf blade at least 1.5 mm.
- 10a. Leaf blade less than 3.5 cm; plant usually to 40(–60) cm tall.
- 11a. Inflorescence racemose, rachis 1–4.5 cm.
- 12a. Leaves purple abaxially; fruit dark purple, fleshy; leaf blade less than 2 × as long as wide; rachis glabrous ..... 22. *G. purpurea*
- 12b. Leaves pale green abaxially; fruit whitish, succulent; leaf blade usually more than 2 × as long as wide; rachis densely puberulous.
- 13a. Inflorescence solitary on each twig, pseudoterminal; leaf blade 8–11(–15) × 3–7 mm, elliptic-oblong or oblanceolate ..... 6. *G. borneensis*
- 13b. Inflorescences usually 2 or 3, terminal and from upper leaf axils; leaf blade 1.2–3.5 × 0.4–1.2 cm, obovate or narrowly obovate ..... 9. *G. cuneata*
- 11b. Inflorescence shortly racemose, rachis 2–15 mm.
- 14a. Plant 30–40 cm tall; twigs rust-colored long setose; inflorescence 3–8-flowered, pedicels ca. 6 mm; leaf blade ovate, 2–3.5 × 1.5–2 cm ..... 3. *G. notabilis*
- 14b. Plant 5–20 cm tall; twigs pubescent to glabrous; inflorescence 1–5-flowered, pedicel 1–6 mm; leaf blade elliptic, obovate, or suborbicular, 0.8–5 × 0.6–2.5 cm.
- 15a. Calyx and corolla lobes 4; leaf blade hirtellous abaxially ..... 23. *G. heteromera*
- 15b. Calyx and corolla lobes 5; leaf blade punctate or hispidulous abaxially.
- 16a. Corolla campanulate, ca. 4 mm; inflorescence 1–3-flowered; leaf blade elliptic, 10–12 × 6–8 mm, abaxially dark punctate ..... 7. *G. prostrata*
- 16b. Corolla urceolate, ca. 5 mm; inflorescence 2–5-flowered; leaf blade obovate, elliptic, or suborbicular, 13–50 × 8–25 mm, abaxially hispidulous ..... 3. *G. pyrolifolia*
- 10b. Leaf blade more than 4 cm; plant usually more than 40 cm tall.
- 17a. Twigs glabrous.
- 18a. Leaf blade ovate or broadly ovate, base rounded to auriculate-cordate, apex acuminate to caudate-acuminate.
- 19a. Inflorescence corymbose or shortly racemose, axis 3–10 mm; secondary veins 1 pair arising near base of leaf blade ..... 2. *G. dumicola*
- 19b. Inflorescence racemose, axis at least 3 cm; secondary veins more than 3 pairs.
- 20a. Leaf blade auriculate-cordate at base, abaxially shortly glandular setose, secondary veins 4–7(or 8) pairs; twigs trigonous and winged; rachis and pedicels pubescent ..... 11. *G. brevistipes*
- 20b. Leaf blade obtuse to subcordate at base, abaxially glabrous, secondary veins 3 or 4 pairs; twigs terete; rachis and pedicels glabrous ..... 21. *G. leucocarpa*
- 18b. Leaf blade elliptic, oblong, or obovate to lanceolate, base cuneate, sometimes rounded-obtuse, apex acute, sometimes acuminate.
- 21a. Twigs distinctly trigonous or with narrow wings; inflorescence 2–3 cm; bract ovate-lanceolate, 5–6 mm, with 1 distinct main vein, distinctly carinate, secondary veins 2 pairs ..... 19. *G. trigonoclada*
- 21b. Twigs terete, sometimes obtusely angled; inflorescence 2–12 cm; bract ovate to orbicular-ovate, 1–4(–7) mm, main veins inconspicuous, secondary veins more than 3 pairs.
- 22a. Inflorescence terminal and axillary, 10–12 cm; leaf blade obovate or elliptic-obovate, 3–6.5 × 1–2.5 cm, apex acute, adaxially puberulous on midvein ..... 16. *G. longiracemosa*
- 22b. Inflorescence axillary, 2–9 cm; leaf blade oblong or elliptic, 5–17 × 2–6.5 cm, apex acute to caudate-acuminate, adaxially glabrous.
- 23a. Leaf blade usually oblong, thickly leathery, apex caudate-acuminate, abaxially densely punctate; bracteoles below middle to near base of pedicel ..... 18. *G. griffithiana*
- 23b. Leaf blade usually elliptic, leathery, apex acute to acuminate, abaxially scattered punctate;

- bracteoles close to calyx ..... 20. *G. fragrantissima*
- 17b. Twigs densely hirsute, hispid, or setose.
- 24a. Leaf blade (4–)8–16 × 3–9 cm, base shallowly cordate to rounded; corolla broadly campanulate, 6–13 mm.
- 25a. Corolla red; inflorescence shortly corymbose-racemose, 2–8 mm, glabrous ..... 4. *G. pseudonotabilis*
- 25b. Corolla white; inflorescence racemose or corymbose, 10–60(–100) mm, densely tomentulose or glabrous.
- 26a. Corolla 1–1.3 cm; bracteoles basal; inflorescence densely tomentulose ..... 5. *G. codonantha*
- 26b. Corolla 6–7 mm; bracteoles apical; inflorescence glabrous ..... 21. *G. leucocarpa*
- 24b. Leaf blade 1.7–11 × 1–4 cm (not *G. dumicola*), base usually cuneate or obtuse-rounded; corolla urceolate or tubular, rarely campanulate, (2–)3–5(–6) mm.
- 27a. Leaf blade (4.5–)6–17 × 2.5–9 cm; inflorescence shortly racemose or corymbose, 3–10 mm ..... 2. *G. dumicola*
- 27b. Leaf blade 1.7–11 × 1–4 cm; inflorescence racemose, at least 10 mm.
- 28a. Dwarf shrub, (5–)10–25 cm tall; leaf blade elliptic or broadly ovate, 1.7–6 × 1–4 cm, base obtuse to shallowly cordate; raceme 1–2.5 cm ..... 12. *G. praticola*
- 28b. Shrub more than 30 cm tall; leaf blade elliptic to lanceolate, sometimes ovate, 3–11 × 1–4 cm, base attenuate to obtuse or rounded; raceme 1–5(–7) cm.
- 29a. Bracts orbicular-ovate or oblong, 4–7 mm; bracteoles longer than bracts or not.
- 30a. Bracts 5–7 mm; bracteoles smaller than bracts, subapical or at middle of pedicel; leaf blade abaxially brown, secondary veins (3 or)4(–7) pairs; twigs densely hirsute ..... 10. *G. hookeri*
- 30b. Bracts ca. 4 mm; bracteoles 4–5.5 mm, apical; leaf blade abaxially grayish white or pale brown, secondary veins 2 or 3 pairs; twigs densely hispid and puberulous ..... 15. *G. longibracteolata*
- 29b. Bracts ovate or triangular-ovate, 1–3(–4) mm; bracteoles smaller than bracts.
- 31a. Flowers 4-merous; leaf blade ca. 2 × as long as wide ..... 14. *G. tetramera*
- 31b. Flowers 5-merous; leaf blade 2.5–4 × as long as wide.
- 32a. Ovary half-inferior; stamens 5 ..... 17. *G. semi-infera*
- 32b. Ovary superior; stamens 10.
- 33a. Leaf blade abaxially stramineous or grayish white, appressed setulose; pedicel 1–2 mm ..... 13. *G. straminea*
- 33b. Leaf blade abaxially densely long setulose and puberulous; pedicel 3–6 mm ..... 1. *G. wardii*

**1. *Gaultheria wardii*** C. Marquand & Airy Shaw, J. Linn. Soc., Bot. 48: 198. 1929.

西藏白珠 xi zang bai zhu

Shrubs erect, 0.5–2(–3) m tall. Twigs terete, densely brown- or rust-colored hirsute. Leaves scattered; petiole 2–3 mm, densely hirsute; leaf blade oblong, ovate, or elliptic, 3–7 × 1.2–2.3 cm, leathery, abaxially densely puberulous, intermixed with long appressed setula, adaxially densely sericeous initially, later glabrescent and densely papillate, secondary veins (2 or)3(or)4 pairs with midvein raised abaxially, impressed adaxially, base obtuse to rounded, margin recurved, minutely denticulate, apex acuminate. Inflorescences axillary, racemose, solitary or 2 or 3 together, sometimes terminal panicles, 1–3.5 cm, many flowered, usually crowded; bracts rhombic-ovate or oblong-lanceolate, abaxially velutinous and sericeous or subglabrescent, glandular ciliate. Pedicel 3–6 mm, densely velutinous or setulose; bracteoles 2, linear-lanceolate, nearly at middle, velutinous or glabrescent. Calyx lobes ovate or narrowly triangular, 3–4 mm, abaxially densely sericeous or glabrous, margin ciliolate or glabrous. Corolla white, urceolate to tubular, 3–5 mm, abaxially glabrous; lobes minute. Filaments dilated towards base, 1–2 mm, glabrous; anthers ca. 1 mm, thecae 2-awned. Ovary puberulous. Calyx at fruiting succulent, blue-black; capsule 6–8 mm in diam., sericeous-tomentulose. Fl. Jun–Aug, fr. Aug–Mar.

Forest margins, thickets on slopes; 1000–2700(–3100) m. SE Xizang, NW Yunnan [N India, Myanmar].

The flowers of this species are at least sometimes imperfect.

- 1a. Inflorescence 1–3 cm; flowers or fruit crowded; calyx, bracts, and bracteoles densely sericeous or velutinous abaxially ... 1a. var. *wardii*
- 1b. Inflorescence 2.5–3.5 cm; flowers or fruit distant; calyx glabrous, bracts and bracteoles subglabrous abaxially ..... 1b. var. *elongata*

**1a. *Gaultheria wardii* var. *wardii***

西藏白珠(原变种) xi zang bai zhu (yuan bian zhong)

*Gaultheria trichoclada* C. Y. Wu.

Inflorescence 1–3 cm. Flowers or fruit crowded. Bracts and bracteoles densely sericeous or velutinous abaxially. Calyx densely sericeous abaxially.

*Alnus*, *Pinus*, or *Tsuga* forest margins, thickets on slopes; 1700–2700(–3100) m. SE Xizang, NW Yunnan (Gongshan) [N India, Myanmar].

**1b. *Gaultheria wardii* var. *elongata*** R. C. Fang, Novon 9: 174. 1999.

延序西藏白珠 yan xu xi zang bai zhu

Inflorescence 2.5–3.5 cm. Flowers or fruit distant. Bracts and bracteoles subglabrous. Calyx glabrous abaxially.

• Evergreen forest margins, thickets on slopes; 1000–2000 m. NW Yunnan (Gongshan, Dulongjiang).

**2. *Gaultheria dumicola*** W. W. Smith, Notes Roy. Bot. Gard.

Edinburgh 9: 106. 1916.

丛林白珠 *cong lin bai zhu*

Shrubs erect, 0.6–2(–3) m tall. Twigs terete, glabrous, puberulous, or densely hirsute. Leaves scattered; petiole 3–5 mm, glabrous or hirsute; leaf blade ovate to broadly ovate, orbicular-ovate, or elliptic, (4.5–)6–17 × 2.5–9 cm, leathery, glabrous or abaxially ± brown hispid, secondary veins 1 pair, arising near leaf base, arcuate-ascendant, base cuneate to rounded, rarely cordate, margin slightly revolute or plane, shallowly serrulate, glabrous or often ciliate, apex abruptly acuminate, acuminate, or caudate. Inflorescences axillary, racemose, corymbose, or pseudumbellate, 3–10 mm, glabrous; bracts broadly ovate, 1.5–2 mm, apex acute. Pedicel 3–10 mm, glabrous or puberulous; bracteoles 2, basal, ovate-triangular, ca. 1 mm. Calyx purple, ca. 3 mm; lobes ovate, ca. 1.8 mm, glabrous, apex abruptly acuminate. Corolla reddish or pale green, urceolate-campanulate, 3–4 mm, abaxially glabrous; lobes triangular, ca. 1 mm. Filaments fusiform, ca. 1 mm, papillose; anthers ca. 1.2 mm, thecae 2-awned. Ovary pilose. Calyx at fruiting purplish black; capsule conical, 3–6 × ca. 2.5 mm. Fl. Jul–Aug, fr. Aug–Dec.

Forests, forest margins, thickets, scrub, open slopes, streamsides, dry places, rocks, roadsides; 1400–3000(–3200) m. SE and W Yunnan [Myanmar].

- 1a. Twigs, leaves, and inflorescences glabrous.
  - 2a. Leaf blade usually ovate, base cuneate to rounded ..... 2a. var. *dumicola*
  - 2b. Leaf blade broadly ovate, base usually cordate or rounded-truncate, rarely broadly cuneate ..... 2b. var. *petanoneuron*
- 1b. Twigs, leaves, and inflorescences at least in part pubescent, hirsute or hispid.
  - 3a. Young twigs, pedicels, bracts, and bracteoles densely puberulous; leaf blade glabrous on both surfaces ..... 2c. var. *pubipes*
  - 3b. Young twigs glabrous or densely hirsute; pedicels, bracts, and bracteoles glabrous; leaf blade abaxially shortly brown hispid.
    - 4a. Young twigs glabrous ..... 2d. var. *aspera*
    - 4b. Young and mature twigs densely hirsute ..... 2e. var. *hirticaulis*

**2a. *Gaultheria dumicola* var. *dumicola***

丛林白珠(原变种) *cong lin bai zhu* (yuan bian zhong)

*Diplycosia albolauca* Merrill.

Twigs glabrous. Leaf blade usually ovate, base cuneate to rounded. Inflorescences glabrous.

- Forests, thickets; 1400–2800 m. W Yunnan.

**2b. *Gaultheria dumicola* var. *petanoneuron*** Airy Shaw, Hooker's Icon. Pl. 33: t. 3206. 1933.

高山丛林白珠 *gao shan cong lin bai zhu*

Twigs glabrous. Leaf blade broadly ovate, 11–14 × 7–9 cm, base cordate or rounded-truncate to broadly crenate. Inflorescences glabrous.

- Forests, forest margins, scrub, rocks; 2000–3000 m. W Yunnan.

**2c. *Gaultheria dumicola* var. *pubipes*** Airy Shaw, Kew Bull. 3: 110. 1948.

微毛丛林白珠 *wei mao cong lin bai zhu*

Twigs densely puberulous, glabrescent. Leaf blade elliptic or ovate-lanceolate, 4–13 × 2–7 cm, glabrous, base rounded to broadly cuneate. Pedicel densely puberulous. Bracts and bracteoles denticulate at margin, puberulous.

- Forests, thickets, open slopes; 2000–2500(–3200) m. W Yunnan.

**2d. *Gaultheria dumicola* var. *aspera*** Airy Shaw, Bull. Misc. Inform. Kew 1940: 312. 1941.

粗糙丛林白珠 *cu cao cong lin bai zhu*

Twigs glabrous. Leaf blade ovate, elliptic, or lanceolate, 4–16 × 2.5–6.5 cm, abaxially shortly brown hispid, adaxially glabrous, base rounded or broadly cuneate.

Forests, *Tsuga* forests, streamsides, roadsides; 1500–2500 m. W Yunnan [Myanmar].

**2e. *Gaultheria dumicola* var. *hirticaulis*** R. C. Fang, Novon 9: 164. 1999.

糙茎丛林白珠 *cao jing cong lin bai zhu*

Young and mature twigs densely brown hirsute. Leaf blade ovate, 3–8 × 2–4 cm, abaxially shortly brown hispid, adaxially glabrous, base rounded to broadly cuneate.

- Forest margins, dry places; ca. 2000 m. SE Yunnan (Malipo).

**3. *Gaultheria notabilis*** J. Anthony, Notes Roy. Bot. Gard. Edinburgh 18: 18. 1933.

短穗白珠 *duan sui bai zhu*

Subshrubs branched from base, erect or arcuate-ascending, 30–40 cm tall. Twigs terete, narrowly striate, with long rust-colored setose hairs. Leaves scattered; petiole 1–3 mm, setose; leaf blade usually ovate, rarely oblong- or elliptic-ovate to broadly ovate, 2–3.5 × 1.5–2 cm, papery, abaxially sparsely setulose or glabrescent, adaxially glabrous, secondary veins 2 pairs arising near or above base and arcuate, fine veins raised abaxially, base rounded or subtruncate, margin subentire or inconspicuously serrulate, long ciliate, apex shortly and abruptly callose-apiculate or -cuspidate. Inflorescences shortly corymbose-racemose, 2–10 mm, 3–8-flowered, glabrous; bracts ovate, 1–2 mm, cucullate, abaxially carinate, ciliate. Pedicel spreading, ca. 6 mm; bracteoles similar to bracts but smaller, subbasal. Calyx lobes triangular or ovate-triangular, ca. 3 mm. Corolla white, campanulate, 5–6 mm; lobes recurved, broadly triangular, 2–3 mm. Filaments subulate, ca. 1 mm, papillose; anthers ca. 1 mm, with thecae 2-awned. Ovary ca. 1 mm, glabrous. Calyx at fruiting dark purple; capsule glabrous.

- Dry thickets, scrub, dry stony slopes; ca. 2400 m. Yunnan.

Only the type specimen (*Forrest 26722*) has been seen by the present authors.

**4. *Gaultheria pseudonotabilis*** H. Li ex R. C. Fang, Novon 9:

169. 1999.

假短穗白珠 jia duan sui bai zhu

Shrubs 1–2(–3) m tall. Twigs terete, densely spreading rust-colored setose, setae 2–5 mm. Leaves scattered; petiole 3–7 mm, densely spreading rust-colored setose; leaf blade elliptic-ovate, ovate, or oblong-lanceolate, (5–)8–15 × 3–7 cm, papery-leathery, abaxially sparsely long setose on midvein and secondary veins, otherwise glabrous, adaxially bullate, glabrous, secondary veins 2 pairs arising from blade base, fine veins raised abaxially, base shallowly cordate to rounded, margin slightly revolute, sparsely dentate, densely setiform-ciliate, apex acuminate, caudate, or acute. Inflorescence axillary, shortly corymbose-racemose, 2–8 mm, 4–7-flowered, glabrous; bracts rhombic-triangular, 2–4 mm, leathery, glabrous, ciliolate. Pedicel 0.8–1.2 cm, glabrous; bracteoles 2, basal, similar to bracts but smaller. Calyx lobes triangular, 2.5–3 mm, glabrous. Corolla red, broadly campanulate, 7–9 mm, glabrous; lobes triangular-ovate, 2–3 mm. Filaments dilated at base, 1.5–2 mm, glabrous, papillose; anthers 1.5–2 mm, thecae shortly 2-awned. Ovary glabrous. Calyx at fruiting dark purple; capsule depressed-globose, ca. 5 mm in diam., glabrous. Fl. Jan–Apr, fr. Mar–May.

• Evergreen broad-leaved forests, thickets, rocks; 1000–2000 m. NW Yunnan (Dulongjiang, Gongshan).

**5. *Gaultheria codonantha*** Airy Shaw, Hooker's Icon. Pl. 33: t. 3207. 1933.

钟花白珠 zhong hua bai zhu

Shrubs 1–2(–3) m tall. Twigs terete, densely spreading rust-colored setose. Leaves scattered; petiole 3–5 mm, densely spreading rust-colored setose; leaf blade elliptic-ovate, ovate, or oblong-lanceolate, 8–16 × 4–9 cm, papery-leathery, abaxially very densely rust-colored setulose, especially on veins, adaxially bullate, densely shortly setulose, immediately glabrescent, secondary veins 2 pairs arising from base, fine veins distinctly raised abaxially, impressed adaxially, base shallowly cordate to rounded, margin slightly revolute, sparsely dentate, ± setiform-ciliate, apex acuminate, caudate, or acute. Inflorescences axillary, racemose or corymbose, 1–4 cm, ca. 10-flowered, densely tomentulose; bracts rhombic-triangular, 5–8 × 4–5 mm, leathery, densely tomentulose. Pedicel 0.8–1.3 cm, glabrous; bracteoles 2, basal, similar to bracts but smaller. Calyx lobes triangular-ovate, 3–4 mm, densely tomentulose near apex, otherwise glabrous, margin membranous. Corolla white, broadly campanulate, 1–1.3 cm, abaxially glabrous; lobes broadly triangular, 0.8–1 cm wide. Filaments strongly dilated at base, 2–3(–4) mm, glabrous, papillate; anthers ca. 4 mm, thecae shortly 2-awned. Ovary glabrous. Capsule 7–9 mm in diam., glabrous. Fl. Feb–Mar, fr. Mar–Jul.

Evergreen broad-leaved forests; 1000–1600(–2100) m. SE Xizang (Médog, Zayü) [NE India (Assam)].

This is the first record of this species for China.

**6. *Gaultheria borneensis*** Stapf, Trans. Linn. Soc. London 4: 190. 1894.

高山白珠 gao shan bai zhu

*Gaultheria benguetensis* Copeland; *G. itoana* Hayata.

Shrubs prostrate or erect, 10–15(–30) cm tall, much branched. Twigs terete, puberulous. Leaves scattered; petiole 0.5–1.5 mm, glabrous; leaf blade elliptic-oblong, oblanceolate, or oblong, 8–11(–15) × 3–7 mm, thickly papery or subleathery, abaxially punctate, adaxially glabrous, secondary veins 2 or 3 pairs, fine veins inconspicuous on both surfaces or slightly raised abaxially, base cuneate, margin slightly recurved, sparsely serrate, apex acute to obtuse. Inflorescences pseudoterminal, racemose, ca. 2 cm, 3–10-flowered, densely puberulous and sparsely glandular pubescent; bracts broadly ovate, ca. 1 mm, glabrous. Pedicel 2–3(–9) mm; bracteoles 2, just above middle, lanceolate, ca. 1.5 mm, glabrous. Calyx lobes ovate-triangular, ca. 2.5 mm, glabrous, apex acute. Corolla white, sometimes tinged red to pink, ovoid-tubular, 4–5 mm, abaxially glabrous; lobes minute. Filaments glabrous; anthers with thecae 1- or 2-recurved-awned. Ovary sericeous. Calyx at fruiting milky whitish, succulent; capsule ca. 6 mm in diam. Fl. May–Jun(–Nov), fr. Jul–Aug(–Nov).  $2n = 22$ .

High mountain peaks, open places; 1600–3000(–3600) m. Taiwan [Indonesia, Philippines].

**7. *Gaultheria prostrata*** W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 11: 210. 1920.

平卧白珠 ping wo bai zhu

Shrubs procumbent, 10–20 cm tall. Twigs terete, pubescent, later glabrescent and cinereous. Petiole ca. 1 mm, glabrous; leaf blade elliptic, 1–1.2 cm × 6–8 mm, papery, abaxially scattered dark punctate, glabrous, secondary veins 2 or 3 pairs, fine veins conspicuous on both surfaces, impressed adaxially, base broadly cuneate, margin crenulate(-apiculate), apex rounded or obtuse. Inflorescences terminal, usually racemose, ca. 1 cm, 1–3-flowered, pubescent; bracts green, ovate, 2–3 mm, margin rose. Pedicel ca. 1 mm; bracteoles 2. Calyx lobes ovate, ca. 2 mm, apex acute. Corolla white, broadly campanulate, ca. 4 mm, abaxially glabrous; lobes ovate-triangular, ca. 1 mm. Stamens ca. 2 mm; filaments puberulous; thecae 1-awned. Ovary depressed-globose, slightly pubescent. Fruit unknown. Fl. Jul.

• Open moist pastures, boulders; ca. 4600 m. NW Yunnan (Gongshan).

This species is known only from the type specimen.

**8. *Gaultheria pyrolifolia*** J. D. Hooker ex C. B. Clarke in J. D. Hooker, Fl. Brit. India 3: 457. 1882 [*“pyrolaefolia”*].

鹿蹄草叶白珠 lu ti cao ye bai zhu

Shrubs suberect or creeping, 3–15 cm tall. Twigs terete, substriate, glabrous, sometimes puberulous. Leaves near twig apices; petiole 1–3(–5) mm, glabrous or sparsely hispid; leaf blade obovate or elliptic to suborbicular, 1.3–5 × 0.8–2.5 cm, leathery, glabrous or abaxially sparsely hispidulous, secondary veins 3(or 4) pairs, fine veins distinctly raised abaxially, impressed adaxially, base cuneate to rounded, margin crenate, apex obtuse-rounded, apiculate. Inflorescences from upper foliate axils, racemose, 1–1.5 cm, 2–5-flowered, glabrous, pubescent, or sparsely hispid; bracts ovate, ca. 4 mm, glabrous. Pedi-

cel 2–5 mm, glabrous, pubescent, or sparsely hispid; bracteoles 2, above middle, ovate-lanceolate, ca. 3 mm, glabrous. Calyx lobes triangular-ovate, 2–2.5 mm, glabrous. Corolla white, pinkish at mouth, urceolate or globose-urceolate, ca. 5 mm, abaxially glabrous; lobes reflexed, short. Filaments dilated, 1–1.7 mm, papillate; anthers ca. 1.3 mm; thecae 2-awned. Ovary glabrous. Calyx at fruiting dark purple; capsule 4–6 mm in diam. Fl. Jun–Aug, fr. Aug–Sep.

Alpine windswept moorlands, thickets, grasslands; 3600–4000 m. SE Xizang, NW Yunnan [Bhutan, India, Myanmar, Nepal, Sikkim].

In FRPS (57(3): 51. 1991) this species was treated as *Gaultheria pyroloides* J. D. Hooker & Thomson ex Miquel (Ann. Mus. Bot. Lugduno-Batavi 1: 30. 1863), which was described from Japan. The name *G. miqueliana* Takeda is a synonym. Airy Shaw (Bull. Misc. Inform. Kew 1940: 318. 1941) restricted the name *G. pyroloides* to the Japanese species described by Miquel. Therefore, the Himalayan species described here must be called *G. pyrolifolia*.

**9. *Gaultheria cuneata*** (Rehder & E. H. Wilson) Bean, Bot. Mag. 145: t. 8829. 1919.

四川白珠 si chuan bai zhu

*Gaultheria pyroloides* J. D. Hooker & Thomson ex Miquel var. *cuneata* Rehder & E. H. Wilson in Sargent, Pl. Wilson. 1: 554. 1913.

Shrubs prostrate or erect, 10–60 cm tall, many branched. Twigs terete, densely pubescent. Leaves dense; petiole 1–2 mm, pubescent; leaf blade obovate or narrowly obovate, 1.2–3.5 × 0.4–1.2 cm, leathery, glabrous, abaxially sparsely glandular punctate, secondary veins 2–4 pairs, fine veins slightly raised abaxially, slightly impressed adaxially, base narrowed, rarely obtuse, margin crenulate-mucronate, apex acute. Inflorescences terminal and from upper foliate axil, racemose, 1.5–4.5 cm, puberulous; bracts broadly ovate, 2–3 mm, glabrous. Pedicel 2–4 mm, puberulous; bracteoles 2, subapical, ovate or ovate-triangular, 1.5–2 mm. Calyx whitish, glabrous; lobes triangular-ovate, ca. 1.5 mm, margin ciliolate. Corolla white, urceolate, 4–5 mm, abaxially glabrous; lobes recurved, very small. Filaments swollen towards base, puberulous; thecae 2-awned. Ovary sericeous. Calyx at fruiting white, fleshy; capsule 4–6 mm in diam., sericeous. Fl. Jul, fr. Aug.  $2n = 22^*$ .

• *Rhododendron* forests, *Abies* forest margins, thickets, rocks; 2000–3900 m. NE Guizhou, W Sichuan, N Yunnan.

**10. *Gaultheria hookeri*** C. B. Clarke in J. D. Hooker, Fl. Brit. India 3: 458. 1882.

红粉白珠 hong fen bai zhu

Shrubs prostrate or erect, 30–100 cm tall; bark exfoliating. Twigs rufous, densely hirsute. Leaves scattered; petiole 4–6 mm, hirsute; leaf blade elliptic to lanceolate, 3–11 × 1–4 cm, leathery, abaxially punctate, ± hirsute, adaxially glabrous, secondary veins (3 or)4(–7) pairs, secondary and fine veins raised abaxially, slightly impressed adaxially, base obtuse-rounded or attenuate, margin serrate-mucronate, apex abruptly acute. Inflorescences terminal and axillary, racemose, 1.5–5 cm, pubescent; bracts orbicular-ovate or ovate, 5–7 mm, abaxially glabrous, ciliolate, adaxially puberulous. Pedicel 3–4 mm, glabrous; brac-

teoles 2, subapical to median, similar to bracts but smaller. Calyx glabrous; lobes triangular-ovate, ca. 1.5 mm, margin ciliate. Corolla pink or white, urceolate-globose, 4–5 mm, abaxially glabrous; lobes very short. Filaments dilated towards base, puberulous, ca. 1 mm; anthers ca. 1 mm; thecae 2-awned. Ovary puberulous. Calyx at fruiting blue-black, fleshy; capsule sericeous-puberulous. Fl. May–Jun, fr. Jul–Aug.  $2n = ca. 44$ .

Forests, forest margins, thickets on mountain slopes, *Rhododendron* thickets, open slopes, mountain summits; 1000–3000(–3800) m. SW Guizhou, S Sichuan, SE Xizang, N and SE Yunnan [Bhutan, India, Myanmar, Sikkim].

1a. Leaves elliptic, 2–4 cm wide ..... 10a. var. *hookeri*

1b. Leaves lanceolate or linear-lanceolate, 1–1.5 cm wide ..... 10b. var. *angustifolia*

**10a. *Gaultheria hookeri* var. *hookeri***

红粉白珠(原变种) hong fen bai zhu (yuan bian zhong)

*Gaultheria stapfiana* Airy Shaw; *G. veitchiana* Craib.

Leaves elliptic, 2–4 cm wide. Bracts 2–4 mm wide. Calyx lobes acute.

*Rhododendron* thickets, open slopes, mountain summits; 1000–3000(–3800) m. SW Guizhou (Panxian), S Sichuan, SE Xizang, N and SE Yunnan [Bhutan, India, Myanmar, Sikkim].

**10b. *Gaultheria hookeri* var. *angustifolia*** C. B. Clarke in J. D. Hooker, Fl. Brit. India 3: 458. 1882.

狭叶红粉白珠 xia ye hong fen bai zhu

Leaves lanceolate or linear-lanceolate, 1–1.5 cm wide. Bracts 1–2 mm wide. Calyx lobes acuminate.

Forests, forest margins, thickets on mountain slopes; 2000–2500(–3000) m. NW Yunnan (Gongshan) [Sikkim].

**11. *Gaultheria brevistipes*** (C. Y. Wu & T. Z. Hsu) R. C. Fang, Novon 9: 164. 1999.

短柄白珠 duan bing bai zhu

*Leucothoë brevistipes* C. Y. Wu & T. Z. Hsu, Acta Phytotax. Sin. 23: 315. 1985; *L. griffithiana* C. B. Clarke var. *sessilifolia* C. Y. Wu & T. Z. Hsu; *L. sessilifolia* (C. Y. Wu & T. Z. Hsu) C. Y. Wu & T. Z. Hsu.

Shrubs (0.8–)2–4 m tall. Twigs brown, trigonous, winged, glabrous. Leaves scattered; petiole 2–4 mm, glabrous; leaf blade ovate or oblong-ovate, 7–18 × 4–8 cm, leathery, abaxially shortly brown glandular setose, adaxially glabrous, secondary veins 4–8 pairs, fine veins raised abaxially, impressed adaxially, base auriculate-cordate, margin irregularly serrate, apex acuminate or slightly caudate. Inflorescences axillary and terminal, racemose, 6–10 cm, many flowered, pubescent; bracts ovate, cucullate, ca. 7 mm, abaxially glabrous, adaxially densely puberulous; fruit stalk 3–6 mm, pubescent; bracteoles 2, median, ovate-lanceolate, ca. 2 mm, ciliolate. Flowers unknown. Calyx at fruiting red to rufous; capsule globose, 5–8 mm in diam. Fr. Oct–Mar.

• Forests, mountain slopes, riversides; 1000–2800 m. SE Xizang (Médog).

*Leucothoë brevistipes* and *L. griffithiana* var. *sessilifolia* were based on the same type (*Qinghai-Xizang Exped. 74-3951*, holotype, KUN). In FRPS (57(3): 22. 1991), the name *L. sessilifolia* was used for the species, incorrectly citing as the place of publication that of *L. brevistipes*, but effectively publishing a new combination because *L. griffithiana* var. *sessilifolia* was also cited with a full and correct reference.

**12. *Gaultheria praticola*** C. Y. Wu & T. Z. Hsu, Acta Bot. Yunnan. 3: 425. 1981.

草地白珠 cao di bai zhu

Shrubs prostrate or erect, (5–)10–25 cm tall. Twigs terete, densely rust-colored hirsute. Petiole ca. 3 mm, hirsute; leaf blade elliptic or ovate, 1.7–6 × 1–4 cm, papery or leathery, abaxially ± hirsute or papillate, adaxially glabrous, secondary veins 3 pairs, secondary and fine veins raised abaxially, slightly impressed adaxially, base obtuse, rounded, or shallowly cordate, margin serrate-aristate, apex acute to rounded, distinctly mucronate. Inflorescences purple-red, from uppermost axils, racemose, 1–2.5 cm, 2–7-flowered, glabrous or puberulous; bracts broadly ovate, 2.5–4 mm, glabrous. Pedicel 2–5 mm, glabrous; bracteoles 2, submedian, ovate, ca. 2 mm. Calyx glabrous; lobes ovate-triangular, 1–1.5 mm, ciliolate. Corolla white, urceolate or campanulate, 3–4 mm, abaxially glabrous; lobes minute. Filaments conical, ca. 2 mm, papillate; thecae 2-awned. Ovary puberulous. Capsule 5–6 mm in diam. Fl. Jun–Aug, fr. Sep–Oct.

• *Abies* forests, *Rhododendron* thickets, rocks in thickets, grassy slopes; 3200–3900 m. SE Xizang, NW Yunnan.

**13. *Gaultheria straminea*** R. C. Fang, Novon 9: 171. 1999.

草黄白珠 cao huang bai zhu

*Gaultheria wardii* C. Marquand & Airy Shaw var. *serrulata* C. Y. Wu & T. Z. Hsu.

Shrubs 1–3(–4) m tall. Twigs angled, rather slender, densely brown hispid and puberulous. Leaves scattered; petiole 4–5 mm, hispid and puberulous or glabrous; leaf blade oblong-lanceolate or elliptic, 4–7 × 1–2.5 cm, leathery, abaxially appressed-setulose, adaxially glabrous, secondary veins 3–5 pairs, fine veins slightly raised abaxially, base cuneate or broadly cuneate, margin dentate, apex acuminate or acute, mucronulate. Inflorescences axillary and terminal, racemose, 1.5–3.5 cm, densely pubescent; bracts ovate, 3–4 mm, puberulous, ciliolate. Pedicel 1–2 mm, densely pubescent; bracteoles 2, subapical, 2–3 mm, abaxially puberulous, adaxially glabrous, margin membranous, ciliolate. Calyx lobes subulate- to narrowly triangular, ca. 2 mm, puberulous, ciliolate. Corolla white, urceolate, 3–4 mm, abaxially glabrous, adaxially pilose; lobes ovate-triangular, very short. Filaments spindle-shaped, ca. 0.75 mm, papillate; anthers ca. 0.75 mm, thecae shortly 2-awned. Ovary tomentose. Calyx at fruiting white, rugose; capsule globose, 4–5 mm in diam. Fl. Aug–Oct, fr. Oct–Mar.

• *Salix* scrub forests, margins of evergreen forests, slopes, flood plains; 600–2100 m. SE Xizang (Mêdog).

**14. *Gaultheria tetramera*** W. W. Smith, Notes Roy. Bot. Gard.

Edinburgh 11: 211. 1919.

四裂白珠 si lie bai zhu

Shrubs erect, 0.8–1(–4) m tall. Twigs terete, densely brown hispid. Leaves scattered; petiole 2–3(–5) mm, hispid or subglabrous; leaf blade elliptic, obovate, or oblong, 1.5–6 × 1–3 cm, leathery, abaxially scattered hispidulous, later papillose, adaxially glabrous, secondary veins 3 or 4 pairs, secondary and fine veins raised abaxially, impressed adaxially, base cuneate to broadly cuneate, margin serrate, apex acute, distinctly mucronate. Inflorescences axillary, rarely terminal, racemose, erect, 1–3 cm, 2–10-flowered, secund, puberulous; bracts triangular-ovate, ca. 1 mm, abaxially puberulous. Pedicel 2.5–3 mm; bracteoles 2, median to subapical in fruit, similar to bracts. Flowers 4-merous. Calyx puberulous; lobes triangular-lanceolate, 1.5–2 mm, ciliolate. Corolla white, urceolate, ca. 4 mm, abaxially puberulous, adaxially pubescent; lobes very short. Filaments conical, ca. 1 mm, ciliolate; anthers ca. 1 mm, thecae 2-awned. Ovary sericeous; style villous-hairy. Calyx at fruiting blue-purple, with bloom; capsule globose, 4–6 mm in diam. Fl. May, fr. Aug–Dec.

• Evergreen forests, including those dominated by *Picea*; 1000–2600(–3200) m. SE Xizang, W Yunnan.

**15. *Gaultheria longibracteolata*** R. C. Fang, Novon 9: 166. 1999.

长苞白珠 chang bao bai zhu

Shrubs 0.7–2.4 m tall. Twigs angled, densely brown hispid and puberulous. Leaves scattered; petiole 2–5 mm, sparsely hispid or glabrous; leaf blade elliptic or oblong-elliptic, 2.5–6 × 1.4–3 cm, leathery, abaxially sparsely shortly appressed-setulose, adaxially glabrous, secondary veins 2 or 3 pairs, fine veins raised abaxially, impressed adaxially, base broadly cuneate or cuneate to obtuse, margin recurved, serrate, apex acute to obtuse, mucronulate. Inflorescences axillary and terminal, racemose, 2–3 cm, many flowered, densely pubescent; bracts broadly ovate or oblong, 4–5 mm, glabrous, margin membranous, ciliolate. Pedicel 3–4 mm, densely pubescent; bracteoles 2, apical, ca. 5 mm, concave. Calyx pink, ca. 5 mm, abaxially glabrous, adaxially pubescent; lobes oblong, 2.5–3 mm, margin ciliolate, apex apiculate. Corolla white, urceolate, 5–6 mm, abaxially glabrous, adaxially pilose in upper part; lobes ovate-triangular, ca. 0.8 mm. Filaments spindle-shaped, ca. 1.5 mm, ciliate; anthers ca. 1.5 mm; thecae shortly 2-awned. Ovary tomentose; style pilose. Calyx at fruiting crimson- purple-green or purple-black, glaucous; capsule globose, 4–6 mm in diam., pubescent. Fl. Jun–Jul, fr. Aug–Oct.

Evergreen forest margins, thickets, open slopes; 1000–2000 (–2700) m. SE and W Yunnan [Thailand].

**16. *Gaultheria longiracemosa*** Y. C. Yang, Contr. Biol. Lab. Chin. Assoc. Advancem. Sci., Sect. Bot. 12: 142. 1941.

长序白珠 chang xu bai zhu

Shrubs to 3 m tall. Twigs terete, glabrous. Petiole 1–2 mm, adaxially puberulous, ciliolate; leaf blade obovate or elliptic-obovate, 3–6.5 × 1–2.5 cm, abaxially sparsely punctate, glabrous, adaxially sparsely punctate, puberulous on midvein,

secondary veins 4 or 5 pairs, base cuneate, margin closely serrate, ciliolate towards base, apex acute. Inflorescences terminal and axillary, racemose, 10–12 cm, many flowered; rachis angled, puberulous; bracts broadly ovate, 3–4 mm, ciliolate. Pedicel 4–6 mm, sparsely hairy; bracteoles 2, apical, ovate-lanceolate, ca. 1.5 mm. Calyx lobes angled, ca. 1.5 mm, abaxially glabrous, ciliolate, apex acute. Corolla white, tubular-ovoid, ca. 5 mm, abaxially sparsely setulose on veins; lobes recurved, triangular. Filaments ca. 1.5 mm, glabrous; thecae 2-awned. Ovary densely puberulous. Fruit unknown.

- Woods; ca. 3000 m. WC Sichuan (Baoping).

**17. *Gaultheria semi-infera*** (C. B. Clarke) Airy Shaw, Bull. Misc. Inform. Kew 1940: 306. 1941.

五雄白珠 wu xiong bai zhu

*Diplycosia semi-infera* C. B. Clarke in J. D. Hooker. Fl. Brit. India 3: 459. 1882; *Gaultheria forrestii* Diels var. *setigera* C. Y. Wu & T. Z. Hsu.

Shrubs erect, 0.5–1(–2.5) m tall. Twigs terete, scabrid, densely brown hispid. Leaves scattered; petiole 3–5 mm, glabrous or sparsely hispid; leaf blade oblong or oblong-elliptic, 4–11 × 1.2–3.5 cm, leathery, abaxially sparsely hispidulous or glabrescent, adaxially glabrous, secondary veins 3 or 4 pairs, secondary and fine veins raised abaxially, slightly impressed adaxially, base cuneate or obtuse, margin serrate, apex acute, distinctly mucronate. Inflorescences axillary, narrowly racemose, 1.5–3(–7) cm, few- to many flowered, pubescent; bracts triangular-ovate, 1–3 mm, fimbriate. Pedicel 1.5–2.5 mm; bracteoles apical, ca. 1.2 mm, margin ciliolate. Calyx lobes triangular, ca. 2.5 mm, margin ciliolate. Corolla white, tubular to urceolate, 2–3 mm, abaxially hairy; lobes very short. Filaments basally swollen, ca. 1 mm, ciliolate; thecae 2-awned. Ovary half-inferior, appressed-sericeous. Calyx at fruiting purple-blue, fleshy; capsule ellipsoidal to globose, 3–5 mm in diam. Fl. Jun, fr. Jul–Aug.

*Pinus* forest margins, thickets on slopes; 2000–2700(–3500) m. S Xizang, SE and W Yunnan [Bhutan, NE India, Myanmar, Nepal, Sikkim].

The fruit is edible.

**18. *Gaultheria griffithiana*** Wight, Calcutta J. Nat. Hist. 8: 176. 1847.

尾叶白珠 wei ye bai zhu

Shrubs, rarely small trees, 0.5–3(–4) m tall, stout. Twigs terete or narrowly winged, ± flexuous, glabrous. Leaves scattered; petiole 5–10 mm, glabrous; leaf blade oblong, elliptic, or lanceolate-oblong, 6–17 × 2–6 cm, thickly leathery, abaxially densely punctate, adaxially glabrous, veins 3 or 4 pairs, fine veins raised on both surfaces, base broadly cuneate to subcordate, margin closely serrulate, apex caudate-acuminate. Inflorescences axillary, racemose, clustered, 2–6 cm, many flowered, pubescent or lanuginose; bracts ovate to orbicular-ovate, 2–7 mm, abaxially glabrous or densely sericeous. Pedicel 3–9 mm; bracteoles 2, usually submedian to near basal, ovate, 1.5–3 mm, abaxially glabrous, ciliolate. Calyx lobes triangular-ovate, 1.5–3 mm, ciliolate, apex obtuse to acute. Corolla white, light pink, or pale green, 5–7 mm, campanulate, abaxially glabrous;

lobes recurved, very short. Filaments rhombic, 1.5–2 mm, papillate; anthers 1–1.5 mm, thecae 2-awned. Ovary sericeous. Calyx at fruiting dark purple, fleshy; capsule globose, 4–6 mm in diam. Fl. Apr–Jun, fr. May–Oct. 2n = ca. 44.

*Abies, Pinus, Quercus, Rhododendron, and Tsuga* forests, *Tsuga* forest margins, thickets on slopes; 2000–2800(–3600) m. SW Sichuan, SE Xizang, SE and W Yunnan [Bhutan, NE India (Darjiling), Myanmar, Nepal, Sikkim, Vietnam].

