

3. CYPRIPIEDIUM Linnaeus, Sp. Pl. 2: 951. 1753.

杓兰属 shao lan shu

Chen Xinqi (陈心启 Chen Sing-chi); Phillip J. Cribb

Arietinum L. C. Beck; *Calceolus* Miller; *Criosanthes* Rafinesque; *Fissipes* Small; *Hypodema* Reichenbach; *Sacodon* Rafinesque.

Herbs, with short or long rhizomes and many thickened fibrous roots. Stem erect, elongate or short, clustered or well spaced, often with several sheaths at base. Leaves 1 to several, alternate to opposite, sometimes prostrate on substrate, sheathing and amplexicaul at base; blade adaxially green or sometimes marked with black-purple spots, often elliptic to ovate, rarely cordate or flabellate, with parallel, radiating, or 3–5 prominent veins. Inflorescence terminal, with a solitary flower or rarely many flowers; floral bracts often leaflike, usually smaller than leaves, rarely absent; ovary 1-locular. Flowers usually large and showy. Dorsal sepal erect or hooded over lip; lateral sepals usually united to form a synsepal, but free in *Cypripedium plectrochilum*. Petals spreading horizontally, at an angle below horizontal, or enfolding sides of lip, sometimes spirally twisted; lip deeply pouched and inflated, subglobose or ellipsoid, with incurved lateral lobes and usually also apical margin, hairy within on bottom. Column short, with 2 lateral fertile stamens, a terminal staminode above, and a stigma below; anthers 2-locular, with very short filaments; pollen powdery or glutinous; staminodes often elliptic to ovate, very rarely ligulate or linear, base stalked or not; stigma \pm papillose, inconspicuously 3-lobed. Fruit a capsule.

About 50 species: N temperate zone, mainly in temperate Asia and North America, extending south to the Himalayan regions and Central America; 36 species (25 endemic) in China.

- 1a. Leaves 3 or more, glabrous or hairy.
 - 2a. Staminodes subligulate to linear-oblong, conspicuously narrower than stigma.
 - 3a. Plants more than 100 cm tall, with 9 or 10 leaves; inflorescence with many flowers; flowers yellow with purple spots on lip 1. *C. subtropicum*
 - 3b. Plants 10–20 cm tall, with 2 or 3 leaves; inflorescence reduced to 1 or 2 flowers; flowers white with purple spots on lip 2. *C. wardii*
 - 2b. Staminodes usually elliptic to ovate, ca. as wide as or wider than stigma.
 - 4a. Flowers with 2 lateral sepals completely separate; lip obconic, pointed at apex, pubescent around mouth 19. *C. plectrochilum*
 - 4b. Flowers with 2 lateral sepals connate to different degrees into 1 synsepal; lip never obconic, glabrous around mouth.
 - 5a. Petals shorter than dorsal sepal, suboblong, apex obtuse; flowers yellow, sometimes with red spots 3. *C. flavum*
 - 5b. Petals usually longer than dorsal sepal, attenuate toward apex, apex acute or acuminate; flowers variously colored.
 - 6a. Ovary pubescent or glabrous, never glandular hairy; flowers pink, red, purple, or dark purple, rarely white.
 - 7a. Ovary densely hairy or villous.
 - 8a. Stem densely villous, especially in upper part; dorsal sepal 4–5.5 cm; lip with a smooth rim 17. *C. franchetii*
 - 8b. Stem sparsely pubescent; dorsal sepal 2.4–2.7 cm; lip with a toothed rim 18. *C. himalaicum*
 - 7b. Ovary glabrous, sparsely hairy or hairy only along ribs.
 - 9a. Lip 2.2–3.2 cm; petals 2.2–3.2 cm.
 - 10a. Ovary glabrous or slightly pubescent in upper half; synsepal much narrower than dorsal sepal; flowers usually pink to purplish red 12. *C. yunnanense*
 - 10b. Ovary pubescent at least along ribs; synsepal slightly narrower than dorsal sepal; flowers purple-red 13. *C. taibaiense*
 - 9b. Lip 3.5–6 cm; petals 3.5–6.5 cm.
 - 11a. Flowers red, pink, or occasionally white, not becoming dark purple when dried; petals with inconspicuous veins; staminodes not carinate abaxially 11. *C. macranthos*
 - 11b. Flowers dark purple to deep red, becoming dark purple when dried; petals with very conspicuous veins; staminodes carinate abaxially.
 - 12a. Lip with a white-margined rim to its mouth, lacking translucent “windows” on back 15. *C. tibeticum*
 - 12b. Lip without a white-margined rim to its mouth, with translucent “windows” on back 16. *C. calcicola*
 - 6b. Ovary glandular pubescent; flowers yellow, green, or white, sometimes with maroon sepals

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- and petals or purple-veined sepals and petals.
- 13a. Staminodes not stalked at base; petals usually nearly as long as lip, mostly not twisted; flower usually solitary.
- 14a. Flowers greenish yellow; sepals and petals without maroon stripes or spots, glabrous abaxially; mouth of lip not grooved-toothed along margin 14. *C. ludlowii*
- 14b. Flowers greenish yellow to yellow, marked with maroon stripes or spots on sepals and petals; mouth of lip slightly edged by teeth or grooved-toothed along margin.
- 15a. Lip 5–7 cm; staminode 1.5–2 cm 9. *C. fasciolatum*
- 15b. Lip 1.6–4 cm; staminode 6–10 mm 10. *C. farreri*
- 13b. Staminodes stalked at base; petals longer than lip, often twisted; flowers 1–3.
- 16a. Lip pure white; sepals green 8. *C. cordigerum*
- 16b. Lip not pure white; sepals maroon, yellow, or green, sometimes veined with purple.
- 17a. Sepals and petals maroon, quite different in color from yellow lip 4. *C. calceolus*
- 17b. Sepals and petals similar in color to lip.
- 18a. Flowers bronze-brown to purplish brown 7. *C. shanxiense*
- 18b. Flowers green or yellow.
- 19a. Flowers often 2 or 3, greenish to green; petals nearly 2 × as long as lip 5. *C. henryi*
- 19b. Flowers often solitary, yellowish to yellow; petals not 2 × as long as lip; lip sometimes red spotted 6. *C. segawae*
- 1b. Leaves 1 or 2, in former case, bract subtending flower leaflike.
- 20a. Leaves 2, subopposite, quite distinct in size from bract subtending flower; leaves never spotted with blackish purple; pedicel not elongating after fertilization of flower.
- 21a. Leaves fan-shaped, with many radiating veins ending at margin of apical half.
- 22a. Stem below leaves brown tomentose; sepals and petals greenish yellow; lip strongly grooved-margined around mouth 20. *C. japonicum*
- 22b. Stem below leaves glabrous or puberulent; sepals and petals whitish or pinkish; lip slightly grooved-margined around mouth 21. *C. formosanum*
- 21b. Leaves cordate to elliptic, with subparallel, arcuate, or 3–5 prominent veins ending at their apex.
- 23a. Leaves alternate; rhizome slender, elongate; petals usually subspatulate or pandurate, rounded at apex; lip pitcher-shaped, without an incurved apical margin 22. *C. guttatum*
- 23b. Leaves ± opposite; stems clustered; lip with incurved margin.
- 24a. Peduncle (above leaves) and ovary glabrous 23. *C. debile*
- 24b. Peduncle (above leaves) and ovary hairy.
- 25a. Flowers plum-purple; stem below leaves glabrous; leaves not ciliate; dorsal sepal lanceolate, 3–4 mm wide 24. *C. palangshanense*
- 25b. Flowers green, sometimes marked with purple; stem below leaves densely villous; leaves ciliate; dorsal sepal elliptic-ovate, 6–10 mm wide 25. *C. elegans*
- 20b. Leaf solitary, often prostrate on ground; bract leaflike and also often prostrate; both sometimes spotted with blackish purple; pedicel elongating after fertilization of flower.
- 26a. Leaf blade 2.5–6 cm wide; plants with slender rhizomes underground.
- 27a. Leaves with dark purple or black spots adaxially 28. *C. Forrestii*
- 27b. Leaves without dark purple or black spots.
- 28a. Sepals glabrous 26. *C. bardolphianum*
- 28b. Sepals densely villous abaxially 27. *C. micranthum*
- 26b. Leaf blade 6.5–16 cm wide; plants with stout and short rhizomes underground.
- 29a. Stem to 10 cm; leaf and bract not prostrate on substrate; staminode wider than long 36. *C. wumengense*
- 29b. Stem 2.5–7 cm; leaf and bract prostrate on substrate; staminode longer than wide.
- 30a. Petals glabrous abaxially 30. *C. sichuanense*
- 30b. Petals ± hairy abaxially.
- 31a. Petals nearly 2 × as long as lip 33. *C. lentiginosum*
- 31b. Petals shorter, ca. as long as or longer than, but not 2 × as long as, lip.
- 32a. Petals densely white villous on upper side of abaxial surface, densely marked with small maroon spots 35. *C. fargesii*
- 32b. Petals ± pubescent or purple hairy on upper side of abaxial surface, marked with maroon spots or stripes.
- 33a. Dorsal sepal yellowish, distinctly marked with longitudinal maroon stripes, shortly hairy on abaxial veins 29. *C. margaritaceum*
- 33b. Dorsal sepal liver-colored or greenish, without longitudinal

maroon stripes, glabrous abaxially.

