

36. AMITOSTIGMA Schlechter, Repert. Spec. Nov. Regni Veg. Beih. 4: 91. 1919.

无柱兰属 *wu zhu lan shu*

Chen Xinqi (陈心启 Chen Sing-chi); Stephan W. Gale, Phillip J. Cribb

Mitostigma Blume, Mus. Bot. 2: 189. 1856, not Decaisne (1844).

Herbs, terrestrial, slender. Tubers subglobose to ovoid, undivided, fleshy, neck with several slender roots. Stem erect, 1- or occasionally 2-leaved, glabrous or occasionally pubescent. Leaves basal or cauline, usually green and unspotted, rarely with purple-brown blotches, oblong, lanceolate, elliptic, or ovate, base contracted into amplexicaul sheath. Inflorescence a terminal raceme, glabrous; peduncle elongate, with 1 or more sterile bracts; rachis 1- to several flowered. Flowers often secund, resupinate, white, pink, mauve, or purple, rarely yellow; ovary usually straight, twisted, shortly pedicellate, cylindric-fusiform, glabrous. Sepals free, oblong to ovate, 1-veined. Petals free, often connivent with dorsal sepal and forming a hood, usually wider than sepals; lip spreading, spurred at base, 3-lobed; disk often papillose; mid-lobe often divided, forming 2 lobules; spur cylindric to narrowly conic, short to elongate. Column very short; anther usually erect, oblong-ellipsoid to obovoid, 2-locular, locules parallel or slightly divergent; pollinia 2, oblong, sectile, granular-farinaceous; caudicles straplike; viscidia naked, oblong-ovate; rostellum rather small, 3-lobed, base with \pm ascending arms on both sides, margin adnate to column; stigma ventral, 3-lobed, lobes confluent, relatively large, flat to somewhat raised; auricles 2, large, stout, placed laterally at base of anther. Capsule suberect.

About 30 species: E Asia and adjacent areas; 22 species (21 endemic) in China.

The generic affinity of several of the entities presently referred to *Amitostigma* remains questionable and in need of re-examination; many of the endemic Chinese taxa are poorly known.

- 1a. Plants 2-leaved (*A. alpestre* rarely 1-leaved).
 - 2a. Leaves cauline, widely spaced.
 - 3a. Lip obovate, 3-lobed near middle, 4.5–5.5 mm wide, longer than broad; lateral lobes ovate-oblong, ca. 0.5 mm wide; spur 4–4.5 mm 17. *A. alpestre*
 - 3b. Lip orbicular to transversely elliptic, 3-lobed toward apex, ca. 8.5 mm wide, broader than long; lateral lobes quadrate, ca. 2.5 mm wide; spur 5–7 mm 18. *A. yuanum*
 - 2b. Leaves basal, subopposite.
 - 4a. Rachis 1-flowered 19. *A. papilionaceum*
 - 4b. Rachis 3- to more than 10-flowered.
 - 5a. Leaves usually appressed to substratum; petals ca. 5 × 3 mm; lip ca. 9 mm 22. *A. physoceras*
 - 5b. Leaves erect to porrect; petals 3–3.5 × 1.5–2 mm; lip 4.5–6 mm.
 - 6a. Lip 3-lobed below middle; lateral lobes linear 20. *A. bifoliatum*
 - 6b. Lip 3-lobed above middle; lateral lobes ovate 21. *A. wenshanense*
- 1b. Plants 1-leaved.
 - 7a. Leaf appressed to substratum, adaxially with purplish brown blotches 1. *A. hemipilioides*
 - 7b. Leaf erect or porrect, uniformly green.
 - 8a. Rachis 1- or rarely 2-flowered.
 - 9a. Spur 8–17 mm, ca. as long as to exceeding ovary.
 - 10a. Lip 3-lobed toward apex, 11–15 × 13–19 mm; lateral lobes broadly oblong-ovate, ca. 5 mm wide 6. *A. pinguicula*
 - 10b. Lip 3-lobed below middle, 8–10 × 6–10 mm; lateral lobes linear-oblong or ovate-triangular, 1–3 mm wide.
 - 11a. Dorsal sepal 4–5 mm; spur 11–12 mm 7. *A. dolichocentrum*
 - 11b. Dorsal sepal ca. 7 mm; spur 8–9 mm 8. *A. tibeticum*
 - 9b. Spur 2–4 mm, usually much shorter than ovary.
 - 12a. Stem densely pubescent around leaf base; floral bract much shorter than ovary; lip 5–6 mm 2. *A. amplexifolium*
 - 12b. Stem glabrous; floral bract nearly as long as to exceeding ovary; lip 7–15 mm.
 - 13a. Flower yellow 3. *A. simplex*
 - 13b. Flower pale purple, pink, or white.
 - 14a. Leaf 0.1–0.4 cm wide; petals broadly ovate, 4.5–5.5 mm wide 4. *A. farreri*
 - 14b. Leaf 0.6–1 cm wide; petals ovate, 1.6–2 mm wide 5. *A. monanthum*
 - 8b. Rachis usually 3- or more flowered (*A. faberi* rarely 1- or 2-flowered).
 - 15a. Mid-lobe of lip 4–7 mm wide, nearly as broad as to broader than long.
 - 16a. Ovary and pedicel 15–25 mm; dorsal sepal ca. 7 mm; lip ca. 13 mm 16. *A. gongashanicum*