- 1a. Rachis and pedicels pubescent; bracts ovate, 2–4 mm, both surfaces subglabrous; calyx adaxially subglabrous; leaf base cuneate to obtuse-rounded ..... 18a. var. *griffithiana*
- 1b. Rachis and pedicels lanuginose or tomentose; bracts orbicular-ovate, 5–7 mm, both surfaces densely sericeous; calyx adaxially densely sericeous; leaf base subcordate ..... 18b. var. *insignis*

**18a. *Gaultheria griffithiana* var. *griffithiana***

尾叶白珠(原变种) wei ye bai zhu (yuan bian zhong)

*Gaultheria caudata* Stapf; *G. lasiocarpa* T. Z. Hsu; *G. miyensis* T. Z. Hsu.

Leaf base cuneate to obtuse-rounded. Rachis and pedicels pubescent; bracts ovate, 2–4 mm, both surfaces subglabrous. Calyx subglabrous adaxially.

*Abies, Pinus, Quercus, Rhododendron, and Tsuga* forests, thickets on slopes; 2000–2800(–3600) m. SW Sichuan, SE Xizang, SE and W Yunnan [Bhutan, NE India (Darjiling), Myanmar, Nepal, Sikkim, Vietnam].

**18b. *Gaultheria griffithiana* var. *insignis*** R. C. Fang, Novon 9: 164. 1999.

多毛尾叶白珠 duo mao wei ye bai zhu

Leaf base subcordate. Rachis and pedicels lanuginose or tomentose; bracts orbicular-ovate, 5–7 mm, abaxially densely sericeous at lower part, adaxially densely sericeous. Calyx densely sericeous adaxially.

- *Tsuga* forest margins; ca. 2800 m. SE Xizang (Zayü).

**19. *Gaultheria trigonoclada*** R. C. Fang, Novon 9: 174. 1999.

三棱枝白珠 san leng zhi bai zhu

Shrubs 1–2 m tall. Twigs distinctly trigonous or with narrow wings, glabrous. Leaves scattered; petiole 5–10 mm, glabrous; leaf blade elliptic or rhombic-elliptic, (4–)6–10 × 2.5–4 cm, thickly leathery, abaxially sparsely shortly brown glandular setose, adaxially glabrous, secondary veins 2 or 3 pairs, fine veins subparallel, raised abaxially, impressed adaxially, base cuneate, margin dentate, apex acute to acuminate. Inflorescences axillary, racemose, 2–3 cm, angled, 10-flowered, densely pubescent; bracts ovate-lanceolate, 5–6 mm, leathery, glabrous or abaxially puberulous, with 1 distinct main vein. Pedicel 2–4 mm, pubescent; bracteoles 2, apical, similar to bracts, ovate, ca. 3 mm. Calyx 2.5–3 mm, divided to near base; lobes triangular-lanceolate, glabrous. Corolla white, urceolate, ca. 5 mm, abaxially glabrous, adaxially pilose; lobes triangular-ovate, ca. 0.5 mm. Filaments ca. 0.5 mm, dilated below middle, papil-

late; anthers ca. 1.5 mm, thecae slenderly 2-awned. Ovary tomentose. Calyx at fruiting purple; capsule globose, 4–6 mm in diam. Fl. Oct, fr. Jun–Aug.

• Forests, thickets on river terraces; 2000–2300 m. SE Xizang (Médog).

**20. *Gaultheria fragrantissima*** Wallich, *Asiat. Res.* 13: 397. 1820.

芳香白珠 fang xiang bai zhu

*Gaultheria forrestii* Diels.

Shrubs, rarely small trees, (0.3–)1–3(–4) m tall, glabrous except on racemes. Twigs terete, sometimes obtusely angled. Leaves scattered; petiole 3–5(–10) mm; leaf blade elliptic, oblong-elliptic, ovate, obovate, or narrowly obovate-lanceolate, 5–17 × 2–6.5 cm, leathery, abaxially scattered punctate, secondary veins 4–7 pairs, secondary and fine veins distinctly raised abaxially, slightly impressed adaxially, base cuneate to broadly cuneate, sometimes obtuse-rounded, margin obtusely serrulate, apex acute, sometimes acuminate. Inflorescences axillary, racemose, 3–9 cm, strict, many flowered, densely pubescent; bracts ovate, 1–3 mm, abaxially glabrous or puberulous, margin ciliolate. Pedicel 1–7 mm, pubescent; bracteoles apical, rarely distant, broadly ovate. Calyx glabrous; lobes triangular, ca. 2 mm, margin ciliolate. Corolla white, tubular-urceolate, 4–5 mm, abaxially glabrous; lobes very short. Filaments dilated, ca. 1.25 mm, puberulous; anthers ca. 1.25 mm, thecae 2-awned. Ovary pubescent. Calyx at fruiting blue-purple, fleshy; capsule globose, 4–6 mm in diam., pubescent. Fl. Jan–May, fr. Jun–Aug. *2n* = 44, 48.

Evergreen, *Pinus*, and mixed forests, forest margins, thickets on dry slopes, sunny slopes; 1000–3200 m. SE Xizang, Yunnan [Bhutan, India, Malaysia, Myanmar, Nepal, Sri Lanka, N Vietnam].

*Gaultheria fragrantissima* varies much in leaf size and shape, generally because of habitat differences. In forest understories or at forest margins it is a large shrub or small tree with large leaves, whereas in thickets or on sunny slopes it is often a small shrub with narrow leaves. It is characterized by glabrous twigs, abaxially punctate leaf blades, and white waxy inflorescences with densely pubescent rachis and pedicels.

**21. *Gaultheria leucocarpa*** Blume, *Bijdr. Fl. Ned. Ind.* 856. 1826.

白果白珠 bai guo bai zhu

Shrubs erect, 0.5–2 m tall, glabrous. Twigs terete, often flexuous. Leaves scattered; petiole 3–8 mm; leaf blade ovate, elliptic, or oblong-lanceolate, 4–14.5 × 2–6.5 cm, papery, rarely thickly so, abaxially inconspicuously papillate, secondary veins 3 or 4 pairs, fine veins raised abaxially, slightly raised or slightly impressed adaxially, base obtuse to rounded or subcordate, margin serrate, apex acuminate to caudate-acuminate. Inflorescences axillary, racemose, 3–6(–10) cm, (1–)4–12-flowered, slender, often flexuous; bracts triangular-lanceolate, ca. 2.5 mm. Pedicel usually recurved, 3–9 mm; bracteoles apical, broadly ovate, densely ciliolate. Calyx lobes broadly triangular, ca. 1.5 mm, ciliolate. Corolla white, campanulate, 6–7 mm; lobes triangular, 1.5–2 mm. Filaments spindle-shaped, ca. 1.8 mm, papillate, glabrous; anthers 0.8–1.2 mm, thecae 2-awned. Ovary densely sericeous. Calyx at fruiting purplish black; cap-

sule globose or depressed-globose, 4–7 mm in diam., tomentellous. Fl. May–Sep, fr. Jun–Dec.

Forests, thickets, slopes; 500–3000(–3300) m. Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, Taiwan, Yunnan [Cambodia, Indonesia, Laos, Malaysia, Philippines, Thailand, Vietnam].

Three varieties occur in China; var. *leucocarpa* occurs in Indonesia and Malaysia and var. *cumingiana* (Vidal) T. Z. Hsu is endemic to the Philippines.

- 1a. Ovary glabrous; filaments glabrous; twigs glabrous or puberulous, intermixed glandular pilose, or only sparsely glandular setulose ..... 21c. var. *psilocarpa*
- 1b. Ovary sericeous; filaments with varied hairs; twigs glabrous or glandular hirsute.
- 2a. Twigs and leaves glabrous ..... 21a. var. *yunnanensis*
- 2b. Twigs, petioles, inflorescence rachis, and pedicels glandular hirsute ..... 21b. var. *crenulata*

**21a. *Gaultheria leucocarpa* var. *yunnanensis*** (Franchet) T. Z. Hsu & R. C. Fang, *Novon* 9: 166. 1999.

滇白珠 dian bai zhu

*Vaccinium yunnanense* Franchet, *J. Bot. (Morot)* 9: 368. 1895; *Embelia vaniotii* H. Léveillé; *Gaultheria laxiflora* Diels; *G. leucocarpa* var. *pingbienensis* C. Y. Wu ex T. Z. Hsu; *G. yunnanensis* (Franchet) Rehder; *Pieris fortunatii* H. Léveillé; *P. vaccinium* H. Léveillé; *Vaccinium yunnanense* var. *franchetianum* H. Léveillé.

Twigs and leaves glabrous. Filaments with varied hairs. Ovary sericeous.

*Pinus* and secondary forests, thickets on open slopes; 500–3000 (–3300) m. Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, Taiwan, Yunnan [Cambodia, Laos, Thailand, Vietnam].

This variety is widely used medicinally in Guizhou and Yunnan, as “tou gu cao,” for its rich content of salicylic acid. In the past, some specimens of this variety have been misidentified as var. *cumingiana* from the Philippines.

**21b. *Gaultheria leucocarpa* var. *crenulata*** (Kurz) T. Z. Hsu, *Acta Bot. Yunnan.* 3: 429. 1981.

毛滇白珠 mao dian bai zhu

*Gaultheria crenulata* Kurz, *J. Bot.* 11: 195. 1873; *G. leucocarpa* var. *hirsuta* (D. Fang & N. K. Liang) T. Z. Hsu; *G. yunnanensis* var. *hirsuta* D. Fang & N. K. Liang.

Twigs, petioles, inflorescence rachis, and pedicels glandular hirsute. Leaf blade abaxially shortly hispid, sometimes adaxially glandular hirsute, margin setaceous-ciliate. Inflorescence rachis, pedicels, filaments, and capsule tomentellous. Ovary sericeous.

• Thickets on hilltops, open slopes; 2000–2800 m. EC Guangxi (Guiping), Yunnan.

Flowering specimens were not seen by the present authors.

**21c. *Gaultheria leucocarpa* var. *psilocarpa*** (Copeland) R. C.

Fang, Novon 9: 166. 1999.

秃果白珠 tu guo bai zhu

*Gaultheria psilocarpa* Copeland, Philipp. J. Sci. 47: 62. 1932.

Twigs glabrous or puberulous, intermixed glandular pilose, or only sparsely glandular setulose. Leaf blade glandular setulose or setulose-apiculate at margin. Inflorescence rachis and pedicels glabrous. Filaments glabrous. Ovary and capsule glabrous.

Slopes; (800–)1000–2600 m. Taiwan [Philippines].

Specimens from the Philippines have scattered, marginal hairs on the filaments, but as Copeland (in the protologue) noted, this is a poor character.

**22. *Gaultheria purpurea*** R. C. Fang, Novon 9: 171. 1999.

紫背白珠 zi bei bai zhu

Shrubs procumbent, 5–10 cm tall. Twigs terete, slender, slightly puberulous, densely brown hirsute. Leaves towards the ends of branches; petiole 1–2 mm, hirsute; leaf blade gray-green adaxially, elliptic, 1.5–3 × 1–2 cm, leathery, abaxially purple hirsute on veins, adaxially glabrous, secondary veins 2–4 pairs, with fine veins raised abaxially, impressed adaxially, base broadly cuneate to rounded, margin denticulate, denticles setose, apex obtuse to acute, mucronulate. Inflorescences terminal or axillary at apices of twigs, racemose, 5–7 cm at fruiting, 1–4 fruited, glabrous; peduncle 3.5–4.5 cm; bracts ovate, 2–3 mm, leathery, glabrous. Flowers unknown. Pedicels 4–9 mm, glabrous; bracteoles 2, median or above, ovate-triangular, ca. 2 mm, margin ciliolate. Calyx glabrous; lobes triangular-ovate, 1.5–2 mm, margin ciliolate. Corolla and stamens unknown. Ovary hispidulous. Calyx at fruiting dark purple, fleshy; capsule globose, 6–7 mm in diam. Fr. Nov–Dec.

• Dominant on rocky slopes near mountain summits; 2000–3400 m. SE Xizang (Médog).

**23. *Gaultheria heteromera*** R. C. Fang, Novon 9: 164. 1999.

异数白珠 yi shu bai zhu

Shrubs procumbent, 5–20 cm tall. Twigs terete, slender, densely puberulous and with long brown hairs. Leaves towards the ends of branches; petiole ca. 1 mm, glabrous or sparsely hirtellous; leaf blade drying brown on both surfaces, elliptic, 0.8–1.7(–2.3) × 0.6–1 cm, papery, glabrous or abaxially sparsely hirtellous, secondary veins 3 pairs, fine veins raised abaxially, impressed adaxially, base broadly cuneate, margin dentate, apex obtuse to acute, mucronulate. Inflorescences terminal or axillary at apices of twigs, shortly racemose, 3–6 mm, 1–4 flowered, puberulous; bracts broadly ovate, 1.5–2 mm, glabrous. Pedicel 4–6 mm, puberulous; bracteoles 1 pair, towards middle of pedicel, ovate, 1–1.5 mm, glabrous. Flowers 4-merous. Calyx glabrous; lobes triangular-ovate, 2.5–3 mm. Corolla white, globose-urceolate, ca. 4 mm, abaxially glabrous; lobes reflexed, very short. Stamens 8 or 9; filaments ca. 1 mm, swollen, glabrous, papillate; anthers ca. 1 mm, thecae 2-awned. Ovary hispidulous. Fruit unknown. Fl. Jul–Aug.

• Alpine thickets, meadows; ca. 3900 m. SE Xizang (Médog).

**24. *Gaultheria suborbicularis*** W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 8: 186. 1914.

伏地白珠 fu di bai zhu

*Chiogenes suborbicularis* (W. W. Smith) Ching ex T. Z. Hsu; *C. suborbicularis* var. *albiflora* T. Z. Hsu.

Shrubs dwarf, prostrate. Twigs terete, wiry, shortly tawny-setose. Leaves dense; petiole very short, 0.5–1 mm; leaf blade suborbicular or elliptic, 3–7 × 2–5 mm, leathery, abaxially sparsely shortly setulose, adaxially glabrous, secondary and fine veins inconspicuous, slightly raised abaxially, impressed adaxially, both ends obtuse to rounded, margin recurved, sparsely shortly setulose. Flowers solitary, axillary. Pedicel ca. 1 mm, glabrous; bracts absent; bracteoles 2, apical, broadly ovate, ca. 2 mm, leathery, glabrous. Flowers 4-merous. Calyx tinged with red, ca. 2 mm, glabrous; lobes triangular. Corolla rosy to purplish, sometimes white, 2.5–3 mm, glabrous, lobed to middle; lobes ovate. Filaments elliptic; thecae very short, 2-apiculate. Ovary glabrous. Calyx at fruiting red, fleshy; capsule globose, glabrous. Fl. Jul–Aug, fr. Aug–Oct.

• Forest understories, thickets, grassy slopes, rocks; 3000–3900 m. NW Yunnan (Dèqên, Gongshan, Weixi).

The gathering *J. F. Rock 8734*, from NW Yunnan (“Tseku” and “Tsehching”), has flowers with four, five, or seven stamens.

**25. *Gaultheria nummularioides*** D. Don, Prodr. Fl. Nepal. 150. 1825.

铜钱叶白珠 tong qian ye bai zhu

*Gaultheria nummularioides* var. *elliptica* Rehder & E. H. Wilson; *G. nummularioides* var. *microphylla* C. Y. Wu & T. Z. Hsu; *G. repens* Blume.

Shrubs prostrate, small, many branched. Twigs terete, wiry, densely brown hirsute. Leaves dense; petiole ca. 1 mm; leaf blade broadly ovate or suborbicular, sometimes ovate or elliptic, 5–10(–18) × 3–9(–16) mm, papery or leathery, abaxially densely or sparsely setiferous, usually pale, sometimes red punctate, adaxially glabrous, secondary veins 2 or 3 pairs, secondary and fine veins slightly raised abaxially, inconspicuous adaxially, base obtuse, truncate, rounded, or subcordate, rarely cuneate, margin denticulate-setulose, apex acute, distinctly mucronate. Flowers solitary, axillary. Pedicel ca. 1 mm; bracts ovate-triangular, ca. 1.5 mm; bracteoles 2–4, persistent, stramineous, larger than bracts, carinate, ca. 3 mm, glabrous. Calyx glabrous; lobes ovate, ca. 3 mm, apex shortly acuminate. Corolla white, pink, or crimson, campanulate, ca. 5 mm, abaxially glabrous; lobes often erect, ca. 1 mm, triangular. Filaments spindle-shaped, ca. 1.5 mm, villous, papillate; anthers ca. 1.5 mm, thecae 2-awned. Ovary glabrous. Calyx at fruiting blue-purple or black; capsule globose, 6–7(–9) mm in diam., glabrous. Fl. Jul–Oct, fr. Mar–Dec.  $2n = 44$ .

*Abies*, *Picea*, *Pinus*, and *Tsuga* forests, often on rocks, rarely epiphytic on trees; 1000–2000(–3400) m. WC Sichuan, SE Xizang, N and SE Yunnan [Bangladesh, Bhutan, NE India (Darjiling), Indonesia (Java,

Sumatra), Myanmar, Nepal, Sikkim].

This species is variable in the shape and size of its leaves and in its indumentum.

**26. *Gaultheria dolichopoda*** Airy Shaw, Bull. Misc. Inform. Kew 1940: 321. 1941.

长梗白珠 *chang geng bai zhu*

Shrubs dwarf, usually prostrate, 5–20 cm tall, much branched below, glabrous. Twigs terete, densely brown hispidulous. Leaves dense; petiole less than 1 mm; leaf blade oblong-oblong-ovate or oblong-elliptic, 6–13 × 3–5 mm, leathery, sometimes rigid, midvein slightly raised abaxially, inconspicuous, fine veins inconspicuous, base cuneate, margin serrulate, apex obtuse-acute. Flowers solitary, axillary. Pedicel 5–9(–19) mm; bracts absent; bracteoles 2, apical, broadly ovate, ca. 1.3 mm, leathery. Calyx lobes ovate-triangular, ca. 3 mm. Corolla white, shortly tubular, ca. 5 mm; lobes erect or recurved, oblong, ca. 2 mm. Stamens ca. 2 mm; filaments basally swollen; thecae 2-awned. Ovary glabrous. Calyx at fruiting blue; capsule pyriform, 6–8 mm in diam., glabrous. Fl. Jul, fr. Jul–Aug.

*Abies* forests, alpine thicket-meadows, rocky places; 3000–4400 m. SE Xizang [Myanmar].

**27. *Gaultheria trichophylla*** Royle, Ill. Bot. Himal. Mts. 260. 1835.

刺毛白珠 *ci mao bai zhu*

*Brossea trichophylla* (Royle) O. Kuntze; *Gaultheria nana* C. Y. Wu & T. Z. Hsu.

Shrubs dwarf, prostrate, much branched below. Twigs terete, wiry, brown hirsute. Leaves dense; petiole very short, ca. 0.5 mm; leaf blade elliptic or elliptic-oblong, 5–13 × 2–5 mm, leathery, glabrous, rarely abaxially scattered hispidulous on midvein, secondary and fine veins inconspicuous, both ends obtuse to acute, margin inconspicuously crenulate, usually long ciliate when mature. Flowers solitary, axillary. Pedicel 1–2 mm or flower subsessile; bracts absent; bracteoles 2, apical, broadly ovate, ca. 2 mm, leathery, glabrous. Calyx glabrous; lobes ovate-oblong, 2–2.8 mm, ciliolate. Corolla white, campanulate, ca. 6 mm, deeply 5-lobed, glabrous; lobes erect, oblong, 2–3 mm. Stamens ca. 2 mm; filaments spindle-shaped; thecae 1- or 2-awned. Ovary glabrous. Calyx at fruiting blue, fleshy; capsule 6–10 mm in diam., glabrous. Fl. Jun, fr. Jul–Sep.

Mountain slopes, alpine windswept moorlands, montane grasslands, rocky places, stony soils; 3000–4700 m. C and W Sichuan, S Xizang, NW Yunnan [Bhutan, NE India (?Assam, Darjiling), Kashmir, Myanmar, Nepal, Sikkim].

- 1a. Leaf blade not ciliate along margin ..... 27c. var. *eciliata*
- 1b. Leaf blade long ciliate along margin.
  - 2a. Thecae 1-awned, awn ca. 0.5 mm ..... 27a. var. *trichophylla*
  - 2b. Thecae 2-awned, awn ca. 1 mm .... 27b. var. *tetracme*

**27a. *Gaultheria trichophylla*** var. ***trichophylla***

刺毛白珠(原变种) *ci mao bai zhu* (yuan bian zhong)

Leaf blade elliptic or elliptic-oblong, long ciliate along mar-

gin. Thecae 1-awned, awn ca. 0.5 mm.

Mountain slopes, montane grasslands, rocky places; 3000–4200 m. C Sichuan, S Xizang, NW Yunnan [Bhutan, NE India (?Assam, Darjiling), Kashmir, Nepal, Sikkim].

**27b. *Gaultheria trichophylla*** var. ***tetracme*** Airy Shaw, Bull. Misc. Inform. Kew 1940: 323. 1941.

四芒刺毛白珠 *si mang ci mao bai zhu*

Leaf blade ovate or ovate-oblong, long ciliate along margin. Thecae 2-awned, awn ca. 1 mm.

- Stony soils; 4200–4700 m. W Sichuan, S Xizang.

**27c. *Gaultheria trichophylla*** var. ***eciliata*** S. J. Rae & D. G. Long, Notes Roy. Bot. Gard. Edinburgh 45: 334. 1988.

无刺毛白珠 *wu ci mao bai zhu*

Leaf blade ovate, elliptic, or oblong, not ciliate along margin. Thecae 1-awned, awn ca. 0.5 mm.

Alpine windswept moorlands, rocky places; 3200–4200 m. NW Yunnan [Bhutan].

**28. *Gaultheria cardiosepala*** Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 60: 185. 1923.

苍山白珠 *cang shan bai zhu*

Shrubs, sometimes prostrate, 4–14(–20) cm tall, much branched below. Twigs terete, brown hispidulous. Leaves dense; petiole ca. 1 mm; leaf blade linear to oblong-linear, 0.5–1.6 cm × 1–4 mm, leathery, glabrous, rarely adaxially puberulous on midvein, secondary and fine veins inconspicuous, base cuneate, decurrent, margin serrulate, apex obtuse to acute. Flowers solitary, axillary, glabrous. Pedicel ca. 1 mm; bracts absent; bracteoles 2, apical, broadly ovate, ca. 2 mm, leathery, glabrous. Calyx lobes ovate, ca. 3 mm, base slightly cordate. Corolla white, oblong-urceolate, 4–5 mm; lobes often erect, oblong, very short. Stamens ca. 1.5 mm; filaments spindle-shaped, papillate; thecae 2-awned. Ovary glabrous. Calyx at fruiting usually white, rarely blue or pale purple; capsule globose, 7–8 mm in diam. Fl. May–Jun, fr. Jul–Oct.

*Rhododendron* forests, rocks in forests, thickets, thicket margins, alpine grasslands; 2000–3500(–3800) m. W Yunnan [Myanmar].

**29. *Gaultheria hypochlora*** Airy Shaw, Bull. Misc. Inform. Kew 1940: 324. 1941.

绿背白珠 *lü bei bai zhu*

Shrubs procumbent, 8–20 cm tall, much branched below. Twigs terete, brown hispidulous. Leaves dense; petiole ca. 1 mm; leaf blades dimorphic, smaller ones usually elliptic, 3–4 mm, larger ones obovate or oblong, 0.8–1.4 cm × 6–8 mm, usually broadest above middle, papery-leathery, glabrous, or when young abaxially scattered brown shortly hispidulous, secondary veins 2 or 3 pairs, slightly raised abaxially, impressed adaxially, fine veins inconspicuous abaxially, impressed adaxially, base cuneate, margin slightly recurved, serrulate, apex obtuse-rounded, mucronulate. Flowers solitary, axillary, glabrous. Pedicel 2–3 mm; bracts absent; bracteoles 2, apical, suborbicular, ca. 2 mm. Calyx lobes ovate-triangular, ca. 2 mm. Corolla white, broadly campanulate, 4–5 mm; lobes often erect, oblong-tri-

angular, ca. 2 mm. Stamens ca. 2 mm; filaments rhombic; thecae 2-awned. Ovary glabrous. Calyx at fruiting dark blue; capsule globose, ca. 6 mm in diam. Fl. Jun–Jul, fr. Jul–Oct.

*Abies* forest margins, rocky places in *Rhododendron* thickets, grassy slopes, alpine grasslands; 3000–3600 m. W Sichuan, NW and SE Yunnan [Bhutan, NE India (Assam), Myanmar].

This species has been confused with *Gaultheria sinensis*. According to Airy Shaw (in the protologue), *G. hypochlora* differs in having leaves markedly obovate, thinner, drying a very characteristic light green abaxially, with a rounded apex, and corollas broadly campanulate.

**30. *Gaultheria sinensis*** J. Anthony, Notes Roy. Bot. Gard. Edinburgh 18: 19. 1933.

华白珠 hua bai zhu

Shrubs procumbent, (2.5–)5–15 cm tall, much branched below. Twigs densely brown hispidulous, rarely white tomentulose. Leaves dense; petiole 0.5–1.5 mm; leaf blade elliptic or elliptic-oblong, 0.6–1.6 cm × 2–6 mm, leathery, glabrous, or abaxially scattered hispidulous on midvein, midvein slightly raised abaxially, other veins inconspicuous, base cuneate to broadly cuneate, margin slightly recurved, serrulate, apex acute, sometimes mucronulate. Flowers solitary, axillary. Pedicel 1–2 mm; bracts absent; bracteoles 2, apical, suborbicular, 2–2.5 mm, leathery. Calyx lobes broadly ovate or ovate-triangular, ca. 2 mm, margin densely white ciliolate. Corolla white, urceolate to shortly tubular, 4–5 mm, glabrous; lobes erect or recurved, oblong, 2–2.5 mm. Stamens ca. 2 mm; filaments dilated to orbicular at middle, papillate; thecae 2-awned. Ovary glabrous. Calyx at fruiting dark blue or white; capsule depressed-globose, 5–8(–10) mm in diam., glabrous. Fl. May–Jul, fr. Aug–Sep.

*Abies* forests, *Rhododendron* thickets, alpine thicket-meadows, peaty stony meadows, stony slopes, rocky places in mountains, humus-covered boulders, open ledges of cliffs; 3000–4300 m. NW Sichuan, SE Xizang, C and NW Yunnan [Bhutan, NE India (Assam), N Myanmar, Sikkim].

- 1a. Twigs densely brown hispidulous; calyx dark blue ..... 30a. var. *sinensis*
- 1b. Twigs densely white tomentellate; calyx white ..... 30b. var. *nivea*

**30a. *Gaultheria sinensis* var. *sinensis***

华白珠(原变种) hua bai zhu (yuan bian zhong)

*Gaultheria sinensis* var. *crassifolia* Airy Shaw; *G. sinensis* var. *major* Airy Shaw.

Plants 5–20 cm tall. Twigs densely brown hispidulous. Leaves 5–10(–15) × 2–6 mm. Calyx dark blue.

*Abies* forests, *Rhododendron* thickets, alpine thicket-meadows, rocky places in mountains; 3000–4200 m. NW Sichuan, SE Xizang (Zayü), C and NW Yunnan [Bhutan, NE India (Assam), N Myanmar,

**21. VACCINIUM** Linnaeus, Sp. Pl. 1: 349. 1753.

越桔属 yue ju shu

Fang Ruizheng (方瑞征 Fang Rhui-cheng); Peter F. Stevens

Shrubs or small trees, terrestrial or epiphytic. Leaves evergreen or deciduous, rarely pseudovercillate, petiolate, margin entire or serrate. Inflorescences terminal or axillary, racemose, fasciculate, or solitary flowers. Bracts and bracteoles persistent or caducous,

Sikkim].

**30b. *Gaultheria sinensis* var. *nivea*** J. Anthony, Notes Roy. Bot. Gard. Edinburgh 18: 20. 1933.

白果华白珠 bai guo hua bai zhu

*Gaultheria nivea* (J. Anthony) Airy Shaw.

Plants 2.5–10 cm tall. Twigs densely white tomentellate. Calyx white.

• Peaty stony meadows, stony slopes, humus-covered boulders, open ledges of cliffs; ca. 4300 m. SE Xizang, NW Yunnan.

**31. *Gaultheria jingdongensis*** R. C. Fang, Novon 9: 166. 1999.

景东白珠 jing dong bai zhu

Shrubs subprostrate, 15–30 cm tall. Twigs terete, densely cinnamon- or brown hirsute. Petiole 1–2 mm, hirsute; leaf blade obovate-elliptic or obovate-oblong, 1–2 × 0.5–1 cm, papery to leathery, abaxially densely hispidulous, adaxially glabrous, midvein slightly raised abaxially, secondary veins 2 or 3 pairs, secondary and fine veins inconspicuous on both surfaces, base cuneate-attenuate, margin denticulate-setose, apex obtuse or rounded, mucronate. Flowers solitary, axillary. Pedicel 2–3 mm, hirtellous; bracts absent; bracteoles 2, apical, broadly ovate, ca. 3 mm, leathery, cucullate, glabrous. Calyx lobes unequal, triangular-ovate, 3–5 mm, densely white ciliolate. Corolla white, 6–9 mm; lobes erect or recurved, oblong-ovate, 3–6 mm. Filaments rhomboid, ca. 1.5 mm, glabrous, papillate; anthers ca. 1 mm, thecae 1-awned. Ovary glabrous. Fruit unknown. Fl. Mar–May.

• Shrub forests, roadsides on slopes; 2000–3000 m. WC Yunnan (Jingdong).

**32. *Gaultheria taiwaniana*** S. S. Ying, Quart. J. Chin. Forest. 9: 136. 1976.

台湾白珠 tai wan bai zhu

Shrubs 10–30 cm, branched above, glabrous. Twigs ?terete. Petiole 1–2 mm; leaf blade oblong, obovate-oblong, or oblong-lanceolate, 1–1.5 cm × 4–7 mm, leathery, secondary veins 2 or 3 pairs, base cuneate, margin crenulate above middle, apex obtuse or acuminate. Flowers solitary, from upper leaf axil. Pedicel 3–4 mm, slender; bracts ovate; bracteoles 2, ovate, 1–2 × 0.5–0.8 mm, concave, apex acute. Calyx green, obconical, minute; lobes triangular, 1–1.5 mm, apex acute. Corolla white, urceolate, 3.5–4.5 mm; lobes ovate-triangular, 0.2–0.3 mm. Filaments ca. 1.5 mm, papillate at base. Ovary globose, pubescent. Fruit unknown.

• Open fields. C Taiwan.

This is a rare species.



- cuneate ..... 81. *V. haitangense*
- 12b. Flowers solitary or in axillary racemes; anthers with spurs or not.
- 21a. Leaf margin entire, rarely glandular serrulate; corolla broadly campanulate to urceolate-campanulate, anthers with two distinct, rarely inconspicuous, spreading or erect spurs.
- 22a. Flowers solitary, or racemes to 2.5 cm, 1–6-flowered; leaf blade to 4 × 2 cm, apex emarginate to obtuse, rarely acute or acuminate; usually epiphytic.
- 23a. Inflorescence subcapitate, with several subpersistent, basal imbricate inflorescence bracts; leaf blade 8–11 × 3–4.5 cm, apex abruptly acuminate; branch and leaf blade densely setiferous ..... 60. *V. lanigerum*
- 23b. Flowers solitary or in short racemes, without subpersistent basal inflorescence bracts; leaf blade to 4 × 2 cm, apex rounded, obtuse, or emarginate, rarely acute; plant not densely setiferous.
- 24a. Leaf apex rounded or acute.
- 25a. Leaf blade 2.5–3.8 × 1–2 cm, apex acute to abruptly acute; raceme pubescent and mixed glandular pilose ..... 61. *V. cuspidifolium*
- 25b. Leaf blade to 3 × 1.4 cm, apex acute, rounded, or obtuse-acuminate; raceme glabrous or pubescent.
- 26a. Inflorescence very short, 1–3-flowered; pedicels ca. 1 mm, pubescent; corolla pale green ..... 65. *V. brevipedicellatum*
- 26b. Inflorescence 0.6–2 cm, 3–6-flowered; pedicels 1–3 mm, glabrous; corolla white or red (unknown in *V. lamprophyllum*).
- 27a. Leaf blade oblong-obovate, 2–3 × 0.9–1.4 cm, apex acute; calyx lobes 2.5–3 mm, apex subulate ..... 62. *V. lamprophyllum*
- 27b. Leaf blade obovate or broadly obovate, 0.8–2 × 0.6–1.1 cm, apex rounded; calyx lobes 1.5–2 mm, apex obtuse to acute.
- 28a. Corolla red, urceolate; calyx lobes ca. 1.5 mm, apex acute ..... 63. *V. conchophyllum*
- 28b. Corolla white, campanulate; calyx lobes 1.5–2 mm, apex obtuse ..... 64. *V. sinicum*
- 24b. Leaf apex ± emarginate.
- 29a. Pedicel and calyx hispid; flowers solitary or 2 or 3 together in short raceme.
- 30a. Flowers 2 or 3; calyx lobes lanceolate-subulate, 4–5 mm ..... 66. *V. craspedotum*
- 30b. Flowers 1 or 2; calyx lobes triangular-ovate, ca. 2 mm ..... 67. *V. sciaphilum*
- 29b. Pedicel and calyx glabrous, pubescent or puberulous; flowers 1–6 in long to short racemes.
- 31a. Pedicels 0.5–1 cm, glabrous; inflorescences 1–2.5 cm.
- 32a. Leaf blade elliptic, 1.5–2.6 × 0.9–1.2 cm; filaments 0.5–1 mm, tubules ca. 3 × as long as thecae ..... 68. *V. papillatum*
- 32b. Leaf blade obovate-elliptic, 2.5–3(–5) × 1–2 cm; filaments ca. 2 mm, tubules ca. 2 × as long as thecae ..... 69. *V. emarginatum*
- 31b. Pedicels 3–5(–9) mm, pilose or glabrous; inflorescence to 5 mm.
- 33a. Flowers 1 or 2; calyx lobes ciliate and usually glandular along margin ..... 73. *V. pseudotonkinense*
- 33b. Flowers (1 or)2 or 3(–5); calyx lobes glabrous or ciliate along margin.
- 34a. Leaf blade glaucous abaxially; pedicels 3–5 mm, pedicel and calyx glabrous or villous ..... 70. *V. chengiae*
- 34b. Leaf blade not glaucous abaxially; pedicels 6–9 mm, pedicel and calyx pubescent, pilose, or glabrous.
- 35a. Leaf blade oblong-obovate; inflorescence 1- or 2-flowered; pedicels thickening upwards; corolla white ..... 71. *V. saxicola*
- 35b. Leaf blade elliptic; inflorescence (1- or)2- or 3(–5)-flowered; pedicels hardly thickening upwards; corolla red ..... 72. *V. triflorum*
- 22b. Raceme usually 2.5 cm or longer, (3–)5–10(or more)-flowered, and/or leaf blade at least (1.5–)4 × (0.35–)2 cm, apex acute, acuminate, or caudate, rarely obtuse or emarginate; terrestrial.
- 36a. Leaf blade with ± glandular serrulate or entire margin, abaxially glaucous, sparsely glandular setose on midvein.
- 37a. Leaf blade 4–6 × 2–4 cm, margin densely glandular serrulate; pedicels 3–5 mm; bracts leaflike, broadly elliptic, 1–2 cm ..... 1. *V. glaucoalbum*
- 37b. Leaf blade 7–13 × 4–6.5 cm, margin sparsely glandular setose or entire; pedicels 4–12 mm; bracts elliptic, ca. 1.2 cm ..... 2. *V. gaultheriifolium*
- 36b. Leaf blade with entire margin, abaxially rarely glaucous, but glabrous or punctate or brownish appressed-headed hairy, rarely strigose on midvein.
- 38a. Leaf apex obtuse or emarginate.
- 39a. Raceme many flowered; pedicels 1–1.5 mm; calyx lobes ca. 1 mm; corolla ca. 3.5 mm; leaf apex obtuse ..... 3. *V. cavinerve*

- 39b. Raceme 3-flowered; pedicels 10–17 mm; calyx lobes 4–6 mm; corolla ca. 1.2 cm; leaf apex emarginate or obtuse ..... 4. *V. impressinerve*
- 38b. Leaf apex acute, acuminate, or caudate.
- 40a. Leaf blade 1.5–7 × 0.35–2 cm, apex acute or shortly acuminate; secondary veins 3–5-paired.
- 41a. Leaf base cuneate-attenuate; twigs glabrous or puberulous.
- 42a. Leaf blade linear-ob lanceolate or linear-lanceolate, 3.5–8 mm wide ..... 5. *V. podocarpoideum*
- 42b. Leaf blade oblanceolate or oblanceolate-ovate, 10–22 mm wide ..... 6. *V. foetidissimum*
- 41b. Leaf base broadly cuneate to obtuse; twigs pubescent.
- 43a. Inflorescence from uppermost axil; leaf blade glaucous adaxially ..... 7. *V. glaucophyllum*
- 43b. Inflorescence from uppermost and lower axils; leaf blade not glaucous adaxially.
- 44a. Inflorescence 2.5–3 cm; calyx lobes ca. 1 mm; corolla urceolate, 4–5 mm ..... 8. *V. omeiense*
- 44b. Inflorescence 4.5–6.5 cm; calyx lobes 2.5–3 mm; corolla campanulate, 6–7 mm ..... 9. *V. pratense*
- 40b. Leaf blade larger, apex acuminate, caudate or abruptly acuminate; secondary veins 6–12-paired, rarely 3- or 4-paired.
- 45a. Inflorescence pubescent, tomentose, or shortly glandular hairy; twigs with hairs or not.
- 46a. Inflorescence shorter than leaves, 1.5–3 cm; leaf blade with appressed glandular hairs abaxially; pedicels 1–2(–3) mm.
- 47a. Rachis and pedicels densely tomentellate; berry densely hairy ..... 18. *V. arbutoides*
- 47b. Rachis and pedicels glandular pubescent; berry glabrous ..... 19. *V. brachyandrum*
- 46b. Inflorescences ca. as long as leaves, 3–8 cm; leaf blade glabrous or sparsely pubescent abaxially; pedicels 2–14 mm.
- 48a. Leaf blade lanceolate or oblong-lanceolate, ca. 3 × as long as broad, base cuneate-attenuate, glabrous; pedicel 10–14 mm ..... 20. *V. kachinense*
- 48b. Leaf blade ovate-cordate, ovate, or oblong, ca. 2.5 × as long as broad, base obtuse to shallowly cordate, abaxially subglabrous or pubescent; pedicel 2–8 mm.
- 49a. Leaf blade ovate-cordate, base cordate, sometimes auriculate or obtuse; inflorescence densely pubescent ..... 21. *V. pseudospadiceum*
- 49b. Leaf blade ovate or oblong, base rounded, rarely shallowly cordate; inflorescence glabrous or puberulous, rarely densely pubescent.
- 50a. Inflorescence 3–5 cm; pedicels 2–6 mm; leaf veins raised adaxially ..... 22. *V. urceolatum*
- 50b. Inflorescence 5–8 cm; pedicels 6–9 mm; leaf veins distinctly impressed adaxially .... 23. *V. bullatum*
- 45b. Inflorescence and sometimes also twig glabrous.
- 51a. Inflorescence longer than or subequal to leaves.
- 52a. Leaf blade rounded to subcordate at base, veins impressed adaxially, blade 9–19 × 2.5–5.5 cm ..... 10. *V. dunnianum*
- 52b. Leaf blade cuneate to broadly cuneate at base, veins distinctly raised or not distinctly raised adaxially, blade 3–12 × 2–3.2 cm.
- 53a. Leaf blade oblong-lanceolate, 6–12 × 2–3.2 cm; corolla white; veins raised on both surfaces ..... 11. *V. crassivenium*
- 53b. Leaf blade obovate to elliptic, 3–4(–7) × 1.2–2(–4) cm; corolla green, purple tinged; veins raised abaxially only ..... 12. *V. supracostatum*
- 51b. Inflorescence shorter than leaves.
- 54a. Leaf margin lacking glands at base ..... 22. *V. urceolatum*
- 54b. Leaf margin with gland(s) at base.
- 55a. Leaf blade (4–)5–8(–10) × 3–4(–5) cm, abaxially glabrous or with appressed glandular hairs.
- 56a. Leaf blade ovate, broadly ovate, or suborbicular, abaxially papillate, with short fulvous hairs ..... 17. *V. chunii*
- 56b. Leaf blade elliptic or ovate-oblong, abaxially smooth, whether or not glandular hairy.
- 57a. Leaf margin with two glands per side at base; petiole 2–3 mm ..... 16. *V. pseudorobustum*
- 57b. Leaf margin with one gland per side at base; petiole at least 5 mm ..... 15. *V. dunalianum*
- 55b. Leaf blade 10–21 × 4–9 cm, abaxially with appressed glandular hairs.
- 58a. Leaf blade elliptic or ovate, bullate, veins distinctly impressed adaxially, raised abaxially ..... 13. *V. pseudobullatum*
- 58b. Leaf blade oblong, oblong-lanceolate, or narrowly ovate, smooth, veins inconspicuously raised on both surfaces.
- 59a. Leaf base rounded to shallowly cordate; petioles 3–6 mm; inflorescence 1.5–3 cm; pedicels 9–12 mm ..... 14. *V. petelotii*

- 59b. Leaf base cuneate to obtuse; petioles 5–14 mm; inflorescence 3–7 cm;  
pedicels 5–8 mm ..... 15. *V. dunalianum*
- 21b. Leaf margin denticulate, crenulate, rarely entire or subentire; corolla urceolate or tubular, rarely campanulate; anthers with short spurs or not.
- 60a. Leaves pseudovercillate, rarely scattered; raceme elongate; calyx tube often with fleshy protuberances; twigs often with some conspicuous and subsistent bud scales.
- 61a. Leaf margin entire; twigs without conspicuous bud scales.
- 62a. Leaf blade ovate or elliptic, 6–15 × 2.5–7 cm; pedicels purple, slender; corolla white-green, urceolate-tubular; filaments subglabrous, anthers without spurs ..... 49. *V. ardisioides*
- 62b. Leaf blade oblong-lanceolate or oblong-ovate, 7.5–12 × 2–4 cm; pedicels red, clavate; corolla orange or pink, tubular; filaments pubescent, anthers with 2 short spurs ..... 50. *V. rubescens*
- 61b. Leaf margin serrate; twigs with some conspicuous bud scales.
- 63a. Leaves rather scattered.
- 64a. Branch glabrous; leaf blade 12–18.5 × 3.5–9 cm; inflorescence 2–3.5 cm ..... 58. *V. papulosum*
- 64b. Branch dark brownish hispid, sometimes glandular setose; leaf blade 2.5–6(–10) × 0.6–2(–4) cm; inflorescence 2–15 cm.
- 65a. Leaf blade lanceolate or oblanceolate, 2.5–4.5 × 0.6–1.7 cm; inflorescence 2–5 cm ..... 57. *V. scopulorum*
- 65b. Leaf blade oblong, oblong-obovate, or oblong-lanceolate, 4.5–6(–10) × 1.5–4 cm; inflorescence 5–15 cm ..... 59. *V. subdisitifolium*
- 63b. Leaves 4–6(–10) together.
- 66a. Leaves small, 3.5–5(–7) × 0.9–3 cm; inflorescence 1.5–3(–6) cm.
- 67a. Branch densely shortly setose; leaf blade oblong-lanceolate, base cuneate to narrowly rounded ..... 53. *V. vacciniaceum*
- 67b. Branch densely puberulous and mixed setulose; leaf blade oblong or oblong-ovate, base rounded to slightly cordate ..... 55. *V. leucobotrys*
- 66b. Leaves large, 4–11(–14) × (0.9–)2–5 cm; inflorescence (2–)3.5–6 cm.
- 68a. Leaves 9 or 10 together; rachis, pedicel, and calyx tube densely pubescent ..... 54. *V. tenuiflorum*
- 68b. Leaves 5 or 6 together; rachis, pedicel, and calyx tube glabrous.
- 69a. Leaf blade drying brownish below ..... 56. *V. bulleyanum*
- 69b. Leaf blade drying blackish below.
- 70a. Leaf blade leathery ..... 51. *V. venosum*
- 70b. Leaf blade papery ..... 52. *V. kingdon-wardii*
- 60b. Leaves scattered; inflorescence various; calyx tube lacking fleshy protuberances; twigs without conspicuous and subsistent bud scales.
- 71a. Flowers solitary, 4-merous; leaf blade with 3–5 teeth on each side ..... 74. *V. spiculatum*
- 71b. Flowers in racemes, 5-merous; leaf blade serrate, rarely entire.
- 72a. Bracts usually persistent, rarely caducous; anthers usually without or with very small spurs; leaf blade adaxially smooth, veins not impressed.
- 73a. Leaf blade 4–11 × 1–2 cm, ca. 4 × as long as broad ..... 26. *V. subfalcatum*
- 73b. Leaf blade (1.5–)2–6(–9) × (1–)1.5–3(–4) cm, to 3 × as long as broad.
- 74a. Inflorescence ± hairy.
- 75a. Inflorescence 2–3 × as long as leaves; rachis pubescent, bracts and calyx lobes fimbriate, otherwise glabrous ..... 31. *V. fimbriacteatum*
- 75b. Inflorescence shorter than or ca. as long as leaves; petiole, rachis, calyx, and corolla densely pubescent.
- 76a. Calyx limb not lobed, truncate; corolla purple; bract caducous ..... 29. *V. truncatocalyx*
- 76b. Calyx limb with lobes; corolla white; bract persistent ..... 30. *V. bracteatum*
- 74b. Inflorescence glabrous.
- 77a. Leaf blade ± lanceolate; fruit stalk ca. 2 mm (in *V. randaiense*, unknown in *V. kengii*).
- 78a. Corolla tubular, 5.5–7.5 mm; pedicels ca. 2 mm; tubule of thecae ca. 3 mm, without spur ..... 24. *V. randaiense*
- 78b. Corolla campanulate, ca. 5 mm; pedicels ca. 7 mm; tubule of thecae ca. 1 mm, with a short spur ..... 25. *V. kengii*
- 77b. Leaf blade ± elliptic, ovate, or oblong; fruit stalk 3–15 mm.
- 79a. Leaf blade obovate or oblong-elliptic, 4–6 × 2–3 cm, apex obtuse or abruptly acute, margin subentire; fruit stalk 3–5 mm ..... 27. *V. hainanense*
- 79b. Leaf blade ovate, oblong, or rhombic-oblong, (1.5–)2–5 × (1–)1.5–2.5 cm, apex acute to acuminate, margin dentate; fruit stalk 10–15 mm ..... 28. *V. wrightii*
- 72b. Bracts caducous or absent; anthers usually with short, or very short, spur, very rarely without