- 34a. Dorsal sepal yellowish green; petals 2.4–2.8 cm wide, ca. as long as or slightly longer than lip 31. *C. dawuishanense*
- 34b. Dorsal sepal liver-colored; petals 1.4–2.1 cm wide, obviously longer than lip.
- 35a. Leaf blade not similar in color to petals and lip; dorsal sepal 3.8–6 cm wide 32. *C. lichiangense*
- 35b. Leaf blade often similar in color to petals and lip; dorsal sepal 2.5–2.8 cm wide 34. *C. malipoense*

1. *Cyripedium subtropicum* S. C. Chen & K. Y. Lang, Acta Phytotax. Sin. 24: 317. 1986.

暖地杓兰 nuan di shao lan

Plants to 1.5 m tall, with a stout, rather short rhizome 2–3 mm in diam. Stem erect, ca. 1 cm in diam., pubescent, with several sheaths at base and 9 or 10 leaves above; sheaths 2.5–9.5 cm, pubescent. Leaf blade elliptic-oblong to elliptic-lanceolate, 21–33 × 7.7–10.5 cm, abaxially pubescent, base contracted into petiole, margin ± ciliate, apex acuminate; petiole 1–2 cm. Inflorescence terminal, racemose, 7-flowered; peduncle ca. 21 cm; rachis ca. 15 cm, with reddish hairs; floral bracts ± reflexed, linear-lanceolate, 1–2.8 × 0.2–0.3 cm, with reddish hairs; pedicel and ovary ca. 4.5 cm, densely glandular hairy and brownish pilose. Flowers yellow, with purple spots on lip. Dorsal sepal ovate-elliptic, 3.5–3.9 × 2.2–2.5 cm, abaxially with reddish hairs, apex cuspidate-acuminate; synsepal broadly ovate-elliptic, slightly wider than dorsal sepal, abaxially also hairy, apex shallowly 2-lobed. Petals suboblong-ovate, 3–3.6 × 9–11 mm, reddish hairy on adaxial veins and abaxial surface; lip deeply pouched, obovoid-ellipsoid, 4–4.6 cm, ca. 3 cm in diam., glabrous on outer surface, hairy toward inner base. Staminode subligulate, ca. 5 × 1.5 mm, base stalked, apex obtuse, slightly upcurved. Fl. Jul.

- *Alnus* forests; ca. 1400 m. SE Xizang (Médog).

2. *Cyripedium wardii* Rolfe, Notes Roy. Bot. Gard. Edinburgh 8: 128. 1913.

宽口杓兰 kuan kou shao lan

Cyripedium guttatum Swartz var. *wardii* (Rolfe) P. Taylor.

Plants 10–20 cm tall. Rhizome 3–6 cm × 2–5 mm. Stem erect, rather slender, pubescent, with several sheaths at base and 2 or 3 (or 4) leaves above. Leaf blade elliptic to elliptic-lanceolate, 4.5–10 × 2.5–3.5 cm, both surfaces pubescent especially on veins, ciliate, base contracted and sheathing, apex acute or subacuminate. Inflorescence terminal, 1- or 2-flowered; peduncle slender, pubescent; floral bracts foliaceous, ovate-lanceolate, 1.5–2.7 cm, pubescent and ciliate; pedicel and ovary 1–1.2 cm, densely pubescent. Flowers small, white or creamy white with purple spots on inside of lip and around its mouth. Dorsal sepal elliptic or ovate-elliptic, 14–17 × 8–10 mm, abaxially sparsely pubescent, apex obtuse or subacute; synsepal broadly elliptic, slightly shorter than dorsal sepal, abaxially pubescent, apex shallowly 2-lobed. Petals subovate-rhombic or ovate-oblong, 9–12 × ca. 6 mm, apex obtuse; lip deeply pouched, subobovoid-globose, 1.2–1.6 cm, with a broad mouth. Staminode

narrowly ligulate to linear-oblong, 1–3 × 1–2.5 mm, narrower than stigma. Fl. Jun–Jul.

- Dense forests, limestone cliffs, rocks by streams; 2500–3500 m. W Sichuan (Dadu He valley), SE Xizang (Zayü), NW Yunnan (Dêqên).

3. *Cyripedium flavum* P. F. Hunt & Summerhayes, Kew Bull. 20: 51. 1966.

黄花杓兰 huang hua shao lan

Cyripedium luteum Franchet.

Plants often 30–50 cm tall, with a stout, usually rather short rhizome. Stem erect, densely pubescent, especially near upper nodes, with several sheaths at base and 3–6 leaves above. Leaves well spaced; blade elliptic to elliptic-lanceolate, 10–16 × 4–8 cm, both surfaces pubescent, shortly ciliate, apex acute or acuminate. Inflorescence terminal, 1- or rarely 2-flowered; peduncle pubescent; floral bracts foliaceous, elliptic-lanceolate, 4–8 × 1.8–2.3 cm, pubescent; pedicel and ovary 2.5–4 cm, densely rusty hairy. Flowers yellow, sometimes tinged or flushed with red, occasionally with maroon spots on lip. Dorsal sepal elliptic to broadly elliptic, 3–3.5 × 1.5–3 cm, abaxial midvein and base sparsely puberulent, shortly ciliate, apex obtuse; synsepal broadly elliptic, 2–3 × 1.5–2.5 cm, subglabrous, apex nearly unlobed. Petals oblong to oblong-lanceolate, slightly oblique, 2.5–3.5 × 1–1.5 cm, adaxially pubescent toward base, shortly ciliate, apex obtuse; lip deeply pouched, globose-ellipsoid, 3–4.5 cm. Staminode orbicular or broadly elliptic, 6–7 × ca. 5 mm, abaxially slightly keeled, adaxially with conspicuous reticulate veins, sessile and ± auriculate. Capsule narrowly obovoid, 3.5–4.5 cm, hairy. Fl. and fr. Jun–Sep. $2n = 20^*$.

- Forests, forest margins, thickets, stony places on grasslands; 1800–3500 m. S Gansu, W Hubei (Fangxian), Sichuan, SE Xizang, NW Yunnan.

4. *Cyripedium calceolus* Linnaeus, Sp. Pl. 2: 951. 1753.

杓兰 shao lan

Plants 20–45 cm tall, with a somewhat stout rhizome. Stem erect, with glandular hairs, with several sheaths at base and 3 or 4 leaves above middle. Leaf blade elliptic or ovate-elliptic, rarely ovate-lanceolate, 7–16 × 4–7 cm, abaxially sparsely pubescent especially on veins and toward base, minutely ciliate, apex acute or shortly acuminate. Inflorescence terminal, usually 1- or 2-flowered; floral bracts foliaceous, elliptic-lanceolate or ovate-lanceolate, 4–6(–10) × 1.5–4 cm; pedicel and ovary ca. 3 cm, with short glandular hairs. Flowers with maroon sepals and petals and yellow lip. Dorsal sepal

ovate or ovate-lanceolate, 2.5–5 × 0.8–1.5 cm, abaxial midvein sparsely pubescent, apex acuminate or cuspidate-acuminate; synsepal similar to dorsal sepal, apex shallowly 2-lobed. Petals twisted, linear or linear-lanceolate, 3–5 × 0.4–0.6 cm, pubescent toward adaxial base and on abaxial veins; lip deeply pouched, ellipsoid, 3–4 × 2–3 cm, outside glabrous, inner bottom hairy; incurved lateral lobes 3–4 mm wide. Staminode suboblong-elliptic, 7–10 × 5–7 mm, abaxially carinate, base with a stalk ca. 1 mm, apex obtuse. Fl. Jun–Jul. $2n = 20$.

Rocky places in forests, forest margins, grasslands; 500–1000 m. Heilongjiang, E Jilin, Liaoning, NE Nei Mongol [Japan, Korea, Russia; Europe].

5. *Cypripedium henryi* Rolfe, Bull. Misc. Inform. Kew 1892: 211. 1892.

绿花杓兰 lǜ huā shāo lán

Cypripedium chinense Franchet.

Plants 30–60 cm tall, with a rather stout rhizome. Stem erect, pubescent, with several sheaths at base and 4 or 5 leaves above. Leaf blade elliptic to ovate-lanceolate, 10–18 × 6–8 cm, glabrous or pubescent near abaxial base, apex acuminate. Inflorescence terminal, usually 2- or 3-flowered; floral bracts foliaceous, ovate-lanceolate or lanceolate, 4–10 × 1–3 cm, glabrous or occasionally pubescent on abaxial veins, apex cuspidate-acuminate; pedicel and ovary 2.5–4 cm, densely white glandular hairy. Flowers green to greenish. Dorsal sepal ovate-lanceolate, 3.5–4.5 × 1–1.5 cm, slightly pubescent on abaxial veins especially toward base, apex acuminate; synsepal similar to dorsal sepal, apex shallowly 2-lobed. Petals usually slightly twisted, linear-lanceolate, 4–5 × 0.5–0.7 cm, pubescent toward adaxial base and on abaxial veins, apex acuminate; lip deeply pouched, ellipsoid, ca. 2 cm, ca. 1.5 cm in diam., outside glabrous, inner bottom hairy. Staminode elliptic or ovate-elliptic, 6–7 × 3–4 mm, abaxially carinate, base with a stalk 2–3 mm. Capsule sub-ellipsoid or narrowly ellipsoid, to 3.5 × 1.2 cm, hairy. Fl. Apr–May, fr. Jul–Sep. $2n = 22^*$.