- 16b. Ovary and pedicel 6–10 mm; dorsal sepal 2.5–3.5 mm; lip 5–7.5 mm.
 17a. Peduncle ebracteate; spur 2–3 mm 14. *A. basifoliatum*
 17b. Peduncle with 1 sterile bract; spur 5–6 mm 15. *A. faberi*
- 15b. Mid-lobe of lip 0.5–3.5 mm wide, much longer than broad.
 18a. Mid-lobe of lip ca. 3.5 mm wide, deeply divided above middle to form 2 distinct lobules 9. *A. parceflorum*
- 18b. Mid-lobe of lip 0.5–2 mm wide, apex truncate, obtuse-rounded, occasionally emarginate or shallowly notched.
 19a. Lateral lobes of lip oblong-obovate, 1.6–2 mm wide; spur 3.5–6 mm 10. *A. tetralobum*
 19b. Lateral lobes of lip lanceolate, linear-oblong, ovate-oblong, or triangular, 0.3–0.8 mm wide; spur 1–2.5(–3.5) mm.
 20a. Peduncle ebracteate; flowers white; mid-lobe of lip ca. 1.6 mm 11. *A. capitatum*
 20b. Peduncle with 1 or 2 sterile bracts; flowers pink, rose-pink, purplish red, or purple; mid-lobe of lip 2–4 mm.
 21a. Plants 7–25 cm tall; leaf usually basal; lip 3-lobed above middle 12. *A. gracile*
 21b. Plants 24–36 cm tall; leaf cauline; lip 3-lobed below middle 13. *A. trifurcatum*

1. *Amitostigma hemipilioides* (Finet) Tang & F. T. Wang, Bull. Fan Mem. Inst. Biol. Bot. 7: 5. 1936.

卵叶无柱兰 *luan ye wu zhu lan*

Gymnadenia hemipilioides Finet, Rev. Gén. Bot. 13: 515. 1901; *Amitostigma microhemipilia* Schlechter; *Chusua hemipilioides* (Finet) P. F. Hunt; *Hemipilia silvatica* Kraenzlin; *Orchis microhemipilia* (Schlechter) Soó; *Ponerorchis hemipilioides* (Finet) Soó.

Plants 8–12 cm tall. Tubers oblong, 8–12 × 5–10 mm. Stem with 2 tubular sheaths at base, 1-leaved. Leaf basal, appressed to substratum, adaxially with purplish brown blotches, ovate-orbicular to oblong, 1.5–2.2 × 0.8–2.5 cm, apex acute. Peduncle with 1 or 2 lanceolate sterile bracts; rachis to 5.5 cm, subdensely (2 or) 3–12-flowered; floral bracts ovate, much shorter than ovary, apex acute. Flowers pinkish white, with pinkish purple spots on lip; ovary and pedicel ca. 7 mm. Dorsal sepal oblong-ovate, concave, 3–3.5 × 1.5–1.8 mm, 1-veined, apex obtuse; lateral sepals oblong-ovate, slightly oblique, ca. 3.5 × 1.7 mm, apex subobtuse. Petals connivent with dorsal sepal and forming a hood, oblong, slightly oblique, 2.7–3 × 1.2–1.5 mm, 1-veined, margin irregularly serrulate, apex obtuse; lip obovate, 5–7 × 4–4.5 mm, base cuneate, margin 3-lobed above middle, margin irregularly serrulate; disk finely papillate; lateral lobes oblong-quadrate, oblique, ca. 1 × 1 mm, 3- or 4-veined, apex subacute; mid-lobe quadrate, ca. 2 × 2 mm, apex obtuse; spur horizontal and curving downward to pendulous, cylindrical, 3–4 mm, apex obtuse; viscidia subovoid; stigma lobes oblong. Fl. Jun–Jul.