- spur; leaf blade with veins usually impressed adaxially.
- 80a. Corolla campanulate; leaf blade with distant teeth or subentire.
- 81a. Leaf blade  $2-7 \times 1-2.5$  cm, base rounded or broadly cuneate, sometimes cuneate, margin distantly serrate; inflorescence less than 3.5 cm ..... 32. *V. carlesii*
- 81b. Leaf blade  $9-18 \times 2-9$  cm, base cuneate, margin subentire; inflorescence to 10 cm ..... 33. *V. yaoshanicum*
- 80b. Corolla urceolate or tubular; leaf margin distinctly serrate.
- 82a. Plant glabrous.
- 83a. Calyx lobes triangular-lanceolate, apex subulate, margin glandular fimbriate; corolla 7–8 mm; inflorescence 4–10 cm; leaf blade 5.5–12.5 cm, apex falciform-acuminate ..... 34. *V. harmandianum*
- 83b. Calyx lobes triangular or orbicular, apex acute or obtuse, sometimes ciliolate; corolla 6–7(–8) mm; inflorescence 1.5–8(–10) cm; leaf blade  $3-9(-13) \times 1.5-3.5$  cm, apex acute to acuminate.
- 84a. Bracteoles ovate, apical; pedicels 0.5–2.5 mm; anther tubules ca. as long as thecae ..... 35. *V. duclouxii*
- 84b. Bracteoles linear or lanceolate, sometimes ovate, median to basal; pedicels 1–8 mm; anther tubules longer than thecae.
- 85a. Bracteoles linear, ca. 1.5 mm; pedicels 1–2 mm; tubules 2–3  $\times$  as long as thecae .... 36. *V. brachybotrys*
- 85b. Bracteoles linear-lanceolate to ovate, 2–4 mm, pedicels 2–8 mm; tubules 1.5–2  $\times$  as long as thecae ..... 37. *V. mandarinorum*
- 82b. Inflorescence rachis, pedicel, and calyx, often also twig and petiole,  $\pm$  hairy.
- 86a. Twig densely or sparsely glandular setose.
- 87a. Dwarf shrub, 20–50(–100) cm tall; leaf blade  $1.2-3.5 \times 0.7-2.5$  cm; bract leaflike ..... 39. *V. fragile*
- 87b. Shrub or small tree, 1–8 m tall; leaf blade  $3-9 \times 2-3.5$  cm; bract not leaflike.
- 88a. Leaf blade glabrous or pubescent; bracts 5–7 mm ..... 35. *V. duclouxii*
- 88b. Leaf blade glandular setose and hispidulous; bracts ca. 2.5 mm ..... 38. *V. trichocladum*
- 86b. Twig glabrous, puberulous, pubescent, or tomentose.
- 89a. Inflorescence distinctly shorter than leaves, pubescent or glabrous.
- 90a. Leaf margin entire; calyx lobes ciliolate; anthers without spurs, tubules ca. as long as thecae ..... 40. *V. fimbriicalyx*
- 90b. Leaf margin denticulate; calyx lobes glabrous; anthers with short spurs, tubules longer than thecae.
- 91a. Inflorescence glabrous; leaf blade elliptic-lanceolate, apex caudate-acuminate ..... 41. *V. longicaudatum*
- 91b. Inflorescence usually hairy; leaf blade ovate, elliptic, or ovate-lanceolate, apex acute or caudate-acuminate.
- 92a. Leaf blade ovate or elliptic,  $1.7-4(-6) \times 1-2$  cm, apex acute or obtuse to acuminate; twig densely pubescent; inflorescence subglabrous; small shrub, 0.5–2 m tall ..... 42. *V. chamaebuxus*
- 92b. Leaf blade ovate-lanceolate to lanceolate,  $3-7 \times 1.5-2.5$  cm, apex acuminate or shortly caudate-acuminate; twig and inflorescence densely puberulous or pubescent; shrub or small tree, 1–6 m tall ..... 43. *V. albidens*
- 89b. Inflorescence ca. as long as or longer than leaves,  $\pm$  pubescent, sometimes subglabrous.
- 93a. Anthers without spurs or spurs inconspicuous; both surfaces of leaf blade drying pale fulvous or straw-colored ..... 48. *V. exaristatum*
- 93b. Anthers with spurs (unknown in *V. guangdongense*); both surfaces of leaf blade drying brown or brown-green.
- 94a. Leaf blade  $4-9 \times 2-4$  cm; anther tubules at least 1.5  $\times$  as long as thecae.
- 95a. Branch, petiole, and inflorescence axis rust-colored pubescent or tomentellate; anther tubules 4–6  $\times$  as long as thecae ..... 44. *V. iteophyllum*
- 95b. Branch, petiole, and inflorescence axis pubescent or glabrous; anther tubules 1.5–2  $\times$  as long as thecae ..... 37. *V. mandarinorum*
- 94b. Leaf blade  $2-6 \times 0.7-2.5$  cm; anther tubules ca. as long as thecae or slightly longer (unknown in *V. guangdongense*).
- 96a. Leaf base rounded or broadly cuneate ..... 45. *V. serrulatum*
- 96b. Leaf base cuneate or broadly cuneate.
- 97a. Leaf blade ovate or ovate-lanceolate to lanceolate,  $2-6 \times 0.7-2.5$  cm; pedicels 1–2 mm ..... 46. *V. pubicalyx*
- 97b. Leaf blade elliptic or elliptic-lanceolate,  $3.5-4.2 \times 1.2-1.6$  cm; pedicels 3–3.5 mm ..... 47. *V. guangdongense*

**1. *Vaccinium glaucoalbum*** J. D. Hooker ex C. B. Clarke in J. D. Hooker, Fl. Brit. India 3: 453. 1882 [*"glauco-album"*].

粉白越桔 fen bai yue ju

Shrubs evergreen, (0.3–)1–3 m tall. Twigs subglabrous or pubescent, when older with scattered raised lenticels; bud scales inconspicuous. Leaves scattered; petiole 2–4 mm, glabrous; leaf blade yellowish green adaxially, elliptic to ovate-elliptic, 4–6 × 2–4 cm, thinly leathery, abaxially glaucous, sparsely glandular setose on midvein, secondary veins 4–8 pairs, ascending, raised on both surfaces, fine veins barely evident, base cuneate or broadly cuneate, margin plane, densely glandular serrulate, with 1 basal gland per side, apex obtuse to acute. Inflorescences racemose, 3–5.5 cm, pubescent, 5–10-flowered; bracts persistent, leaflike, broadly elliptic, 1–2 cm, glabrous, slightly glaucous, apex acute. Pedicel 3–5 mm, glabrous, glaucous; bracteoles persistent, oblong-lanceolate, 7–9 mm, glabrous, glaucous. Hypanthium ca. 1.8 mm, glabrous, glaucous; calyx limb ca. 1 mm; lobes broadly triangular, ca. 0.2 mm, apex ± rounded. Corolla white, urceolate-campanulate, ca. 6 mm; lobes reflexed, ca. 0.5 mm. Filaments 2–2.5 mm, densely pubescent; anthers ca. 3 mm, with 2 erect spurs; tubules ca. as long as thecae. Berry 10-pseudoloculed, purple, with a bloom, 6–8 mm in diam. Fl. Jun, fr. Aug–Dec.

Forest margins, thickets; 2900–3300 m. SE Xizang, W Yunnan [Bhutan, NE India, Myanmar, Nepal, Sikkim].

**2. *Vaccinium gaultheriifolium*** (Griffith) J. D. Hooker ex C. B. Clarke in J. D. Hooker, Fl. Brit. India 3: 453. 1882.

软骨边越桔 ruan gu bian yue ju

Shrubs evergreen, 2–4 m tall, sometimes epiphytic. Twigs glabrous; bud scales caducous. Leaves scattered; petiole 4–6 mm; leaf blade elliptic, 7–13 × 4–6.5 cm, leathery, abaxially glaucous, glabrous or sparsely glandular setose on midvein, adaxially glabrous, secondary veins 5–8 pairs, fine veins raised on both surfaces, base broadly cuneate to obtuse, decurrent, margin plane, entire or sparsely glandular setose, with 1–3 basal glands per side, apex shortly acuminate. Inflorescences racemose, 2–3.5 cm, glabrous, 8–13-flowered; bracts caducous, elliptic, ca. 1.2 cm. Pedicel 4–12 mm, expanded towards apex; bracteoles caducous, linear, 5–6 mm. Hypanthium glabrous, glaucous; calyx limb 0.7–1 mm, triangular-toothed nearly to base. Corolla pink or red, urceolate, 6–11 mm; lobes ca. 1 mm. Stamens ca. as long as corolla; filaments ca. 1.5 mm, densely pubescent; anthers ca. 3 mm, with 2 erect spurs; tubules ca. as long as thecae or shorter. Style puberulous apically. Berry 10-pseudoloculed, dark purple, with a bloom, 8–9 mm in diam.

Forests, forest margins, sometimes epiphytic on trees, thickets on stony mountain slopes, slopes; 1200–2600 m. SE Xizang, NW and SE Yunnan [Bhutan, NE India, Myanmar, Nepal, Sikkim].

- 1a. Leaf blade sparsely glandular setose on midvein abaxially, with 3 basal glands per side; pedicel 6–12 mm; corolla pink, 6–7 mm ..... 2a. var. *gaultheriifolium*  
1b. Leaf blade glabrous abaxially, with 1 basal gland per side; pedicel 4–5

mm; corolla red, 8–11 mm ..... 2b. var. *glaucorubrum*

**2a. *Vaccinium gaultheriifolium*** var. *gaultheriifolium*.

软骨边越桔(原变种) ruan gu bian yue ju (yuan bian zhong)

*Thibaudia gaultheriifolia* Griffith, Ic. Pl. Asiat. 4: t. 512. 1854; *Vaccinium diaphanoloma* Handel-Mazzetti.

Leaf blade abaxially sparsely glandular setose on midvein, with 3 basal glands per side. Pedicel 6–12 mm, in fruit to 1–1.7 cm. Corolla pink, 6–7 mm.

Forests, forest margins, sometimes epiphytic on trees; 1200–1900 m. SE Xizang, NW Yunnan [Bhutan, NE India, Myanmar, Nepal, Sikkim].

**2b. *Vaccinium gaultheriifolium*** var. *glaucorubrum* C. Y. Wu, Acta Bot. Yunnan. 9: 379. 1987.

粉花软骨边越桔 fen hua ruan gu bian yue ju

Leaf blade abaxially glabrous, with 1 basal gland per side. Pedicel 4–5 mm, in fruit to 7 mm. Corolla red, 8–11 mm.

• Thickets on stony mountain slopes, slopes; 1800–2600 m. SE Yunnan (Maguan, Malipo).

**3. *Vaccinium cavinerve*** C. Y. Wu, Acta Bot. Yunnan. 9: 379. 1987.

圆顶越桔 yuan ding yue ju

Shrubs evergreen, ca. 2 m tall, glabrous. Twigs rounded; bud scales caducous. Leaves borne towards ends of twigs; petiole 5–7 mm; leaf blade elliptic, 5–6.5 × 3–4 cm, thickly leathery, both surfaces punctate, secondary veins 6 or 7 pairs, fine veins inconspicuous abaxially, impressed adaxially, base broadly cuneate, decurrent, margin slightly revolute, entire, with 1 basal gland side, apex rounded. Inflorescences racemose, ca. 1.5 cm, many flowered; bracts oblong, ca. 3 cm, apex acute. Pedicel 1–1.5 mm. Hypanthium 1–1.5 mm; calyx lobes ovate, ca. 1 mm, apex acute. Corolla greenish purple, urceolate, ca. 3.5 mm, teeth triangular. Filaments ca. 0.6 mm, glabrous; anthers ca. 1.6 mm, with 2 erect spurs; tubules ca. as long as thecae. Immature berry globose. Fl. May.

Thickets; 1900–2600 m. SE Yunnan [N Vietnam].

**4. *Vaccinium impressinerve*** C. Y. Wu, Acta Bot. Yunnan. 9: 381. 1987.

凹脉越桔 ao mai yue ju

Shrubs evergreen, procumbent, sparsely branched. Twigs angled, pubescent; bud scales caducous. Leaves 1 or 2 at ends of twigs, subsessile; leaf blade ovate or elliptic, 4–8 × 2.5–4 cm, thickly leathery, glabrous or abaxially with sparse appressed hairs, midvein stout, secondary veins 4 pairs, subsessile, secondary and fine veins raised abaxially, impressed adaxially, base cuneate to broadly cuneate, margin plane, entire, with 1 basal gland per side, apex obtuse or emarginate. Inflorescences from defoliate axils, racemose, 1–2 cm, usually 3-flowered; bracts ca. 1 cm. Pedicel 1–1.7 cm, expanded towards apex, glabrous; bracteoles similar to bracts. Hypanthium glabrous; calyx lobes oblong, 4–6 mm. Corolla pinkish, campanulate, ca. 1.2 cm, glabrous; lobes broadly triangular. Filaments

ca. 3 mm, densely ciliate; anthers ca. 1 cm, with 2 erect spurs; tubules ca.  $2 \times$  as long as thecae. Berry globose, ca. 8 mm in diam. Fl. May–Jun, fr. Jul.

• Mossy places in evergreen forests on calcareous mountains; ca. 1700 m. SE Yunnan (Malipo, Xichou).

**5. *Vaccinium podocarpoideum*** W. P. Fang & Z. H. Pan, Acta Phytotax. Sin. 19: 107. 1981.

罗汉松叶乌饭 luo han song ye wu fan

Shrubs evergreen, 40–90 cm tall. Twigs angled, puberulous, glabrescent; bud scales inconspicuous. Leaves dense; petiole ca. 1.5 mm, glabrous; leaf blade linear-oblongate or linear-lanceolate, 2.5–3.2 cm  $\times$  3.5–8 mm, leathery, glabrous, secondary veins 3 pairs, fine veins inconspicuous, base cuneate, decurrent, margin slightly revolute, entire, with 1 basal gland per side, apex acute. Inflorescences at upper parts of branches, racemose, 4–5 cm, angled, glabrous, 5–7-flowered; bracts unknown. Pedicel 6–8 mm, glabrous, with a bloom. Flowers unknown. Immature berry globose, 4–5 mm in diam., with a bloom; persistent calyx lobes triangular, 1.5–2 mm, glabrous, apex acuminate. Fr. Jul.

• Thickets in wooded valleys, shrubby slopes; ca. 1100 m. Guangxi, Hunan.

**6. *Vaccinium foetidissimum*** H. Lévillé & Vaniot, Repert. Spec. Nov. Regni Veg. 9: 447. 1911.

臭越桔 xiu yue ju

*Anisophyllea cavaleriei* H. Lévillé.

Shrubs evergreen, 0.5–2.5 m tall, much branched, glabrous. Twigs angled; bud scales inconspicuous. Leaves scattered; petiole 2–5 mm; leaf blade oblanceolate or oblanceolate-ovate, 4–7  $\times$  1–2.2 cm, leathery, secondary veins 3(–5) pairs, strongly ascending, secondary and fine veins slightly raised abaxially, raised adaxially, base cuneate-attenuate, margin slightly revolute, entire, with 1 basal gland per side, apex acute, shortly acuminate, or obtuse. Inflorescences racemose, 2–6 cm, angled, many flowered; bracts unknown. Pedicel 5–8 mm. Flowers unknown. Berry 10-pseudoloculed, ovoid, 6–7 mm in diam., with a bloom, fetid; persistent calyx lobes ca. 2.8 mm. Fr. Aug–Oct.

• Forests; 900–1500 m. S Guizhou.

**7. *Vaccinium glaucophyllum*** C. Y. Wu & R. C. Fang, Acta Bot. Yunnan. 9: 381. 1987.

灰叶乌饭 hui ye wu fan

Shrubs evergreen, 0.5–3 m tall, much branched. Twigs angled, stout, densely pubescent. Leaves dense; petiole ca. 2 mm,  $\pm$  pubescent; leaf blade brownish abaxially, oblong-elliptic or elliptic, 1.8–2.5 cm  $\times$  5–9 mm, leathery, abaxially initially only midvein pubescent, adaxially glaucous, both surfaces early glabrescent, secondary veins 3 or 4 pairs, fine veins inconspicuous, base broadly cuneate, margin revolute, entire, with 1 basal gland per side, apex acute or shortly acuminate. Inflorescences racemose, 3–4 cm, angled, glabrous; flowers many, close; bracts unknown. Pedicel 3–4 mm, glabrous. Flowers un-

known. Immature berry 10-pseudoloculed, globose, glabrous; persistent calyx lobes triangular, 0.6–1 mm, glabrous. Fr. Jun.

• Dense forests; 1700–1800 m. SW Guizhou.

**8. *Vaccinium omeiense*** W. P. Fang, Icon. Pl. Omei. 1(1): t. 38. 1942.

峨眉越桔 e mei yue ju

Shrubs evergreen, occasionally epiphytic, 0.3–1(–4) m tall, much branched. Twigs angled, densely pubescent; bud scales inconspicuous. Leaves dense; petiole 1–3 mm,  $\pm$  pubescent; leaf blade elliptic or elliptic-oblong, 1.4–3.5  $\times$  0.8–1.4 cm, leathery, adaxially initially puberulent, glabrescent, secondary veins 2 or 3 pairs, ascending, slightly raised abaxially, inconspicuous adaxially, fine veins inconspicuous, base broadly cuneate, margin revolute, entire, with 1 basal gland per side, apex acute. Inflorescences axillary, racemose, 2.5–3 cm, glabrous, ca. 4-flowered; bracts caducous, red or tinged with yellow, elliptic, 5–7 mm, ciliate. Pedicel 2–3 mm, glabrous. Hypanthium dark red, ca. 1 mm, glabrous; calyx limb ca. 1 mm, divided nearly to base, teeth triangular. Corolla red or purplish, urceolate, 4–5 mm, glabrous; lobes recurved, ca. 0.6 mm. Filaments 1–1.5 mm, pubescent; anthers ca. 3 mm, with 2 erect spurs; tubules 1–2  $\times$  as long as thecae. Berry 10-pseudoloculed, subglobose, 5–6 mm in diam., glabrous. Fl. Jun–Jul, fr. Aug–Oct.

• Forests, occasionally epiphytic, rocks; 1800–2100 m. NE Guangxi, W Guizhou, C Sichuan, NE Yunnan.

**9. *Vaccinium pratense*** P. C. Tam ex C. Y. Wu & R. C. Fang, Acta Bot. Yunnan. 9: 383. 1987.

草地越桔 cao di yue ju

Shrubs evergreen. Twigs angled, densely pubescent, glabrescent; bud scales caducous. Leaves scattered; petiole stout, flattened, ca. 2 mm, densely pubescent; leaf blade elliptic or ovate-elliptic, 2.4–3.6  $\times$  1.3–2 cm, leathery, abaxially appressed-hairy, adaxially densely puberulent, secondary veins 3 or 4 pairs, base broadly cuneate to obtuse, margin slightly revolute or not, entire, with 2–5 basal glands per side, apex acute, shortly acuminate, or abruptly acuminate. Inflorescences from upper axils, racemose, 4.5–6.5 cm, with sparse claviform glandular hairs, 5–10-flowered; bracts caducous, ovate-lanceolate, 1.1–1.6 cm, glabrous. Pedicel 4–6 mm, thickened toward apex. Hypanthium glabrous; calyx lobes triangular, 2.5–3 mm. Corolla purple-red, campanulate, 6–7 mm, glabrous; lobes erect or recurved, ovate-triangular, 2–3 mm. Filaments ca. 3 mm, puberulent; anthers ca. 4 mm, with 2 spreading spurs; tubules ca. 2  $\times$  as long as thecae. Berry ca. 4 mm in diam. Fl. May, fr. Jul.

• Forests; 900–1000 m. Guangdong.

**10. *Vaccinium dunnianum*** Sleumer, Bot. Jahrb. Syst. 71: 447. 1941.

长穗越桔 chang sui yue ju

*Agapetes vaccinioides* Dunn, J. Linn. Soc., Bot. 35: 515. 31 Oct 1903, not *A. vaccinioides* H. Lévillé (Apr–May 1903).

Shrubs evergreen, rarely small trees, 1–5 m tall, occasionally epiphytic, sparsely branched, glabrous. Twigs terete, slender, slightly flexuous; bud scales inconspicuous. Leaves scat-

tered; petiole 1–2 mm, stout; leaf blade ovate-lanceolate, 9–19 × 2.5–5.5 cm, leathery, secondary veins 5–9, fine veins raised abaxially, impressed adaxially, base rounded to subcordate, margin slightly revolute or not, entire, basal glands absent, apex long acuminate or caudate. Inflorescences racemose, (3–)7–15 cm, many flowered; bracts caducous, ca. 1 mm. Pedicel 0.6–1.5 cm. Hypanthium ca. 0.6 mm; calyx lobes triangular, ca. 1 mm. Corolla yellow-green, tinged with purple, campanulate, 6–7 mm; lobes reflexed, ovate-triangular, ca. 2 mm. Filaments 1.5–3 mm, densely pubescent; anthers ca. 4 mm, with 2 spreading spurs; tubules 1.5–2 × as long as thecae. Berry 10-pseudoloculed, ca. 6 mm in diam. Fl. Apr–May, fr. Jun–Nov.

• Evergreen forests, sparse forests and thickets on calcareous mountains, occasionally epiphytic on trees; 1100–1800 m. W Guangxi, SE Yunnan.

**11. *Vaccinium crassivenium*** Sleumer, Notizbl. Bot. Gart. Berlin-Dahlem 12: 482. 1935.

网脉越桔 wang mai yue ju

Shrubs evergreen, 2–3 m tall, glabrous. Twigs narrowly angled; bud scales inconspicuous. Leaves scattered; petiole 1.5–2 cm, slender, glabrous; leaf blade oblong-lanceolate, 6–12 × 2–3.2 cm, leathery, secondary veins 6 pairs, ascending, fine veins distinctly raised on both surfaces, base broadly cuneate, margin slightly revolute, entire, with 1 or 2 basal glands per side, apex acuminate. Inflorescences axillary and terminal, racemose, 6.5–12 cm, many flowered; bracts caducous, lanceolate, 3–5 mm, margin serrulate. Pedicel 4–6 mm. Hypanthium ca. 0.6 mm; calyx lobes ovate-triangular, 0.7–1 mm. Corolla white, urceolate, 4–6 mm; lobes ca. 0.5 mm. Filaments ca. 1 mm, rust-colored puberulous; anthers ca. 1.5 mm, with 2 inconspicuous spurs; tubules ca. as long as thecae. Berry 10-pseudoloculed, globose, 5–6 mm in diam. Fl. Apr–May, fr. Jul.

• Forests, cliffs; 600–1400 m. E Guangxi.

**12. *Vaccinium supracostatum*** Handel-Mazzetti, Sinensia 5: 3. 1934.

凸脉越桔 tu mai yue ju

Shrubs evergreen, 0.7–2 m tall or small trees to 7 m tall, shortly branched. Twigs distinctly angled, initially pubescent, glabrescent; bud scales inconspicuous. Leaves rather dense; petiole flattened, 1.5–2 mm, pubescent; leaf blade obovate to elliptic, 3–4(–7) × 1.2–4 cm, leathery, abaxially glabrous, adaxially pubescent on midvein and secondary veins, secondary veins 5 or 6 pairs, strongly ascending, secondary and fine veins flat and inconspicuous abaxially, distinctly raised adaxially, base cuneate-attenuate, margin slightly recurved, entire, with 1(or 2) basal glands per side, apex shortly abruptly acuminate. Inflorescences racemose, 3–4 cm, glabrous or with glandular hairs, ca. 8-flowered; bracts and bracteoles caducous. Pedicel 3–4 mm, glabrous. Hypanthium ca. 1 mm, glabrous; calyx lobes triangular to ovate, 1.5–2 mm. Corolla virescent, tinged with purple, campanulate, ca. 5 mm, glabrous; lobes reflexed at apex, triangular, ca. 2 mm. Filaments 1–1.5 mm, laxly puberulent; anthers 3–8 mm, with 2 spreading spurs; tubules ca. 1.5 × as long as thecae. Berry 10-pseudoloculed, 4–5 mm in diam. Fl.

Jun, fr. Jul–Aug.

• Dense forests, thickets; 400–1700 m. N Guangxi, S Guizhou.

**13. *Vaccinium pseudobullatum*** W. P. Fang & Z. H. Pan, Acta Phytotax. Sin. 19: 108. 1981.

拟泡叶乌饭 ni pao ye wu fan

Shrubs evergreen, erect or scandent, ca. 3 m tall. Twigs subterete, lenticels many; bud scales inconspicuous. Leaves scattered; petiole 6–8 mm, glabrous; leaf blade elliptic or ovate, 11–17.5 × 5.5–9 cm, leathery, abaxially densely brownish glandular hairy, adaxially subglabrous, secondary veins 8–12 pairs, secondary and fine veins raised abaxially and strongly impressed adaxially, base rounded or broadly cuneate, margin revolute, entire, with 1 basal gland per side, apex abruptly acuminate or shortly caudate-acuminate. Inflorescence racemose, 1.5–3 cm, glabrous, 6–10-flowered; bracts caducous, obovate-spatulate, 1–1.2 cm. Pedicel 4–7 mm, glabrous. Hypanthium ca. 1.5 mm, glabrous; calyx lobes triangular-lanceolate, 4–6 mm, strongly veined. Corolla white to pink or dark red, campanulate, 8–10 mm, glabrous; lobes ovate-triangular, 2.5–4 mm. Filaments 1–1.5 mm, glabrous or pilose; anthers ca. 6 mm, with 2 spreading spurs; tubules 2–3 × as long as thecae. Immature berry 10-pseudoloculed, globose. Fl. Feb–Apr, fr. after May.

• Evergreen forests on calcareous mountains; 1000–1700 m. SE Yunnan.

**14. *Vaccinium petelotii*** Merrill, Univ. Calif. Publ. Bot. 13: 138. 1926.

大叶越桔 da ye yue ju

*Agapetes parviflora* Dunn.

Shrubs evergreen, erect or scandent, rarely epiphytic, 2–5 m tall, sparsely branched. Twigs angled, glabrous, when old strongly lenticellate; bud scales inconspicuous. Leaves scattered; petiole 3–6 mm, glabrous; leaf blade oblong or narrowly ovate, 14–21 × 4.5–8.5 cm, leathery, abaxially sparsely appressed-glandular pubescent, adaxially glabrous, secondary veins 9–12 pairs, ascending, raised abaxially, flat adaxially, base rounded to shallowly cordate, margin plane, entire, with 1 basal gland per side, apex acuminate or shortly caudate. Inflorescences racemose, ca. 3 cm, glabrous, 6- or 7-flowered; bracts unknown. Pedicel 0.9–1.2 cm. Hypanthium ca. 1.3 mm, glabrous; calyx limb divided nearly to base; calyx lobes triangular-ovate, ca. 3 mm, strongly veined. Corolla cream-colored, campanulate, 6–11 mm, glabrous; lobes spreading or reflexed, triangular, ca. 3 mm. Filaments ca. 0.5 mm, glabrous; anthers ca. 4 mm, with 2 spreading spurs; tubules ca. 3 × as long as thecae. Berry 10-pseudoloculed, dark red, globose, 6–9 mm in diam.; fruit stalk 1.5–2 cm. Fl. Sep–Oct, fr. after Nov–Aug of next year.

Evergreen forests often in ravines, rarely epiphytic on trees; 1100–1700 m. SE Yunnan [Vietnam].

**15. *Vaccinium dunalianum*** Wight, Calcutta J. Nat. Hist. 8: 175. 1847.

樟叶越桔 zhang ye yue ju

Shrubs evergreen, erect or occasionally scandent, 1–4 m tall or trees 3–17 m tall, sometimes epiphytic. Twigs narrowly angled, glabrous or pubescent; bud scales conspicuous, caducous. Leaves scattered; petiole 5–14 mm, glabrous to densely pubescent; leaf blade elliptic, oblong, oblong-lanceolate, or ovate, 4.5–13(–17) × 2–5.5(–8) cm, leathery to thickly leathery, abaxially sparsely appressed-glandular hairy, adaxially glabrous or pubescent on midvein, rarely densely dark punctate, secondary veins 3–9 pairs, conspicuous adaxially, sometimes conspicuous abaxially, fine veins inconspicuous or raised adaxially, base cuneate to obtuse, margin plane, entire, with 1 basal gland per side, apex caudate-acuminate. Inflorescences racemose, 3–7 cm, glabrous, 5–18-flowered; bracts caducous, ovate, 7–10 mm. Pedicel 5–8 mm. Hypanthium 1.2–1.5 mm, glabrous; calyx lobes triangular or lanceolate, 1–2.5 mm, glabrous or with hairs. Corolla virescent, purplish, or pinkish, broadly campanulate, ca. 6 mm, glabrous; lobes triangular, ca. 2 mm. Filaments ca. 1 mm, puberulous; anthers 3–3.5 mm, with 2 spreading spurs; tubules 1–2 × as long as thecae. Berry 10-pseudoloculed, dark purple with a bloom, 4–12 mm in diam. Fl. Apr–May, fr. Sep–Dec.

Forests, forest margins, sometimes epiphytic on trees, thickets, shrubby slopes, exposed rocky slopes, high mountains, calcareous mountains; (700–)1400–2700(–3100) m. Guangxi, Guizhou, Sichuan, Taiwan, Xizang, Yunnan [Bhutan, NE India, Myanmar, Nepal, Sikkim, Vietnam].

- 1a. Twigs, petioles, both surfaces of leaves on midvein sparsely or densely pubescent ..... 15b. var. *urophyllum*
- 1b. Twigs, petioles, both surfaces of leaves glabrous, or sometimes leaf abaxially sparsely appressed-glandular hairy, or sometimes petioles pubescent.
  - 2a. Leaf blade 10–17 × 4–8 cm; a shrub or twining shrub, rarely a tree ..... 15c. var. *megaphyllum*
  - 2b. Leaf blade 4.5–13 × 2–5 cm; a shrub, rarely scandent.
    - 3a. Leaf blade 4.5–13 × 2.5–5 cm; calyx lobes ca. 1 mm, triangular ..... 15a. var. *dunalianum*
    - 3b. Leaf blade 5–11 × 2.5–3.5 cm; calyx lobes ca. 2.5 mm, lanceolate ..... 15d. var. *caudatifolium*

**15a. *Vaccinium dunalianum* var. *dunalianum***

樟叶越桔(原变种) zhang ye yue ju (yuan bian zhong)

*Epigynium dunalianum* (Wight) Klotzsch; *Thibaudia revoluta* Griffith.

Twigs, petioles, both surfaces of leaves glabrous, sometimes abaxially sparsely appressed-glandular hairy. Leaf blade 4.5–13 × 2.5–5 cm. Calyx lobes triangular, 0.8–1 mm.

Dense or sparse forests, forests and thickets of calcareous mountains, rarely epiphytic on trees, thickets at roadsides, shrubby dry slopes; (700–)2000–2700(–3100) m. Guangxi, Guizhou, Sichuan, Xizang, Yunnan [Bhutan, NE India, Myanmar, Nepal, Sikkim, Vietnam].

**15b. *Vaccinium dunalianum* var. *urophyllum*** Rehder & E. H. Wilson in Sargent, Pl. Wilson. 1: 560. 1913.

尾叶越桔 wei ye yue ju

*Pieris martini* H. Léveillé; *Vaccinium camphorifolium* Handel-Mazzetti; *V. dunalianum* var. *calycinum* Dop; *V. dopii* Copeland; *V. loquihense* Dop & Trochain–Marquès; *V. petelotii* Dop (1930), not Merrill (1926); *V. sangtavanense* Dop & Trochain–Marquès; *V. yersinii* A. Chevalier.

Twigs, petioles, midvein of leaves on both surfaces pubescent. Leaf blade 6–12.7 × 2–4.7 cm. Calyx lobes 1.5–2.2 mm.

Evergreen forests, mixed forests, sometimes epiphytic on trees, shrubby slopes, calcareous mountains; 1400–2700(–3100) m. Guizhou, Xizang, Yunnan [Myanmar, C and N Vietnam].

**15c. *Vaccinium dunalianum* var. *megaphyllum*** Sleumer, Bot. Jahrb. Syst. 71: 448. 1941, excl. *C. W. Wang 66945*.

大樟叶越桔 da zhang ye yue ju

*Vaccinium lincangense* W. P. Fang & Z. H. Pan.

Shrubs, sometimes subscandent. Twigs and petioles usually glabrous. Leaf blade 10–17 × (2.8–)4–8 cm, both surfaces usually glabrous. Calyx lobes ca. 0.9 mm.

• Mossy forests, mixed forests on calcareous mountains, sometimes epiphytic on *Quercus*; 1400–2500 m. W Guizhou, SE and W Yunnan.

**15d. *Vaccinium dunalianum* var. *caudatifolium*** (Hayata) H. L. Li, Woody Fl. Taiwan, 700. 1963.

长尾叶越桔 chang wei ye yue ju

*Vaccinium caudatifolium* Hayata, Icon. Pl. Formos. 3: 127. 1913.

Twigs and petioles pubescent or glabrous. Leaf blade 5–11 × 1.8–3.5 cm, glabrous. Calyx lobes lanceolate, 2.2–2.5 mm.

• Broad-leaved forest margins, sometimes epiphytic on trees, high mountains, exposed rocky slopes; 1600–2300 m. Taiwan.

**16. *Vaccinium pseudorobustum*** Sleumer, Bot. Jahrb. Syst. 71: 451. 1941.

椭圆叶越桔 tuo yuan ye yue ju

Shrubs scandent or small trees, evergreen, sparsely branched. Twigs angled, densely pubescent; bud scales inconspicuous. Leaves scattered; petiole 2–3 mm, glabrous or pubescent; leaf blade elliptic or ovate-oblong, 5–8(–10) × 3–4(–5) cm, leathery, abaxially appressed-glandular hairy or glabrous, adaxially glabrous or initially pubescent on midvein, secondary veins 3 or 4 pairs, fine veins ± raised abaxially, strongly raised adaxially, base broadly cuneate, decurrent, margin slightly recurved, entire, with 2 basal glands per side, apex shortly caudate or abruptly shortly acuminate for ca. 1 cm. Inflorescences racemose, 3–5 cm, angled, glabrous, 10- to many flowered; bracts caducous. Pedicel 4–5 mm, stout. Hypanthium ca. 1.3 mm, glabrous; calyx lobes triangular, ca. 2 mm. Corolla greenish white, campanulate, ca. 7 mm, glabrous; lobes reflexed, triangular, ca. 2.5 mm. Filaments ca. 2 mm, pubescent; an-

thers ca. 4 mm, with 2 spurs; tubules ca. 3 × as long as thecae. Berry 10-pseudoloculed, 5–6 mm in diam. Fl. Jun, fr. Jul–Oct.

- Forests, rocky mountains; 1300–1700 m. Guangdong, Guangxi.

**17. *Vaccinium chunii*** Merrill ex Sleumer, Bot. Jahrb. Syst. 71: 450. 1941.

蓝果越桔 lan guo yue ju

Shrubs evergreen, 1–2 m tall, sparsely branched. Twigs angled, glabrous; bud scales inconspicuous. Leaves scattered; petiole 0.5–1 cm; leaf blade ovate, broadly ovate, or suborbicular, 5–7 × 3–4.5 cm, thickly leathery, abaxially papillate, with short fulvous hairs, adaxially glabrous, secondary veins 6 or 7 pairs, ascending, slender, inconspicuous abaxially, raised adaxially, fine veins not evident, base broadly cuneate, truncate, or rounded, margin slightly revolute, entire, with 1 or 2 basal glands per side, apex abruptly caudate-acuminate. Inflorescences racemose, 2.5–4 cm, stout, angled, glabrous, 5–9-flowered; bracts caducous, lanceolate, ca. 9 mm. Pedicel ca. 3 mm, stout. Hypanthium ca. 1.5 mm; calyx lobes lanceolate, 2–2.5 mm, apex acuminate. Corolla greenish white, urceolate to campanulate, 3.5–6 mm, glabrous; lobes reflexed at apex, ovate, ca. 1.8 mm. Filaments ca. 1.3 mm, puberulent; anthers ca. 4 mm, with 2 spurs; tubules ca. 2 × as long as thecae. Berry 10-pseudoloculed, dark blue with a bloom, ca. 5 mm in diam.; pedicel 4–5 mm. Fl. Mar–May, fr. Sep–Dec.

Dense forests, rocks in forests; 1200–1400 m. Hainan [Vietnam].

**18. *Vaccinium arbutoides*** C. B. Clarke in J. D. Hooker, Fl. Brit. India 3: 453. 1882.

草莓树状越桔 cao mei shu zhuang yue ju

Shrubs epiphytic, 0.6–1 m tall, sparsely branched. Twigs subangled, glabrous, with scattered lenticels; bud scales inconspicuous. Leaves scattered; petiole 6–9 mm, stout, densely shortly strigose; leaf blade oblong or elliptic, 8–13 × 3–5 cm, leathery, abaxially densely glandular pubescent, adaxially glabrous, secondary veins 5 or 8 pairs, ascending, secondary and fine veins raised abaxially, flat adaxially, base broadly cuneate, margin plane, entire, with 1 basal gland per side, apex shortly caudate-acuminate. Inflorescences racemose, 1.5–3 cm, densely brownish tomentellate, many flowered; bracts caducous. Pedicel 1–3 mm, densely tomentellate. Hypanthium densely strigose; calyx lobes narrowly triangular, ca. 2.5 mm, densely ciliate. Corolla not known. Filaments ca. 1.5 mm, pilose; anthers ca. 1.5 mm, with 2 spreading spurs, tubules ca. 1/2 as long as thecae and ca. as long as spurs. Berry 10-pseudoloculed, red to dark purple, globose, 6–7 mm in diam., densely hairy. Fr. Nov.

Forests, epiphytic on old tree stumps; ca. 2500 m. S Xizang, NW Yunnan [NE India, Myanmar].

**19. *Vaccinium brachyandrum*** C. Y. Wu & R. C. Fang, Acta Bot. Yunnan 9: 383. 1987.

短蕊越桔 duan rui yue ju

Shrubs evergreen, scandent. Twigs angled, pubescent or subglabrous; bud scales caducous. Leaves scattered; petiole 0.8–1 cm, stout, pubescent or subglabrous; leaf blade ovate-

elliptic, 8.5–11 × 4–6 cm, leathery, abaxially appressed-glandular pubescent, adaxially glabrous, secondary veins 6 or 7 pairs, subascending, secondary and fine veins raised abaxially, impressed adaxially, base rounded, margin plane, entire, with broad, cartilaginous edge, with 1 basal gland per side, apex shortly caudate-acuminate. Inflorescences racemose, 1.5–3.5 cm, angled, glandular pubescent, many flowered; bracts caducous, ovate, 3–4 mm. Pedicel ca. 2 mm, glandular pubescent. Hypanthium glabrous; calyx lobes ovate-triangular, ca. 2 mm, ciliate. Corolla urceolate, ca. 4 mm, glabrous; lobes triangular. Filaments ca. 0.5 mm, glabrous; anthers ca. 2 mm, with 2 erect spurs; tubules ca. as long as thecae. Ripe berry unknown. Fl. May.

- About 2700 m. W Yunnan (Tengchong).

**20. *Vaccinium kachinense*** Brandis, Ind. Trees, 406. 1921.

卡钦越桔 ka qin yue ju

Shrubs evergreen, 0.5–4 m tall, with inflated root tubers, sparsely branched. Twigs angled, glabrous, scattered; bud scales persistent, lanceolate, 1–1.4 cm. Leaves weakly pseudoverticillate; petiole 4–5 mm, stout, glabrous; leaf blade lanceolate or oblong-lanceolate, 7–15(–17) × 2–5 cm, leathery, glabrous, secondary veins 7–13 pairs, slender, strongly raised abaxially, raised adaxially, base cuneate, margin slightly recurved, entire, with 1 subbasal gland per side, apex acute-acuminate. Inflorescences racemose, 3–5 cm, densely puberulent, with persistent bud scales, many flowered; bracts unknown. Pedicel 1–1.4 cm, slender, puberulent. Hypanthium ca. 1.3 mm, densely puberulent; calyx limb triangular-lanceolate, 1–1.8 mm, divided nearly to base, densely puberulent. Corolla pinkish, urceolate, ca. 5 mm, puberulent; lobes reflexed, ca. 1 mm. Filaments 1–2 mm, densely pubescent; anthers 2.5–3.5 mm, with 2 inconspicuous spurs; tubules ca. 2 × longer than thecae. Berry 10-pseudoloculed, globose, ca. 6 mm in diam. Fl. Mar, fr. May.

Evergreen forests, *Pinus* and *Quercus* forests, rocky slopes; 2100–2600 m. W Yunnan [Myanmar].

**21. *Vaccinium pseudospadiceum*** Dop in Lecomte, Fl. Indo-Chine 3: 705. 1930.

耳叶越桔 er ye yue ju

Shrubs evergreen, ca. 2 m tall, sparsely branched. Twigs terete, spreading pubescent, glabrescent; bud scales inconspicuous. Leaves scattered; petiole ca. 1 mm, strigose; leaf blade ovate to cordate, 8–12 × 3.5–5.5 cm, thinly leathery, abaxially sparsely strigose on midvein, adaxially glabrous, secondary veins ca. 10 pairs, fine veins raised on both surfaces, base cordate or obtuse, sometimes auriculate, margin plane, entire, apex acuminate to 2.5 cm. Inflorescences racemose, 1(–3) from same axil, 3.5–8 cm, densely spreading pubescent, 3–8-flowered; bracts triangular, 1–2 mm. Pedicel 5–8 mm, indumentum as with rachis. Hypanthium ca. 1 mm, densely pubescent; calyx lobes triangular, 2–4 mm, glabrous or with hairs. Corolla greenish, broadly campanulate, ca. 5.5 mm, glabrous; lobes reflexed, triangular. Filaments ca. 2 mm, pubescent; anthers ca. 3 mm, with 2 falcate spurs; tubules ca. 2.5 × as long as thecae. Ripe

fruit unknown. Fl. May.