• Humus-rich places in open forests, at forest margins, or on scrubby slopes; 800–2800 m. S Gansu, Guizhou, W Hubei, S Shaanxi, S Shanxi, Sichuan, NW to SE Yunnan.

6. *Cypripedium segawae* Masamune, Trans. Nat. Hist. Soc. Formosa 23: 209. 1933 [*“segawai”*].

宝岛杓兰 bǎo dǎo shāo lán

Cypripedium guttatum Swartz var. *segawae* (Masamune) S. S. Ying; *C. reginae* T. Walter var. *segawae* (Masamune) S. S. Ying.

Plants with a short, creeping rhizome. Stem erect, with glandular hairs, with 1 or 2 sheaths at base and 3 or 4 leaves above. Leaf blade elliptic to elliptic-lanceolate, 5–10 × 1.5–3 cm, both surfaces pubescent, apex subacute. Inflorescence terminal, with 1 flower; peduncle slender, with glandular hairs; floral bracts foliaceous, lanceolate, 2.5–3.5 cm. Flower yellowish to yellow, rarely with small red spots on lip, 5–6 cm in diam. Dorsal sepal ovate-lanceolate, 2–4 × 0.8–1.4 cm, glabrous, apex acuminate; synsepal ovate, 2–3.5 × 1–1.5 cm, glabrous, apex shallowly 2-lobed. Petals not twisted, linear-lanceo-

late, 2.3–4 × 0.6–0.8 cm, densely pubescent at adaxial base, apex acuminate; lip deeply pouched, subglobose, 2–2.5 × ca. 1.7 cm, with a small mouth often toothed margined. Staminode oblong, 6–7 mm, base with a stalk 1–2 mm. Fl. Mar–Apr. $2n = 20^*$.

• Forests, alpine grassy slopes; 1300–3000 m. NE Taiwan.

7. *Cypripedium shanxiense* S. C. Chen, Acta Phytotax. Sin. 21: 343. 1983.

山西杓兰 shān xī shāo lán

Plants 40–55 cm tall, with a rather stout, creeping rhizome. Stem erect, pubescent and glandular hairy, with several sheaths at base and 3 or 4 leaves above. Leaf blade elliptic to ovate-lanceolate, 7–15 × 4–8 cm, sometimes hairy toward abaxial base and on veins on both surfaces, ciliate, apex acuminate. Inflorescence terminal, 2-flowered, rarely 1- or 3-flowered; peduncle and rachis pubescent and glandular hairy; floral bracts foliaceous, 5.5–10 × 1–3 cm, both surfaces pubescent on veins; pedicel and ovary 2.5–3 cm, densely glandular hairy and pubescent. Flowers ochre-brown to purplish brown, with darker venation; lip often spotted with dark brown; staminode white with a few purplish brown spots. Dorsal sepal lanceolate or ovate-lanceolate, 2.5–3.5 × ca. 1 cm, abaxially often hairy, apex cuspidate-acuminate; synsepal similar to dorsal sepal, apex deeply 2-lobed. Petals not twisted or slightly twisted, narrowly lanceolate or linear, 2.7–3.5 × 0.4–0.5 cm, apex acuminate; lip deeply pouched, subglobose to ellipsoid, 1.6–2 × ca. 1.3 cm, outside glabrous, inner bottom hairy. Staminode oblong-elliptic, 7–9 × 3.5–5 mm, base with a short but distinct stalk. Capsule spindle-shaped or narrowly ellipsoid, 3–4 × ca. 1 cm, with sparse glandular hairs or glabrous. Fl. and fr. May–Aug. $2n = 20$.

Forests, grassy slopes; 1000–2500 m. S Gansu, W Hebei, S Nei Mongol, E Qinghai, Shanxi, NW Sichuan [N Japan, SE Russia].

8. *Cypripedium cordigerum* D. Don, Prodr. Fl. Nepal. 37. 1825.

白唇杓兰 bái chún shāo lán

Plants 25–50 cm tall, with a short, stout rhizome. Stem erect, usually pubescent or glandular hairy, especially toward upper part, with several sheaths at base and 2–5 leaves above. Leaf blade elliptic or broadly elliptic, 10–15 × 4–10 cm, sparsely ciliate, apex acute or acuminate. Inflorescence terminal, 1- or rarely 2-flowered; peduncle ± with glandular hairs; floral bracts foliaceous, elliptic to lanceolate, 6–9 × 2–4 cm, pubescent on abaxial veins, apex acuminate; pedicel and ovary 2–4 cm, with dense glandular hairs. Flowers 9–10 cm in diam., usually with pale green to yellowish green sepals and petals and white lip; staminode often yellow spotted with red. Dorsal sepal broadly ovate, 2.5–3 × ca. 1.5 cm, adaxial base and abaxial surface pubescent, apex acuminate; synsepal elliptic-ovate, slightly narrower than dorsal sepal, abaxially pubescent, apex shallowly 2-lobed. Petals not twisted, linear-lanceolate, 2.5–3.5 × 0.7–0.9 cm, adaxial base pubescent, apex acuminate; lip deeply pouched, ellipsoid, dorsiventrally flattened, 2.5–3.5 cm, with a small mouth, outer surface glabrous, inner bottom hairy. Staminode suboblong, ca. 10 × 5 mm, base with a short stalk. Fl. Jun–Aug. $2n = 20$.

Pinus forests, grasslands; 3000–3400 m. S Xizang (Yadong) [Bhutan, India, Kashmir, Nepal, Pakistan].

9. *Cypripedium fasciolatum* Franchet, J. Bot. (Morot) 8: 232. 1894.

大叶杓兰 da ye shao lan

Cypripedium langrhoa Gattefosse ex Constantin; *C. wilsonii* Rolfe.

Plants 30–45 cm tall, with a stout, short rhizome. Stem erect, glabrous or pubescent near upper nodes, with several sheaths at base and 3 or 4 leaves above. Leaf blade elliptic or broadly elliptic, 15–20 × 6–12 cm, both surfaces glabrous, ciliate, apex shortly acuminate. Inflorescence terminal, 1- or rarely 2-flowered; peduncle pubescent in upper part; floral bracts foliaceous, elliptic or ovate, 7–10 × 3–6.5 cm, abaxial veins occasionally pubescent toward base, apex acuminate; pedicel and ovary 1.5–3 cm, with dense reddish brown glandular hairs. Flowers fragrant, large, to 12 cm in diam., pale to lemon-yellow, with maroon longitudinal stripes on sepals and petals. Dorsal sepal ovate-elliptic or ovate, 5–6 × 2.8–3.5 cm, abaxial veins slightly puberulent, margin sometimes slightly undulate, apex acuminate; synsepal similar to dorsal sepal, 5–6 × 2–2.5 cm, apex shallowly 2-lobed. Petals linear-lanceolate or broadly linear, 5.5–8 × 0.8–1.5 cm, pubescent toward adaxial base and on abaxial veins, apex acuminate; lip often ± ascending, deeply pouched, subglobose, 5–7 cm, mouth often slightly edged by teeth, outer surface glabrous, inner bottom hairy. Staminode ovate-elliptic, 1.5–2 × ca. 1 cm, abaxially carinate, base slightly auriculate, margin slightly incurved. Fl. Apr–Jun.

• Open forests, scrubby slopes, grasslands; 1600–2900 m. Chongqing, W Hubei, SW Sichuan.

10. *Cypripedium farreri* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 9: 102. 1916.

华西杓兰 hua xi shao lan

Cypripedium cheniae Torelli.

Plants 20–30 cm tall, with a stout, short rhizome. Stem erect, nearly glabrous, with several sheaths at base and often 2 leaves above. Leaf blade elliptic or ovate-elliptic, 6–9 × 2.5–3.5 cm, glabrous, minutely ciliate, apex acute or shortly acuminate. Inflorescence terminal, with 1 flower; peduncle pubescent toward apex; floral bracts foliaceous, narrowly ovate-elliptic or ovate, 3.5–5 × 1–1.5 cm, glabrous, apex acuminate; pedicel and ovary ca. 2.5 cm, slightly glandular hairy. Flower fragrant; sepals and petals greenish yellow, marked with maroon longitudinal stripes or also spots; lip waxy yellow, with maroon spots inside. Dorsal sepal ovate or ovate-elliptic, 3–3.5 × ca. 1.5 cm, abaxially sparsely shortly hairy on veins, apex acuminate; synsepal ovate-lanceolate, ca. as long as dorsal sepal, ca. 1.1 cm wide, abaxially slightly puberulent, apex shallowly 2-lobed. Petals lanceolate, 3–4 × 0.6–0.7 cm, pubescent toward adaxial base and on abaxial midvein, apex acuminate; lip deeply pouched, urceolate, 2.5–3.3 × 1.5–2 cm, with a dilated mouth grooved-toothed along margin. Staminode suboblong-ovate, 10 × 5 mm, base sessile. Fl. Jun.

• Stony grasslands, shaded cliffs in open forests; 2600–3400 m. S

Gansu, Guizhou, NW and W Sichuan, NW Yunnan.

“*Cypripedium zhongdianense*” (Z. D. Fang, Wild Fl. Hengdun Mts. 209. 1993) belongs here but was not validly published because no Latin description or diagnosis was provided (*Vienna Code*, Art. 36.1).

Cypripedium ×wenqingiae Perner (Orchidee (Hamburg) 49: 201. 1998), described from Wenchuan, Sichuan, is a natural hybrid between *C. farreri* and *C. tibeticum*.

