

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

白珠树属 bai zhu shu shu

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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 ciliate 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-tomentellose. 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. *pupipes*
 - 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 alboglauca 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. *pupipes* 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, sec-

ondary 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 (Mêdog, 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, sparse-

ly 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. Pedicel 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 pyrolloides* 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. pyrolloides* 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 pyrolloides 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; bracteoles 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 (Médog).

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, papillate; 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; capsule globose or depressed-globose, 4–7 mm in diam., tomentelous. 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 (Mêdog).

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 (Mêdog).

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 (Dêqên, 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-oblancoelate 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 margin. 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 lu 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-triangular, 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, 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.

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