Evergreen valley forests. SE Yunnan [N Vietnam].

**22. *Vaccinium urceolatum*** Hemsley, J. Linn. Soc., Bot. 26: 16. 1889.

红花越桔 hong hua yue ju

Shrubs or small trees, evergreen, (0.4–)1–5 m tall, occasionally epiphytic, sparsely branched. Twigs angled, pubescent; bud scales inconspicuous. Leaves scattered; petiole 2–3 mm, pubescent; leaf blade ovate to oblong, 6–13 × 2.5–5.5 cm, leathery, both surfaces initially pubescent or glabrescent, abaxially persistently pubescent, adaxially subglabrescent, secondary veins 2–5 pairs, strongly ascending, evident on both surfaces, fine veins inconspicuous or evident on both surfaces, base rounded to slightly cordate, margin slightly revolute, entire, apex ± abruptly acuminate to 2 cm. Inflorescences racemose, 3–5(–9) cm, glabrous or pubescent, many flowered; bracts caducous, broadly ovate, 6–8 mm, ciliate. Pedicel 2–6 mm, glabrous or pubescent. Calyx ca. 1 mm, glabrous; lobes triangular, 1–1.5 mm. Corolla pinkish or yellow-green, tinged with pink, urceolate or campanulate, 4–5 mm; lobes recurved, ca. 2 mm. Filaments ca. 1 mm, with sparse hairs; anthers 3–4 mm, with 2 erect spurs; tubules 1.5–2 × as long as thecae. Berry 10-pseudoloculed, dark purple, 4–6 mm in diam. Fl. May–Jul, fr. Jun–Sep.

• Forests, rocks in forests, occasionally epiphytic on trees, thickets; 700–2000 m. SE Guizhou, C and S Sichuan, NE Yunnan.

- 1a. Inflorescence axis 3–5 cm, inflorescence axis, pedicels, and berry glabrous ..... 22a. var. *urceolatum*
- 1b. Inflorescence axis 5–9 cm, inflorescence axis, pedicels, and berry densely pubescent ..... 22b. var. *pubescens*

**22a. *Vaccinium urceolatum* var. *urceolatum***

红花越桔(原变种) hong hua yue ju (yuan bian zhong)

Inflorescence axis 3–5 cm, inflorescence axis, pedicels, and berry glabrous.

• *Quercus* forests, thickets; 700–2000 m. C and S Sichuan, NE Yunnan.

**22b. *Vaccinium urceolatum* var. *pubescens*** C. Y. Wu & R. C. Fang, Acta Bot. Yunnan. 9: 384. 1987.

毛序红花越桔 mao xu hong hua yue ju

Inflorescence axis 5–9 cm, inflorescence axis, pedicels, and berry densely pubescent.

• Forests, rocks in forests, occasionally epiphytic on trees; 1600–1800 m. NE Yunnan (Daguan).

**23. *Vaccinium bullatum*** (Dop) Sleumer, Bot. Jahrb. Syst. 71: 446. 1941.

泡泡叶越桔 pao pao ye yue ju

*Agapetes bullata* Dop in Lecompte, Fl. Indo-Chine 3: 700. 1930.

Shrubs evergreen, ca. 2 m tall, sparsely branched. Twigs angled, slender, densely puberulous, with many brownish len-

ticels; bud scales inconspicuous. Leaves scattered; petiole 1–2 mm, puberulous; leaf blade ovate or narrowly ovate, 9–16 × 5–8 cm, leathery, subglabrous, secondary veins 7 or 8 pairs, ± ascending, secondary and fine veins distinctly raised abaxially, distinctly impressed adaxially, base rounded, margin slightly revolute, entire, with 1 basal gland per side, apex acute to acuminate. Inflorescences racemose, 5–8 cm, puberulous; bracts triangular, ca. 2 mm. Pedicel 6–9 mm, puberulous, expanded towards apex. Flowers unknown. Immature berry 10-pseudoloculed, ca. 7 mm in diam.; persistent calyx lobes lanceolate, 2–3 mm, puberulous. Fr. Sep.

Forests on calcareous mountains. W Guangxi [Vietnam].

**24. *Vaccinium randaiense*** Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 168. 1911.

畲大越桔 shan da yue ju

*Vaccinium bracteatum* Thunberg var. *lanceolatum* Nakai; *V. hancockiae* Merrill.

Shrubs evergreen, 3–6 m tall, much branched, glabrous. Twigs subrounded; bud scales inconspicuous. Leaves scattered; petiole 4–8 mm; leaf blade lanceolate-rhombic, lanceolate-oblong, or lanceolate, 3–7 × 1.5–2 cm, leathery, glabrous, secondary veins 5 or 6 pairs, not ascending, fine veins raised abaxially, less obvious adaxially, base broadly cuneate, margin plane, conspicuously to inconspicuously toothed or subentire, apex acuminate for ca. 1 cm. Inflorescences pseudoterminal, racemose, (1–)3–4.5 cm, angled, glabrous, ca. 10-flowered; bracts lanceolate, 4–5 mm, glabrous; bracteoles unknown. Pedicel 1–2 mm, glabrous. Hypanthium ca. 0.7 mm, glabrous; calyx lobes triangular, 0.8–1 mm, glabrous. Corolla white, tubular, 5.5–7.5 mm, glabrous; lobes triangular, ca. 0.5 mm. Filaments ca. 2 mm, villous; anthers 2.5–3 mm, without spurs, tubules ca. 2 × as long as thecae. Berry 10-pseudoloculed, dark purple, 5–6 mm in diam.; fruit stalk ca. 2 mm, glabrous. Fl. Jul–Aug, fr. Aug–Oct.

Mountain forests, forest margins; 400–900(–2500) m. N Guangdong, Guangxi, C Guizhou, Hunan, Taiwan [Japan].

**25. *Vaccinium kengii*** C. E. Chang, Bull. Taiwan Inst. Agric. 10: 54. 1969.

鞍马山越桔 an ma shan yue ju

Trees small. Twigs slender. Leaves scattered; petiole ca. 8 mm, pilose; leaf blade ovate-lanceolate, 6.5–7 × 1.8–2.2 cm, leathery, both surfaces glabrous, secondary veins 7 pairs, inconspicuous adaxially, base obtuse or acute, margin crenulate-serrate, apex long acuminate or cuspidate-acuminate. Inflorescences racemose, terminal or pseudoterminal, 5–6 cm, glabrous; bracts lanceolate, margin crenulate, ca. 6 mm. Pedicel ca. 7 mm, glabrous. Hypanthium cup-shaped; calyx lobes triangular, slightly ciliate, apex acute. Corolla campanulate, ca. 5 × 6 mm, glabrous; lobes obtuse, ca. 3 mm. Filaments ca. 0.8 mm, villous; anthers ca. 1.2 mm, with 2 very short spurs; tubules 0.8–1 mm. Immature berry 10-pseudoloculed. Fl. Aug.

• Forests; 1600–2300 m. C and N Taiwan (Taizhong, Taoyuan, Yilan).

The above description follows that in the protologue.

**26. *Vaccinium subfalcatum*** Merrill ex Sleumer, Bot. Jahrb. Syst. 71: 475. 1941.

镰叶越桔 *lian ye yue ju*

Shrubs or small trees, evergreen, 2–5(–7) m tall, glabrous. Twigs subangled; bud scales inconspicuous. Leaves scattered; petiole 2–3 mm; leaf blade narrowly lanceolate or elliptic-lanceolate, 4–11 × 1–2(–3) cm, thinly leathery, secondary veins 7 or 8 pairs, ascending, secondary and fine veins raised abaxially, flat to impressed or inconspicuous adaxially, base cuneate-attenuate, margin plane, serrate, apex long acuminate or subfalcate. Inflorescences axillary and terminal, racemose, 4–6 cm, slender, angled, ca. 10-flowered; bracts ovate-lanceolate or oblong-lanceolate, 0.8–1.5 cm × ca. 2.5 mm, margin shortly glandular hairy. Pedicel 4–6 mm. Flowers fragrant. Hypanthium ca. 1.3 mm, densely pubescent; calyx lobes narrowly triangular, 2–2.5 mm, glabrous. Corolla white, tubular, ca. 8 mm, puberulous; lobes reflexed, ca. 0.6 mm. Stamens ca. 6 mm, densely hairy; anthers ca. 1 mm with 2 short spurs; tubules ca. as long as thecae, 1.5–2 mm. Berry 10-pseudoloculed, dark purple, pubescent, 5–6 mm in diam. Fl. May, fr. Oct.

Forests, thickets, rocky slopes; (100–)300–900 m. SW Guangdong, S Guangxi [N Vietnam].

**27. *Vaccinium hainanense*** Sleumer, Bot. Jahrb. Syst. 71: 469. 1941.

海南越桔 *hai nan yue ju*

Shrubs evergreen, glabrous. Twigs terete, slightly angled; bud scales inconspicuous. Leaves scattered; petiole 6–8 mm; leaf blade oblong-elliptic or obovate, 4–6 × 2–3 cm, leathery, secondary veins 5 or 6 pairs, secondary and fine veins abaxially raised, adaxially flat, base cuneate-attenuate, slightly decurrent, margin plane, entire, without basal glands, apex obtuse or abruptly obtuse-acute. Inflorescences racemose, 4–6 cm, angled, many flowered; bracts unknown. Pedicel 2.5–5 mm. Flower unknown. Berry 10-pseudoloculed, red, globose, ca. 5 mm in diam. Fr. Jun–Oct.

• Forests on mountain summits. NE Hainan (Ding’an).

**28. *Vaccinium wrightii*** Gray, Mem. Amer. Acad. Arts Sci., n.s., 6: 398. 1858–1859.

海岛越桔 *hai dao yue ju*

Shrubs or small trees, evergreen, 4–5 m tall. Twigs subterete, glabrous or sparsely pubescent; bud scales inconspicuous. Leaves scattered; petiole 1–2 mm, puberulous or glabrous; leaf blade ovate, elliptic, elliptic-lanceolate, oblong, or rhombic-oblong, (1.5–)2–5 × (1–)1.5–2.5 cm, thickly leathery, glabrous, secondary veins 3 or 4 pairs, base cuneate to broadly cuneate to suborbicular, margin serrate, apex acute to acuminate. Inflorescences pseudoterminal, racemose, ca. 7 cm, glabrous; bracts persistent, leaflike, 2–5 mm. Pedicel 5–10 mm. Calyx glabrous; lobes triangular. Corolla urceolate to campanulate-tubular, 5–7 mm, glabrous. Filaments pilose at base; anthers with 2 spurs on back. Berry ca. 6 mm in diam.; fruit stalk 1–1.5 cm.  $2n = 24^*$ .

Forests, near coasts; 600–1600 m. Taiwan [Japan (including Ryukyu Islands)].

kyu Islands)].

- 1a. Leaves elliptic or elliptic-lanceolate, 3–5 × 1.5–2.5 cm; a small tree ..... 28a. var. *wrightii*
- 1b. Leaves elliptic, 1.5–2 × 1–1.3 cm; a shrub ..... 28b. var. *formosanum*

**28a. *Vaccinium wrightii* var. *wrightii***

海岛越桔(原变种) *hai dao yue ju* (yuan bian zhong)

*Vaccinium bracteatum* Thunberg var. *wrightii* (Gray) Rehder & E. H. Wilson.

Trees small. Leaves elliptic or elliptic-lanceolate, 3–5 × 1.5–2.5 cm.

Near coasts; 600–1600 m. Taiwan [Japan (including Ryukyu Islands)].

**28b. *Vaccinium wrightii* var. *formosanum*** (Hayata) H. L. Li, Woody Fl. Taiwan, 704. 1963.

长柄海岛越桔 *chang bing hai dao yue ju*

*Vaccinium formosanum* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 167. 1911; *V. bracteatum* Thunberg var. *formosanum* (Hayata) S. S. Ying.

Shrubs small. Leaves elliptic, 1.5–2 × 1–1.5 cm.

• Forests; ca. 1600 m. E Taiwan.

**29. *Vaccinium truncatocalyx*** Chun ex W. P. Fang & Z. H. Pan, Acta Phytotax. Sin. 19: 112. 1981.

平萼乌饭 *ping e wu fan*

Shrubs or small trees, evergreen, 2.6–8 m tall. Twigs narrowly angled, glabrous; bud scales inconspicuous. Leaves scattered; petiole 3–4 mm, glabrous; leaf blade elliptic or oblong-elliptic, 3–5 × 1.2–1.5 cm, thinly leathery, glabrous, secondary veins 5 or 6 pairs, base broadly cuneate, margin plane, inconspicuously dentate, apex acuminate. Inflorescences pseudoterminal, racemose, 1.5–2 cm, densely pubescent; bracts caducous. Pedicel 1.5–2 mm, densely pubescent. Hypanthium ca. 1.4 mm, densely pubescent; calyx lobes obsolete. Corolla purple, tubular-urceolate, 4.5–5 mm, densely pubescent; lobes reflexed, triangular. Filaments ca. 2 mm, slender, densely pubescent; anthers ca. 0.5 mm, without spurs; tubules ca. 3 × as long as thecae. Berry unknown. Fl. Jul.

• Forests. W Guangdong (Xinyi).

**30. *Vaccinium bracteatum*** Thunberg in Murray, Syst. Veg., ed. 14, 363. 1784.

南烛 *nan zhu*

Shrubs or small trees, evergreen, 2–6(–9) m tall, much branched. Twigs inconspicuously angled, pubescent or glabrous; bud scales inconspicuous. Leaves scattered; petiole 2–8 mm, puberulous or glabrous; leaf blade elliptic, rhombic- or lanceolate-elliptic, or lanceolate, rarely obovate, (1.1–)4–9 × (0.7–)2–4 cm, thinly leathery, glabrous, secondary veins 5–7 pairs, barely raised, fine veins conspicuous or not, base cuneate, broadly cuneate, or obtuse, margin plane, denticulate, apex

acute, acuminate, rarely rounded or long acuminate. Inflorescences pseudoterminal, racemose, 4–10 cm, densely pubescent, rarely glabrous, many flowered; bracts persistent or caducous, leaflike, lanceolate, 0.5–2 cm. Pedicel ca. 4 mm, densely pubescent or subglabrous. Hypanthium densely pubescent or tomentellate, rarely subglabrous; calyx limb ca. 1 mm, triangular-toothed. Corolla white, rarely reddish, tubular or slightly urceolate, 5–7 mm, densely pubescent; lobes reflexed, triangular. Filaments 2–2.5 mm, densely pilose; anthers 2–2.5 mm, without spurs; tubules 2–2.5 × as long as thecae. Berry 10-pseudoloculed, dark purple, pubescent. Fl. Jun–Jul, fr. Aug–Oct.

Forests, thickets, grassy places at roadsides; 400–1500(–1900) m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [Cambodia, Indonesia, S Japan, Korea, Laos, Malaysia, Thailand, Vietnam].

This species is used medicinally and to stain cooked rice.

- 1a. Corolla reddish, corolla tube 2–3 mm in diam. .... 30d. var. *rubellum*
- 1b. Corolla white, corolla tube 3–4 mm in diam.
  - 2a. Leaf blade 4–9 × 2–4 cm ..... 30a. var. *bracteatum*
  - 2b. Leaf blade 1–4 × 0.7–1.4 cm.
    - 3a. Leaf blade rhombic-elliptic or lanceolate-elliptic, apex acuminate, 1.1–4 × 0.7–1.4 cm ..... 30b. var. *chinense*
    - 3b. Leaf blade obovate, apex rounded, 1.2–1.4 × ca. 0.9 cm ..... 30c. var. *obovatum*

**30a. Vaccinium bracteatum** var. **bracteatum**

南烛(原变种) nan zhu (yuan bian zhong)

*Acosta spicata* Loureiro; *Pieris divaricata* H. Léveillé; *P. lucida* H. Léveillé; *P. ovalifolia* (Wallich) D. Don var. *denticulata* H. Léveillé; *Vaccinium bracteatum* var. *longitubum* Hayata; *V. malaccense* Wight; *V. spicatum* (Loureiro) Poiret.

Plants glabrous or hairy. Leaf blade 4–9 × 2–4 cm, apex acute to acuminate. Corolla white; tube 3–4 mm in diam.

Forests, thickets; 400–1400(–1900) m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [Cambodia, Indonesia, S Japan, Korea, Laos, Malaysia, Thailand, Vietnam].

**30b. Vaccinium bracteatum** var. **chinense** (Loddiges) Chun ex Sleumer, Bot. Jahrb. Syst. 71: 474. 1941.

小叶南烛 xiao ye nan zhu

*Andromeda chinensis* Loddiges, Bot. Cab. 17: t. 1648. 1831; *Vaccinium chinense* (Loddiges) Champion.

Plants subglabrous. Leaf blade rhombic-elliptic or lanceolate-elliptic, 1.1–4 × 0.7–1.4 cm, apex acuminate or acute. Corolla white; tube 3–4 mm in diam.

• Forests, thickets; 800–1500 m. Fujian, Guangdong, S Guangxi.

**30c. Vaccinium bracteatum** var. **obovatum** C. Y. Wu & R. C. Fang, Acta Bot. Yunnan. 9: 385. 1987.

倒卵叶南烛 dao luan ye nan zhu

Plants glabrous or subglabrous. Leaf blade obovate, 1.2–1.4 × ca. 0.9 cm, apex rounded. Corolla white; tube 3–4 mm in

diam.

• Grassy places at roadsides. SE Guangdong (Haifeng).

**30d. Vaccinium bracteatum** var. **rubellum** P. S. Hsu et al., Acta Bot. Yunnan. 11: 319. 1989.

淡红南烛 dan hong nan zhu

Leaf blade elliptic, rhombic-elliptic, or obovate. Corolla reddish; tube 2–3 mm in diam.

• Thickets. Jiangxi, Zhejiang.

**31. Vaccinium fimbribracteatum** C. Y. Wu, Acta Bot. Yunnan. 9: 385. 1987.

齿苞越桔 chi bao yue ju

Shrubs evergreen, 1–1.5(–4) m tall, much branched. Twigs terete, densely pubescent; bud scales inconspicuous. Leaves scattered; petiole 2–3 mm, densely fulvous pubescent; leaf blade elliptic-lanceolate, 3.5–5 × 1.3–1.8 cm, leathery, pubescent only on midvein, or abaxially glabrous, secondary veins ca. 7 pairs, fine veins slightly raised abaxially, inconspicuous adaxially, base broadly cuneate to rounded, margin plane, serrate, apex acuminate. Inflorescences racemose, 7–12 cm, pubescent, many flowered; bracts persistent, ovate to lanceolate, 6–10 mm, margin persistently glandular fimbriate, apex subulate. Pedicel reddish, 2–5 mm, glabrous. Hypanthium glabrous; calyx lobes triangular, 1–1.5 mm, fimbriate. Corolla white or pinkish, tubular, 7–8 mm, glabrous; lobes reflexed, triangular. Filaments ca. 2.5 mm, pilose; anthers ca. 1.5 mm with 2 erect spurs; tubules ca. 2 × as long as thecae. Fruit unknown. Fl. Apr–May.

• Forests on slopes; 900–1200 m. N Guizhou, E Sichuan.

**32. Vaccinium carlesii** Dunn, J. Linn. Soc., Bot. 38: 361. 1908.

短尾越桔 duan wei yue ju

Shrubs or small trees, evergreen, 1–3(–6) m tall, much branched. Twigs slightly angled, pubescent, glabrescent; bud scales inconspicuous. Leaves dense; petiole 1–5 mm, puberulous or subglabrous; leaf blade ovate-lanceolate or narrowly ovate, 2–7 × 1–2.5 cm, leathery, abaxially glabrous, adaxially densely puberulous on midvein, otherwise glabrous, secondary veins ca. 6 pairs and fine veins inconspicuous on both surfaces, base rounded or broadly cuneate, rarely cuneate, margin plane, serrate, apex acuminate. Inflorescences racemose, 2–3.5 cm, slender, pubescent or glabrous, 6–15-flowered; bracts persistent or sometimes caducous, lanceolate, 2–5(–13) mm. Pedicel ca. 2 mm, glabrous. Hypanthium ca. 0.7 mm, glabrous; calyx lobes triangular, 0.8–1.3 mm. Corolla white, broadly campanulate, 3–5 mm; lobes reflexed, ovate-triangular, 0.7–1.5 mm. Filaments 1–1.5 mm, pilose; anthers 1.5–2 mm, with 2 inconspicuous spurs; tubules 1/2–2/3 as long as thecae. Berry 10-pseudoloculed, dark purple, globose, glabrous, with a bloom. Fl. May–Jun, fr. Aug–Oct.

• Evergreen forests, sparse forests, thickets; 300–800(–1200) m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hunan, Jiangxi, Zhejiang.

**33. Vaccinium yaoshanicum** Sleumer, Notizbl. Bot. Gart. Ber-

lin-Dahlem 12: 483. 1935.

瑶山越桔 yao shan yue ju

*Vaccinium yaoshanicum* var. *megaphyllum* C. Y. Wu & R. C. Fang.

Shrubs or small trees, evergreen, to 13 m tall, glabrous. Twigs terete; bud scales inconspicuous. Leaves scattered; petiole 1–2 cm; leaf blade ovate-elliptic or oblong-lanceolate, 9–18 × 2.2–9 cm, thinly leathery, secondary veins ca. 7 pairs, fine veins raised abaxially or inconspicuous, base broadly cuneate, margin plane, entire, sparsely glandular dentate, apex acuminate or long acuminate to 4 cm. Inflorescences racemose, (2–)4–8 (–10) cm, many flowered; bracts ca. 3 mm. Pedicel 3–6 mm. Hypanthium ca. 1 mm; calyx lobes ca. 1 mm, sparsely ciliate. Corolla white, campanulate, 3.4–4 mm; lobes reflexed, ovate-triangular, ca. 2 mm. Filaments ca. 1 mm, puberulous; anthers 2–2.5 mm, with 2 short spurs; tubules ca. as long as thecae. Berry 5-loculed, dark purple, globose, ca. 5 mm in diam. Fl. May–Jun, fr. Jul–Sep.

- Forests, thickets; 900–1000 m. W Guangdong, E Guangxi.

**34. *Vaccinium harmandianum*** Dop in Lecompte, Fl. Indo-Chine 3: 709. 1930.

长冠越桔 chang guan yue ju

Shrubs or small trees, evergreen, 2–10 m tall, glabrous, rarely twigs and petioles pubescent. Twigs angled; bud scales inconspicuous. Leaves scattered; petiole 3–7 mm; leaf blade ovate or ovate-lanceolate, 5.5–12.5 × 2–5 cm, secondary veins 6 or 7 pairs, ascending, fine veins slightly raised abaxially, ± flat adaxially, base cuneate or broadly cuneate, margin plane, shallowly serrate, apex falciform-acuminate. Inflorescences racemose, 4–10 cm, 10–15-flowered; bracts caducous, lanceolate, 5–6 mm. Pedicel 4–5 mm. Hypanthium ca. 1 mm, glabrous; calyx lobes triangular-lanceolate, ca. 1.2 mm, margin glandular fimbriate. Corolla white or tinged with pink, tubular, 7–8 mm; lobes erect or reflexed, ca. 0.7 mm. Filaments ca. 1.8 mm, hairy; anthers ca. 2.5 mm, with 2 inconspicuous spurs; tubules ca. as long as thecae. Berry 10-pseudoloculed, purple, globose, 6–7 mm in diam. Fl. Apr–May, fr. Jun–Sep.

Evergreen forests; (800–)1000–1600 m. S Yunnan [Cambodia, Laos].

This species differs from *Vaccinium mandarinorum* by having the leaf blade falciform-acuminate at the apex, calyx lobes triangular-lanceolate with a glandular fimbriate margin, and corolla tubular, 7–8 mm.

One of us (Stevens) questions whether *Vaccinium harmandianum* is the same as *V. sprengelii* (G. Don) Sleumer.

**35. *Vaccinium duclouxii*** (H. Léveillé) Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 62: 146. 1925.

云南越桔 yun nan yue ju

Shrubs or small trees, evergreen, 1–5(–10) m tall, much branched. Twigs angled, glabrous, pubescent, or glandular setose; bud scales inconspicuous. Leaves scattered; petiole 3–6 mm, glabrous, pubescent, or glandular setose; leaf blade ovate-

lanceolate, oblong-lanceolate, or ovate, 3–7(–13) × 1.7–3.5 cm, leathery, glabrous or abaxially pubescent on midvein at base, secondary veins 3 pairs, secondary and fine veins raised abaxially, inconspicuous and impressed adaxially, base broadly cuneate or rounded, rarely cuneate, margin plane, slightly recurved, denticulate, apex acuminate or acute. Inflorescences racemose, 1.5–8 cm, glabrous, densely tomentellate, or hirtellous, 9–18-flowered; bracts caducous, ovate or broadly ovate, 5–7 mm, apex caudate. Pedicel 0.5–2.5 mm, glabrous; bracteoles 2, subapical, ovate, ca. 1.5 mm. Hypanthium globose, 1.5–1.7 mm, glabrous or hirtellous; calyx lobes 1–1.3 mm, ciliate or glandular fimbriate. Corolla white or pink, tubular-urceolate, 6–8 mm, glabrous; lobes usually reflexed, triangular. Filaments 2.5–3 mm, pilose; anthers 2.7–3 mm, with 2 inconspicuous spurs; tubules ca. as long as thecae. Berry 10-pseudoloculed, dark purple, globose, 6–7 mm in diam. Fl. Feb–May, fr. Jul–Nov.

- Forests, thickets, grassy or rocky slopes; 1500–3100(–3200) m. Sichuan, Xizang, Yunnan.

- 1a. Plant glabrous ..... 35a. var. *duclouxii*
- 1b. Plant with glandular setose and/or pubescent indumentum.
  - 2a. Twigs and petioles pubescent; inflorescence axis tomentellate ..... 35c. var. *pubipes*
  - 2b. Twigs and petioles glandular setose; inflorescence axis glandular setose or hirtellous.
    - 3a. Indumentum glandular setose ..... 35b. var. *hirticaule*
    - 3b. Rachis, hypanthium, and calyx lobes hirtellous, twigs pubescent and glandular setose ..... 35d. var. *hirtellum*

**35a. *Vaccinium duclouxii* var. *duclouxii***

云南越桔(原变种) yun nan yue ju (yuan bian zhong)

*Pieris duclouxii* H. Léveillé, Bull. Acad. Int. Géogr. Bot. 12: 253. 1903; *V. forrestii* Diels.

Twigs, petioles, leaf blade abaxially on midvein, and rachis of inflorescences glabrous.

- Evergreen forests, *Pinus-Quercus* forests, thickets; 1500–3100 m. Sichuan, Yunnan.

**35b. *Vaccinium duclouxii* var. *hirticaule*** C. Y. Wu, Acta Bot. Yunnan. 9: 386. 1987.

刚毛云南越桔 gang mao yun nan yue ju

Twigs, petioles, hypanthium, and calyx lobes ± glandular setose alone.

- Open forests, thickets, grassy or rocky slopes; 1500–2000 (–2200) m. SE Yunnan.

**35c. *Vaccinium duclouxii* var. *pubipes*** C. Y. Wu, Acta Bot. Yunnan. 9: 387. 1987.

柔毛云南越桔 rou mao yun nan yue ju

Twigs, petioles, and leaf blade abaxially pubescent at base;

rachis of inflorescences tomentellate.

• Mixed forests, *Pinus* forests, thickets, (1700–)2300–2700 (–3200) m. Xizang, NW Yunnan.

**35d. *Vaccinium duclouxii* var. *hirtellum*** C. Y. Wu & R. C. Fang, Acta Bot. Yunnan. 9: 387. 1987.

毛果云南越桔 *mao guo yun nan yue ju*

Twigs pubescent and glandular setose intermixed. Inflorescence axis, hypanthium, and calyx lobes hirtellous.

• Thickets. C Yunnan.

**36. *Vaccinium brachybotrys*** (Franchet) Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 62: 146. 1925.

短序越桔 *duan xu yue ju*

*Vaccinium donianum* Wight var. *brachybotrys* Franchet, J. Bot. (Morot) 9: 369. 1895; ?*V. brachybotrys* var. *glaucoarpum* C. Y. Wu.

Shrubs, occasionally small trees, evergreen, (0.5–)1–5 m tall, glabrous. Twigs terete, glaucous when young; bud scales inconspicuous. Leaves scattered; petiole 1–3 mm, sometimes glaucous; leaf blade ovate or ovate-lanceolate, 3–8 × 1.5–3 cm, leathery, glaucous when young, secondary veins 7 or 8 pairs, slightly raised on both surfaces, fine veins raised abaxially, inconspicuous adaxially, base cuneate or rounded, margin denticulate, apex acute or acuminate. Inflorescences racemose, 3–6 cm, many flowered; bracts caducous, ovate, 1.5–3 mm. Pedicel 1–4 mm. Hypanthium usually glaucous; calyx lobes ca. 1 mm. Corolla purple or pink, urceolate or tubular, 6–7 mm; lobes erect or reflexed. Filaments ca. 2 mm, pubescent; anthers ca. 1 mm, with at most 2 inconspicuous spurs; tubules 2–3 × as long as thecae. Berry ca. 5 mm in diam. Fl. Mar–Apr, fr. Apr–May.

• Secondary forests, thickets; 1400–2400 m. W Sichuan, Yunnan.

**37. *Vaccinium mandarinorum*** Diels, Bot. Jahrb. Syst. 29: 516. 1901.

江南越桔 *jiang nan yue ju*

*Lyonia bracteata* (W. W. Smith) Chun; *Pieris bracteata* W. W. Smith; *P. esquirolii* H. Léveillé & Vaniot; *P. esquirolii* var. *discolor* H. Léveillé & Vaniot; *P. longicornuta* H. Léveillé & Vaniot; *Vaccinium donianum* Wight var. *austrosinense* Handel-Mazzetti; *V. donianum* var. *hangchouense* Matsuda; *V. donianum* var. *laetum* (Diels) Rehder & E. H. Wilson; *V. hangchouense* (Matsuda) Komatsu; *V. laetum* Diels; *V. laetum* var. *undulatum* Y. C. Yang; *V. mandarinorum* var. *austrosinense* (Handel-Mazzetti) Metcalf; *V. mandarinorum* var. *laetum* (Diels) Metcalf; *V. parvibracteatum* Hayata.

Shrubs or small trees, evergreen, 1–4(–7) m tall. Twigs terete, glabrous or pubescent, sometimes densely puberulous; bud scales inconspicuous. Leaves scattered; petiole 3–8 mm, glabrous or pubescent; leaf blade ovate or oblong-lanceolate to lanceolate, 3–9 × 1.5–3.5 cm, leathery to thinly leathery, both surfaces usually glabrous, sometimes puberulous on midvein,

secondary veins 5–9 pairs, ± ascending, thin, fine veins raised abaxially, flat to inconspicuous adaxially, base cuneate to rounded, margin dentate, apex acute to abruptly acuminate for ca. 1.5 cm. Inflorescences racemose, 2.5–10 cm, pubescent or glabrous, many flowered; bracts caducous or persistent, lanceolate, ovate, or ovate-lanceolate, (2–)4–15 mm. Pedicel 2–8 mm, slender, glabrous or puberulous. Hypanthium 1–1.5 mm, glabrous; calyx lobes ± recurved, 0.5–1.5 mm. Corolla white or pinkish, tubular or urceolate, 5–7 mm, glabrous; lobes ca. 1.5 mm. Filaments ca. 1.5 mm, ± pubescent; anthers ca. 3.5 mm, with 2 short spurs; tubules ca. 1.5 × as long as thecae or longer. Berry 10-pseudoloculed, dark purple, glabrous, 4–7 mm in diam. Fl. Apr–Jun, fr. Jun–Oct.

• *Pinus-Quercus* forests, secondary forests, forest margins, thickets; 100–1600 m (or mostly 1800–2900 m on Yunnan plateau). Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Yunnan, Zhejiang.

**38. *Vaccinium trichocladum*** Merrill & Metcalf, Lingnan Sci. J. 16: 174. 1937.

刺毛越桔 *ci mao yue ju*

Shrubs, occasionally small trees, evergreen, 3–8 m tall. Twigs rounded, densely or sparsely glandular setose and hispidulous, glabrescent; bud scales inconspicuous. Leaves scattered; petiole 2–4 mm, indumentum same as twigs; leaf blade ovate-lanceolate, 4–9 × 2–3 cm, thinly leathery, abaxially hispidulous, intermixed glandular setose on midvein, adaxially densely hispidulous on midvein, otherwise glabrous, secondary veins 8–10 pairs, raised abaxially, flat adaxially, fine veins raised abaxially, inconspicuous adaxially, base rounded or slightly cordate, margin plane, spiniform-dentate or subentire, apex acuminate. Inflorescences pseudoterminal, racemose, 4–8 cm, densely hispidulous, pubescent, or glabrous, many flowered; bracts oblong or oblong-lanceolate, ca. 2.5 mm, margin glandular fimbriate. Pedicel 3–4 mm, indumentum as on rachis. Hypanthium ca. 1 mm, hairy or glabrous; calyx limb divided to near base; calyx lobes triangular-ovate, ca. 1 mm, glabrous. Corolla white, tubular-urceolate, 5–6 mm, glabrous; lobes reflexed, ca. 1 mm. Filaments ca. 1 mm, densely hairy; anthers ca. 3 mm, with 2 spurs; tubules 1.5–2 × as long as thecae. Berry 10-pseudoloculed, red, globose, 5–6 mm in diam., hispidulous. Fl. Apr, fr. May–Sep.

• Forests, open mountain slopes; 200–700 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Jiangxi, Zhejiang.

- 1a. Twigs densely glandular setose and hispidulous; inflorescence axis, pedicels, and hypanthium densely hispidulous and pubescent ..... 38a. var. *trichocladum*
- 1b. Twigs sparsely glandular setose; inflorescence axis, pedicels, and hypanthium glabrous ..... 38b. var. *glabriracemosum*

**38a. *Vaccinium trichocladum* var. *trichocladum***

刺毛越桔(原变种) *ci mao yue ju* (yuan bian zhong)

*Vaccinium iteophyllum* Hance var. *hispidum* Handel-Mazzetti.

Twigs densely glandular setose and hispidulous. Leaf margin distinctly dentate. Inflorescence axis, pedicels, and hypanthium densely hispidulous and pubescent.

• Forests; 500–700 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Jiangxi, Zhejiang.

**38b. *Vaccinium trichocladum* var. *glabriracemosum* C. Y. Wu, Acta Bot. Yunnan. 9: 387. 1987.**

光序刺毛越桔 *guang xu ci mao yue ju*

Twigs sparsely glandular setose. Leaf margin inconspicuously dentate or subentire. Inflorescence axis, pedicels, and hypanthium glabrous.

• Open mountain slopes; 200–300 m. Fujian, Jiangxi, Zhejiang.

**39. *Vaccinium fragile* Franchet, J. Bot. (Morot) 9: 366. 1895.**

乌鸦果 *wu ya guo*

Shrubs dwarf, evergreen, 20–50(–100) cm tall. Stem base a burl. Twigs angled, sparsely or densely glandular setose and pubescent; bud scales inconspicuous. Leaves rather dense; petiole 1–1.5 mm; leaf blade oblong or elliptic, 1.2–4.5 × 0.7–2.5 cm, leathery, both surfaces setose and pubescent, or sparsely shortly hispid, or subglabrous, secondary veins 2–5 pairs, inconspicuous, base rounded or cuneate, margin plane, serrulate, apex acute, acuminate, or obtuse. Inflorescences racemose, 1.5–6 cm, glandular setose and pubescent, many flowered; bracts usually reddish, leaflike, 4–9 mm, both surfaces strigose, margin denticulate or setose. Pedicel 1–2 mm, hairy. Hypanthium green, tinged with dark red, ca. 1.2 mm, hairy or not; calyx lobes 1–1.2 mm. Corolla white, tinged with pink, with 5 red veins, urceolate, 5–6 mm, glabrous or pubescent; lobes 0.6–1 mm. Filaments ca. 1.5 mm, pubescent; anthers ca. 3 mm, with 2 erect spurs; tubules ca. as long as thecae. Berry 10-pseudoloculed, red, turning dark purple, 4–5 mm in diam., hairy or not.

• *Pinus* and *Quercus* forests, thickets, open grassy slopes; 1100–3400 m. Guizhou, Sichuan, SE Xizang, Yunnan.

This is an indicator plant of acid soils.

- 1a. Leaf blade 1.2–3.5 × 1.2–2.2 cm, both surfaces ± setose and pubescent, rarely subglabrous ..... 39a. var. *fragile*
- 1b. Leaf blade 3–4.5 × 1.2–2.2 cm, both surfaces subglabrous or abaxially sparsely shortly hispid on midvein ..... 39b. var. *mekongense*

**39a. *Vaccinium fragile* var. *fragile***

乌鸦果(原变种) *wu ya guo (yuan bian zhong)*

*Pieris gagnepainiana* H. Léveillé; *P. repens* H. Léveillé; *Vaccinium anthonyi* Merrill; *V. fragile* var. *crinitum* Franchet; *V. fragile* var. *myrtifolium* Franchet; *V. repens* (H. Léveillé) Rehder; *V. setosum* C. H. Wright; *V. wardii* Adams.

Leaf blade 1.2–3.5 × 0.7–2.5 cm, with 2 or 3 pairs of inconspicuous veins, both surfaces ± setose and pubescent, rarely subglabrous; other parts of plant usually with dense hairs.

• *Pinus* forests, thickets, open grassy slopes; 1100–3400 m. Guizhou, Sichuan, SE Xizang (Zayü), Yunnan.

**39b. *Vaccinium fragile* var. *mekongense* (W. W. Smith) Sleumer, Bot. Jahrb. Syst. 71: 456. 1941.**

大叶乌鸦果 *da ye wu ya guo*

*Vaccinium mekongense* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 9: 133. 1916; *V. salweenense* W. W. Smith; *V. taliense* W. W. Smith.

Leaf blade 3–4.5 × 1.2–2.2 cm, with 3–5 pairs of veins raised on both surfaces, fine venation ± evident, both surfaces subglabrous or abaxially sparsely shortly hispid on midvein; other parts of plant with fewer hairs.

• *Pinus* and *Quercus* forests, thickets; 1700–2000 m. SW Sichuan, C and W Yunnan.

**40. *Vaccinium fimbrialyx* Chun & W. P. Fang, Acta Phytotax. Sin. 6: 165. 1957.**

流苏萼越桔 *liu su e yue ju*

Shrubs evergreen. Twigs terete, glabrous. Leaves scattered; petiole 4–6 mm, pubescent; leaf blade elliptic-lanceolate or ovate-lanceolate to lanceolate, 3–6.5 × 1.5–2.2 cm, leathery, abaxially glabrous, adaxially initially densely puberulous on midvein, glabrescent, fine veins inconspicuous, base cuneate to broadly cuneate, margin entire, apex caudate-acuminate. Inflorescences racemose, 1–2 cm, thin, angled, glabrous, 6–12-flowered. Pedicel 1.5–2 mm. Hypanthium glabrous; calyx lobes triangular, ca. 0.8 mm, margin densely white fimbriate, apex acute. Corolla white, tubular-campanulate, 4–4.2 mm, glabrous; lobes reflexed, ovate-triangular, ca. 1.5 mm. Anthers without spurs. Berry dark purple, with a bloom, 8–10 mm in diam.

• Forest margins on mountain summits; ca. 1400 m. Guangdong, Guangxi.

**41. *Vaccinium longicaudatum* Chun ex W. P. Fang & Z. H. Pan, Acta Phytotax. Sin. 19: 110. 1981.**

长尾乌饭 *chang wei wu fan*

*Vaccinium carlesii* Dunn var. *longicaudatum* (Chun ex W. P. Fang & Z. H. Pan) P. C. Tam.

Shrubs evergreen, 1.5–4 m tall. Twigs slightly angled, initially puberulous, glabrescent; bud scales inconspicuous. Leaves scattered; petiole 6–7 mm, puberulous; leaf blade elliptic-lanceolate, 4.5–7 × 1.8–2.5 cm, leathery, secondary veins 6 pairs, ascending, barely evident, base cuneate or broadly cuneate, margin plane, sparsely serrulate, apex caudate-acuminate. Inflorescences racemose, 1.5–2 cm, glabrous, 10–15-flowered; bracts broadly elliptic. Pedicel 1–1.5 mm; bracteoles lanceolate, ca. 1.5 mm. Calyx lobes triangular, ca. 1 mm, margin sparsely ciliate. Corolla white, tubular, 4–4.5 mm, glabrous; lobes triangular-ovate, ca. 1.5 mm. Filaments ca. 0.6 mm, subglabrous; anthers 1–1.2 mm, with 2 small spurs, tubules shorter than thecae, ca. 0.8 mm. Berry red, ca. 5 mm in diam. Fl. Jun, fr. Nov.

• Open montane forests; 700–1600 m. Guangdong, Guangxi, Guizhou, Hunan.

**42. *Vaccinium chamaebuxus* C. Y. Wu, Acta Bot. Yunnan. 9: 388. 1987.**

矮越桔 ai yue ju

Shrubs evergreen, 0.5–2 m tall, much branched. Twigs terete, densely pubescent, glabrescent; bud scales inconspicuous. Leaves scattered; petiole 2–5 mm, adaxially densely pubescent; leaf blade ovate or elliptic, 1.7–4(–6) × 1–2 cm, leathery, adaxially nigrescent-punctate, puberulous on midvein, otherwise glabrous, secondary veins 6 or 7 pairs, fine veins raised abaxially, inconspicuous adaxially, base broadly cuneate, sometimes cuneate or rounded, margin plane, densely serrate, apex acute or obtuse to acuminate. Inflorescences racemose, 1.5–2 cm, pubescent or glabrous, ca. 8-flowered; bracts broadly ovate, 3–5 mm, glabrous. Pedicel 0.5–2 mm, glabrous; bracteoles ca. 2.5 mm, median. Hypanthium glabrous; calyx lobes ovate-triangular or suborbicular, 0.5–1 mm. Corolla white or pink, urceolate, ca. 7 mm, glabrous; lobes triangular or narrowly triangular. Filaments 1–1.2 mm, hairy; anthers 0.8–1 mm, with 2 spurs; tubules ca. 1.2 × as long as thecae. Berry purple, 5–6 mm in diam. Fl. Apr–May, fr. Jun–Nov.

• *Rhododendron* forests on mountain summits, thickets on open slopes; 2500–3100 m. WC Yunnan (Jingdong).

43. *Vaccinium albidens* H. Léveillé & Vaniot, Repert. Spec. Nov. Regni Veg. 9: 447. 1911.

白花越桔 bai hua yue ju

Shrubs or small trees, evergreen, 1–6 m tall, much branched. Twigs terete, densely puberulous, glabrescent; bud scales inconspicuous. Leaves scattered; petiole 2–3 mm, densely puberulous or subglabrous; leaf blade ovate-lanceolate, rarely lanceolate, 3–7 × 1.5–2.5 cm, thinly leathery, adaxially puberulous on midvein, otherwise glabrous, secondary veins 5 pairs, fine veins raised abaxially, flat adaxially, base rounded to cuneate, margin plane, denticulate, apex acuminate or caudate-acuminate. Inflorescences racemose, 1.5–4 cm, densely puberulous, 8–16-flowered; bracts caducous, broadly ovate, ca. 3 mm, margin fimbriate. Pedicel 1–1.5 mm, densely puberulous. Hypanthium pubescent; calyx lobes ovate-triangular or suborbicular, 0.5–1 mm, glandular fimbriate. Corolla white, tubular, ca. 6 mm, glabrous; lobes reflexed. Filaments ca. 1.5 mm, pilose; anthers ca. 1.5 mm with 2 inconspicuous spurs; tubules 1–1.5 × as long as thecae. Berry 10-pseudoloculed, ca. 4 mm in diam., pubescent, glabrous when mature. Fl. Feb–Apr, fr. May–Oct.