11. *Cypripedium macranthos* Swartz, Kongl. Vetensk. Acad. Nya Handl. 21: 251. 1800 [“*macranthon*”].

大花杓兰 da hua shao lan

Cypripedium macranthos f. *albiflorum* (Makino) Ohwi; *C. macranthos* var. *albiflorum* Makino; *C. macranthos* var. *taiwanianum* F. Maekawa; *C. speciosum* Rolfe; *C. taiwanianum* Masamune; *Sacodon macranthos* (Swartz) Rafinesque.

Plants 25–50 cm tall, with a stout, short rhizome. Stem erect, slightly pubescent or glabrescent, with several sheaths at base and 3 or 4 leaves above. Leaf blade elliptic or elliptic-ovate, 10–15 × 6–8 cm, slightly pubescent or glabrescent on veins on both surfaces, minutely ciliate, apex acuminate or subacute. Inflorescence terminal, 1- or rarely 2-flowered; peduncle pubescent or glabrous; floral bracts foliaceous, elliptic or rarely elliptic-lanceolate, 7–9 × 4–6 cm, both surfaces often puberulent on veins, apex shortly acuminate; pedicel and ovary 3–3.5 cm, glabrous. Flowers large, red or pink, usually with darker stripes, very rarely white. Dorsal sepal broadly ovate-elliptic or ovate-elliptic, 4–5 × 2.5–3 cm, glabrous, apex acuminate; synsepal ovate, 3–4 × 1.5–2 cm, apex shallowly 2-lobed. Petals not twisted, lanceolate, 4.5–6 × 1.5–2.5 cm, villous toward adaxial base, apex acuminate; lip deeply pouched, subglobose or ellipsoid, 4.5–5.5 cm, with a small mouth ca. 1.5 cm in diam., inner bottom hairy. Staminode ovate-oblong, 10–14 × 7–8 mm, abaxially not carinate, base sessile. Capsule narrowly ellipsoid, ca. 4 cm, glabrous. Fl. Jun–Jul, fr. Aug–Sep. *2n* = 20, 21, 30.

Humus-rich soils and well-drained places in forests, forest margins, grassy slopes; 400–2400 m. Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Shandong, Taiwan [Japan, Korea, Russia].

Cypripedium ×ventricosum Swartz (Kongl. Vetensk. Acad. Nya Handl. 21: 251. 1800), a natural hybrid between *C. macranthos* and *C. calceolus*, was reported to be found in Heilongjiang and Nei Mongol.

12. *Cypripedium yunnanense* Franchet, J. Bot. (Morot) 8: 231. 1894.

云南杓兰 yun nan shao lan

Cypripedium amesianum Schlechter.

Plants 20–37 cm tall, with a stout, short rhizome. Stem erect, glabrous or sparsely pubescent in upper part especially near nodes, with several sheaths at base and 3 or 4 leaves above. Leaf blade elliptic or elliptic-lanceolate, 6–14 × 1–3.5 cm, abaxially puberulent especially on veins, adaxially glabrous or sparsely puberulent, apex acuminate. Inflorescence terminal, with 1 flower; peduncle sparsely pubescent in upper part; floral bracts foliaceous, ovate-elliptic or ovate-lanceolate, 4–6 × ca. 1.5 cm, both surfaces sparsely pubescent, apex acute or acuminate; pedicel and ovary 2–3.5 cm, glabrous or upper part

slightly hairy. Flower 4–6 cm in diam., pink, purplish red, or occasionally off-white, with darker veins; staminode white with a purple stripe centrally. Dorsal sepal ovate-elliptic, 2.2–3.2 × 1.2–1.6 cm, apex acuminate; synsepal elliptic-lanceolate, 2.2–3.2 × 0.8–1 cm, apex shallowly 2-lobed. Petals slightly twisted or not, lanceolate, 2.2–3.2 × 0.7–0.8 cm, adaxial base hairy, apex acuminate; lip deeply pouched, ellipsoid, 2.2–3.2 × 1.5–1.8 cm, with a paler rim to its mouth, outer surface glabrous, inner bottom hairy. Staminode elliptic or ovate, 6–7 × 3–4 mm, base subsessile. Fl. May.

• *Pinus* forests, thickets, grassy slopes; 2700–3800 m. SW and W Sichuan, SE Xizang, NW Yunnan.

13. *Cypripedium taibaiense* G. H. Zhu & S. C. Chen, *Novon* 9: 454. 1999.

太白杓兰 tai bai shao lan

Plants 13–15(–24) cm tall. Rhizome 4–5 cm, stout, 4–5 mm in diam. Stem erect, glabrous, with 2 or 3 sheaths at base and 3 or 4 leaves above. Leaf blade elliptic or elliptic-lanceolate, 4.5–11 × 2.8–3.5 cm, abaxially minutely pubescent or glabrescent, adaxially glabrous, ciliate, apex acuminate or subacute. Inflorescence terminal, 1-flowered; peduncle minutely pubescent; floral bracts narrowly elliptic or ovate-lanceolate, 6–6.5 cm, both surfaces minutely pubescent or adaxially glabrescent; pedicel and ovary 1.7–2 cm, pubescent at least along ribs. Flower purple-red, 4–4.5 cm in diam. Dorsal sepal elliptic-ovate, 2.2–3 × 1.3–1.5 cm, glabrous, apex acuminate; synsepal ovate-elliptic to narrowly elliptic, 2.2–2.8 × 1–1.2 cm, glabrous, bifid at apex. Petals lanceolate, 2.6–3 × 0.7–0.9 cm, villous in basal half adaxially; lip deeply pouched, obovoid-subglobose, 2.5–3 × 1.5–2 cm, outer surface glabrous, inner bottom hairy. Staminode oblong, 10–11 × 5–6 mm, with a longitudinal groove centrally, carinate abaxially, mucronate at apex. Fl. Jun–Jul.

• Grassy slopes; 2600–3300 m. S Shaanxi (Taibai Shan).

14. *Cypripedium ludlowii* P. J. Cribb, *Gen. Cypripedium*, 204. 1997.

波密杓兰 bo mi shao lan

Plants 25–38 cm tall. Stem erect, glabrous, with several sheaths at base and 3 leaves above. Leaf blade elliptic-ovate or elliptic, 6–13 × 3.6–7.5 cm, both surfaces sparsely pubescent on veins, occasionally with glandular hairs toward apex and base, apex acuminate or acute. Inflorescence terminal, with 1 flower; floral bracts ovate or ovate-elliptic, 6–8 × 3–4 cm, sparsely pubescent, apex acuminate or acute; pedicel and ovary 3.5–4.1 cm, occasionally with glandular hairs toward apex. Flower greenish yellow. Dorsal sepal ovate-elliptic, 3.3–3.8 × 1.5–1.7 cm, apex acuminate; synsepal ovate to lanceolate, 3.3–3.8 × 1.2–1.5 cm, apex shallowly 2-lobed. Petals not twisted, obliquely lanceolate, 3–4 × 0.9–1.2 cm, adaxial base pubescent, margin slightly undulate, apex acuminate; lip pouched, sub-ellipsoid, 3–3.6 cm, inner bottom hairy; incurved lateral lobes to 1 cm wide. Staminode subovate-oblong, ca. 1 cm, with a longitudinal groove centrally, glabrous. Fl. unknown.

• Moist places in forests; ca. 4300 m. SE Xizang (Bomi).

15. *Cypripedium tibeticum* King ex Rolfe, *J. Linn. Soc., Bot.* 29: 320. 1892.

西藏杓兰 xi zang shao lan

Cypripedium compactum Schlechter; *C. corrugatum* Franchet; *C. corrugatum* var. *obesum* Franchet; *C. lanuginosum* Schlechter; *C. macranthos* Swartz var. *tibeticum* (King ex Rolfe) Kraenzlin.

Plants 15–35 cm tall, with a stout, rather short rhizome. Stem erect, glabrous or pubescent near upper nodes, with several sheaths at base and 3 or rarely 2 or 4 leaves above. Leaf blade elliptic, ovate-elliptic, or broadly elliptic, 8–16 × 3–9 cm, glabrous or sparsely puberulent, minutely ciliate, apex acute, acuminate, or obtuse. Inflorescence terminal, with 1 flower, usually appearing before full development of leaves; floral bracts foliaceous, elliptic to ovate-lanceolate, 6–11 × 2–5 cm, apex acute or acuminate; pedicel and ovary 2–3 cm, glabrous or occasionally slightly pubescent toward apex. Flower large, nodding; sepals and petals white or yellow, boldly striped with purple to deep maroon; lip purple or dark maroon, usually with a white-margined rim. Dorsal sepal elliptic or ovate-elliptic, 3–6 × 2.5–4 cm, abaxially glabrous or occasionally sparsely puberulent, ± minutely ciliate, apex acuminate, acute, or mucronulate; synsepal similar to dorsal sepal, but slightly shorter and narrower, apex shallowly 2-lobed. Petals lanceolate or oblong-lanceolate, 3.5–6.5 × 1.5–2.5 cm, with very conspicuous veins, densely pubescent toward adaxial base, sparsely minutely ciliate, apex acuminate or acute; lip deeply pouched, subglobose to ellipsoid, 4–6 × 4–5.5 cm, outer surface often wrinkled, inner bottom hairy. Staminode ovate-oblong, 1.5–2 × 0.8–1.2 cm, abaxially ± keeled, base subsessile. Fl. May–Aug. *2n* = 20.