• Valley forests, thickets, ridges; 1000–2300 m. Guizhou, SE Yunnan.

44. *Vaccinium iteophyllum* Hance, Ann. Sci. Nat., Bot., sér. 4, 18: 223. 1862.

黄背越桔 huang bei yue ju

Shrubs or small trees, evergreen, 1–7 m tall. Twigs terete, brownish pubescent or tomentellate, rarely glandular setose, glabrescent; bud scales inconspicuous. Leaves scattered; petiole 2–5 mm, densely brownish pubescent or puberulous, rarely glandular setose; leaf blade ovate or ovate-lanceolate to lanceolate, 4–13 × 2–4 cm, leathery, abaxially pubescent on midvein, rarely glandular setose, adaxially puberulous on midvein, otherwise glabrous, rarely pubescent, secondary veins 6–9 pairs, ± ascending, fine veins raised abaxially, flat adaxially, base cune-

ate to rounded, margin plane, sparsely dentate or subentire, apex acuminate. Inflorescence racemose, 4–6 cm, densely pubescent or tomentellate, many flowered; bracts lanceolate, 3–7 mm, puberulous. Pedicel 2–4 mm, densely pubescent or tomentellate. Hypanthium ca. 1.2 mm, hairy; calyx lobes triangular, 1–1.5 mm. Corolla white or pinkish, tubular to urceolate, 5–7 mm, puberulous or not; lobes erect or reflexed, ca. 1 mm. Filaments 1.5–2 mm, densely pubescent; anthers ca. 3 mm, with 2 slender spurs; tubules ca. 3 × as long as thecae. Berry 10-pseudoloculed, globose, 4–5 mm in diam., ± pubescent. Fl. Apr–May, fr. after Jun.

• Forests, montane thickets; 400–1400(–2400) m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Xizang, Yunnan, Zhejiang.

- 1a. Twigs, petioles, and abaxial midvein pubescent or tomentellate ..... 44a. var. *iteophyllum*
- 1b. Twigs, petioles, and abaxial midvein glandular setose ..... 44b. var. *glandulosum*

44a. *Vaccinium iteophyllum* var. *iteophyllum*

黄背越桔(原变种) huang bei yue ju (yuan bian zhong)

*Vaccinium iteophyllum* var. *fragrans* Rehder & E. H. Wilson.

Twigs, petioles, and abaxial midvein pubescent or tomentellate.

• Forests, montane thickets; 400–1400(–2400) m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Xizang, Yunnan, Zhejiang.

44b. *Vaccinium iteophyllum* var. *glandulosum* C. Y. Wu & R. C. Fang in C. Y. Wu, Fl. Xizang. 3: 729. 1986.

腺毛米饭树 xian mao mi fan shu

Twigs, petioles, and abaxial midvein glandular setose.

• Evergreen forests; ca. 2300 m. SE Xizang (Zayü).

45. *Vaccinium serrulatum* W. P. Fang & Z. H. Pan, Acta Phytotax. Sin. 19: 111. 1981.

细齿乌饭 xi chi wu fan

Shrubs evergreen. Twigs slightly angled, puberulous; bud scales inconspicuous. Leaves scattered; petiole ca. 4 mm, glabrous; leaf blade elliptic to broadly elliptic, 3–4.5 × 1.3–2.5 cm, leathery, subglabrous or adaxial midvein puberulous, secondary veins 6–8 pairs, fine veins slightly raised abaxially, inconspicuous adaxially, base rounded or broadly cuneate, margin plane, serrulate, apex acuminate, mucronulate. Inflorescences racemose, 1.5–3 cm, pubescent, 8–12-flowered; bracts oblong, ca. 3 mm. Pedicel ca. 1 mm, pubescent. Hypanthium sparsely pubescent; calyx lobes broadly ovate-triangular. Corolla white or pink, urceolate, 5–6 mm, abaxially pilose; lobes ovate-triangular, ca. 1.2 mm. Filaments 1.2–2 mm, pubescent; anthers ca. 2 mm, with 2 slender spurs; tubules ca. as long as thecae or longer. Immature berry 3–4 mm in diam., glabrous. Fl. Dec to beginning of next year, fr. Aug.

• About 1500 m. SW Sichuan (Huili), SE Yunnan (Qiubei).

46. *Vaccinium pubicalyx* Franchet, J. Bot. (Morot) 9: 369.

1895.

毛萼越桔 *mao e yue ju*

Shrubs or small trees, evergreen, 1–4 m tall. Twigs brownish tomentose, glabrescent; bud scales inconspicuous. Leaves scattered; petiole 2–4 mm, brownish tomentose; leaf blade ovate or ovate-lanceolate to lanceolate, 2–6 × 0.7–2.5 cm, thinly leathery, both surfaces ± pubescent on midvein, otherwise glabrous, rarely both surfaces tomentose or villous, abaxially with glands or glandular hairs or not, secondary veins 4–7 pairs, secondary and fine veins ± raised abaxially, flat adaxially, base cuneate or broadly cuneate, rarely rounded, margin plane, serrulate, apex acuminate to caudate, rarely acute. Inflorescences racemose, 1–4 cm, densely pubescent; flowers ca. 10, dense, secund; bracts caducous, pinkish, ovate, 5–8 mm, abaxially and marginally pubescent. Pedicel 1–2 mm, densely pubescent. Hypanthium ca. 0.8 mm, densely pubescent or tomentose, rarely glabrous; calyx lobes triangular, 0.8–1.2 mm, densely pubescent or only margin densely ciliate. Corolla white or pinkish, tubular or tubular-urceolate, ca. 5 mm, glabrous; lobes triangular. Filaments ca. 1.5 mm, pilose; anthers ca. 2.5 mm, with 2 short spurs; tubules ca. as long as thecae or longer. Berry 10-pseudoloculed, dark purple, 5–6 mm, pilose or glabrous. Fl. Apr–May, fr. Sep–Oct.

*Pinus* forests, open valley forests, secondary forests, montane thickets; 600–3600 m. S and W Guizhou, SW Sichuan, Yunnan [Myanmar].

- 1a. Calyx glabrous, lobes densely ciliate ..... 46b. var. *anomalum*
- 1b. Calyx densely pubescent or tomentose.
  - 2a. Calyx densely pubescent; leaves ± pubescent on midvein on both surfaces, otherwise glabrous ..... 46a. var. *pubicalyx*
  - 2b. Calyx densely tomentose; leaves abaxially tomentose or villous .... 46c. var. *leucocalyx*

**46a. *Vaccinium pubicalyx* var. *pubicalyx***

毛萼越桔(原变种) *mao e yue ju* (yuan bian zhong)

*Myrica mairei* H. Léveillé; *Vaccinium spicigerum* W. W. Smith.

Leaves ± pubescent on midvein on both surfaces, otherwise glabrous. Calyx densely pubescent, abaxially with glands or glandular hairs.

*Pinus* forests, secondary forests, montane thickets; 1300–2700 m. W Guizhou, SW Sichuan, Yunnan [Myanmar].

**46b. *Vaccinium pubicalyx* var. *anomalum*** J. Anthony, Notes Roy. Bot. Gard. Edinburgh 18: 34. 1933.

少毛毛萼越桔 *shao mao mao e yue ju*

Leaves punctate abaxially, puberulous along midvein or glabrous on both surfaces. Calyx glabrous; lobes densely ciliate.

- Montane thickets; 2000–3600 m. N Yunnan (Eryuan, Luquan).

**46c. *Vaccinium pubicalyx* var. *leucocalyx*** (H. Léveillé) Rehder, J. Arnold Arbor. 15: 285. 1934.

多毛毛萼越桔 *duo mao mao e yue ju*

*Pieris esquirolii* H. Léveillé & Vaniot var. *leucocalyx* H. Léveillé, Bull. Soc. Bot. France 53: 206. 1906.

Leaves abaxially tomentose or villous. Calyx densely tomentose.

- Open valley forests, montane thickets; 600–1000 m. S Guizhou.

**47. *Vaccinium guangdongense*** W. P. Fang & Z. H. Pan, Acta Phytotax. Sin. 19: 112. 1981.

广东乌饭 *guang dong wu fan*

Trees evergreen, ca. 6 m tall. Twigs slightly angled, glabrous; bud scales inconspicuous. Leaves scattered; petiole 2.5–3 mm, subglabrous; leaf blade elliptic or elliptic-lanceolate, 3.5–4.2 × 1.2–1.6 cm, leathery, glabrous, secondary veins 4–6 pairs, base cuneate, margin plane, obtusely dentate, apex acuminate or acute. Inflorescences racemose, 3.5–4.5 cm, angled, puberulous, many flowered; bracts unknown. Pedicel 3–3.5 mm, puberulous. Flowers unknown. Immature berry red, globose, ca. 2.5 mm in diam., densely pubescent; persistent calyx lobes triangular, densely pubescent. Fr. after Jun.

- Dense montane forests; ca. 900 m. SW Guangdong (Yangjiang).

**48. *Vaccinium exaristatum*** Kurz, J. Asiat. Soc. Bengal 42(2): 86. 1873.

隐距越桔 *yin ju yue ju*

*Vaccinium exaristatum* var. *pubescens* Kurz; *V. longitubulosum* J. J. Smith.

Shrubs or small trees, evergreen, (1–)3–5(–14) m tall. Twigs obscurely lenticellate, densely pubescent, glabrescent; bud scales inconspicuous. Leaves scattered; petiole 2–3 mm, densely pubescent; leaf blade drying pale brown or straw-colored on both surfaces, elliptic, oblong-ovate, or oblong-lanceolate, 3–7.5 × 1.1–3 cm, leathery, both surfaces pubescent on midvein, otherwise glabrous or adaxially pubescent, secondary veins 4 or 5 pairs, fine veins raised abaxially, ± flat adaxially, base cuneate to rounded, margin plane, dentate, apex acute or acuminate. Inflorescences racemose, 3–10 cm, usually pubescent, many flowered; bracts caducous, ovate or broadly ovate, 2.5–3 mm. Pedicel 1–3.5 mm, pubescent or glabrous. Hypanthium 0.8–1 mm, pubescent or glabrous; calyx lobes triangular or suborbicular, 0.8–1.2 mm, sometimes densely ciliate. Corolla pink, tubular, 6–8 mm, glabrous; lobes erect or reflexed, triangular or oblong. Filaments ca. 1.8 mm, pilose; anthers ca. 3.5 mm, without or with inconspicuous spurs; tubules 2–3 × as long as thecae. Berry 10-pseudoloculed, red to dark purple, 4–5 mm in diam. Fl. Mar–Apr, fr. May–Jun.

Sparse forests, shrubby slopes; 500–1500(–2000) m. W Guangxi, S Guizhou, S Yunnan [Laos, Myanmar, Thailand, Vietnam].

**49. *Vaccinium ardisioides*** J. D. Hooker ex C. B. Clarke in J. D. Hooker, Fl. Brit. India 3: 452. 1882.

紫梗越桔 *zi geng yue ju*

Shrubs evergreen, usually epiphytic, 0.5–1.2 m tall, glabrous. Twigs terete; bud scales inconspicuous. Leaves 3–5-pseudoverticillate, sessile; leaf blade ovate or elliptic, 6–15 × 2.5–7 cm, papery to leathery, secondary veins 8–12(–14) pairs, spreading, fine veins raised abaxially, slightly raised adaxially, base broadly obtuse-rounded to narrowly cordate, margin plane, entire, without basal glands, apex acuminate. Inflorescences racemose, 2–4- in whorl of leaves, 7–10 cm, slender, sometimes glaucous, many secund flowered; bracts caducous. Pedicel purple, 0.5–1.5 cm, slender, thickened upwards. Hypanthium subglobose, ca. 2.3 mm; calyx limb ca. 2.2 mm, divided 1/3–2/5; calyx lobes triangular, ca. 1 mm. Corolla white-green, urceolate-tubular, 6–7 mm; lobes less than 1 mm. Filaments ca. 2.5 mm, subglabrous; anthers ca. 4.5 mm, papillate, without or with 2 small spurs; tubules ca. as long as thecae. Berry 10-pseudoloculed, purple-green, ca. 4 mm in diam.; fruit stalk purple-green. Fl. Mar, fr. May.

Below evergreen trees, usually epiphytic, riversides; 1000–1400 m. NW Yunnan (Dulongjiang) [Myanmar].

**50. *Vaccinium rubescens*** R. C. Fang, Novon 9: 174. 1999.

红梗越桔 hong geng yue ju

Shrubs evergreen, terrestrial or epiphytic, 1–2 m tall, glabrous. Twigs terete; bud scales caducous. Leaves 3–8-pseudoverticillate, sessile; leaf blade oblong-lanceolate or oblong-ovate, 7.5–12 × 2–4 cm, papery, secondary veins more than 15 pairs, midvein raised on both surfaces, fine veins raised on both surfaces, base narrowly obtuse-rounded, subcordate, margin plane, entire, basal glands inconspicuous, apex acuminate. Inflorescences racemose, red, 7–12 cm, angled-winged, many flowered; bracts unknown. Pedicel red, ca. 1.5 cm, thickened upwards. Hypanthium terete, ca. 4 mm, upper parts free, not adnate to ovary; calyx lobes triangular, ca. 1 mm. Corolla orange or pink, tubular, 7–8 mm; lobes less than 1 mm. Filaments 2–4 mm, pubescent, especially at apex; anthers ca. 3 mm, papillate, with 2 short spurs; tubules ca. as long as thecae. Berry scarlet, ca. 5 mm in diam.; fruit stalk scarlet, ca. 2 cm. Fl. Mar, fr. May.

• Dense forests, sometimes epiphytic, moist places, roadsides; 2000–2200 m. SW Yunnan.

**51. *Vaccinium venosum*** Wight, Icon. Pl. Ind. Orient. 4. t. 1185. 1848.

轮生叶越桔 lun sheng ye yue ju

*Epigynium venosum* (Wight) Klotzsch.

Shrubs evergreen, often epiphytic, ca. 60 cm tall. Twigs angled, pubescent or glabrous, when older lenticellate; persistent bud scales few, oblong-lanceolate, ca. 3 mm. Leaves 5- or 6-pseudoverticillate, subsessile or shortly petiolate; leaf blade oblong or oblong-lanceolate, 6–10 × 2–3.5 cm, leathery, glabrous, secondary veins (4–)6–10 pairs, ± ascending, fine veins raised abaxially, ± impressed adaxially, base broadly cuneate, slightly obtuse, margin ?plane, undulate-crenate, apex acuminate. Inflorescences racemose, 3.5–4 cm, glabrous; bud scales persistent, many flowered; bracts caducous, ca. 7 mm. Pedicel 2–2.5 mm, glabrous, thickened upwards. Hypanthium ca. 1

mm, glabrous, with several small, rounded verrucae; calyx lobes triangular, ca. 1 mm. Corolla tubular-urceolate, 4–5 mm, glabrous; lobes ca. 0.5 mm. Filaments ca. 1 mm, glabrous; anthers ca. 3.5 mm, without spurs; tubules rather longer than thecae. Berry 10-pseudoloculed (from ovary). Fl. Dec to beginning of next year.

Epiphytic or on rocks on riverbanks; ca. 1400 m. SE Xizang (Médog) [?Bhutan, NE India].

**52. *Vaccinium kingdon-wardii*** Sleumer, Bot. Jahrb. Syst. 71: 477. 1941.

纸叶越桔 zhi ye yue ju

Shrubs evergreen, terrestrial or epiphytic, 2–3 m tall, glabrous. Twigs angled, with few persistent bud scales. Leaves 5- or 6-pseudoverticillate; petiole ca. 2 mm; leaf blade elliptic or oblong-lanceolate, 4–8(–14) × 2–5 cm, papery, secondary veins more than 10 pairs, fine veins raised abaxially, impressed adaxially, base cuneate or broadly cuneate, margin obtusely dentate, apex acute to acuminate. Inflorescences racemose, to 5 cm, with persistent bud scales, many flowered; bracts caducous, oblong-ovate, fimbriate. Pedicel 2–3 mm, thickened upwards. Hypanthium with several small, rounded verrucae; calyx lobes triangular, ca. 1.5 mm. Corolla cream-colored or greenish, tubular, ca. 5 mm; lobes ca. 0.5 mm. Filaments ca. 1.5 mm, glabrous; anthers ca. 2.5 mm, without spurs; tubules ca. as long as thecae. Immature berry 10-pseudoloculed, purple, glabrous. Fl. Nov–Dec, fr. Apr–May of next year.

• *Pinus* forests, sometimes epiphytic; 1800–3300 m. SE Xizang (Bomi, Médog).

**53. *Vaccinium vacciniaceum*** (Roxburgh) Sleumer, Bot. Jahrb. Syst. 71: 479. 1941.

小轮叶越桔 xiao lun ye yue ju

Shrubs evergreen, terrestrial or epiphytic, ca. 0.5 m tall. Twigs rounded, densely shortly setose, glabrescent; persistent bud scales few, oblong-lanceolate. Leaves 5–8-pseudoverticillate; petiole 1–4 mm; leaf blade oblong-lanceolate, 3.5–5 × 0.9–1.4 cm, papery, glabrous, secondary veins 7–11 pairs, spreading, secondary and fine veins raised on both surfaces, base cuneate or obtuse to narrowly rounded, margin plane, sparsely serrate, apex narrowly acute to acuminate to 1 cm. Inflorescences racemose or corymbose-racemose, 1.5–6 cm, glabrous or sparsely glandular hairy, with persistent bud scales, many flowered; bracts caducous, narrowly triangular, ca. 3 mm. Pedicel 5–9 mm, glabrous, thickened upwards. Hypanthium 1–1.5 mm, glabrous; calyx lobes triangular, ca. 1 mm. Corolla greenish yellow, urceolate, 4–6 mm, glabrous; lobes ca. 0.6 mm. Filaments 1–2 mm, glabrous; anthers ca. 4 mm, without spurs; tubules ca. as long as thecae. Berry 10-pseudoloculed (from ovary). Fl. Apr.

Evergreen forests, sometimes epiphytic on trees, mountain valleys; 1200–2400(–2700) m. SE Xizang [Bhutan, NE India, Myanmar, Nepal, Sikkim].

1a. Corolla tube pubescent adaxially especially towards mouth; petiole 2–4 mm; leaf blade cuneate at base

..... 53a. subsp. *vacciniaceum*

- 1b. Corolla tube glabrous adaxially;  
petiole 1–2 mm; leaf blade narrowly  
rounded at base ..... 53b. subsp. *glabritubum*

**53a. *Vaccinium vacciniaceum* subsp. *vacciniaceum***

小轮叶越桔(原亚种) xiao lun ye yue ju (yuan ya zhong)

*Ceratostema vacciniaceum* Roxburgh, Fl. Ind., ed. 1832, 2: 412. 1832; *Agapetes serrata* G. Don; *A. vacciniacea* (Roxburgh) Dunal; *Epigynium serratum* (G. Don) Klotzsch; *Gaylussacia serrata* (G. Don) Lindley; *Vaccinium serratum* (G. Don) Wight.

Petiole 2–4 mm; leaf blade cuneate at base. Corolla tube pubescent adaxially especially towards mouth.  $2n = 24$ .

Evergreen forests, sometimes epiphytic on trees; 2300–2400 m. SE Xizang (Médog) [NE India, Myanmar, Nepal].

**53b. *Vaccinium vacciniaceum* subsp. *glabritubum*** P. F. Stevens, J. Arnold Arbor. 66: 487. 1985.

秃冠小轮叶越桔 tu guan xiao lun ye yue ju

Petiole 1–2 mm; leaf blade narrowly rounded at base. Corolla tube glabrous adaxially.

Mountain valleys; 1200–1800(–2700) m. SE Xizang (Cona) [Bhutan, NE India, Nepal, Sikkim].

**54. *Vaccinium tenuiflorum*** R. C. Fang, Novon 9: 178. 1999.

狭花越桔 xia hua yue ju

Shrubs or climbers, evergreen. Twigs angled, pubescent and shortly glandular setose, becoming scabrous; persistent bud scales scattered, lanceolate. Leaves 9- or 10-pseudovercillate; petiole 1–2 mm, pubescent; leaf blade olivaceous abaxially, drying dull green adaxially, lanceolate to oblong-lanceolate, 4–11 × 0.9–2 cm, leathery, when young puberulous on midvein, secondary veins 12 or 13 pairs, fine veins raised abaxially, base narrowly cuneate, ± rounded, margin recurved, sparsely serrate, apex acuminate. Inflorescences racemose, 5–6 cm, densely pubescent, with persistent bud scales, many flowered; bracts lanceolate, 2–3 mm, puberulous, ciliolate. Pedicel 5–6 mm, slender, densely pubescent, slightly thickened upwards. Hypanthium densely pubescent; calyx lobes triangular, ± pubescent. Corolla white, narrowly tubular, 4–5 mm, glabrous except for 5 pubescent ridges; lobes triangular, ca. 0.6 mm. Filaments ca. 2 mm, glabrous; anthers ca. 4 mm, papillate, without spurs; tubules longer than thecae. Berry subglobose, ca. 3 mm in diam. Fl. Dec, fr. Apr.

- Forests; ca. 1800 m. SE Xizang (Médog).

**55. *Vaccinium leucobotrys*** (Nuttall) G. Nicholson, III. Dict. Gard. 4: 130. 1886.

白果越桔 bai guo yue ju

*Epigynium leucobotrys* Nuttall, Bot. Mag. 85: t. 5103. 1859; *Vaccinium serratum* (G. Don) Wight var. *leucobotrys* (Nuttall) C. B. Clarke.

Shrubs evergreen, terrestrial or epiphytic, 0.5–1 m tall,

with inflated root tubers. Twigs rounded, densely puberulous and brown setulose, scabrous, glabrescent; persistent bud scales lanceolate. Leaves 4–6-pseudovercillate; petiole very short or leaves sessile; leaf blade oblong or oblong-ovate, 3–5(–7) × 1.8–3 cm, papery, glabrous, secondary veins spreading, 7–9, secondary and fine veins raised abaxially, slightly raised adaxially, base rounded to slightly cordate, margin slightly recurved, denticulate, apex acute to acuminate. Inflorescences racemose, 2–3 cm, glabrous, with persistent bud scales, many flowered; bracts caducous, to 6 mm. Pedicel 2–3 mm. Hypanthium 0.8–1.2 mm, glabrous; calyx lobes triangular, 1–1.3 mm. Corolla white to greenish white, urceolate, ca. 5 mm, glabrous; lobes ca. 0.5 mm. Filaments ca. 0.5 mm, glabrous; anthers ca. 3 mm, without spurs; tubules ca. as long as thecae. Berry 10-pseudoloculed, white, slightly depressed, 5–7 mm in diam.; pedicel red, clavate, (0.7–)1–1.2 cm, thickened upwards. Fl. Mar–Apr, fr. May–Aug.

Evergreen forests, sometimes epiphytic on trees, rocks; 2100–2800 m. SE Xizang, NW Yunnan [NE India (Assam), Myanmar].

**56. *Vaccinium bulleyanum*** (Diels) Sleumer, Bot. Jahrb. Syst. 71: 478. 1941.

灯台越桔 deng tai yue ju

*Agapetes bulleyana* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 294. 1912; *A. bulleyana* var. *tenuifolia* J. Anthony.

Shrubs evergreen, 1.2–2.5 m tall. Twigs rounded, pubescent, glabrescent, with scattered rounded lenticels; persistent bud scales scattered. Leaves 4–6-pseudovercillate; petiole very short or leaves sessile; leaf blade oblong or oblanceolate-oblong, 7–11 × 1.5–3.2 cm, leathery, glabrous, secondary veins 9–11 pairs, strongly raised abaxially, secondary and fine veins inconspicuous adaxially, base narrowly rounded, margin plane, cartilaginous, sparsely callous-serrate, apex acute. Inflorescences from defoliate axils, corymbose-racemose, 2–6 cm, glabrous, many flowered in upper half; bracts lanceolate-subulate, ca. 3 mm. Pedicel 1–1.5 cm. Calyx ca. 2 mm, glabrous; lobes 2.5–3.5 mm. Corolla greenish yellow, tubular-urceolate, 5–9 mm, glabrous; lobes ca. 1 mm. Filaments ca. 1 mm, glabrous; anthers ca. 4.5 mm, without spurs; tubules ca. 1.5 × as long as thecae. Berry 10-pseudoloculed (from ovary). Fl. Mar, fr. after Apr.

- Shaded situations in mountain valleys; 2000–2400 m. W Yunnan.

**57. *Vaccinium scopulorum*** W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 9: 135. 1916.

岩生越桔 yan sheng yue ju

Shrubs evergreen, terrestrial or epiphytic, 1.2–2(–5) m tall, with inflated root tubers. Twigs rounded to angled, densely brown setose-hispid or glandular setose, glabrescent, scabrous, densely punctiform-lenticellate; persistent bud scales scattered, lanceolate. Leaves quite dense; petiole very short or leaves sessile; leaf blade lanceolate or oblanceolate, 2.5–4.5 × 0.6–1.7 cm, papery, glabrous or adaxially puberulous at base of midvein, secondary veins 5–7 pairs, secondary and fine veins raised on both surfaces, base cuneate, margin plane, sparsely serrulate,

apex acute or slightly obtuse, mucronulate. Inflorescences from defoliate to upper foliate axils, racemose, 2–5 cm, slender, glabrous, with persistent bud scales, ca. 5-flowered; bracts caducous, ovate-lanceolate, 1.5–2 mm, glandular ciliate. Pedicel 0.8–1.2 cm, glabrous. Hypanthium 0.8–1.3 mm, glabrous; calyx lobes ovate-triangular, 0.8–1 mm. Corolla greenish white or greenish yellow, urceolate, ca. 5 mm, glabrous; lobes reflexed, ca. 0.5 mm. Filaments ca. 1 mm, glabrous; anthers ca. 4 mm, without spurs; tubules ca. 2 × as long as thecae. Berry 10-pseudoloculed, 4–5 mm in diam. Fl. Mar–Apr, fr. May–Aug.

Montane forests, sometimes epiphytic on trunks of old trees, rocks; 1500–3300 m. W Yunnan [Bhutan, Myanmar].

**58. *Vaccinium papulosum*** C. Y. Wu & R. C. Fang, Acta Bot. Yunnan. 9: 388. 1987.

瘤果越桔 liu guo yue ju

Shrubs evergreen, ca. 1 m tall, few branched, glabrous. Twigs rounded, when older strongly white lenticellate; persistent bud scales few. Leaves scattered; petiole 2–6 mm; leaf blade rhombic-elliptic or oblong-lanceolate, 12–18.5 × 3.5–9 cm, thinly leathery, glabrous, secondary veins 8–14 pairs, fine veins slightly raised on both surfaces, base cuneate, margin sparsely obtusely dentate, with 1 basal gland per side, apex acute or acuminate. Inflorescences from foliate or defoliate axils, racemose, 2–3.5 cm, slender, many secund flowered; bracts unknown. Pedicel 6–7 mm. Hypanthium with several small, rounded verrucae; calyx lobes triangular, ca. 0.5 mm. Corolla yellow, urceolate, ca. 5 mm; lobes small. Filaments ca. 0.7 mm; anthers ca. 4.5 mm, without spurs; tubules ca. 2 × as long as thecae. Immature berry verruculose. Fl. Apr–May.

- Evergreen forests; 700–1900 m. SE Xizang (Médog).

**59. *Vaccinium subdissitifolium*** P. F. Stevens, J. Arnold Arbor. 66: 484. 1985.

梯脉越桔 ti mai yue ju

*Vaccinium scalarinervium* C. Y. Wu & R. C. Fang; *V. vacciniaceum* (Roxburgh) Sleumer var. *hispidum* (C. B. Clarke) Sleumer; *V. venosum* Wight var. *hispidum* C. B. Clarke.

Shrubs evergreen, usually epiphytic, 0.4–2 m tall. Twigs angled, scabrous, dark brownish hispid; persistent bud scales few. Leaves ± scattered; petiole ca. 2 mm; leaf blade oblong, oblong-obovate, or oblong-lanceolate, 4.5–6(–10) × 1.5–2(–4) cm, papery or leathery, secondary veins 6–10 pairs, fine veins raised abaxially, flat adaxially, base broadly cuneate to narrowly rounded, margin plane, obtusely dentate, apex acute or shortly acuminate. Inflorescences racemose, 5–15 cm, with persistent bud scales, many flowered; bracts ovate-lanceolate, ca. 3.5 mm. Pedicel 1–1.5 cm. Hypanthium ca. 1 mm, glabrous, with several small, rounded verrucae; calyx lobes triangular, less than 1 mm. Corolla greenish yellow, urceolate, ca. 6 mm, 5-angled, glabrous; lobes ca. 0.5 mm. Filaments 0.8–1 mm, glabrous; anthers ca. 3 mm, without spurs; tubules to 1.5 × as long as thecae. Berry 10-pseudoloculed, greenish white, globose, ca. 3 mm in diam. Fl. Aug, fr. Mar–Apr of next year.

Evergreen forests, usually epiphytic on trees; 1500–1800 m. SE Xizang (Médog) [Bhutan, NE India (Assam), Sikkim].

**60. *Vaccinium lanigerum*** Sleumer, Bot. Jahrb. Syst. 71: 443. 1941.

羽毛越桔 yu mao yue ju

Shrubs evergreen, usually epiphytic, ca. 2 m tall, sparsely branched. Twigs terete, densely brown feathery-setiferous, glabrescent; bud scales inconspicuous. Leaves scattered; petiole 2–3 mm, indumentum same as stem; leaf blade oblong-ovate to broadly ovate, 8.5–11 × 3–4.5 cm, somewhat papery, abaxially densely brown feathery-setiferous, adaxially pubescent to glabrescent, secondary veins 2–4 pairs, strongly ascending, slightly raised (obscured by hairs) on both surfaces, base rounded or broadly cuneate, margin slightly recurved, entire, apex abruptly acuminate to 1.5–3 cm. Inflorescences fasciculate, 2- or 3-flowered; bracts persistent, many, imbricate, brown-yellow or brown-red, oblong, 7–10 × 5–7 mm, leathery, densely appressed pubescent. Pedicel ca. 1 mm or flowers subsessile. Hypanthium ca. 1.5 mm, glabrous; calyx lobes narrowly triangular, 2–3 mm, abaxially hispid and densely ciliate. Corolla greenish brown, subcampanulate, ca. 7 mm, glabrous; lobes reflexed, ca. 1/2 as long as tube, lanceolate, abaxially ?glabrous, adaxially ?hispid. Filaments ca. 1.5 mm, puberulous; anthers ca. 5 mm, with 2 spreading spurs; tubules 1.5–2 × as long as thecae. Berry 10-pseudoloculed, dark purple or red, included in bracts.

Evergreen forests, usually epiphytic on trees, rocks; 1200–1400 m. SE Xizang (Médog), NW Yunnan (Dulongjiang, Gongshan) [Myanmar].

**61. *Vaccinium cuspidifolium*** C. Y. Wu & R. C. Fang, Acta Bot. Yunnan. 9: 390. 1987.

凸尖越桔 tu jian yue ju

Shrubs evergreen. Twigs ?angled, densely pubescent; bud scales inconspicuous. Leaves rather dense; petiole ca. 2 mm, pubescent to glabrous; leaf blade elliptic, 2.5–3.8 × 1.2–1.8 cm, leathery, abaxially glabrous, adaxially densely pubescent on midvein, glabrescent, secondary veins 6 or 7 pairs, fine veins ± inconspicuous abaxially, subprominent adaxially, base broadly cuneate, margin revolute, entire, with 1 basal gland per side, apex abruptly acute. Inflorescences racemose, 2–3 mm, pubescent and glandular pilose, 2- or 3-flowered; bracts caducous. Pedicel 3–4 mm, pubescent and glandular pilose. Perianth unknown. Stamens persistent; filaments ca. 1 mm, subglabrous; anthers ca. 2.5 mm, with 2 spreading spurs; tubules 1.5–2 × as long as thecae. Immature berry glabrous; persistent calyx lobes triangular-lanceolate, ca. 2 mm. Fr. Jul.

- Montane forests. NW Guangxi.

**62. *Vaccinium lamprophyllum*** C. Y. Wu & R. C. Fang, Acta Bot. Yunnan. 9: 390. 1987.

亮叶越桔 liang ye yue ju

Shrubs evergreen, many branched. Twigs ?terete, densely pubescent, glabrescent; bud scales inconspicuous. Leaves dense; petiole ca. 2 mm, initially pubescent, glabrescent; leaf blade oblong-obovate, 2–3 × 0.9–1.4 cm, leathery, abaxially sparsely

appressed-setose, adaxially nitid, puberulous only on midvein, secondary veins ca. 3 pairs, these and fine veins inconspicuous abaxially, hardly raised adaxially, base broadly cuneate, margin plane, entire, with 1 basal gland per side, cartilaginous, apex acute. Inflorescences racemose, 1.2–2 cm, glabrous, few flowered; bracts unknown. Pedicel ca. 7 mm, glabrous. Flowers unknown. Immature berry glabrous; persistent calyx lobes triangular-lanceolate, 2.5–3 mm. Fl. and fr. Jun.

- Montane dwarf forests; ca. 1200 m. W Guangdong (Fengkai).

**63. *Vaccinium conchophyllum*** Rehder, J. Arnold Arbor. 11: 167. 1930.

贝叶越桔 *bei ye yue ju*

Shrubs evergreen, sometimes epiphytic, 0.2–0.3 m tall. Twigs terete, spreading pilose, glabrescent; bud scales inconspicuous. Leaves dense; petiole 1–2 mm; leaf blade broadly ovate or obovate, 8–14 × 6–9 mm, thickly leathery, abaxially glabrous, adaxially pilose or only on midvein, secondary veins 3 or 4 pairs, ascending, inconspicuous abaxially, inconspicuous or impressed adaxially, base broadly cuneate to rounded, margin revolute, entire, with 1 basal gland per side, initially ciliate, glabrescent, apex rounded. Inflorescences racemose, ca. 1 cm, glabrous, 4–6-flowered; bracts caducous, oblong, ca. 5 mm, glabrous. Pedicel 1–2 mm. Hypanthium ca. 0.6 mm, glabrous; calyx lobes triangular-ovate, 1–1.5 mm. Corolla red, urceolate, 4–5 mm, glabrous; lobes reflexed, triangular, ca. 0.5 mm. Filaments ca. 1 mm, pilose; anthers ca. 2.5 mm, with 2 spurs, tubules slightly longer than thecae. Immature berry 10-pseudoloculed, greenish, with a slight bloom. Fl. Apr–May, fr. Aug–Sep.

- Rocks in forests, sometimes epiphytic on trees; 1300–2800 m. C and SE Sichuan.

**64. *Vaccinium sinicum*** Sleumer, Bot. Jahrb. Syst. 71: 440. 1941.

广西越桔 *guang xi yue ju*

Shrubs evergreen, sometimes epiphytic, 0.4–2 m tall, many branched. Twigs angled, densely spreading pubescent, glabrescent; bud scales inconspicuous. Leaves dense; petiole ca. 2 mm; leaf blade obovate or oblong-obovate, 0.9–2 × 0.8–1.1 cm, leathery, abaxially glabrous, adaxially puberulous on midvein, otherwise glabrous, secondary veins ca. 3 pairs, inconspicuous abaxially, ± curved adaxially, base cuneate, margin revolute, entire, with 1 basal gland per side, apex rounded, mucronate. Inflorescences racemose, 0.6–1.2 cm, with hairs or not, 3–7-flowered; bracts caducous, oblong, 6–7 mm. Pedicel 2–3 mm, glabrous. Hypanthium ca. 1 mm, glabrous; calyx lobes triangular, 1.5–2 mm, glabrous, apex obtuse. Corolla white, campanulate, ca. 5 mm, abaxially glabrous; lobes very short. Filaments ca. 1 mm, pilosulose or subglabrous; anthers ca. 2.8 mm, with 2 spreading spurs; tubules ca. 1.5 × as long as thecae. Berry 10-pseudoloculed, dark purple, subglobose, 3–6 mm in diam. Fl. Jun, fr. Jul–Nov.

- Forests, sometimes epiphytic on *Quercus*, rocks; 1200–1700 m. Fujian, Guangdong, Guangxi, Hunan.

**65. *Vaccinium brevipedicellatum*** C. Y. Wu ex W. P. Fang & Z. H. Pan, Acta Phytotax. Sin. 19: 107. 1981.

短梗乌饭 *duan geng wu fan*

Shrubs or small trees, evergreen, 1–3(–8) m tall, many branched. Twigs angled, densely pubescent, glabrescent. Leaves dense; petiole 1.5–2 mm, pubescent; leaf blade elliptic, 1.5–2 (–3) × 0.8–1.2 cm, leathery, glabrous or adaxially pubescent on midvein, secondary veins 1 or 2 pairs, ascending, inconspicuous abaxially, slightly raised adaxially, base cuneate or broadly cuneate, margin revolute, entire, with 1 basal gland per side, apex obtuse-acuminate. Inflorescences racemose, ca. 2 cm, pubescent, 1- or 2(or 3)-flowered; bracts caducous. Pedicel ca. 1 mm, pubescent. Hypanthium glabrous; calyx lobes triangular-lanceolate, ca. 1.5 mm. Corolla pale green, campanulate, 3–4 mm; lobes reflexed. Filaments ca. 0.5 mm, pubescent; anthers ca. 2.3 mm, with 2 short spurs; tubules ca. 2 × as long as thecae. Berry 10-pseudoloculed, red to purple-black, 4–5 mm in diam. Fl. May, fr. Jun–Nov.

- Forests on calcareous mountains; 1000–1600 m. SE Yunnan.

**66. *Vaccinium craspedotum*** Sleumer, Bot. Jahrb. Syst. 71: 439. 1941.

长萼越桔 *chang e yue ju*

*Vaccinium craspedotum* var. *brevipes* C. Y. Wu.

Shrubs evergreen, usually epiphytic, 0.5–1.2 m tall. Twigs rounded, densely hispid, glabrescent, rough; bud scales inconspicuous. Leaves dense; petiole ca. 1 mm, indumentum same as stem; leaf blade ovate, 1.3–2.4 × 0.8–1.4 cm, leathery, subglabrous, secondary veins ca. 3 pairs, ascending, inconspicuous on both surfaces, fine veins inconspicuous, base rounded or broadly cuneate, margin plane, entire, with 1 basal gland per side, apex obtuse, emarginate. Inflorescences racemose, ca. 1 cm, with several ovate scales at base, 1–3-flowered; bracts ca. 3 mm. Pedicel 5–6 mm or flowers subsessile, densely hispid. Hypanthium ?ca. 7 mm, densely hispid; calyx lobes lanceolate-subulate, 4–5 mm, pilose. Corolla white, campanulate, ca. 4 mm, sparsely puberulous or subglabrous; lobes erect. Filaments ca. 2 mm, pubescent; anthers ca. 2 mm with 2 distinct spurs; tubules ca. as long as thecae. Berry 10-pseudoloculed, globose, 5–6 mm in diam., with hairs. Fl. Apr–May, fr. Aug–Nov.

- Dense forests, usually epiphytic on trees, rocky hills; 1200–1900 m. SE Yunnan (Pingbian).

**67. *Vaccinium sciaphilum*** C. Y. Wu, Acta Bot. Yunnan. 9: 392. 1987.

林生越桔 *lin sheng yue ju*

Shrubs evergreen, usually epiphytic, 0.5–0.6 m tall. Roots with beadlike swellings. Twigs terete, densely pubescent, glabrescent; bud scales caducous. Leaves dense; petiole ca. 2 mm, pubescent; leaf blade obovate, elliptic, or broadly ovate, 1.3–2 × 0.6–1(–1.4) cm, leathery, abaxially sparsely brown glandular hispid, adaxially glabrous, secondary veins 2 or 3 pairs from basal half, fine veins inconspicuous, base cuneate to broadly cuneate, margin revolute, entire, with 1 basal gland per side, apex rounded, emarginate. Flowers solitary or sometimes 2 together; bracts unknown. Pedicel ca. 3 mm, densely pubescent. Hypanthium densely hispid; calyx lobes triangular-ovate, ca. 2 mm,

densely pubescent. Corolla greenish purple, broadly campanulate, ca. 5 mm, glabrous, lobed to middle; lobes reflexed at apex, oblong. Filaments ca. 1 mm, glabrous; anthers ca. 1.5 mm, with 2 subspreading spurs; tubules ca. as long as thecae. Berry 5–6 mm in diam., pubescent. Fl. May, fr. Sep–Nov.

• Evergreen forests, usually epiphytic on trees; 1700–2200 (–2800) m. SC and SE Yunnan.

**68. *Vaccinium papillatum*** P. F. Stevens, J. Arnold Arbor. 66: 479. 1985.

粉果越桔 *fen guo yue ju*

*Agapetes poilanei* Dop.

Shrubs evergreen, usually epiphytic, 1–2 m tall. Roots with swellings. Twigs terete, pubescent to glabrous; bud scales inconspicuous. Leaves dense; petiole ca. 2 mm; leaf blade elliptic, 1.5–2.6 × 0.9–1.2 cm, thickly leathery, glabrous, adaxially drying rugose, secondary veins 1 or 2 pairs near base, ascending, raised abaxially, impressed adaxially, base broadly cuneate, margin revolute, entire, with 2 basal glands per side, apex rounded or obtuse, emarginate. Inflorescences racemose, 1.5–2.5 cm, glabrous, 3–6-flowered; bracts ovate, ca. 2 mm. Pedicel 0.5–1 cm, slender, glabrous. Hypanthium 1–1.2 mm, pubescent; calyx lobes triangular, 1.5–2.1 mm. Corolla purplish red or pink, campanulate, 4.5–6 mm, glabrous; lobes reflexed, ca. 1.5 mm. Filaments 0.5–1 mm, pilose; anthers ca. 4 mm, with 2 short spurs; tubules ca. 1.5 × as long as thecae. Berry 10-pseudoloculed, ca. 5 mm in diam., with a bloom; fruit stalk ca. 1.3 cm, stout. Fl. Apr–May, fr. Sep–Nov.

Evergreen forests, forests or thickets on calcareous mountains, usually epiphytic on trees; (1000–)1400–2000 m. SE Yunnan [W Vietnam].

**69. *Vaccinium emarginatum*** Hayata, J. Coll. Sci. Imp. Univ. Tokyo 25(19): 149. 1908.

凹顶越桔 *ao ding yue ju*

*Agapetes emarginata* (Hayata) Nakai.

Shrubs evergreen, epiphytic. Twigs inconspicuously angled; bud scales inconspicuous. Leaves scattered; petiole 2–3 mm; leaf blade obovate-elliptic, 2.5–3(–5) × 0.9–2 cm, thickly leathery, abaxially brownish, adaxially usually glaucous, midvein prominent abaxially, raised adaxially, secondary veins ca. 2 pairs, barely evident, base cuneate, margin revolute, entire, with 1 basal gland per side, apex rounded-emarginate. Inflorescences racemose, 0.2–1(–1.5) cm, glabrous, 2–5-flowered; bracts ca. 1.5 mm. Pedicel angled-winged, 5–10 mm, pubescent. Hypanthium ca. 1 mm, glabrous or pubescent; calyx lobes lanceolate, 2–2.2 mm, ciliolate or pubescent. Corolla white, campanulate, 5–6 mm, glabrous; lobes reflexed, ca. 1.4 mm. Filaments ca. 1 mm, puberulous; anthers ca. 4 mm, with 2 spreading spurs; tubules ca. 2 × as long as thecae. Berry 10-pseudoloculed, ca. 5 mm in diam. Fl. Apr–May.

• Evergreen forests, epiphytic on trees; 1200–2000(–3500) m. Taiwan.

**70. *Vaccinium chengiae*** W. P. Fang, Icon. Pl. Omei. 1(1): t. 39. 1942 [“*chengae*”].

四川越桔 *si chuan yue ju*

Shrubs evergreen, sometimes epiphytic, 0.5–1.5 m tall. Twigs angled, pilose, glabrescent; bud scales inconspicuous. Leaves dense; petiole 1–2 mm, pilose to glabrescent; leaf blade elliptic or elliptic-oblong, 1.7–2.2 × 1–1.4 cm, leathery, glabrous, abaxially glaucous, adaxially drying rugose, secondary veins inconspicuous, base broadly cuneate to rounded, margin revolute, entire, with 1 basal gland per side, apex obtuse to rounded, retuse. Inflorescences racemose, to 5 mm, subglabrous, 2–4-flowered; bracts ca. 1 mm, ovate or ovate-triangular, sparsely ciliate. Pedicel 3–5 mm, subglabrous or villous. Hypanthium glabrous or villous; calyx lobes triangular-ovate, 1.5–2 mm, ciliate. Corolla white or yellowish white, with pinkish stripes, campanulate, 5–6 mm, glabrous. Filaments ca. 1 mm, sparsely pubescent; anthers ca. 2 mm, with 2 spreading spurs; tubules ca. 2 × as long as thecae. Berry purplish, ca. 6 mm in diam. Fl. May, fr. Nov.

• Thickets, rocky places on slopes, sometimes epiphytic on trees; 1000–1600 m. S and SC Sichuan.

- 1a. Pedicel and calyx subglabrous ..... 70a. var. *chengiae*
- 1b. Pedicel and calyx villous ..... 70b. var. *pilosum*

**70a. *Vaccinium chengiae* var. *chengiae***

四川越桔(原变种) *si chuan yue ju* (*yuan bian zhong*)

Pedicel and calyx subglabrous.

• Thickets; ca. 1200 m. SC Sichuan (Emei Shan).

**70b. *Vaccinium chengiae* var. *pilosum*** C. Y. Wu, Acta Bot. Yunnan. 9: 393. 1987.

毛萼四川越桔 *mao e si chuan yue ju*

Pedicel and calyx villous.

• Rocky places on slopes, sometimes epiphytic on trees; 1000–1600 m. S and SC Sichuan (Emei Shan, Hongya, Leibo).

**71. *Vaccinium saxicola*** Chun ex Sleumer, Bot. Jahrb. Syst. 71: 439. 1941.

石生越桔 *shi sheng yue ju*

Shrubs evergreen, 13–17 cm. Lower stem procumbent. Twigs terete, pubescent, glabrescent; bud scales inconspicuous. Leaves dense; petiole 1–2 mm, glabrous; leaf blade oblong-obovate, 1.9–2.4 × 1–1.3 cm, thickly leathery, glabrous, secondary veins slightly raised abaxially, fine veins impressed, base cuneate or broadly cuneate, margin revolute, entire, basal glands inconspicuous, apex rounded to obtuse, retuse. Inflorescences racemose, 4–5 mm, glabrous, 1- or 2-flowered; bracts ovate, 1–1.2 mm, glabrous, apex acute. Pedicel ca. 5 mm, subglabrous. Hypanthium sparsely pubescent; calyx limb divided to 1/2; calyx lobes triangular, ca. 2 mm. Corolla white, campanulate, 6–7 mm, glabrous, shortly 5-lobed. Filaments ca. 1.5 mm, puberulous; anthers ca. 6.5 mm, with 2 distinct spurs; tubules ca. 2 × as long as thecae. Immature berry 10-pseudoloculed; pedicel 8–9 mm. Fl. Mar–Apr, fr. May–Nov.

• Rocks. W Guangdong (Xinyi).

**72. *Vaccinium triflorum*** Rehder, J. Arnold Arbor. 15: 287.

1934.

三花越桔 san hua yue ju

*Pieris buxifolia* H. Léveillé & Vaniot, Bull. Soc. Bot. France 53: 203. 1906; *Vaccinium buxifolium* (H. Léveillé & Vaniot) H. Léveillé (1913), not Gilbert (1782), nor Salisbury (1805–1806), nor J. D. Hooker (1852).

Shrubs evergreen, 0.6–1 m tall. Twigs terete, pubescent, glabrescent; bud scales inconspicuous. Leaves dense; petiole 1–2 mm, pubescent; leaf blade elliptic, 1.4–2.3 × 0.7–1.4 cm, leathery, abaxially glabrous or pilose on midvein, adaxially glabrous, drying convex and rugose, secondary veins 1 pair, fine veins inconspicuous, base cuneate to broadly cuneate or sometimes rounded, margin revolute, entire, with 1 (or 2) small basal glands per side, apex rounded, often retuse. Inflorescences from older axils, racemose, 3–4 mm, pubescent, with persistent bud scales, (1- or)2- or 3(–5)-flowered; bracts caducous, ca. 1.5 mm. Pedicel 6–9 mm, pilose. Hypanthium ca. 1 mm, pubescent or glabrous; calyx lobes triangular-lanceolate, 1.5–2 mm. Corolla dark red, campanulate, ca. 5 mm, 5-veined, puberulous on veins; lobes ca. 2 mm. Filaments 1–1.5 mm, pilose; anthers ca. 4.5 mm, with 2 short erect spurs; tubules ca. 2 × as long as thecae. Berry 10-pseudoloculed (from flower). Fl. Apr–Jun.

Forests on calcareous mountains; 1700–1800 m. S Guizhou, SE Yunnan [N Vietnam].

**73. *Vaccinium pseudotonkinense*** Sleumer, Bot. Jahrb. Syst. 71: 440. 1941.

腺萼越桔 xian e yue ju

Shrubs evergreen, sometimes epiphytic, 0.6–1 m tall. Twigs terete, pubescent, glabrescent; bud scales inconspicuous. Leaves dense; petiole 1–2 mm; leaf blade elliptic or obovate, 1.5–2 × 0.8–1.1 cm, leathery, both surfaces initially pubescent, adaxially drying rugose, secondary veins 2 or 3 pairs, inconspicuous, base cuneate, margin revolute, entire, basal glands 1 or 2, apex rounded. Inflorescences from older axils, racemose, ca. 3 mm, 1- or 2-flowered; bracts ovate, ca. 2 mm, ciliate. Pedicel ca. 4 mm, glabrous. Hypanthium glabrous, rarely pubescent; calyx lobes triangular-lanceolate, ca. 2 mm, glabrous or pubescent, ciliate and glandular at margin. Corolla greenish brown, 5–7 mm. Filaments 1–1.5 mm, pilose; anthers ca. 4.5 mm, with 2 erect spurs; tubules 1.5–2 × as long as thecae. Berry 10-pseudoloculed, yellowish green to pink, subglobose, ca. 7 mm in diam. Fl. Jul–Aug, fr. Nov.

Evergreen forests, sometimes epiphytic on trees; 1800–2200 m. E Yunnan [N Vietnam].

**74. *Vaccinium spiculatum*** C. Y. Wu & R. C. Fang, Acta Bot. Yunnan. 9: 393. 1987.

小尖叶越桔 xiao jian ye yue ju

Shrubs evergreen, epiphytic, much branched. Twigs angled, densely dark brown hirsute, glabrescent; bud scales caducous. Leaves dense; petiole 0.5–1 mm; leaf blade elliptic or ovate-elliptic, 7–10 × 4–6 mm, papery or leathery, glabrous, secondary veins 1–3 pairs, from basal half, base broadly cu-

neate, margin slightly revolute, with 3–5 teeth at upper part of each side, apex acute, apiculate. Flowers solitary, axillary; bracts unknown. Pedicel ca. 0.5 mm. Flowers 4-merous. Hypanthium white pubescent; calyx lobes triangular-lanceolate, ca. 1 mm. Corolla white, tubular-urceolate, ca. 5.5 mm, densely pubescent; lobes minute. Stamens 4; filaments 1–1.5 mm, glabrous; anthers 2–2.5 mm, without spurs; tubules ca. 1/2 as long as thecae. Berry bluntly ellipsoid, 2–3 mm in diam. Fl. Nov–Jan of next year, fr. Feb.

• Evergreen forests, epiphytic on trees; 600–2000 m. SE Xizang (Médog).

**75. *Vaccinium sikkimense*** C. B. Clarke in J. D. Hooker, Fl. Brit. India 3: 451. 1882.

莢蒾叶越桔 jia mi ye yue ju

*Vaccinium oreotrephe* W. W. Smith; *V. viburnoides* Rehder & E. H. Wilson.

Shrubs evergreen, 30–70 cm tall, many branched. Twigs angled, densely grayish brown pubescent, glabrescent, with scattered lenticels; bud scales inconspicuous. Leaves rather dense; petiole ca. 3 mm, pubescent; leaf blade oblong or obovate, 2–5 × 0.9–2.7 cm, leathery, adaxially densely pubescent on midvein, otherwise subglabrous on both surfaces, secondary veins 4 or 5 pairs, ascending, with fine veins inconspicuously raised abaxially, impressed adaxially, base cuneate or broadly cuneate, margin plane, with glandular teeth, apex rounded, mucronulate. Inflorescences axillary or terminal, racemose, 1–2 cm, pubescent, ca. 6-flowered; bracts caducous, ovate-orbicular, sometimes leaflike, 0.7–2 cm × 5–8 mm. Pedicel ca. 6 mm, glabrous. Hypanthium ca. 1.5 mm, glabrous; calyx limb divided to 1/2; calyx lobes broadly triangular or undulate, 0.3–0.6 mm. Corolla pinkish, with red limbs, urceolate, ca. 6 mm, glabrous; lobes recurved, ca. 0.8 mm. Filaments 1.3–2 mm, densely spreading pubescent; anthers ca. 2.3 mm, with 2 erect spurs; tubules ca. as long as thecae. Berry 10-pseudoloculed, dark blue, 5–9 mm in diam. Fl. Jul, fr. Aug–Nov.

• Mixed forests, forest margins, alpine thickets; 3000–3400 (–4300) m. W Sichuan, SE Xizang, W Yunnan.

**76. *Vaccinium vitis-idaea*** Linnaeus, Sp. Pl. 1: 351. 1753.

越桔 yue ju

*Vaccinium jesoense* Miquel.

Shrubs dwarf, evergreen, 10–30 cm tall, erect or prostrate basally, rhizomatous. Twigs terete, pubescent; bud scales inconspicuous. Leaves dense; petiole ca. 1 mm, puberulous; leaf blade elliptic or obovate, 0.7–2 cm × 4–8 mm, leathery, abaxially with appressed glandular hairs, adaxially glabrous or puberulous on midvein, secondary veins 5 or 6 pairs, fine veins inconspicuous on both surfaces, base broadly cuneate, margin revolute, undulate-crenate, apex rounded, mucronulate, or retuse. Inflorescences terminal, racemose, 1–1.5 cm, puberulous, 2–8-flowered; bracts caducous, broadly ovate, ca. 3 mm. Pedicel ca. 1 mm, puberulous; bracteoles ± median. Flowers 4-merous. Hypanthium glabrous; calyx lobes broadly triangular, ca. 1 mm. Corolla white or pink, campanulate, ca. 5 mm; lobes

erect, triangular-ovate, 2–2.5 mm. Filaments ca. 0.5 mm, puberulous; anthers ca. 1.5 mm, without spurs; tubules ca. as long as thecae. Berry 4-loculed, purplish red, 5–10 mm in diam., acidic or slightly bitter. Fl. Jun–Jul, fr. Aug–Sep.  $2n = 24^*$ .

*Betula* and *Larix* forest, meadows, alpine grasslands; 900–3200 m. Heilongjiang, Jilin, Nei Mongol, Shanxi, Xinjiang [Japan, Korea, Mongolia, Russia; Europe, North America].

The berries are nutritious, and are especially tasty after overwintering.

**77. *Vaccinium delavayi*** Franchet, J. Bot. (Morot) 9: 367. 1895.

苍山越桔 *cang shan yue ju*

Shrubs evergreen, terrestrial or epiphytic, prostrate, or 0.5–1 m tall, many branched; rootstock swollen. Twigs angled, grayish brown pubescent and brown glandular setose; bud scales inconspicuous. Leaves dense; leaf blade obovate, 0.7–1.5 cm × 4–9 mm, leathery, glabrous, secondary veins ca. 3 pairs, inconspicuous abaxially, impressed adaxially, base cuneate, margin plane, cartilaginous, with 1 basal gland per side, sparsely denticulate or subentire, usually sparsely deciduously glandular ciliate, apex rounded, retuse. Inflorescences pseudoterminal, racemose, 1–3 cm, pubescent and glandular setose, 4–8-flowered; bracts caducous, ovate, 5–6 mm. Pedicel 2–4 mm, pubescent and glandular setose. Hypanthium ca. 1 mm, glabrous; calyx limb divided to 1/2; calyx lobes broadly triangular, ca. 0.8 mm, ciliate. Corolla white or pinkish, urceolate, 3–5 mm, glabrous; lobes erect, ca. 0.7 mm. Filaments ca. 1 mm, subglabrous or retrorse-pilose; anthers ca. 2.3 mm, thecae with 2 spreading spurs; tubules ca. as long as thecae. Berry 10-pseudoloculed, dark purple, 4–8 mm in diam. Fl. Mar–May.

Forests, *Tsuga-Rhododendron* forests, sometimes epiphytic on trees, alpine *Rhododendron* thickets, ridges, dry slopes, rocks; 2000–3700(–3800) m. SW Sichuan, Taiwan, SE Xizang, Yunnan [Myanmar].

- 1a. Filaments subglabrous ..... 77a. subsp. *delavayi*
- 1b. Filaments retrorse-pilose ..... 77b. subsp. *merrillianum*

**77a. *Vaccinium delavayi* subsp. *delavayi***

苍山越桔(原亚种) *cang shan yue ju (yuan ya zhong)*

Filaments subglabrous.

Forests, *Tsuga-Rhododendron* forests, sometimes epiphytic on trees, alpine *Rhododendron* thickets, dry slopes, rocks; 2400–3200 (–3800) m. SW Sichuan, SE Xizang, Yunnan [Myanmar].

**77b. *Vaccinium delavayi* subsp. *merrillianum*** (Hayata) R. C. Fang, Acta Bot. Yunnan. 9: 394. 1987.

台湾越桔 *tai wan yue ju*

*Vaccinium merrillianum* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 25(19): 149. 1908; *Agapetes merrilliana* (Hayata) Nakai; *Vaccinium vitis-idaea* Linnaeus var. *merrillianum* (Hayata) S. S. Ying.

Filaments retrorse-pilose.

• Forests, sometimes epiphytic on trees in high mountains, ridges, sometimes prostrate on rocks; 2000–3700 m. Taiwan.

**78. *Vaccinium nummularia*** J. D. Hooker & Thomson ex C. B. Clarke in J. D. Hooker, Fl. Brit. India 3: 451. 1882.

抱石越桔 *bao shi yue ju*

*Vaccinium nummularia* var. *oblongifolium* C. Y. Wu & R. C. Fang.

Shrubs evergreen, sometimes epiphytic, 0.5–0.7 m tall, much and diffusely branched. Twigs rounded, pubescent and densely brownish glandular setulose, glabrescent, scabrous; bud scales inconspicuous. Leaves dense; petiole ca. 1 mm, pubescent; leaf blade ovate, ovate-orbicular, or oblong, 1–2.3 × 0.7–1.2 cm, leathery or thinly so, adaxially puberulous on midvein, otherwise glabrous on both surfaces, secondary veins 3 or 4 pairs, veins and fine veins inconspicuous and raised abaxially, impressed adaxially, base rounded, margin revolute, cartilaginous, with 1 or 2 basal glands per side, sparsely denticulate. Inflorescences pseudoterminal, racemose, densely pubescent, 0.6–1.5 cm; bracts caducous, broadly ovate, ca. 4 mm. Pedicel 6–7 mm, glabrous. Hypanthium ca. 0.7 mm, glabrous; calyx lobes broadly triangular or undulate, ca. 0.8 mm, ciliate. Corolla white, pinkish above, urceolate, 5–6 mm; lobes erect or reflexed, 0.5–0.8 mm. Filaments 1.5–2 mm, densely pilose; anthers ca. 2.5 mm, thecae with 2 spreading spurs; tubules ca. as long as thecae. Berry 10-pseudoloculed, dark purple. Fl. May, fr. Jul–Aug.

Rocky places in montane forests, sometimes epiphytic, thickets on mountain slopes; 2000–3500 m. SE Xizang, NW Yunnan (Gongshan) [Bhutan, NE India, Myanmar, Nepal, Sikkim].

**79. *Vaccinium chaetothrix*** Sleumer, Bot. Jahrb. Syst. 71: 432. 1941.

团叶越桔 *tuan ye yue ju*

Shrubs evergreen, epiphytic, many diffuse or pendulous branched. Twigs rounded, pubescent and brownish glandular setulose, glabrescent; bud scales inconspicuous. Leaves dense; petiole ca. 1 mm; leaf blade ovate to suborbicular, 4–8 × 3–7 mm, leathery, glabrous, abaxially brown or pale brown, adaxially drying grayish green and rugose, secondary veins 2 or 3 pairs, barely conspicuous, raised abaxially, impressed adaxially, fine veins inconspicuous, base rounded, margin revolute, cartilaginous, sparsely denticulate, apex rounded. Inflorescences pseudoterminal, racemose, setose below, 6–8-flowered; bracts caducous, to 3 mm. Pedicel 6–8 mm, pubescent or glabrous. Hypanthium glabrous; calyx lobes broadly triangular, slightly ciliate. Corolla white, tubular-urceolate, ca. 6.5 mm, glabrous; lobes ca. 0.8 mm. Filaments ca. 1.5 mm, hairy; anthers ca. 3 mm, thecae with 2 spurs; tubules ca. as long as thecae. Berry 10-pseudoloculed, dark purple, 6–8 mm in diam. Fl. Jun, fr. Jul–Oct.

Broad-leaved forests, *Abies* or *Tsuga* forests, epiphytic on trees; 2500–3200 m. SE Xizang (Médog), NW Yunnan (Gongshan) [NE India (Assam), Myanmar].

**80. *Vaccinium moupinense*** Franchet, Nouv. Arch. Mus. Hist. Nat., sér. 2, 10: 43. 1888.

宝兴越桔 *bao xing yue ju*

*Vaccinium sikangense* Y. C. Yang.

Shrubs evergreen, epiphytic, 0.5–1.2 m tall, many branched. Twigs rounded, densely grayish pubescent, glabrescent; bud

scales inconspicuous. Leaves dense; petiole 1–2 mm, pubescent; leaf blade elliptic, obovate-elliptic, or obovate-oblong, 0.7–1.7 cm × 4–8 mm, leathery, abaxially glabrous, adaxially drying rugose, sparsely pubescent or only puberulous on midvein, secondary veins ca. 3 pairs, ± ascending, secondary and fine veins conspicuous abaxially only, base cuneate, margin revolute, with inconspicuous obtuse teeth in upper part, apex obtuse to rounded. Inflorescences often pseudoterminal, racemose, 1.5–3 cm, glabrous, 6–15-flowered; bracts caducous, broadly ovate, 5–6 mm. Pedicel 3–4 mm, glabrous. Hypanthium ca. 1.5 mm, glabrous; calyx limb divided to 2/3; calyx lobes broadly triangular, ca. 1 mm. Corolla light purple to rose-pink, urceolate, ca. 4 mm, glabrous; lobes erect or reflexed, ca. 0.8 mm. Filaments ca. 1 mm, hairy; anthers ca. 3 mm, thecae with 2 spreading spurs; tubules ca. as long as thecae. Berry 10-pseudoloculed, black or black-purple, ca. 6 mm in diam. Fl. May–Jun, fr. Jul–Oct.

• Epiphytic on *Quercus* or *Tsuga*; (900–)1800–2400 m. Guizhou, WC Sichuan (Baoping), NE Yunnan.

**81. *Vaccinium haitangense*** Sleumer, Bot. Jahrb. Syst. 71: 434. 1941.

海棠越桔 hai tang yue ju

Shrubs dwarf, evergreen. Twigs terete, pubescent or subglabrous; bud scales inconspicuous. Petiole 1–2 mm; leaf blade oblong-elliptic, 2.2–2.6 × 1–1.2 cm, leathery, glabrous, secondary veins 3 pairs, ascending, slightly raised abaxially, impressed adaxially, base broadly cuneate, margin entire, apex gradually attenuate. Inflorescences at branch apices, racemose, 2–3 cm, glabrous, few flowered; bracts caducous, oblong, ciliate. Pedicel ca. 4 mm, glabrous. Hypanthium glabrous; calyx lobes triangular. Corolla pinkish, urceolate, 4–5 mm, glabrous. Filaments 1–1.5 mm, pilose; anthers ca. 3.5 mm, with 2 spurs; tubules slightly longer than thecae. Berry unknown.

• SC Sichuan (Ganluo).

The above description follows that in the protologue.

**82. *Vaccinium dendrocharis*** Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 62: 132. 1925.

树生越桔 shu sheng yue ju

Shrubs evergreen, usually epiphytic, 0.3–1(–2.6) m tall, many branched. Twigs angled, densely grayish brown pubescent, glabrescent. Leaves dense; petiole 1–2 mm, pubescent; leaf blade obovate or spatulate, 1–2.2 cm × 4–9 mm, leathery, glabrous or pubescent, secondary veins 2–4 pairs, ascending, raised abaxially, slightly impressed adaxially, or inconspicuous, base cuneate, margin cartilaginous, slightly revolute, entire, with 1 basal gland per side, apex rounded, retuse. Inflorescences terminal, racemose, pubescent or subglabrous, 1–3 cm; bracts caducous or persistent, obovate-elliptic, 6–9 mm, to 1.1–1.6 cm and leaflike at fruiting. Pedicel ca. 3 mm, glabrous; bracteoles lanceolate, 4–5 mm, caducous or persistent and enlarged in fruit. Hypanthium 0.8–1 mm, glabrous; calyx lobes broadly triangular, 0.5–1 mm, densely ciliate or glabrous. Corolla white or pinkish, urceolate, ca. 4.5 mm, glabrous; lobes erect, ca. 0.5 mm. Filaments ca. 1 mm; anthers ca. 2.5 mm, with

2 erect spurs; tubules ca. as long as thecae. Berry 10-pseudoloculed, dark purple, 5–8 mm in diam. Fl. May–Jul, fr. Jul–Oct.

Evergreen forests, *Abies* or *Tsuga* forests, mossy *Rhododendron* forests, usually epiphytic on trees, rocks; 2300–3500(–3800) m. SE Xizang, W Yunnan [Myanmar].

**83. *Vaccinium retusum*** (Griffith) J. D. Hooker ex C. B. Clarke in J. D. Hooker, Fl. Brit. India 3: 451. 1882.

西藏越桔 xi zang yue ju

*Thibaudia retusa* Griffith, Not. Pl. Asiat. 4: 300. 1854.

Shrubs dwarf, evergreen, often epiphytic, ca. 30 cm tall. Twigs diffuse, angled, densely pubescent when young, glabrescent. Leaves dense; petiole 2–3 mm, pubescent; leaf blade elliptic or obovate, 2–2.5 × 0.9–1.4 cm, leathery, adaxially puberulous on midvein, otherwise glabrous on both surfaces, secondary veins 2 or 3 pairs, ascending, slightly raised abaxially, inconspicuous adaxially, base cuneate, margin cartilaginous, revolute, entire, with 1 basal gland per side, apex rounded, retuse. Inflorescences pseudoterminal, racemose, 3–5 cm, ca. 12-flowered; rachis densely pubescent to glabrous; bracts ovate-orbicular, ca. 1.1 cm. Pedicel ca. 3 mm, glabrous. Hypanthium ca. 1.3 mm, glabrous; calyx lobes 0.8–1 mm, with marginal hairs. Corolla white, with 5 red stripes abaxially, urceolate, ca. 0.5 mm; lobes small. Stamens shorter than corolla, pilose; filaments ca. 0.5 mm; anthers ca. 3 mm, with 2 erect spurs; tubules ca. as long as thecae. Berry 10-pseudoloculed, black-purple, ca. 5 mm in diam. Fr. Jun.

Epiphytic or on rocks; ca. 2500 m. S Xizang, Yunnan [Bhutan, NE India, Myanmar, Nepal, Sikkim].

The above description of the flower follows that in the protologue and that by Clarke in Fl. Brit. India.

**84. *Vaccinium henryi*** Hemsley, J. Linn. Soc., Bot. 26: 15. 1889.

无梗越桔 wu geng yue ju

Shrubs deciduous, (0.5–)1–3 m tall, much branched. Twigs rounded, densely pubescent when young, lenticellate; bud scales inconspicuous. Leaves scattered; petiole 1–2 mm, densely pubescent; leaf blade ovate, ovate-oblong, or oblong, (1.5–)3–8 × (0.7–)1.5–4 cm, papery, both surfaces densely pubescent on midvein and secondary veins, secondary veins 4–6 pairs, slightly raised abaxially, flat adaxially, base cuneate or broadly cuneate to rounded, margin plane, entire, ciliate, apex acute or abruptly acuminate, mucronulate. Inflorescences terminal on short vegetative shoots, racemose; bracts persistent, leaflike, ca. 2 mm. Pedicel to 3 mm, densely pubescent or glabrous; bracteoles broadly triangular, less than 1 mm at anthesis, enlarged to 2–3 mm and 1-veined at fruiting, sometimes caducous. Hypanthium 0.5–1 mm, glabrous; calyx lobes broadly triangular, 0.5–1 mm, abaxially pubescent or glabrous. Corolla yellowish green, campanulate, 3–4.5 mm, glabrous; lobes reflexed, triangular, ca. 0.5 mm. Stamens 3–3.5 mm; filaments ca. 1.5 mm, pilose; anthers 1.5–2 mm, without spurs; tubules ca. as long as thecae. Berry 10-pseudoloculed, dark purple, 7–9 mm in diam. Fl. Jun–Jul, fr. Sep–Oct.

• Forests, thickets on mountain slopes; 700–2100 m. Anhui, Fujian, Gansu, Guizhou, Hubei, Hunan, Jiangxi, Shaanxi, Sichuan, Zhe-

jiang.

- 1a. Twigs densely pubescent; both surfaces of leaf blade densely pubescent on midvein and secondary veins; pedicel to 1 mm; calyx lobes usually with hairs ..... 84a. var. *henryi*
- 1b. Twigs densely or sparsely pubescent; both surfaces of leaf blade sparsely pubescent on veins or subglabrous; pedicel 1–3 mm; calyx lobes glabrous ..... 84b. var. *chingii*

**84a. *Vaccinium henryi* var. *henryi***

无梗越桔(原变种) wu geng yue ju (yuan bian zhong)

Twigs densely pubescent. Leaf blade with both surfaces densely pubescent on veins. Pedicel to 1 mm. Calyx lobes usually with hairs.

- Thickets on mountain slopes; 700–2100 m. Anhui, Fujian, Gansu, Guizhou, Hubei, Hunan, Jiangxi, Shaanxi, Sichuan, Zhejiang.

**84b. *Vaccinium henryi* var. *chingii*** (Sleumer) C. Y. Wu & R. C. Fang, Acta Bot. Yunnan. 9: 395. 1987.

有梗越桔 you geng yue ju

*Vaccinium chingii* Sleumer, Bot. Jahrb. Syst. 71: 482. 1941.

Twigs densely or sparsely pubescent. Leaf blade with both surfaces sparsely pubescent on veins. Pedicel 1–3 mm. Calyx lobes glabrous.

- Forests; 1500–1600 m. Anhui, Fujian, Jiangxi, Zhejiang.

**85. *Vaccinium oldhamii*** Miquel, Ann. Mus. Bot. Lugduno-Batavi 2: 161. 1866 [“*oldhami*”].

腺齿越桔 xian chi yue ju

Shrubs deciduous, 1–3 m tall. Twigs terete, angled, densely pubescent and with scattered glandular hairs, glabrescent; bud scales inconspicuous. Leaves scattered; petiole 1–3 mm, pubescent, with intermixed glandular hairs; leaf blade ovate, elliptic, or oblong, 2.5–8 × 1.2–4.5 cm, papery, abaxially setose or glandular setose on veins, otherwise appressed-setose or glabrous, adaxially pubescent on veins, otherwise appressed-setose or glabrous, secondary veins (5–)7 or 8 pairs, secondary and fine veins raised abaxially, slightly raised or flat adaxially, base cuneate, broadly cuneate, or rounded, margin plane, denticulate, glandular setulose at tips of teeth, apex acute. Inflorescences terminal, racemose, 3–6 cm, pubescent, with intermixed glandular hairs, (1–)9–17-flowered; bracts ovate-lanceolate to linear, 2.5–7 mm. Pedicel ca. 1.5 mm, glandular pubescent. Hypanthium glandular pubescent; calyx lobes triangular, ca. 1.5 mm, ciliate. Corolla pinkish, campanulate, 3–5 mm, glabrous; lobes ca. 0.5 mm. Filaments ca. 1.5 mm, pilose in upper part; anthers ca. 1.7 mm, thecae without spurs; tubules ca. 1/2 as long as thecae. Berry 10-pseudoloculed, dark purple, subglobose, 0.7–1 cm in diam. Fl. May–Jun, fr. Jul–Oct.

Thickets on mountain slopes; 200–700(–1300) m. N Jiangsu, Shandong [Japan, Korea].

**86. *Vaccinium koreanum*** Nakai, Trees Shrubs Japan 1: 191. 1922.

红果越桔 hong guo yue ju

Shrubs deciduous. Twigs angled, pubescent, glabrescent; bud scales inconspicuous. Leaves scattered; petiole 1–2 mm, pilose; leaf blade elliptic or ovate, 3–6.5 × 1.3–3 cm, papery, both surfaces white pilose, secondary veins ± ascending, raised abaxially, flat adaxially, base cuneate or broadly cuneate to slightly obtuse, margin plane, denticulate, apex acute or acuminate. Inflorescence pseudoterminal, shortly racemose, axis to 6 mm, ?glabrous, 1–3(–5)-flowered; bracts caducous. Pedicel 4–6 mm, glabrous. Hypanthium ca. 0.8 mm, glabrous; calyx limb ca. 1 mm, divided 1/2–3/4; calyx lobes triangular. Corolla whitish, campanulate, 7–8 mm, glabrous; lobes recurved, broadly ovate, 1–1.5 mm. Filaments ca. 2.5 mm, puberulous; anthers 2.5–3.5 mm, thecae with 2 very short spurs, tubules ca. as long as thecae. Berry 5-loculed, red, ellipsoid, 8–9 × 6–7 mm, 5-angled, glabrous; persistent calyx lobes triangular or suborbicular, 2–3 mm, glabrous. Fl. May, fr. Sep.

Rocky places on mountain summits; 600–1000 m. E Liaoning (Kuandian) [Korea].

The above description of the flower is based on herbarium specimens.

**87. *Vaccinium uliginosum*** Linnaeus, Sp. Pl. 1: 350. 1753.

笃斯越桔 du si yue ju

*Vaccinium uliginosum* var. *album* J. Y. Ma & Yue Zhang.

Shrubs deciduous, 0.5–1 m tall, alpine populations usually 10–15 cm tall, much branched, rhizomatous. Twigs terete, puberulous to glabrous. Leaves scattered; petiole ca. 2 mm, puberulous; leaf blade obovate or elliptic to oblong, 1–3 × 0.6–1.5 cm, papery, abaxially glaucous, puberulous, adaxially subglabrous, secondary veins 3–5 pairs, fine veins evident especially abaxially, base cuneate or broadly cuneate, margin plane, entire, with 1 basal gland per side, apex rounded, sometimes retuse. Inflorescences fasciculate, at end of shoot, 1–3-flowered; bracts caducous, 1.5–2.5 mm. Pedicel ca. 5 mm, glabrous. Flowers 4- or 5-merous. Hypanthium ca. 0.8 mm, glabrous; calyx lobes 4 or 5, triangular-ovate, ca. 1 mm. Corolla greenish white, broadly urceolate, ca. 5 mm, glabrous; lobes triangular, ca. 1 mm. Filaments ca. 1 mm, glabrous; anthers ca. 1.5 mm, thecae with 2 spurs, tubules slightly shorter than thecae. Berry 4- or 5-loculed, bluish purple, subglobose or ellipsoidal, with a bloom, ca. 1 cm in diam. Fl. Jun, fr. Jul–Aug.  $2n = 24, 48$ .

*Larix* forests, forest margins, meadow-moors, alpine steppes; 900–2300 m. N Heilongjiang (Da Hinggan Ling), S Jilin (Changbai Shan), NE Nei Mongol (Da Hinggan Ling) [Japan, Korea, Mongolia, Russia; Europe, North America].

The berry is nutritious and has a sweetish taste.

**88. *Vaccinium modestum*** W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 8: 210. 1914.

大苞越桔 da bao yue ju

Shrubs deciduous, dwarf, 5–10 cm tall, erect or procumbent at base, rhizomatous, glabrous. Twigs terete; bud scales inconspicuous. Leaves scattered; petiole to 2 mm; leaf blade ovate, obovate, elliptic, or ovate-orbicular, 1.3–4 cm × 4–9 mm, secondary veins 2–5 pairs, ascending, secondary and fine veins

raised on both surfaces, base cuneate or acute to subrounded, margin plane, entire, apex rounded, sometimes cuneate, mucronate. Flowers solitary, axillary, 1–3 on current shoot. Pedicel 2–4 cm; bracteoles subapical, leaflike, 3–4.5 mm. Hypanthium purplish red, ca. 2 mm, glabrous; calyx lobes broadly triangular or suborbicular, 1–1.5 mm. Corolla pinkish or brownish red, globose-campanulate, 4–6 mm; lobes ovate, ca. 1 mm. Filaments ca. 1.5 mm, glabrous; anthers 3–3.5 mm, thecae with 2 erect spurs; tubules ca. as long as thecae. Berry 5-loculed, dark purple, with a bloom, ca. 1 cm in diam. Fl. Jun–Sep, fr. Aug–Sep.

*Abies* forests, thickets, alpine meadows, cliffs; (2500–)3100–4000(–4300) m. SE Xizang, NW Yunnan [NE India (Assam), Myanmar].

**89. *Vaccinium myrtillosum*** Linnaeus, Sp. Pl. 1: 349. 1753.

黑果越桔 *hei guo yue ju*

Shrubs deciduous, dwarf, 15–30(–60) cm tall, much branched, rhizomatous. Twigs acutely angled; bud scales inconspicuous. Leaves scattered; petiole ca. 1 mm; leaf blade ovate or elliptic, 1–3 × 0.6–1.6 cm, papery, secondary veins 6 or 7 pairs, fine veins raised abaxially, inconspicuous adaxially, base broadly cuneate to rounded, margin plane, serrulate, apex acute to obtuse. Flowers solitary, axillary, pendulous, 1–3 at base of shoot. Pedicel 2.5–3.5 mm; bracteoles absent. Flowers 4- or 5-merous. Hypanthium ca. 4 mm, scarcely lobed. Corolla pale green, tinged with pink, globose-urceolate, 4–6 mm; lobes reflexed. Filaments ca. 1.5 mm, glabrous; anthers 2.2–2.5 mm, thecae with 2 subulate spurs, tubules shorter than thecae. Berry 4- or 5-loculed, bluish black, with a bloom, 6–10 mm in diam. Fl. Jun, fr. Sep.  $2n = 24$ .

*Larix*, *Picea*, *Pinus*, or mixed forests, on acidic and wet soils; 2200–2500 m. Xinjiang [Mongolia, Russia; Europe].

The berries are edible.

**90. *Vaccinium oxycoccus*** Linnaeus, Sp. Pl. 1: 351. 1753.

红莓苔子 *hong mei tai zi*

*Oxycoccus palustris* Persoon; *O. quadripetalus* Gilibert; *O. vulgaris* Hill.

Shrubs evergreen, 10–15 cm tall, sparsely branched, ± procumbent; rhizomes to 80 cm. Twigs terete, slender, puberulous, glabrescent; bud scales inconspicuous. Leaves quite dense; petiole ca. 1 mm; leaf blade dark green adaxially, oblong or ovate, 5–11 × 2–5 mm, leathery, glabrous, abaxially glaucous, secondary veins inconspicuous on both surfaces, base rounded, margin strongly revolute, entire, without basal glands, apex acute to apiculate. Inflorescences terminal umbellate racemes, axis to 7 mm, flowers sometimes axillary at base of innovation, (1- or)2–4-flowered; bracts persistent, ovate, ca. 2 mm, glabrous. Pedicel recurved at apex, filiform, 1–2(–3) cm, pubescent; bracteoles at middle. Flowers 4-merous. Hypanthium glabrous; calyx lobes suborbicular, ca. 0.5 mm. Corolla pinkish, glabrous, lobed nearly to base; lobes reflexed, oblong, 4–6 mm. Filaments ca. 1.5 mm, ciliolate; anthers ca. 3 mm, thecae without spurs; tubules shorter than thecae. Berry 4-loculed, red, ca. 1 cm in diam. Fl.

Jun–Jul, fr. Jul–Aug.  $2n = 48$ , (46, 52, 68, 70), 72.

Moors, marshy places; 500–900 m. Heilongjiang, S Jilin (Changbai Shan) [Japan, SE Russia; Europe, North America].

**91. *Vaccinium microcarpum*** (Turczaninow ex Ruprecht) Schmalhausen, Trudy Imp. S.-Peterburgsk. Obsch. Estestvoisp. 2: 149. 1871.

小果红莓苔子 *xiao guo hong mei tai zi*

*Oxycoccus microcarpus* Turczaninow ex Ruprecht, Beitr. Pfl.-K. Russ. Reiches 4: 56. 1845; *O. palustris* Persoon var. *pusillus* Dunal; *O. pusillus* (Dunal) Nakai.

Shrubs low, evergreen, 5–10 cm tall, ± procumbent, rhizomatous. Twigs terete, slender, puberulous, glabrescent; bud scales inconspicuous. Leaves quite dense; petiole less than 1 mm, puberulous; leaf blade ovate or elliptic, broader near base, 2–6 × 1–2(–3) mm, leathery, glabrous, secondary veins inconspicuous on both surfaces, base rounded, margin revolute, entire, without basal glands, apex acute. Flowers 1 or 2, terminal; bracts persistent, ovate, ca. 1 mm, glabrous. Pedicel recurved at apex, filiform, 1.5–2.5 cm, glabrous; bracteoles at middle. Flowers 4-merous. Hypanthium glabrous; calyx lobes suborbicular, ca. 0.5 mm. Corolla pinkish, glabrous, lobed nearly to base; lobes reflexed, oblong, ca. 5 mm. Filaments ca. 2 mm, glabrous; anthers ca. 2 mm; thecae without spurs, tubules ca. as long as thecae. Berry 4-loculed, red, ca. 6 mm in diam. Fl. Jun–Jul, fr. Jul–Aug.  $2n = 24$ .

*Larix* forests, moors, marshy places; ca. 900 m. N Heilongjiang (Da Hinggan Ling), S Jilin (Changbai Shan), NE Nei Mongol (Da Hinggan Ling) [Japan, Korea, Mongolia, E Russia; Europe, North America].

**92. *Vaccinium japonicum*** Miquel, Ann. Mus. Bot. Lugduno-Batavi 1: 28. 1863.

日本扁枝越桔 *ri ben bian zhi yue ju*

Shrubs deciduous, 0.4–2 m tall, many branched. Twigs flattened-angular, glabrous; bud scales inconspicuous. Leaves scattered; petiole 1–2 mm, glabrous or abaxially pubescent; leaf blade sometimes reddish when young, ovate or ovate-lanceolate, (1.5–)2–6 × 0.7–2 cm, papery, abaxially subglabrous or pubescent towards base of midvein, adaxially glabrous or rarely pubescent, secondary veins 2–4 pairs, ± ascending, raised abaxially, inconspicuous and impressed adaxially, fine veins raised abaxially, impressed adaxially, base broadly cuneate to subtruncate, margin plane, setose-serrulate, apex acute or acuminate for ca. 0.5 cm. Flowers solitary, axillary, pendulous, at base of young shoot. Pedicel 5–8 mm, slender, glabrous. Flowers 4-merous. Hypanthium glabrous; calyx limb divided nearly to base; calyx lobes triangular, 1–1.8 mm, apex abruptly acuminate. Corolla white or pinkish, glabrous, lobed nearly to base; lobes linear-lanceolate, 0.8–1 cm, margin revolute. Filaments 1–2 mm, often densely villous; anthers 6–7 mm, thecae without spurs; tubules ca. as long as thecae. Berry 4-loculed, red, ca. 5 mm in diam. Fl. Jun–Jul, fr. Aug–Oct.

Forests, thickets, alpine areas; 1000–2600(–3000) m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [Japan].

Two varieties occur in China; var. *japonicum* is endemic to Japan.

- 1a. Leaf blade ovate or ovate-lanceolate, (1.5–)2–6 × 0.7–2 cm, abaxially subglabrous or pubescent towards base of midvein, base broadly cuneate to subtruncate ..... 92a. var. *sinicum*
- 1b. Leaf blade lanceolate or ovate-lanceolate, 1.2–4.2 × 0.5–1.5 cm, abaxially glabrous, base obtuse to cuneate ..... 92b. var. *lasiostemon*

**92a. *Vaccinium japonicum* var. *sinicum*** (Nakai) Rehder, J. Arnold Arbor. 5: 56. 1924.

扁枝越桔 *bian zhi yue ju*

*Oxycoccoides japonicus* (Miquel) Nakai var. *sinicus* Nakai, Trees Shrubs Japan 1: 168. 1922; *Agapetes vaccinioides* H. Léveillé (Apr–May 1903), not *A. vaccinioides* Dunn (31 Oct 1903); *Hugeria japonica* (Miquel) Nakai var. *sinica* (Nakai) Handel-Mazzetti; *H. sinica* (Nakai) Maekawa; *H. vaccinioides* (H. Léveillé) H. Hara; *Vaccinium siccum* H. Léveillé & Vaniot.

Leaf blade ovate or ovate-lanceolate, (1.5–)2–6 × 0.7–2 cm, abaxially subglabrous or pubescent towards base of midvein, base broadly cuneate to subtruncate.

• Forests, thickets; 1000–1600(–1900) m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, Yunnan, Zhejiang.

**92b. *Vaccinium japonicum* var. *lasiostemon*** Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 499. 1911.

台湾扁枝越桔 *tai wan bian zhi yue ju*

*Hugeria japonica* var. *lasiostemon* (Hayata) Sasaki; *H. lasiostemon* (Hayata) Maekawa; *H. randaiensis* Masamune; *H. vaccinioides* var. *lasiostemon* (Hayata) H. Hara; *Oxycoccus japonicus* (Miquel) Makino var. *lasiostemon* (Hayata) Makino & Nemoto.

Leaf blade lanceolate or ovate-lanceolate, 1.2–4.2 × 0.5–1.5 cm, abaxially glabrous, base obtuse to cuneate.

• Alpine areas; 2300–2600(–3000) m. Taiwan.

## 22. AGAPETES D. Don ex G. Don, Gen. Hist. 3: 862. 1834.

树萝卜属 *shu luo bo shu*

Fang Ruizheng (方瑞征 *Fang Rhui-cheng*); Peter F. Stevens

*Caligula* Klotzsch; *Corallobotrys* J. D. Hooker; *Desmogyne* King & Prain; *Pentapterygium* Klotzsch.

Shrubs evergreen, epiphytic, rarely terrestrial trees, usually with a swollen rootstock. Leaves spirally arranged, subopposite, or pseudoverticillate, subsessile or shortly petiolate, margin entire or serrate. Flowers axillary, in racemes, corymbs, or fascicles, or solitary. Pedicel articulate, sometimes expanded and forming a cup apically; bracteoles basal, small. Flowers 5-merous. Calyx sometimes 5-winged or -angled; limb 5-fid or deeply -lobed. Corolla red, rarely white or yellow, ± plain colored or with dark colored zig-zag horizontal bands, tubular, rarely globose, urceolate, or campanulate, often more than 1 cm, usually shortly 5-lobed. Stamens 10, ± as long as corolla; filaments short or long; anthers dorsally spurred or not, with 2 long tubules opening by apical pores or slits. Disk annular. Ovary inferior, many ovules per carpel, 10-pseudoloculed by false partitions; stigma small, truncate or capitate. Berry globose, succulent or nearly dry; calyx persistent. Seeds several; testa hard or mucilaginous.