Sparse forests, forest margins, scrubby slopes, grassy slopes, stony places; 2300–4200 m. S Gansu, W Guizhou, W Sichuan, E and S Xizang, W Yunnan [Bhutan, India (Sikkim)].

Cypripedium froschii Perner (Orchidee Beih., *Deutsch. Orchid. Ges.* 6: 10. 1999), collected from Lijiang, Yunnan, appears to be a natural hybrid between *C. tibeticum* and *C. yunnanense*, both of which are native to Lijiang. Its flower is similar to that of *C. yunnanense* but much larger.

16. *Cypripedium calcicola* Schlechter, *Acta Horti Gothob.* 1: 129. 1924 [*“calcicolum”*].

褐花杓兰 he hua shao lan

Cypripedium smithii Schlechter.

Plants 15–45 cm tall, with a stout, rather short rhizome. Stem erect, usually glabrous, with several sheaths at base and 3 or 4 leaves above. Leaf blade elliptic, 5–16.5 × 4–5.5 cm, subglabrous, minutely ciliate, apex acuminate or acute. Inflorescence terminal, with 1 flower; peduncle pubescent; floral bracts foliaceous, ovate-lanceolate, to 9.5 × 2–2.5 cm; pedicel and ovary 3–3.5 cm, sparsely hairy. Flower deep purple; lip with translucent “windows” on back, without a white-margined rim to its mouth. Dorsal sepal elliptic-ovate, 3.5–5 × 1.9–2.2 cm, apex acuminate; synsepal elliptic-lanceolate, 3.2–4.2 × 1.5–2 cm, apex shallowly 2-lobed. Petals ovate-lanceolate, 4.4–5.2 × 0.8–0.9 cm, with very conspicuous veins, adaxial base pubescent, apex acuminate; lip deeply pouched, ellipsoid, 3.5–4.2 ×

2.5–2.8 cm, inner bottom hairy. Staminode suboblong, 1.3–1.5 × ca. 1 cm, base subsessile. Fl. Jun–Jul.

• Forests, forest margins, thickets, grassy slopes or stony places along streambanks; 2600–3900 m. W Sichuan, NW Yunnan.

17. *Cypripedium franchetii* E. H. Wilson, Horticulture 16: 145. 1912.

毛杓兰 mao shao lan

Cypripedium macranthos Swartz var. *villosum* Handel-Mazzetti; *C. pulchrum* Ames & Schlechter; *C. rubronerve* Cavestro.

Plants 20–35 cm tall, with a stout, rather short rhizome. Stem erect, densely villous especially toward upper part, with several sheaths at base and 3–5 leaves above. Leaf blade elliptic or ovate-elliptic, 10–16 × 4–6.5 cm, both surfaces sparsely pubescent on veins, minutely ciliate, apex acute or shortly acuminate. Inflorescence terminal, with 1 flower; peduncle densely villous; floral bracts foliaceous, elliptic or elliptic-lanceolate, 6–8(–12) × 2–3.5 cm, both surfaces sparsely hairy, minutely ciliate, apex acuminate or shortly acuminate; pedicel and ovary 4–4.5 cm, densely villous. Flower purplish red to pink, with darker veins. Dorsal sepal elliptic-ovate or ovate, 4–5.5 × 2.5–3 cm, abaxially sparsely pubescent on veins, minutely ciliate, apex acuminate or shortly acuminate; synsepal elliptic-lanceolate, 3.5–4 × 1.5–2.5 cm, abaxially pubescent on veins, minutely ciliate, apex shallowly 2-lobed. Petals lanceolate, 5–6 × 1–1.5 cm, villous toward adaxial base, apex acuminate; lip deeply pouched, ellipsoid or subglobose, 4–5.5 × 3–4 cm. Staminode ovate-sagittate to ovate, 10–15 × 7–9 mm, abaxially slightly carinate, base auriculate, subsessile or with a very short stalk at base. Fl. May–Jul.

• Humus-rich and well-drained places in open forests, scrubby or wet grassy slopes; 1500–3700 m. Chongqing, S Gansu, W Henan, W Hubei, S Shaanxi, S Shanxi, NW Sichuan.

18. *Cypripedium himalaicum* Rolfe, J. Linn. Soc., Bot. 29: 319. 1892.

高山杓兰 gao shan shao lan

Cypripedium macranthos Swartz var. *himalaicum* (Rolfe) Kraenzlin.

Plants 25–28 cm tall, with a relatively slender rhizome. Stem erect, sparsely pubescent, with several sheaths at base and 3 leaves above. Leaf blade oblong-elliptic to broadly elliptic, 5–10 × 2.5–4 cm, both surfaces glabrous or slightly hairy, ciliate, apex acute. Inflorescence terminal, with 1 flower; peduncle ± pubescent, especially in upper part; floral bracts foliaceous, narrowly elliptic to narrowly elliptic-lanceolate, 3–5 × 0.6–1.2 cm, abaxial veins ± hairy, apex acuminate; pedicel and ovary 1.8–2.2 cm, densely pubescent. Flowers fragrant, whitish or greenish yellow, densely marked with purplish brown longitudinal stripes. Dorsal sepal broadly elliptic or broadly ovate, 2.4–2.7 × 1.8–2.1 cm, slightly concave, apex acute; synsepal narrowly oblong or oblong-lanceolate, 1.8–2.2 × 1.1–1.2 cm, concave, apex shallowly 2-lobed. Petals narrowly oblong or linear-lanceolate, 2.3–3.4 × 0.6–0.7 cm, villous toward adaxial base, apex acute; lip deeply pouched, slightly bilaterally compressed,

subellipsoid, 2.3–2.8 cm, with a small mouth and a toothed margin around it, inner bottom hairy. Staminode broadly ovate-cordate, ca. 7 × 5–6 mm, base with a very short stalk. Fl. Jun–Jul. $2n = 20$.

Grasslands in forests, forest margins, open rocky slopes; 3600–4000 m. S and SE Xizang [Bhutan, N India, Nepal].

19. *Cypripedium plectrochilum* Franchet, Bull. Soc. Bot. France 32: 27. 1885.

离萼杓兰 li e shao lan

Cypripedium arietinum Franchet (1885), not R. Brown (1813).

Plants 12–30 cm tall, with a stout, rather short rhizome. Stem erect, pubescent, with several sheaths at base and 3 or rarely 2 or 4 leaves above. Leaf blade elliptic to narrowly elliptic-lanceolate, 4.5–6 × 1–3.5 cm, abaxial veins occasionally puberulent, adaxially subglabrous, apex acute or shortly acuminate. Inflorescence terminal, with 1 flower; peduncle slender, pubescent; floral bracts foliaceous, elliptic-lanceolate or lanceolate, 2–3 × 0.7–0.8 cm, slightly ciliate, apex acuminate or acute; pedicel and ovary 1.5–2.5 cm, densely pubescent. Flowers relatively small; sepals and petals chocolate-brown or greenish brown, petals usually with a white margin; lip and staminode white, tinged with pink. Dorsal sepal ovate-lanceolate, 1.6–1.8 × 0.7–0.8 cm, slightly hairy at base, minutely ciliate, apex acute; lateral sepals free, linear-lanceolate, 1.6–1.8 × 0.2–0.3 cm, slightly hairy at base, apex acuminate or acute. Petals linear, 1.6–2.1 × 0.1–0.2 cm, pubescent toward adaxial base; lip deeply pouched, obconic, slightly oblique, 1.6–2.4 × ca. 1 cm, pubescent around mouth, inner bottom hairy, obtusely tipped. Staminode obovate or square-obovate, 5–6 mm, abaxially carinate, with a very short stalk at base. Capsule narrowly ellipsoid, ca. 2 cm × 5–6 mm, ridged, sparsely pubescent along ridges. Fl. Apr–Jun, fr. Jul. $2n = 20$.

Forests, forest margins, thickets, stony and grassy slopes; 2000–3600 m. W Hubei, W Sichuan, SE Xizang, C and NW Yunnan [Myanmar].

20. *Cypripedium japonicum* Thunberg in Murray, Syst. Veg., ed. 14, 817. 1784.

扇脉杓兰 shan mai shao lan

Cypripedium cathayanum S. S. Chien.

Plants 35–55 cm tall, with a relatively slender, creeping rhizome 3–4 mm in diam. Stem erect, brown tomentose, with several sheaths in lower part and 2 subopposite or rarely 3 nearly alternate leaves near middle. Leaf blade flabellate, 10–16 × 10–21 cm, both surfaces hairy toward base, with many radiating veins reaching margin of apical half, base subcuneate, margin undulate, minutely ciliate. Inflorescence terminal, with 1 flower; peduncle brown tomentose; floral bracts foliaceous, rhombic or ovate-lanceolate, 2.5–5 × 1–2(–3) cm, glabrous, minutely ciliate; pedicel and ovary 2–3 cm, densely hairy. Flowers pendulous; sepals and petals greenish yellow, base ± spotted with purple; lip yellowish pink to whitish, ± marked with purplish red spots and stripes. Dorsal sepal narrowly elliptic or narrowly elliptic-lanceolate, 4.5–5.5 × 1.5–2 cm, glabrous, apex

acuminate; synsepal similar to dorsal sepal, 4–5 × 1.5–2.5 cm, apex shallowly 2-lobed. Petals obliquely lanceolate, 4–5 × 1–1.2 cm, villous toward adaxial base, apex acuminate; lip pendulous, pouched, subellipsoid or obovoid, 4–5 × 3–3.5 cm, strongly grooved-margined around mouth. Staminode elliptic, ca. 10 × 6–7 mm, base shortly auriculate. Capsule subfusiform, 4.5–5 × ca. 1.2 cm, sparsely puberulent. Fl. Apr–May, fr. Jun–Oct. $2n = 20$.

Moist and humus-rich soils in forests, thickets, forest margins, shaded slopes; 1000–2000 m. Anhui, S Gansu, Guizhou, Hubei, Hunan, Jiangxi, S Shaanxi, Sichuan, Zhejiang [Japan].

21. *Cypripedium formosanum* Hayata, Icon. Pl. Formosan. 6: 66. 1916.

台湾杓兰 tai wan shao lan

Cypripedium japonicum Thunberg var. *formosanum* (Hayata) S. S. Ying.

Plants 30–40 cm tall, with a relatively slender, creeping, often branched rhizome. Stem erect, glabrous or puberulent, with several sheaths in lower part and 2 subopposite leaves above. Leaf blade flabellate, 10–13 × 8–11 cm, both surfaces sparsely puberulent or adaxial surface glabrous, with many radiating veins reaching margin of apical half, base cuneate, margin undulate, minutely ciliate, apex mucronate. Inflorescence terminal, with 1 flower; peduncle nearly glabrous or sparsely pubescent; floral bracts foliaceous, ovate-lanceolate, 2.2–3 × 1–1.2 cm, sparsely puberulent, apex acute; pedicel and ovary 1.8–2 cm, densely pubescent. Flowers pendulous, white or pinkish; sepals and petals spotted with purplish red at base; lip ± with purplish red short stripes and spots. Dorsal sepal often curving forward over lip, narrowly ovate or ovate-lanceolate, 4.5–5 × 1.6–2 cm, slightly pubescent toward base, apex acute or shortly acuminate; synsepal elliptic-ovate, 4.5–5 × 2.5–3 cm, slightly hairy toward base, apex shallowly 2-lobed. Petals oblong-lanceolate, 4.5–5 × 1.2–1.8 cm, adaxial base villous, apex acuminate or acute; lip pendulous, pouched, obovoid or ellipsoid, 4–6 × 3.5–4 cm, slightly grooved-margined around mouth, inner bottom hairy. Staminode ovate-triangular or ovate-sagittate, ca. 10 × 6–7 mm. Fl. Apr–May. $2n = 20^*$, 30^* .

• Forests, thickets; 2400–3000 m. Taiwan.

22. *Cypripedium guttatum* Swartz, Kongl. Vetensk. Acad. Nya Handl. 21: 251. 1800.

紫点杓兰 zi dian shao lan

Cypripedium bouffordianum Yong H. Zhang & H. Sun; *C. orientale* Sprengel.

Plants 15–25 cm tall, with a slender, creeping rhizome. Stem erect, pubescent and glandular hairy, with several sheaths at base and 2 or rarely 3 leaves above. Leaves subopposite or occasionally alternate, at or above middle of plant; blade often turning black or blackish when dried, elliptic, ovate, or ovate-lanceolate, 5–12 × 2.5–4.5(–6) cm, abaxial veins sparsely pubescent or subglabrous, apex acute or acuminate. Inflorescence terminal, with 1 flower; peduncle densely pubescent and glandular hairy; floral bracts foliaceous, ovate-lanceolate, usually

1.5–3 cm, minutely ciliate, apex acute or acuminate; pedicel and ovary 1–1.5 cm, with glandular hairs. Flower white with purplish red or brownish red markings. Dorsal sepal ovate-elliptic or broadly ovate-elliptic, 1.5–2.2 × 1.2–1.6 cm, often sparsely puberulent toward abaxial base, apex acute or shortly acuminate; synsepal narrowly elliptic, 1.2–1.8 × 0.5–0.6 cm, apex shallowly 2-lobed. Petals often subspatulate or pandurate, 1.3–1.8 × 0.5–0.7 cm, hairy toward adaxial base, apex often slightly dilated and rounded; lip deeply pouched, pitcher-shaped, ca. 1.5 × 1.5 cm, lacking an incurved apical margin, with a broad mouth, inner bottom hairy. Staminode ovate-elliptic, 4–5 × 2.5–3 mm, abaxially broadly keeled, adaxially minutely longitudinally ridged, apex emarginate or subtruncate. Capsule pendulous, nearly narrowly ellipsoid, ca. 2.5 cm × 8–10 mm, puberulent. Fl. May–Jul, fr. Aug–Sep. $2n = 20$, 30 .

Forests, thickets, grasslands; 500–4000 m. Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi, Sichuan, Xizang, NW Yunnan [Bhutan, Korea, Russia (Far East, Siberia); Europe, North America].

Cypripedium bouffordianum is evidently an albino form of *C. guttatum*. It is very similar in habit and flower structure to *C. guttatum* but lacks any purple-red or brown-red markings on the flower.

Cypripedium yatabeanum Makino (Bot. Mag. (Tokyo) 13: 91. 1899; *C. guttatum* subsp. *yatabeanum* (Makino) Hultén) was described from Japan and later reported from Heilongjiang and Jilin by P. Y. Fu and S. Z. Liu (in P. Y. Fu, Clavis Pl. Chinae Bor.-Orient., ed. 2, 895. 1995). It differs from *C. guttatum* by having dark brown spots on sepals, petals, and lip, and a larger lip more than 2 cm. However, the present authors are unaware of any Chinese specimens.

23. *Cypripedium debile* H. G. Reichenbach, Xenia Orchid. 2: 223. 1874.

对叶杓兰 dui ye shao lan

Cypripedium cardiophyllum Franchet & Savatier.

Plants 10–30 cm tall, with a rather short rhizome. Stem erect, slender, glabrous, with 2 or 3 tubular sheaths at base and 2 leaves at apex. Leaves spreading horizontally, opposite or subopposite; blade broadly ovate, triangular-ovate, or cordate, 2.5–7 × 2.5–7 cm, herbaceous, glabrous, minutely ciliate, with 3–5 palmate veins and inconspicuous reticulate veinlets, base subcordate or broadly cuneate, apex acute or shortly acuminate. Inflorescence terminal, pendulous, with 1 flower; peduncle arching, usually 2–5 cm, slender, glabrous; floral bracts linear, 1.5–3 cm, glabrous; pedicel and ovary 8–14 mm, glabrous. Flower small, often hidden under leaves; sepals and petals pale green or yellowish green, with maroon spots or markings at base; lip white with maroon spots inside and sometimes stripes toward its mouth. Dorsal sepal narrowly ovate-lanceolate, 1–2 × 0.5–0.7 cm, glabrous, apex acuminate; synsepal similar to dorsal sepal, often slightly smaller, apex nearly unlobed. Petals lanceolate, 1–2 × 0.3–0.5 cm, apex acute, often ± enfolding lip; lip deeply pouched, subellipsoid, 1–1.5 cm, with a broad mouth, inner bottom hairy. Staminode orbicular to ovate, 1–2 mm. Capsule narrowly ellipsoid, 1–1.8 cm × 5–6 mm. Fl. May–Jul, fr. Aug–Sep. $2n = 20$.

Humus- and litter-rich places in forests, grassy slopes; 1000–3400 m. Chongqing, S Gansu, W Hubei, W Sichuan, N Taiwan [Japan].

24. *Cypripedium palangshanense* Tang & F. T. Wang, Bull. Fan Mem. Inst. Biol. Bot. 7: 1. 1936.

巴郎山杓兰 ba lang shan shao lan

Plants 8–13 cm tall, with a slender, creeping rhizome. Stem erect, glabrous, mostly enclosed in several sheaths at base and 2 leaves at apex. Leaves spreading horizontally, opposite or subopposite; blade orbicular or nearly broadly elliptic, 4–6 × 4–5 cm, herbaceous, glabrous, with 5–7 prominent veins, not ciliate, apex acute or obtuse. Inflorescence terminal, suberect, with 1 flower; peduncle slender, pubescent; floral bracts lanceolate, 1.2–1.6 × 0.3–0.4 cm, glabrous, apex acute; pedicel and ovary 4–8 mm, with dense, short glandular hairs. Flower pendulous, brown-purple to purplish red. Dorsal sepal lanceolate, 1.4–1.8 × 0.3–0.4 cm, glabrous or pubescent at abaxial base; synsepal ovate-lanceolate, 1.5–1.7 × 0.5–0.6 cm, apex shallowly 2-lobed. Petals obliquely lanceolate, 1.2–1.6 × 0.4–0.5 cm, slightly hairy toward abaxial base, apex acuminate; lip pouched, subglobose, ca. 1 cm, with a rather broad, rounded mouth. Staminode ovate-lanceolate, ca. 3 mm. Fl. Jun.

• Forests, thickets; 2200–2700 m. Chongqing, C and SW Sichuan.

25. *Cypripedium elegans* H. G. Reichenbach, Flora 69: 561. 1886.