About 80 species: from the E Himalayas through SW China and Indochina to SE Asia; 53 species (17 endemic) in China.

The majority of species of *Agapetes* is part of the same lineage as many SE Asian-Malesian species of *Vaccinium*. Species of *Agapetes* from New Guinea and the SW Pacific are now placed in *Paphia* Seemann.

There was no satisfactory way to include three of the Chinese species in the following key: for *Agapetes camellitifolia* (species no. 33) and *A. leiocarpa* (no. 29) no flowering material was seen, and in *A. malipoensis* (no. 44) the leaves are sometimes subopposite.

- 1a. Leaves pseudoverticillate.
  - 2a. Inflorescence with glandular hairs.
    - 3a. Leaves densely glandular hirsute; inflorescence corymbose ..... 13. *A. ciliata*
    - 3b. Leaves glabrous; inflorescence shortly racemose or fasciculate.
      - 4a. Leaf blade obovate or oblong-lanceolate, 20–24 × 8–11 cm, with a distinct intramarginal vein; calyx lobes ca. 1 cm ..... 2. *A. marginata*
      - 4b. Leaf blade narrowly elliptic, oblong-lanceolate, or oblanceolate, 8–11 × 3–6 cm, rigidly leathery, with an inconspicuous marginal vein; calyx lobes 3–5 mm ..... 4. *A. aborensis*
  - 2b. Inflorescence glabrous.
    - 5a. Leaf blade ca. 10 × 0.8–2 cm; corolla 1.5–1.6 cm, lobes ca. 2.5 mm ..... 12. *A. salicifolia*
    - 5b. Leaf blade to 25 cm; corolla 3–6 cm, lobes 4–11 mm.
      - 6a. Leaf blade oblong-lanceolate, 10–25 × 2–4.5 cm; corolla 4–6 cm, pinkish or rose, with dark purple transverse zig-zag bands, lobes ca. 1.1 cm ..... 6. *A. burmanica*
      - 6b. Leaf blade elliptic-lanceolate, 12–18 × 4.5–8 cm; corolla ca. 3 cm, vermilion or crimson, lobes ca. 4 mm ..... 10. *A. miniata*
- 1b. Leaves scattered.
  - 7a. Filaments longer than thecae; flowers solitary or 2–4(–6) in a fascicle, sometimes a corymb or raceme.
    - 8a. Leaf blade (3–)5–17 cm.

- 9a. Inflorescences glabrous.
- 10a. Leaf blade 10–17 cm; pedicel ca. 2.6 cm ..... 9. *A. brandisiana*
- 10b. Leaf blade 5–8 cm; pedicel 5–8 mm ..... 11. *A. graciliflora*
- 9b. Inflorescences variously pubescent and/or glandular hairy.
- 11a. Inflorescence racemose, 5- or 6-flowered; pedicels 4–7 mm ..... 42. *A. inopinata*
- 11a. Inflorescence fasciculate, 1–4-flowered; pedicels 0.6–2 cm.
- 12a. Branches pubescent and glandular setose; corolla crimson or carmine, tubular, 1.3–1.9 cm ..... 43. *A. oblonga*
- 12b. Branches glabrous; corolla green, shortly campanulate, 5–7 mm ..... 41. *A. pilifera*
- 8b. Leaf blade less than 2.5 cm.
- 13a. Leaf margin crenulate or serrate.
- 14a. Leaf blade ovate or elliptic, base obtuse or rounded.
- 15a. Flowers solitary or 2 together from axils along branch; twigs rust-colored pilose; leaf margin crenulate-serrate ..... 50. *A. anonyma*
- 15b. Flowers 2–5 from subterminal leaf axils; twigs densely dark brown glandular setose; leaf margin serrate ..... 52. *A. guangxiensis*
- 14b. Leaf blade obovate or subelliptic, base cuneate.
- 16a. Inflorescence shortly racemose; bract leaflike, 1.3–1.5 × ca. 1.1 cm, bracteoles oblong, 4–6 × ca. 2 mm ..... 51. *A. rubrobracteata*
- 16b. Flowers solitary, axillary; bracts and bracteoles less than 3 mm ..... 53. *A. spissa*
- 13b. Leaf blade entire, recurved.
- 17a. Calyx densely puberulous or glabrous outside; pedicels 4–10 mm, glabrous.
- 18a. Corolla tubular, 1.1–1.5 cm, white or greenish white; stem densely puberulous ..... 45. *A. mannii*
- 18b. Corolla campanulate, 6–7 mm, deep red; stem glabrous or hispid ..... 46. *A. obovata*
- 17b. Calyx densely glandular villous or glandular setose and pubescent outside; pedicels 1–5 mm, glandular villous or glandular pubescent.
- 19a. Leaf blade hirsute abaxially ..... 47. *A. pensilis*
- 19b. Leaf blade glabrous abaxially.
- 20a. Leaf apex abruptly narrowed into a long pungent mucro ..... 48. *A. epacridea*
- 20b. Leaf apex rounded, apiculus minute ..... 49. *A. brachypoda*
- 7b. Filaments shorter than thecae; inflorescence corymbose, rarely racemose or flowers fasciculate or solitary.
- 21a. Calyx tube 5-winged, lobes obvious; corolla usually 5-angled; peduncle to 10 mm.
- 22a. Corolla yellow.
- 23a. Leaf base rounded; pedicels and calyx pubescent; calyx lobes triangular-ovate, ca. 8 mm; anthers with 2 spurs ..... 14. *A. flava*
- 23b. Leaf base shallowly cordate or obtuse; pedicel and calyx glabrous; calyx lobes suborbicular, ca. 3 mm; anthers without spurs ..... 16. *A. listeri*
- 22b. Corolla reddish brown, purple, or white.
- 24a. Corolla 1.5–2 cm; inflorescence corymbose.
- 25a. Calyx lobes ca. 5 mm; corolla ca. 1.9 cm; leaf blade with serrate margin, adaxially very rugose ..... 15. *A. incurvata*
- 25b. Calyx lobes ca. 10 mm; corolla ca. 1.5 cm; leaf blade with subentire margin, adaxially distinctly reticulate ..... 17. *A. medogensis*
- 24b. Corolla 2–3.4 cm; inflorescence shortly racemose.
- 26a. Leaf blade oblanceolate to obovate, apex acuminate to acute; calyx lobes 9–13 mm; stem puberulous ..... 18. *A. pyrolifolia*
- 26b. Leaf blade elliptic, apex acute or apiculate; calyx lobes 6–9(–10) mm; stem hirtellous or glandular setose ..... 19. *A. interdicta*
- 21b. Calyx and corolla not winged or angled; peduncle usually elongate.
- 27a. Leaf blade more than (4–)6 cm.
- 28a. Leaf blade less than 1.5 cm wide, linear or linear-lanceolate.
- 29a. Leaf margin shallowly and remotely undulate-denticulate towards apex; corolla ca. 2.2 cm, crimson or carmine; pedicel enlarged into a disk apically ..... 26. *A. nutans*
- 29b. Leaf margin entire; corolla 1.3–1.4 cm, green, glaucescent; pedicel enlarged into a cup apically ..... 27. *A. linearifolia*
- 28b. Leaf blade more than 1.5 cm wide, oblong or ovate-lanceolate.
- 30a. Corolla lobed nearly to middle ..... 1. *A. lobbii*
- 30b. Corolla lobed less than 1/4 its length.
- 31a. Leaf blade 28–34 × 7–13.5 cm ..... 8. *A. macrophylla*
- 31b. Leaf blade to 17(–22) × (1–)2–10 cm.
- 32a. Pedicel at most clavate towards apex; leaf margin usually at least inconspicuously toothed, except *A. megacarpa*.

- 33a. Pedicel and calyx pubescent; leaf blade 3–10 cm wide, with very distinct intramarginal veins .... 3. *A. pubiflora*  
 33b. Pedicel and calyx glabrous; leaf blade less than 4 cm wide, lacking distinct intramarginal vein.  
 34a. Calyx lobes less than 3 mm; twigs strongly angled ..... 7. *A. angulata*  
 34b. Calyx lobes 4–8 mm; twigs terete or weakly angled.  
 35a. Corolla creamy yellow; anthers with spurs ..... 5. *A. megacarpa*  
 35b. Corolla red or purple; anthers lacking spurs.  
 36a. Leaf blade oblong-lanceolate, 10–21 × 2–4.5 cm; petiole ca. 1 cm; corolla ca. 1.7 cm, bluish purple ..... 24. *A. xizangensis*  
 36b. Leaf blade ovate-oblong or broadly elliptic, 7.5–14 × 3–5.5 cm, subsessile; corolla ca. 2.5 cm, red ..... 25. *A. subsessilifolia*  
 27b. Pedicel enlarged into a cup apically; leaf margin entire.  
 37a. Calyx limb entire, expanded; corolla ca. 4.5 cm or more ..... 20. *A. neriifolia*  
 37b. Calyx limb 5-lobed; corolla 2–3 cm.  
 38a. Calyx limb divided to 2/3 length ..... 21. *A. pseudogriffithii*  
 38b. Calyx limb divided to base.  
 39a. Leaf blade oblong, 8–15 × 2–5 cm, base cuneate; calyx lobes ovate; corolla ± tubular, strongly 5-angled ..... 22. *A. griffithii*  
 39b. Leaf blade ovate-lanceolate, 7–12.5 × 1.5–3.2 cm, base rounded; calyx lobes narrowly triangular; corolla narrowly funnellform, ca. 2 cm, not angled ..... 23. *A. hyalocheilos*  
 27b. Leaf blade less than 6 cm.  
 40a. Inflorescence corymbose; leaf apex acuminate or caudate; twigs glabrous or pubescent, rarely setose.  
 41a. Leaf margin entire; inflorescence 2- or 3-flowered; calyx lobes ca. 3 mm ..... 31. *A. leucocarpa*  
 41b. Leaf margin serrate; inflorescence 4–8-flowered; calyx lobes ca. 1.5 mm or more than 5 mm.  
 42a. Pedicel clavate towards apex; calyx lobes ca. 1.5 mm; twigs densely setose ..... 30. *A. forrestii*  
 42b. Pedicel forming a cup apically; calyx lobes 5–6 mm; twigs glabrous or pubescent ..... 28. *A. discolor*  
 40b. Flowers solitary, or 2 or 3, rarely 3–8, subfasciculate; leaf apex acute, obtuse, or apiculate; twigs setose or hispidulous.  
 43a. Corolla urceolate, 5–8 mm, 5-winged or 5-angled.  
 44a. Flowers 1 or 2; corolla with ca. 2 mm wide wings, lemon-yellow ..... 39. *A. miranda*  
 44b. Flowers 3–8, subfasciculate; corolla strongly 5-angled, cherry-red ..... 40. *A. praestigiosa*  
 43b. Corolla tubular or cylindric, (1.2–)2–3 cm, not angled or winged.  
 45a. Calyx tube 5-winged; pedicel along with calyx wings glandular setose; leaves often appearing to be in two ranks ..... 37. *A. serpens*  
 45b. Calyx tube at most angled; pedicel and calyx glabrous to pubescent, rarely with glandular hairs; leaves not 2-ranked.  
 46a. Inflorescence with peduncle ca. 1.5 cm; corolla puberulous along angles, lobes 4–6 mm ..... 34. *A. mitrarioides*  
 46b. Inflorescence fasciculate or flowers solitary; corolla glabrous outside, lobes at least 4–6 mm.  
 47a. Pedicels and calyx densely pubescent or glandular pubescent or villous.  
 48a. Leaf blade elliptic to obovate, 1.5–2.8 cm; corolla lobes 4–6 mm ..... 32. *A. buxifolia*  
 48b. Leaf blade elliptic, 0.7–2 cm; corolla lobes ca. 3 mm ..... 36. *A. lacei*  
 47b. Pedicels and calyx tube glabrous.  
 49a. Pedicels ca. 1 cm ..... 38. *A. praeclara*  
 49b. Pedicels 1.5–2.5 cm; corolla lobes 7–8.5 mm.  
 50a. Leaf blade ovate; corolla 1.6–1.8 cm ..... 35. *A. refracta*  
 50b. Leaf blade elliptic; corolla 2–3 cm ..... 36. *A. lacei*

**1. *Agapetes lobbii*** C. B. Clarke in J. D. Hooker, Fl. Brit. India 3: 448. 1881.

深裂树萝卜 shen lie shu luo bo

*Agapetes corallina* Cowan; *A. stenantha* Rehder.

Shrubs 1–2 m tall, glabrous. Twigs terete, 1.2–2.5 mm in diam. Leaves scattered; petiole 3–5 mm; leaf blade ovate-lanceolate or lanceolate, 4–11 × 2–3.5 cm, leathery, secondary veins 5–7 pairs, barely evident, base cuneate or broadly cuneate, margin plane, entire, with 1 basal gland per side, apex caudate-acuminate. Inflorescences racemose, 3–8 cm, many flowered; peduncle 0.6–1.3 cm. Pedicel 0.5–1.5 cm, somewhat expanded apically. Calyx tube subglobose, ca. 2 mm; limb

divided to base; lobes triangular-lanceolate, 3–4 mm. Corolla crimson, narrowly campanulate, 2–2.5 cm; lobes erect or recurved, lorate, ca. 1.2 cm. Filaments 3–4(–8) mm, papillate; anthers ca. 2(–2.4) cm, thecae papillate, with minute spurs or not; tubules ca. (1–)2 × as long as thecae. Berry unknown. Fl. Dec–Jan of next year.

Forests, epiphytic on trees, rocks; 1300–1400 m. S Yunnan [NE India (Assam), Myanmar, Thailand].

**2. *Agapetes marginata*** Dunn, Bull. Misc. Inform. Kew 1920: 133. 1920.

边脉树萝卜 bian mai shu luo bo

Shrubs. Root tubers spindle-shaped, ca. 30 × 18 cm. Twigs

terete. Leaves pseudovercillate; petiole very short or leaves subsessile; leaf blade obovate or oblong-lanceolate, 20–24 × 8–11 cm, leathery, glabrous, secondary veins 20–22 pairs, marginal vein distinct, drying prominently abaxially, base gradually narrowed to rounded, margin plane or slightly revolute, with 2 or 3 basal glands per side, subentire, apex shortly acuminate. Inflorescences corymbose-racemose, ramiflorous, ca. 9 cm, 5–7-flowered; peduncle 1.5–2 cm. Pedicel 2.5–3 cm, densely glandular setose, slightly expanded towards apex. Calyx tube ca. 2 mm, densely glandular setose; limb divided to base; lobes lanceolate, ca. 1 cm. Corolla red, tubular, slightly expanded at middle, 3.2–3.8 cm, setulose, especially towards apex; lobes lanceolate-triangular, ca. 6 mm. Filaments ca. 2 mm, glabrous; anthers ca. 2.9 cm, thecae papillate, tubules ca. 3.5 × as long as thecae. Berry unknown. Fl. Mar–Jun.

• Rain forests, *Quercus* forests, epiphytic on trees; 800–1700 m. S Xizang.

**3. *Agapetes pubiflora*** Airy Shaw, Bull. Misc. Inform. Kew 1935: 27. 1935.

毛花树萝卜 mao hua shu luo bo

Shrubs 1.5–3 m tall. Twigs angled, ca. 5 mm in diam., glabrous. Leaves scattered; petiole dark red, 5–10 mm; leaf blade oblong-elliptic, elliptic, or elliptic-lanceolate, 9–22 × 3–10 cm, thickly leathery, glabrous, secondary veins 15–18 pairs, raised abaxially, flat adaxially, marginal vein distinct, base cuneate or broadly cuneate, margin plane, sparsely dentate, with 1 large basal gland per side, apex acute or shortly acuminate. Inflorescence corymbose-racemose, cauliflorous, ca. 1.3 cm, ca. 9-flowered; peduncle 5–7 mm, pubescent. Pedicel red, 1–2.5 cm, puberulous, slightly expanded at apex. Calyx tube 1.5–2 mm, puberulous; limb divided to 3/4; lobes pink, triangular-lanceolate, 2.5–3.5 mm. Corolla pink, with dark red zig-zag bands, tubular, 2.5–3 cm, densely puberulous, 5-angled; lobes recurved, green, triangular-lanceolate, 4–5 mm. Filaments 1.5–2 mm, pubescent; anthers ca. 2.5 cm; thecae densely papillate, base puberulous, tubules ca. 4 × as long as thecae, with 2 reflexed spurs ca. 1.5 mm. Berry unknown. Fl. Jun–Nov.

Rain forests, evergreen forests, epiphytic on large trees; (900–) 1200–1600 m. SE Xizang, NW Yunnan [Myanmar].

**4. *Agapetes aborensis*** Airy Shaw, Kew Bull. 14: 111. 1960.

阿波树萝卜 a bo shu luo bo

Shrubs 0.3–0.4 m tall. Twigs angled, 3–5 mm in diam., glabrous. Leaves pseudovercillate; petiole very short or leaves subsessile; leaf blade narrowly elliptic or oblanceolate, 8–11 × 2–3.6 cm, rigidly leathery, glabrous, marginal vein distinct, fine veins raised on both surfaces, base cuneate, margin entire, apex acute. Inflorescences racemose, ca. 1 cm, 2–8-flowered; peduncle densely brown glandular hispidulous. Pedicel 5–6 mm, glandular hispidulous. Calyx tube 1–1.5 mm, glandular hispidulous; limb divided to base; lobes lanceolate-subulate, 3–5 mm. Corolla dark red, tubular, 1.6–1.8 cm, 5-angled, glabrous or sparsely setulose on angle; lobes ovate, ca. 1 mm. Filaments ca. 2 mm, glabrous; anthers ca. 1.4 cm, thecae papillate, base shortly caudate, tubules nearly 2 × as long as thecae, with 2 minute spurs towards apex. Berry unknown. Fl. Jan–Feb.

• Forests, epiphytic on trees; 400–700 m. SE Xizang.

**5. *Agapetes megacarpa*** W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 11: 194. 1919.

大果树萝卜 da guo shu luo bo

Shrubs to 6 m tall, glabrous. Leaves scattered; petiole very short or leaves subsessile; leaf blade lanceolate or oblong-lanceolate, 10–17 × 2–4 cm, papery, base cuneate to obtuse, margin entire, apex acute or shortly acuminate. Inflorescence axillary or terminal, corymbose-racemose, 7–8 cm, few flowered; peduncle ca. 1 cm, stout. Pedicel 2.2–2.3 cm, slightly expanded upwards. Calyx tube turbinate, ca. 3 mm; limb divided to base; lobes subulate, 7–8 mm. Corolla creamy yellow, with dark bands, infundibular, ca. 4.5 cm; lobes narrowly triangular, 9–10 mm. Filaments ca. 3 mm, shortly pilose basally; anthers 4–7.5 cm, thecae densely papillate, base with incurved incrassate appendage; tubules ca. 5 × as long as thecae, with 2 spreading ca. 1 mm spurs at middle. Berry globose, ca. 1 cm in diam.; persistent calyx lobes 9–10 mm. Fl. Apr.

Forests, open thickets, epiphytic on trees; ca. 2100 m. S Yunnan [Thailand].

**6. *Agapetes burmanica*** W. E. Evans, Notes Roy. Bot. Gard. Edinburgh 15: 199. 1927.

缅甸树萝卜 mian dian shu luo bo

Shrubs 1.5–3(–4) m tall, glabrous. Root tubers conoid or spherical. Twigs not angled, 4–10 mm in diam. Leaves pseudovercillate; petiole 2–3 mm or leaves subsessile; leaf blade oblong-lanceolate, 10–25 × 2–4.5 cm, leathery, secondary veins 14–16 pairs, evident, marginal vein distinct, base obtuse to rounded, margin plane, inconspicuously and distantly sinuous. Inflorescences racemose, on old stem, few flowered; peduncle 0.5–1.5 cm. Pedicel 2.5–3 cm, expanded upwards, clavate. Calyx tube inconspicuously angled, 3–5 mm; limb divided ca. 9/10; lobes narrowly triangular, ca. 1 cm. Corolla pinkish or rose, with dark purple transverse zig-zag bands, tubular, 4.5–6 cm; lobes spreading, greenish, narrowly triangular, ca. 1.1 mm. Filaments ca. 2 mm, pubescent; anthers 4.5–4.8 cm, thecae densely papillate and puberulous, tubules 4–5 × as long as thecae, with 2 spreading ca. 1 mm spurs at middle. Berry large. Fl. Sep–Dec, fr. Nov–Jan of next year.

Sparse forests or thickets on calcareous mountains, epiphytic on trees; 700–1500 m. SE Xizang, S Yunnan [Myanmar].

**7. *Agapetes angulata*** (Griffith) J. D. Hooker in Bentham & J. D. Hooker, Gen. Pl. 2: 571. 1876.

棱枝树萝卜 leng zhi shu luo bo

*Ceratostema angulatum* Griffith, Not. Pl. Asiat. 4: 302. 1854.

Shrubs 0.8–1.3 m tall, glabrous. Twigs angled, 4–5 mm in diam., becoming lenticellate. Leaves scattered; petiole 0.5–1 cm; leaf blade lanceolate or elliptic-lanceolate, 12–14 × 3.5–4 cm, thinly papery, secondary veins 8 or 9 pairs, raised abaxially, base cuneate, margin sparsely serrulate, apex acuminate. Inflorescences corymbose to subumbellate, 2.5–4 cm, 5–15-flowered; rachis 0.4–1.5 cm. Pedicel 0.9–2.2 cm, slender, ex-

panded at apex. Calyx tube obpyramidal, 1.5–1.7 mm, slightly 5-angled; limb 1.6–2.5 mm, divided ca. 4/5; lobes triangular, 1.2–2.3 mm. Corolla red to reddish yellow, with deep colored zig-zag bands, 1.5–2.7 cm, rather thinly fleshy; lobes green, triangular, 3.5–6 mm. Filaments 1–2 mm, with sparse hairs; anthers ca. 2.6 cm, thecae rounded to acute, somewhat downward-pointing at base, papillate, tubules ca. 4 × as long as thecae, spurs absent. Fl. Feb–Mar, fr. May.

Forests, epiphytic on trees; (700–)1200–1500 m. SE Xizang, NW Yunnan (Dulongjiang) [NE India (Assam), Myanmar].

**8. *Agapetes macrophylla*** C. B. Clarke in J. D. Hooker, Fl. Brit. India 3: 445. 1881.

大叶树萝卜 da ye shu luo bo

Shrubs glabrous. Twigs terete, 4–8 mm in diam. Leaves scattered; petiole ca. 1.3 cm; leaf blade ovate or oblong-lanceolate, 28–34 × 7–13.5 cm, secondary veins 16–18 pairs, midvein and fine veins raised on both surfaces, base broadly cuneate or rounded, margin plane, sparsely inconspicuously dentate, apex acuminate. Inflorescences corymbose, 8–9 cm, 8–10-flowered; peduncle 1–5 cm; bracts linear-lanceolate, ca. 6 mm. Pedicel 1.3–3.8 cm, swollen towards apex. Calyx tube turbinate, ca. 2 cm; limb divided ca. 2/3; lobes lanceolate, ca. 8 mm. Corolla red, with zig-zag bands, tubular, ca. 2.5 cm, 5-angled; lobes triangular, 3–4 mm. Filaments ca. 3 mm, pubescent; anthers ca. 2.2 cm, thecae with a basal beak, tubules ca. 2 × as long as thecae, spurs minute or absent. Berry unknown. Fl. Apr.

Rain forests, epiphytic on trees; ca. 1800 m. SE Xizang [Bangladesh].

**9. *Agapetes brandisiana*** W. E. Evans, Notes Roy. Bot. Gard. Edinburgh 15: 201. 1927.

环萼树萝卜 huan e shu luo bo

Shrubs glabrous. Roots spindle-shaped. Twigs angled, 5–8 mm in diam. Leaves scattered, subsessile; leaf blade narrowly oblong, 10–17 × 2.5–3.8 cm, leathery, secondary veins ca. 12 pairs, raised, base narrowly rounded, margin plane, entire, with 1 basal gland per side, apex acuminate. Inflorescences corymbose, inserted on mature stem, 3–4 cm, 3–5-flowered; peduncle ca. 1 cm. Pedicel 1–1.5 cm, conspicuously cupular at apex. Calyx tube shortly tubular, ca. 5 mm, swollen at middle; limb divided ca. 1/2; lobes triangular-lanceolate, ca. 3 mm. Corolla red, with zig-zag bands, tubular, 2.2–2.6 cm, not angled; lobes recurved, triangular, 5–6 mm; filaments 6–7 mm, base adnate to corolla tube, apex pubescent; anthers 2.2–2.6 cm, thecae papillate, tubules ca. 3.5 × as long as thecae, without spurs. Berry globose, ca. 4 mm in diam. Fr. Feb–Apr.

Rain forests, epiphytic on old trees; 1500–1800 m. SW Yunnan [N Myanmar (Kachin)].

**10. *Agapetes miniata*** (Griffith) J. D. Hooker in Bentham & J. D. Hooker, Gen. Pl. 2: 571. 1876.

朱红树萝卜 zhu hong shu luo bo

*Ceratostema miniatum* Griffith, Not. Pl. Asiat. 4: 302. 1854; *Vaccinium miniatum* (Griffith) Kurz.

Shrubs glabrous. Twigs terete, 2.5–4 mm in diam. Leaves ca. 4-pseudoverticillate, subsessile or petiole ca. 4 mm; leaf blade elliptic-lanceolate, 12–18 × 4.5–8 cm, leathery, secondary veins 11–13 pairs, raised abaxially, flat adaxially, base cuneate to obtuse, margin plane, sparsely serrulate, apex acute. Inflorescences corymbose, 0.7–1 cm, ca. 7-flowered; peduncle 3–5 mm. Pedicel 0.6–2.5 cm. Calyx obconical, 2.5–3 mm; lobes triangular-lanceolate, 4–5 mm. Corolla vermilion or crimson, tubular, ca. 3 mm; lobes triangular, ca. 1.5 mm. Filaments 2–2.5 mm, glabrous; anthers ca. 1.6 cm, thecae densely papillate, tubules slightly longer than thecae, without spurs. Berry unknown. Fl. Mar–Apr.

Forests, epiphytic on trees; 1000–1800 m. SE Xizang [NE India (Assam)].

**11. *Agapetes graciliflora*** R. C. Fang, nom. nov.

细花树萝卜 xi hua shu luo bo

Replaced synonym: *Agapetes leptantha* Airy Shaw, Kew Bull. 13: 483. 1959, not *A. leptantha* (Miquel) Niedenzu, Bot. Jahrb. Syst. 11: 201. 1890.

Shrubs glabrous. Twigs elongate, flexuous, terete, ca. 3 mm in diam. Leaves scattered; petiole ca. 1 cm, slender, narrowly alate on both sides; leaf blade greenish or inconspicuously brown and opaque abaxially, drying blackish and nitid adaxially, oblong-elliptic or oblong-lanceolate, 5–8 × ca. 2 cm, papery, base attenuate, decurrent, margin plane, remotely serrulate, apex acuminate. Inflorescences racemose, 1–4 cm, slender, 15–20-flowered; peduncle 7–10 mm. Pedicel 5–8 mm, slender, shallowly cup-shaped apically. Calyx tube subglobose, ca. 1 mm; limb divided to base; lobes spreading, triangular, minute, ca. 1 mm. Corolla greenish, tinged with red, narrowly tubular, 1.1–1.3 cm; lobes recurved, ovate-triangular, 1–1.5 mm. Filaments 6–7 mm, slender, puberulous; anthers 5–6 mm, thecae papillate, base shortly caudate, tubules ca. 2.5 × as long as thecae, without spurs. Berry unknown. Fl. Nov.

Forests, epiphytic on trees; ca. 900 m. SE Xizang [Myanmar].

**12. *Agapetes salicifolia*** C. B. Clarke in J. D. Hooker, Fl. Brit. India 3: 445. 1881.

柳叶树萝卜 liu ye shu luo bo

Shrubs glabrous. Twigs scarcely angled, ca. 3 mm in diam. Leaves pseudoverticillate, sessile; leaf blade narrowly lanceolate or very narrowly oblong-oblancheolate, 9.5–10 × 1–2 cm, leathery, base attenuate, margin with a basal gland, entire or inconspicuously dentate-crenate, apex subacuminate. Inflorescence vermilion, corymbose, on old wood, ca. 3 cm, ca. 12-flowered; peduncle ?ca. 6 mm. Pedicel 3–6 mm, not expanded. Calyx tube vermilion; limb divided to base; lobes triangular, 2.5–3 mm, apex acute. Corolla crimson, tubular, ca. 1.6 cm; lobes green, triangular, ca. 2.5 mm. Berry unknown.

• Forests, epiphytic on trees; ca. 1500 m. SE Xizang.

**13. *Agapetes ciliata*** S. H. Huang, Acta Phytotax. Sin. 25: 314. 1987.

纤毛叶树萝卜 xian mao ye shu luo bo

Shrubs 0.5–1.5 m tall. Twigs terete, 0.9–1 cm in diam.,

densely dark or yellow-brown glandular hirsute. Leaves borne towards ends of innovations; petiole ca. 3 mm, glandular hirsute or leaves subsessile; leaf blade oblong-elliptic, 15–27 × 5.5–14 cm, leathery, abaxially densely hirsute or on veins glandular hirsute, adaxially glabrous, secondary veins 6–8 pairs, secondary and fine veins raised abaxially, impressed and subbullate adaxially, base attenuate to cuneate or subauriculate, margin plane, subentire, with 1 basal gland per side, densely glandular hirsute, apex acute. Inflorescences ± fasciculate, cauliflorous, 6–9-flowered; rachis ca. 0.5 cm. Pedicel 1.7–2.5 cm, clavate, densely glandular pubescent. Calyx densely reddish appanate glandular pilose; tube ca. 3.5 mm; limb divided ca. 2/3; lobes red, lanceolate, ca. 4 mm, glandular. Corolla red, with dark purple zig-zag bands, tubular, 2–2.5 cm, glandular pubescent; lobes greenish, triangular, ca. 2 mm. Filaments ca. 2.5 mm, pilose on the edges; anthers ca. 2.1 cm, thecae densely papillate, tubules ca. 3 × as long as thecae, without spurs. Berry reddish, ellipsoidal, ca. 6.5 × 5 mm, densely brown glandular hirsute. Fl. Apr–Dec.

• Evergreen forests, epiphytic on trees; 1600–2200 m. SE Xizang (Médog).

**14. *Agapetes flava*** (J. D. Hooker) Sleumer, Bot. Jahrb. Syst. 70: 105. 1939.

黄花树萝卜 huang hua shu luo bo

*Pentapterygium flavum* J. D. Hooker, Bot. Mag. 82: t. 4910. 1856.

Shrubs. Twigs terete, glabrous or pubescent towards apices. Leaves scattered; petiole 3–4 mm; leaf blade ovate or elliptic, 5–9 × ca. 3.4 cm, leathery, abaxially silky-hairy on midvein, adaxially rugose with fine veins, glabrous, base rounded, margin serrate, apex acute. Inflorescences corymbose, pendulous or nodding. Pedicel red, ca. 2 cm, pubescent, expanded upwards. Calyx tube yellowish, rounded, 5-winged; lobes triangular-ovate, ca. 8 mm, striate, pubescent. Corolla yellow, tubular, ca. 1.7 cm, inflated at middle, angled, puberulous; lobes recurved, small. Filaments pubescent; anthers with tubules ca. 3.5 × as long as thecae, with 2 spurs. Berry ca. 8 mm in diam.

Forests, epiphytic on trees; 1200–1500 m. SE Xizang [NE India].

The above description follows that in the protologue.

**15. *Agapetes incurvata*** (Griffith) Sleumer, Bot. Jahrb. Syst. 70: 105. 1939.

皱叶树萝卜 zhou ye shu luo bo

*Gaylussacia incurvata* Griffith, Ic. Pl. Asiat. 4: t. 506. 1854; *Pentapterygium rugosum* (J. D. Hooker & Thomson ex Hooker) J. D. Hooker; *Vaccinium rugosum* J. D. Hooker & Thomson ex Hooker.

Shrubs. Twigs rounded, 2–3 mm in diam., hirsute towards apices, lenticellate. Leaves scattered, but towards end of insertion subsessile; leaf blade ovate-lanceolate or oblong, 5–10 × 2–3 cm, leathery, abaxially glabrous or pubescent, adaxially very rugose with impressed veins, pubescent, secondary veins

10–15 pairs, strongly raised abaxially, impressed adaxially, base obtuse or rounded, margin revolute, serrate, apex acuminate. Inflorescences corymbose, pendulous, 2- or 3-flowered; peduncle 3–10 mm. Pedicel deep red basally, ca. 3 mm, barely expanded. Calyx tube 1.8–3.8 mm, 5-angled, sparsely pubescent; limb divided ca. 2/3; lobes ovate-triangular, 5–6 mm. Corolla white, green, or deep red to purple, with purple or blood-red zig-zag bands, tubular, ca. 1.9 cm, strongly 5-angled, glabrous or pubescent on wings; lobes triangular. Filaments ca. 3 mm, puberulous; anthers ca. 1.6 cm, thecae papillate, tubules ca. 3 × as long as thecae, with minute spurs. Berry broadly hemispheric, ca. 8 mm or more, 5-ribbed; persistent calyx lobes to 1.2 cm. Fl. May–Jun.

*Tsuga-Rhododendron* forests, epiphytic on large trees; 1200–2400 m. SE Xizang (Dirangzong) [Bangladesh, Bhutan, NE India (Assam, Khasi hills), E Nepal, Sikkim].

**16. *Agapetes listeri*** (King ex C. B. Clarke) Sleumer, Bot. Jahrb. Syst. 70: 105. 1939.

短锥花树萝卜 duan zhui hua shu luo bo

*Pentapterygium listeri* King ex C. B. Clarke in J. D. Hooker, Fl. Brit. India 3: 450. 1882.

Shrubs. Twigs angled towards apices, glabrous or minutely puberulous. Leaves scattered, subsessile; leaf blade oblong-elliptic, 4–8 × 2–3 cm, leathery, glabrous, secondary veins slightly raised adaxially, base obtuse or shallowly cordate, margin subentire, apex acute. Inflorescences corymbose, 2- or 3-flowered; peduncle 3–4 mm. Pedicel ca. 6 mm, glabrous, ?expanded. Calyx tube conical, ca. 3 mm, 5-winged, glabrous; lobes suborbicular, ca. 3 mm, sometimes minutely apiculate. Corolla yellow, urceolate-cylindric, 1.4–1.5 cm, glabrous; lobes erect, ovate-triangular, ca. 2 mm. Filaments ca. 1 mm, glabrous; anthers ca. 1.2 cm, thecae papillate, shortly caudate at base; tubules ca. 2 × as long as thecae, without spurs. Berry unknown. Fl. May–Oct.

Upper temperate rain forests, epiphytic on trees; (2100–)2400–2700 m. SE Xizang [?Bhutan, NE India (Assam)].

**17. *Agapetes medogensis*** S. H. Huang, Acta Phytotax. Sin. 25: 315. 1987.

墨脱树萝卜 mo tuo shu luo bo

Shrubs 30–40 cm tall. Twigs terete, angled, 2–3 mm in diam., glabrous, becoming lenticellate. Leaves scattered; petiole 1–2 mm, glabrous; leaf blade oblong-elliptic, 3.5–7.5 × 1.2–3.2 cm, leathery, glabrous, secondary veins 8–11 pairs, conspicuously raised adaxially, base cuneate to obtuse, margin plane, subentire, with 1 basal gland per side, apex acute. Inflorescences corymbose, from defoliate axils, 1–3-flowered; peduncle 4–5 mm, subglabrous. Pedicel ca. 8 mm, densely pubescent and with sparse glandular hairs, slightly expanded at apex. Calyx tube brownish red, 4–5 mm, broadly 5-winged, sparsely puberulous; limb red, divided ca. 2/3; lobes ovate-triangular, ca. 10 mm, sparsely puberulous. Corolla reddish brown, with dark red zig-zag bands, tubular, ca. 1.5 cm, glabrous; lobes linear-lanceolate, ca. 4 mm. Filaments ca. 1 mm, glabrous; anthers ca. 1.2 cm, thecae papillate, shortly caudate at base; tubules ca. 3 ×

as long as thecae, without spurs. Berry ellipsoidal, ca.  $1 \times 0.8$  cm, with 5 broad wings. Fl. Jan–Apr.

• Evergreen forests, epiphytic on trees; 1700–2200 m. SE Xizang (Médog).

**18. *Agapetes pyrolifolia*** Airy Shaw, Kew Bull. 13: 487. 1959.

鹿蹄草叶树萝卜 lu ti cao ye shu luo bo

Shrubs 60–80 cm tall. Twigs terete or inconspicuously bluntly angled, 1.5–3 mm in diam., puberulous when young. Leaves scattered; petiole 1–2 mm, glabrous; leaf blade oblanceolate to obovate, 1.5–3.5(–5)  $\times$  0.8–2(–2.5) cm, leathery, glabrous, secondary veins 8 or 9 pairs, base cuneate, margin plane, entire or sparsely serrate near apex, apex acute to rounded, mucronate or apiculate. Inflorescences shortly racemose, 1–3-flowered; peduncle 2–6 mm. Pedicel 7–11 mm, densely puberulous, rarely glabrous, slightly expanded at apex. Calyx glabrous or sparsely pubescent; tube ca. 4 mm, conspicuously 5-winged; limb divided ca. 3/4; lobes ovate-triangular, 9–13 mm, submembranous, apex acuminate-acute. Corolla with carmine zig-zag bands, tubular, 2–3 cm, 5-angled, glabrous; lobes recurved at apex, greenish, narrowly triangular, 6–8 mm, apex greenish, acuminate. Filaments 3–4 mm, puberulous; anthers 2.4–2.7 cm, thecae papillate, caudate at base, tubules ca. 4  $\times$  as long as thecae, without spurs. Immature berry ca. 9 mm in diam. Fl. Mar–May, fr. Sep–Oct.

Evergreen forests, epiphytic on trees, rarely in *Rhododendron* forests or alpine thickets; 1800–2700(–3200) m. SE Xizang, NW Yunnan (Dulongjiang) [Myanmar].

**19. *Agapetes interdicta*** (Handel-Mazzetti) Sleumer, Bot. Jahrb. Syst. 70: 106. 1939.

中型树萝卜 zhong xing shu luo bo

*Pentapterygium interdictum* Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 60: 186. 1923; *Agapetes interdicta* var. *stenoloba* (W. E. Evans) Sleumer; *P. interdictum* var. *stenlobum* W. E. Evans.

Shrubs 30–60 cm tall. Twigs sharply angled, 1–3 mm in diam., hirtellous or glandular setose. Leaves scattered; petiole 1–2 mm, glabrous; leaf blade elliptic, 2–4.5  $\times$  0.8–2.3 cm, leathery, glabrous, secondary veins 8 or 9 pairs, base cuneate, margin slightly revolute, entire or only sparsely serrate near apex, apex acute or apiculate. Inflorescences racemose, 1–3(–7)-flowered; peduncle 4–7 mm. Pedicel 4–10(–13) mm, densely puberulous, sometimes intermixed scattered shortly glandular setose, apex slightly expanded. Calyx glabrous or sparsely pubescent; tube 3–4 mm, conspicuously 5-winged, sparsely pubescent; limb divided ca. 2/3; lobes narrowly ovate-triangular, 6–9(–10) mm, submembranous, apex acuminate. Corolla red, tubular, 2.2–3(–3.4) cm, 5-angled; lobes recurved, greenish, triangular-subulate, 6–9 mm. Filaments 4–5 mm, glabrous; anthers 2.2–2.6(–3.2) cm, thecae caudate at base, tubules (2)–4  $\times$  as long as thecae, without spurs. Berry unknown. Fl. Mar, fr. Aug.

Evergreen forests, epiphytic on trees; 2300–2700(–2900) m. SE Xizang, NW Yunnan (Dulongjiang) [Myanmar].

**20. *Agapetes neriifolia*** (King & Prain) Airy Shaw, Bull. Misc. Inform. Kew 1935: 39. 1935.

夹竹桃叶树萝卜 jia zhu tao ye shu luo bo

*Desmogyne neriifolia* King & Prain, J. Asiat. Soc. Bengal 67(2): 297. 1898.

Shrubs glabrous. Twigs inconspicuously angled, 1.5–5 mm in diam. Leaves scattered; petiole 1–2 mm; leaf blade drying grayish on both surfaces, oblong-lanceolate, 5–10(–15)  $\times$  1.5–2 cm, leathery, secondary veins inconspicuous on both surfaces, base rounded, margin revolute, entire, with 1  $\pm$  conspicuous basal gland per side, apex long acuminate. Inflorescences corymbose, 1.5–2.5 cm, 5–10-flowered. Pedicel 1.5–3 cm, enlarged into a cup apically. Calyx crimson, broadly campanulate; tube obconical, ca. 2 mm; limb inflated, ca. 1.5 cm wide, undivided. Corolla dull crimson with a bluish bloom, with dark zig-zag bands, tubular, ca. 4 cm; lobes triangular, ca. 2 mm. Filaments ca. 3 mm, glabrous; anthers ca. 3.3 cm, thecae papillate, tubules ca. 4.5  $\times$  as long as thecae, without spurs. Fl. Mar–Sep.

Forests, epiphytic on trees; ca. 1200 m. SW Yunnan [Myanmar].

**21. *Agapetes pseudogriffithii*** Airy Shaw, Bull. Misc. Inform. Kew 1935: 40. 1935.

杯梗树萝卜 bei geng shu luo bo

Shrubs 0.4–1(–2) m tall, glabrous. Root tuber spindle-shaped. Twigs terete, 1–2.5 mm in diam. Leaves scattered; petiole 3–7 mm; leaf blade oblong-lanceolate or ovate-lanceolate, 6–14  $\times$  1.5–3.5 cm, leathery, secondary veins inconspicuous on both surfaces, base rounded or broadly cuneate, margin plane or slightly revolute, entire, basal glands inconspicuous, apex long acuminate. Inflorescences red, corymbose, 1.5–5 cm, slender, 3–7-flowered. Pedicel red, 1–2 cm, stout, fleshy, cup-shaped apically. Calyx ca. 1 cm, glabrous; limb divided ca. 2/3; lobes ovate-triangular, ca. 6 mm. Corolla pinkish, crimson, carmine, or orange, tubular, 2–3 cm; lobes erect, green, triangular, ca. 2 mm. Filaments 3–4 mm, subglabrous; anthers ca. 2.1 cm, thecae papillate, tubules ca. 3  $\times$  as long as thecae, without spurs. Berry shortly cylindric, 7–12  $\times$  5–9 mm. Fl. Nov–Jan of next year, fr. Mar–May.

Evergreen forests, epiphytic on trees; 1300–1500 m. NW Yunnan (Dulongjiang) [Myanmar].

**22. *Agapetes griffithii*** C. B. Clarke in J. D. Hooker, Fl. Brit. India 3: 449. 1882.

尾叶树萝卜 wei ye shu luo bo

Shrubs climbing, glabrous. Twigs ?terete. Leaves scattered; petiole ca. 5 mm; leaf blade oblong, 8–15  $\times$  2–5 cm, papery to thinly leathery, base cuneate, margin entire, apex acuminate to abruptly and shortly caudate. Inflorescences corymbose, 3–4 cm, 2–4-flowered. Pedicel 1.5–2.5 cm, enlarged apically. Calyx tube ca. 2.5  $\times$  3 mm, not angled; limb divided to base; lobes ovate, 3–5 mm, apex acute. Corolla reddish, with dark violet zig-zag bands,  $\pm$  tubular, ca. 2.5 cm; lobes green, ca. 4 mm. Filaments ca. 8 mm, hairy in upper part; anthers ca. 2.2 cm, tubules ca. 2  $\times$  as long as thecae, without spurs. Berry unknown. Fl. Nov.

Forests; 1000–2100 m. SE Xizang [India].

**23. *Agapetes hyalocheilos*** Airy Shaw, Bull. Misc. Inform. Kew 1935: 42. 1935.

透明边树萝卜 tou ming bian shu luo bo

*Agapetes saligna* J. D. Hooker var. *cordifolia* C. B. Clarke.