雅致杓兰 ya zhi shao lan

Plants 10–15 cm tall, with a slender, creeping rhizome. Stem erect, densely villous, with 2 tubular sheaths at base and 2 leaves at apex. Leaves spreading horizontally, opposite or subopposite; blade ovate or broadly ovate, 4–5 × 3–3.5 cm, herbaceous, both surfaces sparsely pubescent or rarely glabrous, long ciliate, with 3(–5) prominent veins raised abaxially, apex obtuse. Inflorescence terminal, suberect, with 1 flower; peduncle 2–4 cm, villous; floral bracts ovate, 1.5–2 × 0.6–0.8 cm, slightly shortly hairy; pedicel and ovary 4–5 mm, hairy along longitudinal ridges. Flower small; sepals and petals yellowish green, adaxially with purplish red stripes; lip yellowish green to nearly white, with 3 purplish red warty stripes at front. Dorsal sepal elliptic-ovate, 1.5–2 × 0.6–1 cm, glabrous, apex acute; synsepal similar to dorsal sepal, apex shallowly 2-lobed. Petals lanceolate, 1.5–2 × 0.4–0.5 cm, glabrous, apex subacute; lip pouched, subglobose, ca. 1 cm, often upturned at apex with its mouth hidden. Staminode transversely elliptic, small, ca. 1.5 × 2 mm, base with a short stalk. Fl. May–Jul.

Humus-rich soils in forests, forest margins, thickets; 3600–3700 m. S and SE Xizang, NW Yunnan [Bhutan, N India, Nepal].

26. *Cypripedium bardolphianum* W. W. Smith & Farrer, Notes Roy. Bot. Gard. Edinburgh 9: 101. 1916.

无苞杓兰 wu bao shao lan

Cypripedium nutans Schlechter.

Plants 8–12 cm tall, with a slender, creeping rhizome. Stem erect, relatively short, 2–3 cm, glabrous, covered by 2 sheaths, with a subopposite leaf and bract at apex. Leaf and bract spreading horizontally or ascending; blade elliptic, 6–7 × 2.5–3 cm, subglabrous, apex obtuse or subacute. Inflorescence terminal, erect, 7–9 cm, with 1 flower, ebracteate; pedicel gla-

brous, continuously elongating at fruiting; ovary ca. 1 cm, with 3 longitudinal ridges often sparsely pubescent. Flower small; sepals and petals pale green or reddish with brown stripes; lip golden yellow ± with brown markings. Dorsal sepal elliptic or ovate-elliptic, 1.5–2 × 0.7–0.9 cm, glabrous, apex acute; synsepal similar to dorsal sepal, 1.4–1.8 × 0.7–0.9 cm, apex shallowly 2-lobed. Petals oblong-lanceolate, oblique, 1.5–1.8 × 0.5–0.6 cm, glabrous, apex acute, often ± enfolding lip; lip pouched, slightly dorsiventrally compressed, 1.2–1.5 cm, tuberculate on front surface toward mouth. Staminode broadly elliptic-oblong, ca. 6 × 4 mm, minutely papillate. Capsule ellipsoid-oblong, 1.5–1.7 × ca. 1 cm, glabrous. Fl. Jun–Jul, fr. Aug.

• Humus-rich and rocky or moist and mossy places on woody and scrubby slopes, at forest margins, or in open forests, often forming large colonies; 2300–3900 m. S Gansu, W Sichuan, SE Xizang.

27. *Cypripedium micranthum* Franchet, J. Bot. (Morot) 8: 265. 1894.

小花杓兰 xiao hua shao lan

Plants 8–10 cm tall, with a slender, creeping rhizome. Stem erect, 2–6 cm, glabrous, with 2 or 3 sheaths at base and a subopposite leaf and bract. Leaf and bract spreading horizontally or nearly prostrate on substrate; blade elliptic or obovate-elliptic, 7–9 × 3.5–6 cm, glabrous, apex mucronate. Inflorescence terminal, erect, with 1 flower, ebracteate; pedicel 2–5 cm, continuously elongating at fruiting, densely reddish villous; ovary 5–6 mm, densely reddish villous. Flower small, with blackish purple spots and short stripes on sepals and petals and red spots and stripes on lip and tinged with white around its mouth. Dorsal sepal ovate, 1.2–1.7 × 0.8–1 cm, concave, abaxially densely purple villous, apex acute or mucronate; synsepal elliptic, 1–1.3 × 0.8–0.9 cm, abaxially villous, apex shallowly 2-lobed. Petals ovate-elliptic, 1.3–1.4 × 0.5–0.8 cm, glabrous, apex acute; lip pouched, conspicuously dorsiventrally compressed, subellipsoid, ca. 1 cm, papillate on front surface. Staminode broadly orbicular or subsquare, ca. 3 mm, base slightly auriculate. Fl. May–Jun.

• Forests; 2000–2500 m. Chongqing, NW and SW Sichuan.

28. *Cypripedium forrestii* P. J. Cribb, Quart. Bull. Alpine Gard. Soc. Gr. Brit. 60: 172. 1992.

玉龙杓兰 yu long shao lan

Cypripedium bardolphianum W. W. Smith & Farrer var. *zhongdianense* S. C. Chen.

Plants 3–5 cm tall, with a slender, creeping rhizome. Stem erect, 1.5–3 cm, covered by 2 conic sheaths, with a subopposite leaf and bract. Leaf and bract spreading horizontally or nearly prostrate on substrate; blade adaxially green, usually heavily marked with dark purple or black spots, rarely unspotted, elliptic or elliptic-ovate, 5–6.5 × 2.5–3.6 cm, apex mucronate. Inflorescence terminal, with 1 flower, ebracteate; pedicel 1.7–2.5 cm, villous; ovary 0.8–1 cm, villous. Flower small, dull yellow, finely spotted with maroon. Dorsal sepal ovate, 2.2–2.4 × 1.4–1.5 cm, abaxial midvein hairy, apex mucronate; synsepal ovate-elliptic, 1.8–1.9 × 0.8–1 cm, abaxial veins slightly hairy, apex shallowly 2-lobed and slightly recurved. Petals obliquely

ovate, ± enfolding lip, 1.5–1.8 × 0.5–0.6 cm, apex acute; lip pouched, dorsiventrally compressed, subglobose, ca. 1 cm, outer surface papillose. Staminode oblong, ca. 3.5 × 3 mm, adaxially papillate, apex obtuse. Fl. Jun.

• *Pinus* forests, scrubby slopes, open forests; ca. 3500 m. NW Yunnan.

29. *Cypripedium margaritaceum* Franchet, Bull. Soc. Philom. Paris, sér. 7, 12: 141. 1888.

斑叶杓兰 ban ye shao lan

Cypripedium daliense S. C. Chen & J. L. Wu.

Plants 7–11 cm tall, with a stout rhizome. Stem erect, usually 2–5 cm, glabrous, covered by 2 sheaths, with a subopposite leaf and bract prostrate on substrate. Leaf blade dark green with blackish purple spots, broadly ovate to orbicular, 10–15 × 7–13 cm, apex obtuse or mucronate. Inflorescence terminal, with 1 flower, ebracteate; pedicel 4–6 cm, glabrous; ovary 1–1.5 cm, 3-ribbed; ribs sparsely pubescent. Flower yellow, marked with maroon longitudinal stripes on sepals and petals and spots on lip; staminode dark maroon. Dorsal sepal broadly ovate, 3–4 × 2.5–3.5 cm, shortly hairy on abaxial veins, papillate-ciliate, apex obtuse or mucronate; synsepal elliptic-ovate, slightly shorter than dorsal sepal, 2–2.5 cm wide, papillate-ciliate, apex obtuse and bidentate. Petals obliquely oblong-lanceolate, curved forward, enfolding lip, 3–4 × 1.5–2 cm, shortly hairy on abaxial veins, apex acute; lip pouched, subellipsoid, dorsiventrally flattened, 2.5–3 cm, tuberculate on front surface. Staminode orbicular to subsquare, ca. 1 cm, adaxially papillate. Fl. May–Jul.

• Grassy slopes, open forests; 2500–3600 m. SW Sichuan, NW Yunnan.

30. *Cypripedium sichuanense* Perner, Orchidee (Hamburg) 53: 89. 2002.

四川杓兰 si chuan shao lan

Plants 10–12 cm tall, with a stout, sometimes branched rhizome. Stem 3–3.6 cm, glabrous, covered by a sheath, apex with a subopposite leaf and bract prostrate on substrate. Leaf blade green spotted with dark red-brown, broadly elliptic to suborbicular, 11.5–13.5 × 9.5–12 cm. Inflorescence terminal, 1-flowered, ebracteate; pedicel ca. 5.5 cm, glabrous; ovary ca. 1.7 cm, glabrous. Flower yellow to greenish yellow, ca. 4.5 cm in diam.; dorsal sepal spotted with maroon on adaxial veins and whole abaxial surface; synsepal with fewer maroon spots; petals and lip marked with maroon spots and stripes; staminode dark maroon. Dorsal sepal ovate-lanceolate, ca. 3.7 × 2.8 cm, both surfaces glabrous, ciliate, apex acute; synsepal similar to dorsal sepal, bidentate at apex. Petals curved forward, enfolding lip, oblong-lanceolate, ca. 4.3 × 1.6 cm, glabrous, apex acuminate; lip pouched, dorsiventrally flattened, ca. 2.6 × 1.6 cm, maroon spots at front usually wartlike. Staminode shortly trullate, ca. 10 × 9 mm, distinctly auriculate at base, obtuse. Fl. Jun–Jul.

• Humus-rich soils in bamboo and deciduous thickets. NC Sichuan (Wenchuan).

31. *Cypripedium daweishanense* (S. C. Chen & Z. J. Liu) S.

C. Chen & Z. J. Liu, J. Wuhan Bot. Res. 23: 233. 2005.

大围山杓兰 da wei shan shao lan

Cypripedium lichiangense S. C. Chen & P. J. Cribb var. *daweishanense* S. C. Chen & Z. J. Liu, Acta Bot. Yunnan. 26: 384. 2004.

Plants 10–15 cm tall, with a stout rhizome. Stem 5–8 cm, glabrous, covered by a sheath, apex with a subopposite leaf and bract prostrate on substrate. Leaf blade grayish green or green heavily spotted with purple-brown, suborbicular or broadly elliptic, 15–17 × 11–14 cm. Inflorescence terminal, 1-flowered, ebracteate; pedicel 5–7 cm, glabrous; ovary 2–2.5 cm, glabrous. Flower rather large; dorsal sepal yellowish green, very sparsely spotted with maroon; synsepal yellowish, tinged with grayish green, sparsely spotted with maroon; petals yellowish, densely spotted with maroon; lip yellowish spotted with maroon especially around mouth; staminode yellowish heavily spotted with maroon. Dorsal sepal ovate or broadly ovate, 4–5 × 3–4 cm, both surfaces glabrous, ciliate; synsepal lanceolate, 4–5 × 1.5–1.8 cm. Petals curved forward, enfolding lip, elliptic-oblong, 4.2–4.7 × 2.4–2.8(–3.4) cm, abaxially pubescent on upper side, ciliate along apical margin; lip pouched, slightly dorsiventrally flattened, 3.8–4.5 × 3–3.5 cm, ± papillate on front surface. Staminode tongue-shaped, 17–20 × ca. 5 mm, adaxially puberulent. Fl. May–Jun.

• Wet but well-drained and humus-rich soils in thickets; ca. 2300 m. SE Yunnan (Pingbian).

32. *Cypripedium lichiangense* S. C. Chen & P. J. Cribb, Orchid Rev. 102: 321. 1994.

丽江杓兰 li jiang shao lan

Plants 7–14 cm tall, with a stout, rather short rhizome. Stem erect, 3–7 cm, covered by 2 tubular sheaths, apex with a subopposite leaf and bract prostrate on substrate. Leaf blade dark green, marked with purplish black spots, ovate or obovate to orbicular, 8.5–19 × 7–16 cm, margin sometimes purplish, apex obtuse or mucronate. Inflorescence terminal, with 1 flower, ebracteate; pedicel 4–7 cm, glabrous; ovary 1.2–1.8 cm, glabrous. Flower rather large; sepals and staminode liver-colored; petals and lip yellow spotted with maroon. Dorsal sepal ovate or broadly ovate, 4.2–7 × 3.8–6 cm, both surfaces glabrous, ciliate, apex acute; synsepal elliptic, 3.5–5.6 × 2–3.6 cm, ciliate, with 2 teeth at apex. Petals incurved forward, enfolding lip, obliquely oblong, 4–6.5 × 1.4–2.1 cm, abaxially pubescent on upper side, ciliate, apex acute; lip pouched, subellipsoid, dorsiventrally flattened, 3.3–4 cm, papillate on front surface. Staminode suboblong, 1.3–1.5 cm, adaxially papillate. Fl. May–Jul.

• Sparse thickets, open forests; 2600–3500 m. SW Sichuan, NW Yunnan.

33. *Cypripedium lentiginosum* P. J. Cribb & S. C. Chen, Quart. Bull. Alpine Gard. Soc. Gr. Brit. 67: 155. 1999.

长瓣杓兰 chang ban shao lan

Cypripedium lichiangense S. C. Chen & P. J. Cribb subsp. *lentiginosum* (P. J. Cribb & S. C. Chen) Eccarius.

Plants 7–11 cm tall, with a stout, creeping rhizome. Stem

erect, 3–7 cm, covered by 2 tubular sheaths, apex with a subopposite leaf and bract prostrate on substrate. Leaf blade dark green, heavily spotted with black, sometimes with a purplish margin, ovate, obovate, or suborbicular, ca. 16×14 cm. Inflorescence terminal, 1-flowered, ebracteate; pedicel 3–4 cm, glabrous; ovary ca. 1.6 cm, glabrous. Dorsal sepal and synsepal liver-colored; petals and lip off-white, creamy white, or yellowish, marked with maroon spots; staminode liver-colored. Dorsal sepal elliptic-ovate, ca. 6×2.5 –3 cm, subglabrous, apex acute; synsepal lanceolate, ca. 5×1 cm, ciliate, apex acute. Petals incurved forward, enfolding lip, obliquely oblong-lanceolate, ca. 6.2×1.9 cm, concave, abaxially pubescent on upper side, sparsely ciliate, apex acuminate; lip pouched, dorsiventrally flattened, ca. 3×2.5 cm, minutely papillate on front surface. Staminode trullate, ca. 1 cm, papillose toward adaxial apex, rounded at apex. Fl. May.

• Steep rocky limestone boulders just below ridges in thickets or open forests; 2100–2200 m. SE Yunnan (Malipo).

34. *Cypripedium malipoense* S. C. Chen & Z. J. Liu, Acta Bot. Yunnan. 26: 382. 2004.

麻栗坡杓兰 ma li po shao lan

Plants 6–9 cm tall, with a stout rhizome. Stem short, covered by 2 sheaths, apex with 2 subopposite leaves prostrate on substrate. Leaf blade yellowish, spotted with maroon, very similar in color to petals and lip, broadly ovate to suborbicular, 12 – 14×12 – 14 cm, apex acute. Inflorescence terminal, 1-flowered, ebracteate; pedicel 2–3 cm, glabrous; ovary 1–2 cm, glabrous. Flower 4–5 cm in diam.; dorsal sepal and synsepal liver-colored; petals and lip yellowish, spotted with maroon; staminode liver-colored, with a yellow longitudinal stripe centrally and a narrow yellow margin. Dorsal sepal broadly ovate, 3 – 3.5×2.5 – 2.8 cm, both surfaces glabrous, minutely ciliate, apex acute; synsepal elliptic-ovate, slightly shorter and much narrower than dorsal sepal. Petals curved forward, enfolding lip, suboblong, ca. 4×1.5 cm, adaxially slightly pubescent, minutely ciliate, apex acute; lip pouched, strongly dorsiventrally flattened, ca. 2.5×2.5 cm, \pm papillose on front surface. Staminode ovate-trullate, 12–13 mm, adaxially minutely papillate. Fl. Jun.

• Grassy and humus-rich places in forests or thickets; 2200–2300 m. SE Yunnan (Malipo).

One of us (Cribb) believes that *Cypripedium malipoense* may be a chlorotic plant of *C. lentiginosum*, but further investigation is needed.

35. *Cypripedium fargesii* Franchet, J. Bot. (Morot) 8: 267. 1894.

毛瓣杓兰 mao ban shao lan

Cypripedium ebracteatum Rolfe; *C. margaritaceum* Franchet var. *fargesii* (Franchet) Pfitzer.

Plants 8–14 cm tall, with a stout, rather short rhizome. Stem erect, 3.5–7 cm, covered by 2 or 3 nearly tubular sheaths, apex with a subopposite leaf and bract prostrate on substrate. Leaf blade green, marked with blackish brown spots, broadly elliptic to orbicular, 10 – 15×8 – 14 cm, glabrous, apex obtuse. Inflorescence terminal, with 1 flower, ebracteate; pedicel 2.5–7

cm, glabrous; ovary 1.2–1.5 cm, 3-ribbed; ribs sparsely pubescent. Sepals yellowish green, with dense maroon spots toward base of dorsal sepal; petals yellowish, marked with purplish red stripes and spots; lip yellow, marked with purplish red fine spots; staminode maroon. Dorsal sepal ovate to broadly ovate, 3 – 4.5×2.5 – 5 cm, puberulent on abaxial veins; synsepal elliptic-ovate, 3 – 5×2.5 – 3 cm, apex subacute, inconspicuously bidentate. Petals incurved forward, enfolding lip, oblong, 3.5 – $5.5 \times$ ca. 1.5 cm, densely white villous on upper side of abaxial surface, apex acute; lip deeply pouched, subglobose, slightly dorsiventrally flattened, ca. 2.5 cm, minutely papillose on front surface. Staminode ovate or oblong, ca. 1 cm. Fl. May–Jul.

• Humus-rich soils in thickets, sparse woods, grassy slopes; 1900–3200 m. N Chongqing, S Gansu, W Hubei, W Sichuan.

36. *Cypripedium wumengense* S. C. Chen, Acta Phytotax. Sin. 23: 372. 1985.

乌蒙杓兰 wu meng shao lan

Plants ca. 22 cm tall. Stem ca. 10 cm, covered by 3 sub-tubular sheaths, apex with an ascending subopposite leaf and bract. Leaf blade green, spotted with purple, ovate-elliptic, 11 – 13×6.5 – 7 cm, glabrous, apex mucronate. Inflorescence terminal, with a solitary flower, ebracteate; pedicel 10–12 cm, glabrous; ovary ca. 9 mm, glabrous. Flower with purple spots and stripes, 6–7 cm in diam. Dorsal sepal broadly ovate, ca. 3.5×2.8 cm, both surfaces glabrous, ciliate, apex mucronate; synse-

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pal elliptic, ca. 4.1×2 cm, both surfaces glabrous, ciliate, apex bidentate. Petals obliquely ovate-oblong, ca. 3.8×1.5 cm, both surfaces glabrous, ciliate, apex slightly mucronate; lip deeply pouched, subglobose, ca. 1.6×1.6 cm, minutely papillate on front surface. Staminode broadly ovate, ca. 5×7.5 mm. Fl. May.

- Bamboo thickets on limestone cliffs; ca. 2900 m. NE Yunnan (Luquan).

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