Shrubs glabrous. Twigs terete, ca. 1 mm in diam., with sparse orbicular lenticels. Leaves scattered; petiole ca. 2 mm; leaf blade ovate-lanceolate, 7–12.5 × 1.5–3.2 cm, thickly papery, glabrous, secondary veins ca. 8 pairs, inconspicuous, base rounded, margin very narrowly hyalocartilaginous, entire, without basal glands, apex acuminate or subcaudate. Inflorescences corymbose, ca. 1.5 cm. Pedicel ca. 2 cm, expanded apically. Calyx tube 6–7 mm; limb divided ca. 1/2; lobes narrowly triangular, ca. 3 mm, carinate on back, apex acute. Corolla bright red, with darker bands, narrowly funnelform, ca. 2 cm; lobes recurved, broadly triangular, 1–2 mm. Filaments 2–3 mm, slightly papillose-ciliolate; anthers ca. 1.5 cm, thecae ca. 4 mm, papillate, tubules free, ca. 3 × as long as thecae, without spurs. Berry unknown.

Forests, epiphytic on trees; ca. 1000 m. S Xizang [N Myanmar].

**24. *Agapetes xizangensis*** S. H. Huang, Acta Phytotax. Sin. 25: 315. 1987.

西藏树萝卜 xi zang shu luo bo

Shrubs 1–2 m tall, or trees to 15 m tall, glabrous. Twigs terete, ca. 8 mm in diam. Leaves scattered; petiole 1–2 cm; leaf blade oblong-lanceolate, 10–21 × 2–4.5 cm, thickly leathery, secondary veins 4–6 pairs, inconspicuous, base broadly cuneate to rounded, margin slightly revolute, sparsely inconspicuously denticulate, apex acuminate. Inflorescences corymbose, 1.5–2.2 cm, 6–13-flowered. Pedicel red, 2–3 cm, fleshy, expanded upwards. Calyx tube rounded, ca. 2.5 mm, glaucous; limb red, ca. 1 cm, divided ca. 2/3; lobes ovate-lanceolate, ca. 6 × 4 mm, angled, distinctly veined. Corolla bluish purple with dark purple zig-zag bands, glaucous, tubular, ca. 1.7 cm, fleshy, with 5 raised veins; lobes triangular, ca. 1 mm. Filaments ca. 3 mm, pilose apically; anthers ca. 1.1 cm, thecae papillate; tubules nearly 3 × as long as thecae, without spurs. Berry unknown. Fl. Mar–May.

• Evergreen forests, epiphytic on tall trees; 1500–2000 m. SE Xizang (Médog).

**25. *Agapetes subsessilifolia*** S. H. Huang, H. Sun & Z. K. Zhou, Novon 8: 378. 1998.

近无柄树萝卜 jin wu bing shu luo bo

Shrubs glabrous. Twigs slightly angled, ca. 2 mm in diam. Leaves scattered, sometimes subopposite, subsessile or petioles 2–3 mm; leaf blade ovate-oblong to broadly elliptic, 7.5–14 × 3–5.5 cm, leathery, secondary veins 4–6 pairs, base rounded, margin plane, subtire, basal glands inconspicuous, apex acuminate. Inflorescences corymbose, 3–5-flowered; peduncle 2.5–3.5 cm. Pedicel ca. 3 cm, slender, clavate apically. Calyx tube ca. 4 mm; limb divided ca. 2/3; lobes narrowly triangular, ca. 5 mm. Corolla red, with purplish zig-zag bands, tubular, ca. 2.5

cm; lobes triangular, short. Filaments ca. 1 mm, puberulous; anthers ca. 2.2 cm, tubules ca. 3 × as long as thecae, without spurs. Berry unknown. Fl. Oct.

• Forests, epiphytic on trees; ca. 1600 m. SE Xizang (Médog).

**26. *Agapetes nutans*** Dunn, Bull. Misc. Inform. Kew 1920: 134. 1920.

垂花树萝卜 chui hua shu luo bo

Shrubs. Roots thick. Twigs slightly angled, ca. 1.5 mm in diam., glabrous. Leaves scattered; petiole ca. 4 mm; leaf blade linear, 12–17 × 0.6–1.1 cm, papery, glabrous, secondary veins inconspicuous on both surfaces, base attenuate, margin slightly revolute, shallow and remotely undulate-denticulate towards apex, without basal glands, apex caudate. Inflorescences corymbose-racemose, 5- or 6-flowered; peduncle 6–7 cm, nutant, pubescent. Pedicel ca. 1.2 cm, glabrous, not expanded. Calyx tube ca. 3 mm; limb divided ca. 1/2; lobes triangular, 3–4 mm. Corolla crimson or carmine, tubular, ca. 2.2 cm; lobes green-tipped, ca. 3 mm, apex acute. ?Anthers with thecae ca. 6 mm, papillate; tubules without spurs. Fl. Jan–Feb.

High forests, epiphytic on trees; 1000–1700 m. SE Xizang [NE India (Assam)].

**27. *Agapetes linearifolia*** C. B. Clarke in J. D. Hooker, Fl. Brit. India 3: 449. 1882.

线叶树萝卜 xian ye shu luo bo

Shrubs 30–40 cm tall, slightly branched, glabrous. Root tubers pointed-ovoid. Twigs terete, 1–2 mm in diam. Leaves scattered; petiole robust, 2–4 mm; leaf blade linear-lanceolate, 10–15 × 0.7–1.3 cm, leathery, glabrous, secondary veins ca. 10 pairs, inconspicuous abaxially, base obtuse, margin strongly revolute, entire, without basal glands, apex acuminate. Inflorescences corymbose, pendent, 8-flowered; peduncle rose, 0.7–2 (–4.2) cm. Pedicel scarlet, ca. 2.2 cm, fleshy, cup-shaped apically. Calyx tube scarlet, 2–3 mm; limb 5-veined, divided ca. 1/2 or more; lobes triangular, 3–4 mm. Corolla green, glaucous, tubular-conical, 1.3–1.5 cm; lobes erect, triangular, ca. 1.3 mm. Filaments ca. 5 mm, glabrous; anthers 0.8–1 cm, thecae scabrous-papillate, tubules to 1.5 × as long as thecae, without spurs. Berry unknown. Fl. Apr.

• Temperate rain forests, epiphytic on trees; ca. 1800 m. SE Xizang.

The above description follows that of Airy Shaw (Bull. Misc. Inform. Kew 1935: 41–42. 1935).

**28. *Agapetes discolor*** C. B. Clarke in J. D. Hooker, Fl. Brit. India 3: 448. 1881.

异色树萝卜 yi se shu luo bo

Shrubs. Twigs terete, ca. 2.5 mm in diam., glabrous or pubescent. Leaves scattered; petiole 1–3 mm; leaf blade green adaxially, elliptic or oblong, ca. 4.5 × 1.2–1.6 cm, leathery, glabrous, abaxially glaucous, base cuneate, margin plane, remotely shallowly dentate, apex acuminate. Inflorescences corymbose, glabrous, to 8-flowered; peduncle 6–8 mm. Pedicels ca. 2 cm, cup-shaped apically. Calyx tube obconical, ca. 3 mm; limb campanulate, divided ca. 3/4; lobes ovate-triangular,

4–5 mm. Corolla much narrowed upwards in bud, 1.2–3.2 cm, lobed nearly to base, glabrous; lobes linear, margin strongly revolute at anthesis. Filaments ca. 1 mm, glabrous; anthers ca. 1 cm; thecae papillate, tubules ca. 3 × as long as thecae, without spurs. Berry globose, narrower upwards; persistent calyx lobes erect, long, ca. 5 mm in diam. Fl. Oct–Dec, fr. Mar.

Forests, epiphytic on trees; 1200–1500 m. S Xizang [?Bhutan, NE India (Assam, Khasi hills), ?Sikkim].

**29. *Agapetes leiocarpa*** S. H. Huang, Acta Phytotax. Sin. 25: 317. 1987.

光果树萝卜 guang guo shu luo bo

Shrubs to 80 cm. Twigs terete, 1.5–2 mm in diam., densely pubescent, glabrescent. Leaves scattered; petiole 1–2 mm, glabrous; leaf blade lanceolate, 3.5–6 × 0.7–1 cm, leathery, glabrous, secondary veins 3 or 4 pairs, inconspicuous, base cuneate, margin plane, remotely dentate, apex acuminate. Flowers unknown. Inflorescences corymbose, 4–6-fruited; peduncle ca. 8 mm, glabrous. Pedicel ca. 2 cm, shallowly cup-shaped apically, glabrous. Berry globose, 4.5–5 mm, glabrous; persistent calyx lobes narrowly triangular, 5–6 mm, leathery, glabrous. Fr. Apr.

• Rocky valleys, epiphytic on tall trees; ca. 1600 m. SE Xizang (Médog).

**30. *Agapetes forrestii*** W. E. Evans, Notes Roy. Bot. Gard. Edinburgh 15: 202. 1927.

伞花树萝卜 san hua shu luo bo

Shrubs or trees, 1–10 m tall. Twigs slightly angled, 1–1.5 mm in diam., densely setose, hairs simple or forked. Leaves scattered; petiole very short; leaf blade green adaxially, ovate-lanceolate, 2.5–4 × 0.8–1.2 cm, leathery, glabrous, both surfaces glaucous, secondary veins ca. 2 pairs, slightly raised abaxially, impressed adaxially, base rounded, margin revolute, remotely dentate, apex acuminate. Inflorescences corymbose, 4–6-flowered; peduncle ca. 2 cm, glabrous. Pedicel ca. 1.5 cm, setose, pubescent, or glabrous, expanded apically. Calyx tube sparsely setose; limb divided to base; lobes triangular, ca. 2 mm, apex acute. Corolla crimson, with dark red zig-zag bands, tubular, ca. 2 cm; lobes greenish, triangular, ca. 2 mm. Filaments ca. 1 mm, pilose; anthers ca. 1.3 cm, tubules ca. 3 × as long as thecae, without spurs. Berry globose, ca. 5 mm in diam. Fl. Dec–May of next year.

Forests, epiphytic on trees, cliffs; 1800–2700 m. SE Xizang, W Yunnan [N Myanmar].

**31. *Agapetes leucocarpa*** S. H. Huang, Acta Phytotax. Sin. 25: 317. 1987.

白果树萝卜 bai guo shu luo bo

Shrubs pendulous, glabrous. Twigs terete, 1.5–2 mm in diam. Leaves scattered; petiole 4–5 mm; leaf blade elliptic, 3–5 × 1–2 cm, thickly leathery, secondary veins inconspicuous with fine veins inconspicuous abaxially, impressed adaxially, base broadly cuneate or obtuse, margin cartilaginous, plane, entire, with 1 basal gland per side, apex acuminate or caudate. Inflorescences corymbose, 2- or 3-flowered; peduncle red, ca. 1 cm.

Pedicel 7–8 mm, clavate apically. Flowers unknown. Berry white, globose, ca. 5 mm in diam.; persistent calyx lobes ca. 3 mm. Fr. Jun.

• Evergreen forests, epiphytic on trees; 2300–2400 m. SE Xizang (Médog).

**32. *Agapetes buxifolia*** Nuttall ex J. D. Hooker, Bot. Mag. 83: t. 5012. 1857.

黄杨树萝卜 huang yang ye shu luo bo

Shrubs 1.2–1.5 m tall. Twigs angled, 2–3 mm in diam., densely glandular hispid. Leaves crowded; petiole ca. 2 mm; leaf blade pale green abaxially, bright green adaxially, obovate or elliptic, 1.5–2.8 × 1–1.2 cm, leathery, glabrous, secondary veins ca. 3 pairs, inconspicuous, base cuneate, margin plane, crenate above middle, apex acute. Inflorescences axillary, 1- or 2-flowered. Pedicel ca. 8 mm, slender, densely villous, slightly expanded towards apex. Calyx tube green, narrowly obconic-campanulate, ca. 3 mm, villous; limb divided to base; lobes triangular-lanceolate, 3–4 mm. Corolla bright red, tubular, ca. 2.5 cm, glabrous; lobes spreading, pale or greenish, ovate-lanceolate, 4–6 mm. Filaments ca. 4 mm, glabrous; anthers ca. 1.8 cm, thecae shortly caudate at base, tubules ca. 4 × as long as thecae, without spurs. Berry unknown. Fl. Apr–May.

Damp forests, epiphytic on trees; 600–900 m. S Xizang [NE India (Assam)].

**33. *Agapetes camelliifolia*** S. H. Huang, Acta Phytotax. Sin. 25: 318. 1987.

茶叶树萝卜 cha ye shu luo bo

Shrubs to 30 cm tall. Twigs terete, 1–2 mm in diam., densely dark brown setose. Leaves scattered; petiole 2–3 mm, glabrous; leaf blade pale abaxially, green adaxially, elliptic, 3.5–5 × 1.5–2.3 cm, leathery, glabrous, secondary veins 4 or 5 pairs with fine veins slightly raised abaxially, impressed adaxially, base broadly cuneate or obtuse, margin slightly revolute, remotely inconspicuously serrate, apex shortly acuminate. Flowers unknown. Fruit solitary, axillary. Pedicel ca. 1.3 cm, glabrous, expanded apically. Immature berry shortly cylindrical, ca. 3 mm in diam.; persistent calyx lobes triangular, ca. 2.5 mm, glabrous. Fr. Apr.

• Forests, epiphytic on trees; ca. 2200 m. SE Xizang (Médog).

**34. *Agapetes mitrarioides*** J. D. Hooker ex C. B. Clarke in J. D. Hooker, Fl. Brit. India 3: 447. 1881.

亮红树萝卜 liang hong shu luo bo

Shrubs small, much branched. Twigs terete, ca. 1 mm in diam., densely brown hispidulous. Leaves scattered; petiole ca. 1 mm; leaf blade elliptic or ovate, 1.2–1.8 × 0.6–1.2 cm, rigidly leathery, secondary veins inconspicuous on both surfaces, base broadly cuneate, margin plane, remotely shallowly rigidly serrate, apex acute. Inflorescences corymbose, 1- or 2-flowered; peduncle 1.5–1.7 cm, very slender, puberulous. Pedicel 1.6–2 cm, slender, puberulous, expanded apically. Calyx tube ca. 6 mm, puberulous; limb divided ca. 1/2; lobes triangular-lanceolate, 2.5–3 mm. Corolla bright red, tubular, 2–2.5 cm, puberulous on angles; lobes triangular, 2–3 mm. Berry unknown.

- Forests, epiphytic on trees, rocks. SE Xizang.

One of us (Stevens) questions whether this is a good species.

**35. *Agapetes refracta*** Airy Shaw, Kew Bull. 13: 496. 1959.

折瓣树萝卜 zhe ban shu luo bo

Shrubs. Twigs terete, 1–2 mm in diam., densely long fuscous-setose. Leaves scattered; petiole ca. 1 mm; leaf blade ovate, 1.7–2.8 × 0.9–1.7 cm, thinly papery, glabrous, base rounded, margin plane, remotely crenulate, apex acute or subacute. Flowers solitary, axillary. Pedicel 1.5–2.5 cm, slender, nutant, glabrous, not expanded. Calyx tube elliptic-obovate, glabrous; limb divided nearly to base; lobes triangular, 1.5–2 mm. Corolla rose, ellipsoidal-tubular, 1.6–1.8 cm, glabrous; lobes reflexed, linear-subulate, 7–8.5 mm, margin not revolute. Filaments 4–5 mm, glabrous; anthers 1.2–1.4 cm; thecae papillate, base shortly caudate; tubules ca. 2 × as long as thecae, without spurs. Berry unknown. Fl. Oct.

- Forests, epiphytic on trees; 1200–1500 m. SE Xizang.

**36. *Agapetes lacei*** Craib, Bull. Misc. Inform. Kew 1913: 43. 1913.

灯笼花 deng long hua

Shrubs 30–90 cm tall, pendulous. Rootstock tuberous. Twigs 1–2 mm in diam., rounded, densely spreading to ascending brown setose. Leaves crowded; petiole ca. 1 mm, puberulous; leaf blade elliptic, 0.7–2 × 0.5–1 cm, leathery, glabrous, secondary veins 1 or 2 pairs, inconspicuous, base cuneate or rounded, margin recurved, remotely serrulate, apex obtuse or acute. Flowers solitary, axillary. Pedicel 1.5–1.8 cm, densely pubescent, glandular pubescent, tomentellate, or glabrous. Calyx tube ca. 4 mm, pubescent, tomentellate, intermixed glandular setose, or glabrous; limb divided 1/2–3/4; lobes triangular, 1.5–3 mm. Corolla light crimson, tubular, 2–3 cm, glabrous; lobes spreading, dark green, triangular, 7–8 mm. Filaments 0.8–1.5 mm, glabrous; anthers 1.3–1.7 cm, thecae apiculate at base, tubules ca. 1.5 × as long as thecae, without spurs. Berry red, 5–8 mm in diam. Fl. Jan–Jun, fr. May.

Evergreen or shaded forests, epiphytic on trees, hills, cliffs, ledges, boulders, rocks; 1500–3000 m. SE Xizang, W Yunnan [N Myanmar (Kachin)].

- 1a. Pedicel and calyx tube glabrous ..... 36b. var. *glaberrima*
- 1b. Pedicel and calyx tube with hairs.
  - 2a. Pedicel and calyx tube pubescent, calyx tube also glandular setose ..... 36a. var. *lacei*
  - 2b. Pedicel and calyx tube densely grayish tomentellate ..... 36c. var. *tomentella*

**36a. *Agapetes lacei* var. *lacei***

灯笼花(原变种) deng long hua (yuan bian zhong)

Pedicel and calyx tube pubescent, calyx tube also glandular setose.

Evergreen forests, epiphytic on trees; 1500–1800 m. SE Xizang, W Yunnan [N Myanmar (Kachin)].

**36b. *Agapetes lacei* var. *glaberrima*** Airy Shaw, Kew Bull. 13: 498. 1959.

无毛灯笼花 wu mao deng long hua

Pedicel and calyx tube glabrous.

- Shaded forests, epiphytic on trees, cliffs, boulders, rocks; 2100–3000 m. SE Xizang, NW Yunnan.

**36c. *Agapetes lacei* var. *tomentella*** Airy Shaw, Kew Bull. 13: 498. 1959.

绒毛灯笼花 rong mao deng long hua

Pedicel and calyx tube densely grayish tomentellate.

- Shaded forests, epiphytic on trees, hills, cliff ledges in valleys; 2100–3000 m SE Xizang, NW Yunnan.

**37. *Agapetes serpens*** (Wight) Sleumer, Bot. Jahrb. Syst. 70: 105. 1939.

五翅莓 wu chi mei

*Vaccinium serpens* Wight, Calcutta J. Nat. Hist. 8: 171. 1847; *Pentapterygium serpens* (Wight) Klotzsch; *Thibaudia myrifolia* Griffith.

Shrubs 40–60 cm tall. Rootstock tuberous. Twigs terete, 1–2 mm in diam., densely spreading glandular setose. Leaves crowded; petiole ca. 1 mm, glabrous; leaf blade pale green abaxially, deep green adaxially, narrowly ovate or ovate-oblong, 1.2–2 cm × 5–8 mm, leathery, abaxially smooth, adaxially drying transversely rugose, glabrous, secondary veins ca. 3 pairs, usually inconspicuous, base rounded, margin slightly recurved, serrate above middle, apex acute or obtuse, distinctly mucronulate. Inflorescences fasciculate, 1–3-flowered. Pedicel erect or pendulous, 0.7–2.5 cm, densely spreading glandular setose, slightly thicker at apex. Calyx tube 3.5–4 mm, 5-winged, along wings sparsely glandular setose; limb divided nearly to base; lobes ovate-triangular, 3.5–4.5 mm, glandular ciliate, apex acute or subobtus. Corolla bright red, orange, or pinkish white, with dark red zig-zag bands, tubular, 1.2–2.8 cm, 5-angled, sparsely glandular; lobes recurved, triangular, 2–3(–6) mm. Filaments ca. 3 mm, glabrous; anthers ca. 1.9 cm, thecae papillate, base apiculate, tubules to 2 × as long as thecae, without spurs. Berry obovoid, 5-winged, ca. 6 mm in diam.; persistent calyx lobes enlarged. Fl. May–Jun, fr. May–Nov.

Evergreen forests, epiphytic on mossy tree trunks, rocks; 1200–2400 m. S Xizang (Dinggyê, Nyalam) [Bhutan, NE India (Darjiling), E Nepal, Sikkim].

**38. *Agapetes praeclara*** C. Marquand, J. Linn. Soc., Bot. 48: 197. 1929.

藏布江树萝卜 zang bu jiang shu luo bo

Shrubs pendulous. Twigs terete, 1–1.5 mm in diam., densely spreading rubiginous setose. Leaves scattered; petiole ca. 1 mm; leaf blade ovate-elliptic, ca. 1.5 × 1 cm, leathery, glabrous, adaxially transversely bullate, veins impressed, secondary veins ca. 3 pairs, inconspicuous abaxially, barely evident adaxially, base rounded, margin recurved, remotely 2- or 3-serrate, apex acute to subobtus. Inflorescences fasciculate, 1- or 2-flowered. Pedicel tinged with red, ca. 1 cm, glabrous, not swollen. Calyx tube ca. 2 mm, glabrous; limb divided nearly to base; lobes triangular, 1.5–2 mm. Corolla crimson or deep red, tubular,

1.5–2 cm, glabrous; lobes green, apex acute. Filaments ca. 0.5 mm, glabrous; anthers 9–12 mm, tubules 2–3 × as long as thecae, without spurs. Berry unknown. Fl. Nov–Feb of next year.

• Evergreen forests, epiphytic on trees, cliffs; ca. 2100 m. SE Xizang (Médog: Zangbo gorge).

**39. *Agapetes miranda*** Airy Shaw, Kew Bull. 3: 102. 1948.

坛花树萝卜 tan hua shu luo bo

Shrubs; branches ca. 60 cm, pendulous. Rootstock tuberous. Twigs terete, ca. 1 mm in diam., densely setose. Leaves crowded; petiole 0.5–1 mm, slender; leaf blade broadly elliptic or suborbicular, 5–9 × 4–6 mm, rigidly leathery, abaxially glaucous, drying rugose, glabrous, secondary veins inconspicuous on both surfaces, base rounded or obtuse, margin recurved, inconspicuously crenate or subentire, apex rounded or obtuse. Inflorescences fasciculate, 1- or 2-flowered. Pedicel 1–1.4 cm, slender, sparsely setose, not expanded. Calyx tube obovoid, setose at base; limb divided to base; lobes spreading, ovate-triangular, ca. 2 mm, sparsely ciliate. Corolla lemon yellow, urceolate, 7–8 mm, with 5 wings ca. 2 mm wide, shortly glandular hairy on wings only; lobes spreading, green, ovate-triangular. Filaments 2–2.5 mm, glabrous; thecae papillate, tubules ca. as long as thecae, without spurs. Berry unknown. Fl. May.

Evergreen forests, epiphytic on trees; ca. 2400 m. SE Xizang [NE India (Assam)].

**40. *Agapetes praestigiosa*** Airy Shaw, Kew Bull. 13: 495. 1959.

听邦树萝卜 ting bang shu luo bo

Shrubs pendulous. Twigs terete, 1–2 mm in diam., densely fuscous-setose. Leaves crowded; petiole ca. 1 mm; leaf blade drying grayish green adaxially, ovate or elliptic, 1.5–2.2 × 0.6–1.1 cm, rigidly leathery, glabrous, adaxially bullate, base broadly cuneate to rounded, margin very recurved, serrulate-denticulate, apex abruptly acuminate, nearly apiculate. Inflorescences subfasciculate, sometimes on older wood, 3–8-flowered. Pedicel 6–10 mm, glabrous, not expanded. Calyx tube obovoid, ca. 2 mm in diam., glabrous; limb divided ca. 1/2; lobes triangular, 1.5–2 mm, glabrous. Corolla cherry-red, globose-urceolate, 5–7 mm, strongly 5-angled, glabrous; lobes erect, triangular, ca. 0.5 mm. Filaments ca. 0.5 mm, glabrous; anthers 4–5 mm, thecae caudate at base, tubules ca. as long as thecae, without spurs. Berry globose, 3–5 mm in diam., glabrous. Fl. May.

Forests, epiphytic on trees; 2100–2400 m. SE Xizang (near Dirangzong) [NE India (Assam)].

**41. *Agapetes pilifera*** J. D. Hooker ex C. B. Clarke in J. D. Hooker, Fl. Brit. India 3: 448. 1881.

钟花树萝卜 zhong hua shu luo bo

*Vaccinium piliferum* (J. D. Hooker) Sleumer.

Trees to 5 m tall or large, epiphytic shrubs. Twigs barely angled, 1–1.5 mm in diam., glabrous. Leaves scattered; petiole 4–6 mm, glabrous or glandular pilose; leaf blade drying blackish, elliptic, 4.5–6.5 × 1.5–2.8 cm, thinly leathery, glabrous, secondary veins 3–5 pairs, barely evident, base rounded, margin plane, entire, without basal glands, apex slenderly caudate-

acuminate. Flowers axillary, fasciculate, 1–4-flowered. Pedicel filiform, 1.5–2 cm, densely spreading glandular pilose, slightly thickened upwards. Calyx tube green, ca. 1 mm; limb ± divided; lobes triangular, ca. 0.5 mm. Corolla green, shortly campanulate, 5–7 mm, glabrous; lobes oblong, apex acute. Filaments ca. 0.5 mm, glabrous; anthers ca. 3 mm, tubules ca. 1.5 × as long as thecae, with spreading spurs. Berry reddish to blackish, globose, 3–4 mm in diam., glabrous. Fr. Nov.

Open forests, river banks in forests, sometimes epiphytic; 1200–1500 m. SE Xizang, NW Yunnan (Dulongjiang) [NE India (Khasi hills), Myanmar].

**42. *Agapetes inopinata*** Airy Shaw, Kew Bull. 14: 229. 1960.

沧源树萝卜 cang yuan shu luo bo

*Agapetes glandulosissima* (C. Y. Wu ex W. P. Fang & Z. H. Pan) S. H. Huang; *Vaccinium glandulosissimum* C. Y. Wu ex W. P. Fang & Z. H. Pan.

Shrubs. Twigs terete, ca. 1.5 mm in diam., densely spreading brown glandular setose or setose. Leaves scattered; petiole ca. 1 mm, glabrous; leaf blade ovate or ovate-oblong, 3–5.5 × 1.4–2 cm, leathery, glabrous, secondary veins 6–8 pairs, obsolete abaxially, evident adaxially, fine veins barely evident, base rounded, margin plane, entire, without basal glands, apex acuminate or shortly caudate-acuminate. Inflorescences axillary, racemose, 4–10 mm, with dense glandular hairs, 4–6-flowered. Pedicel 4–7 mm, with dense glandular hairs, not expanded. Calyx tube rounded, ca. 1 mm, usually densely glandular hairy; limb divided to base; lobes triangular, ca. 1 mm. Corolla red, tubular, ca. 8 mm, with dense glandular hairs; lobes erect or recurved, triangular, ca. 1 mm. Filaments ca. 3 mm, puberulous; anthers ca. 4 mm, thecae papillate, tubules ca. as long as thecae, with 2 short spreading spurs. Berry unknown. Fl. Apr.

Forests, epiphytic on *Quercus*; ca. 1600 m. SW Yunnan [Myanmar].

The illustration of *Agapetes glandulosissima* in Acta Bot. Yunnan. 5: 147. 1983 shows the filaments longer than the anthers; the original description mentions the inflorescence ca. 2.5 cm and pedicels 2–3 mm.

**43. *Agapetes oblonga*** Craib, Bull. Misc. Inform. Kew 1913: 43. 1913.

长圆叶树萝卜 chang yuan ye shu luo bo

*Agapetes oblonga* var. *longipes* Airy Shaw.

Shrubs 0.5–3 m tall, occasionally small trees to 4 m tall. Rootstock tuberous. Twigs rounded, 1.3–2 mm in diam., densely white pubescent and densely brown spreading glandular setose. Leaves scattered; petiole 1–1.5 mm; leaf blade oblong, ovate, or oblong-lanceolate, 3–10 × 1.2–4 cm, leathery or papery, abaxially glabrous or sparsely setose on veins, adaxially smooth or ± bullate, glabrous, secondary veins 5–7 pairs, slightly raised abaxially, flat to slightly impressed adaxially, base broadly cuneate, rounded, shallowly cordate, or obtuse, margin plane, entire or inconspicuously serrate beyond middle or sparsely denticulate at apex, apex acute, acuminate, or caudate. Inflorescences fasciculate, sometimes on older wood, 1–4-flowered. Pedicel 0.6–1.8(–2.5) cm, densely pubescent, sometimes intermixed glandular setose, or glabrous, not expanded. Calyx

tube red or reddish green, ca. 2 mm, densely spreading hirsute; limb sparsely hirsute or glabrous, divided ca. 1/2; lobes ovate-triangular, 1.5–2 mm. Corolla crimson or carmine, tubular, 1.3–1.9 mm, 5-angled, glabrous or sparsely hirsute along angles; lobes green or yellow, triangular, ca. 1.5 mm. Filaments 4–9 mm, glabrous; anthers ca. 6 mm, tubules  $\pm$  as long as thecae, with 2 short spurs. Berry globose, 4–5 mm in diam. Fl. Oct–Apr of next year, fr. Mar–May.

Evergreen forests, epiphytic on trees, rocks; 1300–1700(–2700) m. SE Xizang, W Yunnan [Myanmar].

**44. *Agapetes malipoensis*** S. H. Huang, Acta Bot. Yunnan. 5: 148. 1983.

麻栗坡树萝卜 ma li po shu luo bo

Shrubs. Rootstock spindle-shaped. Twigs terete, to 7 mm in diam., densely brown spreading glandular setose. Leaves scattered and sometimes subopposite; petiole 1–3 mm and glabrous or leaves subsessile; leaf blade elliptic or oblong-lanceolate, 5–12.5  $\times$  to 5.5 cm, leathery, glabrous, adaxially slightly bullate, secondary veins 5–7 pairs, secondary and fine veins raised on both surfaces, base attenuate, obtuse, or auriculate, margin recurved, entire, with 1 or 2(–4) subbasal glands per side, apex acute or acuminate. Inflorescences fasciculate, sometimes below leaves, 3- or 4-flowered. Pedicel 3–6 mm, slightly thickened towards apex, densely glandular setose or glabrous. Calyx 4–5 mm, densely spreading glandular setose; limb divided ca. 1/3; lobes triangular, ca. 1.5 mm. Corolla white, tubular, ca. 2 cm, with glandular hairs; lobes triangular, ca. 1 mm. Filaments ca. 1.4 cm, upwards densely pubescent; anthers ca. 6 mm, thecae papillate, tubules to 2  $\times$  as long as thecae, with 2 erect spurs. Berry globose, 4–6 mm in diam., setose. Fl. Oct–Dec, fr. Oct–Jan.

Dense forests, sometimes epiphytic on trees, thickets at bases of hills, rock crevices; 1100–2000 m. SE Yunnan [N Vietnam].

**45. *Agapetes mannii*** Hemsley, Gard. Chron., ser. 3, 12: 364. 1892.

白花树萝卜 bai hua shu luo bo

*Agapetes yunnanensis* Franchet.

Shrubs 0.3–0.6(–1) m tall. Rootstock tuberous. Twigs terete, 1–1.8 mm in diam., densely puberulous when young, hairs in small groups. Leaves crowded; petiole ca. 2 mm, densely puberulous; leaf blade obovate, elliptic, or spatulate, 1.1–2.5  $\times$  0.5–1.1 cm, leathery, abaxially glabrous, adaxially puberulous on midvein, otherwise glabrous, sometimes slightly transversely bullate, secondary veins 3 or 4 pairs, barely conspicuous, base cuneate, margin recurved, entire, with 1, rarely 2 subbasal glands per side, apex rounded, emarginate. Flowers solitary or 2 together. Pedicel 4–8 mm, glabrous, not swollen. Calyx tube 1.5–2 mm, densely puberulous or glabrous; limb divided ca. 1/2; lobes subtriangular, ca. 1 mm. Corolla white or greenish white, tubular, 1.1–1.5 cm, glabrous; lobes erect or ?recurved, triangular, ca. 2 mm. Filaments ca. 8 mm, densely woolly; anthers ca. 6 mm, tubules ca. as long as thecae, with 2 erect spurs. Berry greenish white, when mature bright red to purple, globose, 0.5–1.1 cm in diam. Fl. (May–)Jun–Sep, fr. (Aug–)Oct–Nov.

Evergreen forests, sometimes epiphytic on *Quercus*, dry slopes, dry cliff ledges, humus-covered boulders, rocks; 1400–3100(–3600) m. Yunnan [NE India (Khasi hills), Myanmar, Thailand].

**46. *Agapetes obovata*** (Wight) J. D. Hooker in Bentham & J. D. Hooker, Gen. Pl. 2: 572. 1876.

倒卵叶树萝卜 dao luan ye shu luo bo

*Vaccinium obovatum* Wight, Icon. Pl. Ind. Orient. 4: t. 1193. 1848; *Thibaudia obovata* (Wight) Griffith.

Shrubs much branched. Twigs terete, ca. 1 mm in diam., glabrous or spreading hispid. Leaves crowded; petiole ca. 2.5 mm; leaf blade obovate-spatulate, 0.8–2.2 cm  $\times$  5–9 mm, leathery, glabrous, adaxially slightly rugose, secondary veins inconspicuous, base cuneate, margin recurved, entire, with 1 subbasal gland per side, apex obtuse or emarginate. Flowers solitary, pendulous. Pedicel 0.8–1 cm, glabrous, not swollen. Calyx tube 1–2 mm, glabrous; limb divided 2/3 to base; lobes triangular-lanceolate, ca. 1 mm. Corolla deep red, campanulate, 6–7 mm; lobes triangular, 1.5–2.5 mm, margin ?revolute. Filaments ca. 1.5 mm, pilose; anthers ca. 4.5 mm, thecae papillate, base apiculate, tubules ca. 2  $\times$  as long as thecae, with 2 erect spurs. Berry white, globose, 4–5 mm in diam. Fl. Mar.

Evergreen forests, epiphytic on trees; ca. 2100 m. SE Yunnan [NE India (Khasi hills)].

In overall appearance this species is much like a small-leaved *Vaccinium*, but the corolla is pointed in bud.

**47. *Agapetes pensilis*** Airy Shaw, Bull. Misc. Inform. Kew 1935. 52. 1935.

倒挂树萝卜 dao gua shu luo bo

*Agapetes dulongensis* S. H. Huang.

Shrubs pendulous. Rootstock spindle-shaped, ca. 3.5 cm in diam. Twigs terete, 1–2 mm in diam., densely rust- or brown hirsute. Leaves dense; petiole ca. 1 mm or leaves subsessile; leaf blade ovate, elliptic, or suborbicular, 7–10  $\times$  5–8 mm, leathery, abaxially densely or sparsely hirsute, adaxially rugose, sparsely puberulous, venation inconspicuous, base rounded to broadly cuneate, margin recurved, entire, without basal glands, sparsely setose, apex acute or rounded, mucronulate. Inflorescences fasciculate, 1–3-flowered. Pedicel 1–3 mm, densely glandular villous, not swollen. Calyx tube ca. 2 mm, densely glandular villous; limb divided to base; lobes triangular-lanceolate, ca. 2 mm, glandular villous. Corolla white, pink in bud, cylindrical, ca. 1.6 cm, densely glandular villous; lobes erect or recurved, triangular, 1–2 mm. Filaments ca. 1.1 cm, densely pubescent; anthers ca. 6.5 mm, tubules ca. as long as thecae, with 2 erect spurs ca. 1 mm. Berry unknown. Fl. Aug.

Forests, epiphytic on trees; 2300–2700(–3500) m. SE Xizang, NW Yunnan (Dulongjiang) [N Myanmar].

**48. *Agapetes epacridea*** Airy Shaw, Kew Bull. 3: 94. 1948.

尖叶树萝卜 jian ye shu luo bo

Shrubs many branched. Twigs densely spreading setose, rust-colored initially. Leaves crowded; petiole less than 1 mm; leaf blade ovate to suborbicular, 8–15  $\times$  4–7 mm, leathery,

transversely wrinkled, glabrous, base broadly cuneate or rounded, margin recurved, entire, towards apex ciliate or glandular ciliate, apex abruptly narrowed into a long pungent mucro. Inflorescences fasciculate, 1–3-flowered. Pedicel 4–5 mm, densely spreading glandular setose and shortly white pubescent. Calyx tube obovate, 2–2.5 mm in diam., densely spreading glandular setose and white pubescent; lobes ovate-triangular, apex acute. Flowers unknown. Berry immature, ca. 7 mm in diam., densely glandular setose, apex truncate; style persistent. Fr. Dec.

Evergreen forests, epiphytic on trees, rocks; 1800–2100 m. SE Xizang (Médog) [N Myanmar].

**49. *Agapetes brachypoda*** Airy Shaw var. ***gracilis*** Airy Shaw, Kew Bull. 3: 94. 1948.

纤细短柄树萝卜 xian xi duan bing shu luo bo

Shrubs. Twigs rounded, 1–1.5 mm in diam., densely rust-colored setose when young. Leaves scattered; petiole 1–2 mm; leaf blade elliptic, obovate, or oblong-elliptic, 1.4–1.9 × 0.7–1 cm, thickly leathery, glabrous, abaxially smooth, adaxially rugose, secondary veins ca. 4 pairs, raised abaxially, base cuneate, margin revolute, undulate or remote denticulate, apex rounded. Inflorescences fasciculate, 1- or 2-flowered, pendulous. Pedicel 2–4 mm, setose, not expanded. Calyx densely rust-colored glandular setose; tube obconical, ca. 4 mm; limb divided to base; lobes ovate-lanceolate, 2.5–4(–6) mm. Corolla dull red, tubular; tube 1.6–1.7 cm, pubescent; lobes triangular, 1–2 mm, margin revolute. Filaments ca. 1.3 cm, densely pubescent; anthers ca. 6 mm, thecae papillate, tubules slightly shorter than thecae, with 2 spurs. Berry unknown. Fl. May.

• Forests, epiphytic on lower side of mossy boughs; ca. 2400 m. W Yunnan (Lushui).

This variety is distinguished from var. *brachypoda* (which occurs in Myanmar) by its elongate, slender twigs, narrower and smaller leaves, pedicels and calyx tube without white pubescence, and dull red (not white) corolla.

**50. *Agapetes anonymsa*** Airy Shaw, Kew Bull. 3: 95. 1948.

锈毛树萝卜 xiu mao shu luo bo

Shrubs ± scandent. Twigs terete, 1–2 mm in diam., rust-colored pilose. Leaves scattered; petiole ca. 1 mm; leaf blade ovate, rarely broadly ovate, or elliptic-ovate to oblong-ovate, 1.5–2.5 × 0.9–1.8 cm, thinly papery, glabrous, secondary veins 6–8 pairs, base broadly cuneate to rounded, margin slightly revolute or plane, conspicuously crenulate-serrate, apex acute or subobtuse. Inflorescences fasciculate, 1- or 2-flowered. Pedicel 3–4 mm, densely setose, not expanded. Flowers unknown. Berry globose, 4–5 mm in diam., densely rust-colored setose; persistent calyx with limb divided to base, lobes ca. 2 mm. Fr. Aug.

• Forests, epiphytic on trees; 2100–2700 m. SE Xizang.

**51. *Agapetes rubrobracteata*** R. C. Fang & S. H. Huang, Acta Bot. Yunnan. 5: 151. 1983.

红苞树萝卜 hong bao shu luo bo

*Vaccinium chapaense* Merrill, J. Arnold Arbor. 19: 60. 1938, not *Agapetes chapaensis* Dop (1930).

Shrubs dwarf, 1–2 m tall. Twigs angled, 0.8–1.5 mm in diam., initially puberulous, rarely scattered setose. Leaves dense; petiole ca. 2 mm, glabrous or puberulous; leaf blade obovate, 0.8–1.6 × 0.5–1.2 cm, leathery, glabrous, secondary veins ca. 3 pairs, raised abaxially, impressed adaxially, base attenuate, cuneate, margin plane, crenulate above middle, apex obtuse or rounded. Inflorescences shortly racemose, from upper axils, ca. 2.5 cm, 1–5-flowered; bracts caducous, leaflike, greenish red, 1.3–1.5 × ca. 1.1 cm, glabrous. Pedicel 1–3.5 mm, glabrous, not expanded towards apex; bracteoles leaflike, 4–6 × ca. 2 mm. Calyx tube obconical, ca. 2.5 mm, glabrous; limb divided to base; lobes ovate-triangular, ca. 1.5 mm. Corolla white, greenish white, or pinkish, tubular, 0.7–1.7 cm, glabrous but tube hairy inside; lobes ca. 1 mm. Filaments 4–14 mm, woolly; anthers 2.5–4.5 mm, thecae papillate, tubules slightly longer than thecae, with 2 erect spurs. Berry green to purplish black, with a bloom, globose or ellipsoidal, 4–7(–10) mm in diam.; pedicel ca. 5 mm. Fl. Mar–Jun, fr. Oct–Dec.

Mossy forests, forest margins, bamboo thickets, open thickets, thickets on calcareous mountain summits, epiphytic on trees; 1000–2400(–3100) m. S Guangxi, SW Guizhou, SC Sichuan (Emei Shan), SE and WC Yunnan [Vietnam].

**52. *Agapetes guangxiensis*** D. Fang, Acta Phytotax. Sin. 36: 276. 1998.

广西树萝卜 guang xi shu luo bo

Shrubs pendulous. Root tubers 0.7–1.7 cm in diam. Twigs terete, ca. 1.5 mm in diam., densely dark brown spreading glandular setose, glabrescent. Leaves dense; petiole ca. 1 mm; leaf blade ovate, 7–14 × 4–9 mm, leathery, glabrous, secondary veins ca. 3 pairs, these and midvein raised abaxially, impressed adaxially, fine veins inconspicuous, base obtuse, margin slightly revolute, upper parts glandular spiny, apex cuneate, setose. Inflorescences fasciculate, from upper axils, (1- or)2–5-flowered. Pedicel ca. 5 mm, expanded apically, hirsute. Calyx tube turbinate, ca. 1 mm in diam., densely hirsute; limb lobed to base; lobes triangular, ca. 1.5 mm, hirsute. Corolla white, tinged with pale green, subtubular, 9.5–10 mm, slightly 5-angled, angles pubescent; lobes triangular, ca. 1 mm, pubescent. Filaments ca. 4 mm, pubescent; anthers ca. 4.5 mm, tubules ca. 2 × as long as thecae, without spurs. Berry unknown. Fl. Sep.

• Forests, limestone hills, epiphytic on trees; ca. 900 m. W Guangxi (Napo).

**53. *Agapetes spissa*** Airy Shaw, Bull. Misc. Inform. Kew 1935: 49. 1935.

丛生树萝卜 cong sheng shu luo bo

Shrubs small. Twigs terete, 2–5 mm in diam., densely long rust-colored glandular-setose, linear-lanceolate, 5–10 mm, brown membranous. Leaves dense; petiole very short; leaf blade obovate or subelliptic, 2–2.5 × 1–1.6 cm, glabrous, secondary veins 4 or 5 pairs, base cuneate, margin subrecurved, crenulate-denticulate, teeth apiculate, apex subacute or subobtuse. Flowers solitary, pendulous. Pedicel ca. 2 mm, glandular setose, not expanded. Calyx tube obconical, 2–3 mm in diam., densely

pubescent; limb divided ca. 4/5; lobes ovate-triangular, 2–3 mm, pubescent. Corolla white, subtubular; tube 8–10 mm, 5-angled, densely puberulous, glandular hairs along angles; lobes triangular, ca. 1 mm, glabrescent. Filaments 3–4 mm, pubescent; anthers ca. 5 mm, thecae rounded and shortly cornute at

base, tubules ca. 1.5 × as long as thecae, with 2 erect spurs. Berry unknown. Fl. Jul.

- Forests, epiphytic on trees; 1500–1800 m. SE Xizang.