• Rocky soils, moist places in forests, crevices; 2400–2500 m. C Guizhou, NW Yunnan.

2. *Amitostigma amplexifolium* Tang & F. T. Wang, Bull. Fan Mem. Inst. Biol. Bot. 7: 3. 1936.

抱茎叶无柱兰 *bao jing ye wu zhu lan*

Plants 6–10 cm tall. Tubers globose, ca. 5 mm in diam. Stem with 1 tubular sheath at base, 1-leaved, densely pubescent around leaf base. Leaf subbasal to cauline, porrect, elliptic to oblong-elliptic, 1–2 × 0.5–1 cm, apex acute. Rachis 1- or 2-

flowered; floral bracts oblong-elliptic, much shorter than ovary, apex obtuse or acute. Flower white, with purplish red spots; ovary and pedicel 8–10 mm. Dorsal sepal elliptic, ca. 3.5 × 2–2.3 mm, apex obtuse; lateral sepals elliptic, slightly oblique, ca. 4 × 2.5 mm, apex obtuse. Petals elliptic, slightly oblique, ca. 3 × 2 mm, apex truncate-obtuse; lip obovate, 5–6 × 4–5 mm, base cuneate, 3-lobed below middle; lateral lobes falcate-oblong, apex obtuse; mid-lobe cuneate-oblong, margin erose, shallowly notched near apex to form 2 small lobules, sinus with a small tooth; spur pendulous, cylindrical, curved, ca. 2 mm, much shorter than ovary; viscidia ovate-triangular; stigma lobes oblong. Fl. Jul.

• Forests. W Sichuan.

3. *Amitostigma simplex* Tang & F. T. Wang, Bull. Fan Mem. Inst. Biol. Bot. 10: 25. 1940.

黄花无柱兰 *huang hua wu zhu lan*

Plants 5–14 cm tall. Tubers ovoid to subglobose, 4–5 mm in diam. Stem with 1 or 2 tubular sheaths at base, 1-leaved. Leaf basal, porrect, linear to oblong-elliptic, 1.5–4 × 0.3–0.6 cm, apex acute or obtuse. Peduncle ebracteate; rachis 1-flowered; floral bracts lanceolate, 6–10 mm, nearly as long as ovary, apex acute or acuminate. Flower erect, yellow, sometimes spotted with brown, rather large; ovary and pedicel 8–9 mm. Dorsal sepal narrowly oblong, concave, 3.8–6 × 1.3–3 mm, 1-veined, apex obtuse; lateral sepals spreading, narrowly oblong-elliptic, falcate, 4.2–8 × 1.5–4 mm, 1-veined, apex obtuse. Petals connivent with dorsal sepal and forming a hood, ovate, oblique, 3.7–5.5 × 1.8–3.5 mm, 1-veined, apex obtuse; lip broadly obovate, 7–15 × 6–13 mm, deeply 3-lobed near middle; lateral lobes oblong-obovate, falcate, 3–7 × 3–6 mm, apex rounded; mid-lobe obcordate to flabellate, 3–5 × 4–8 mm, margin undulate, apex emarginate to shallowly notched to form 2 small lobules; spur pendulous, cylindrical, 3–4 mm, much shorter than ovary, apex obtuse. Fl. Jul–Aug.

• Grassy slopes; 2300–4400 m. W Sichuan, NW Yunnan.

4. *Amitostigma farreri* Schlechter, Repert. Spec. Nov. Regni Veg. 20: 378. 1924.

长苞无柱兰 chang bao wu zhu lan

Orchis farreri (Schlechter) Soó.

Plants 3.5–9 cm tall. Tubers globose, ca. 5 mm in diam. Stem with 2 tubular sheaths at base, 1-leaved. Leaf subbasal, porrect, linear to narrowly oblong, 1.5–5 × 0.1–0.4 cm, apex acute. Rachis 1-flowered; floral bracts narrowly lanceolate, exceeding ovary, apex acute. Flower pink; ovary and pedicel 4–5 mm. Dorsal sepal erect, ovate-oblong, concave, 5–7.5 × 4–5 mm, 3-veined, apex obtuse; lateral sepals ovate-oblong, slightly oblique, 5.5–8 × 4–5 mm, apex subobtuse. Petals connivent with dorsal sepal and forming a hood, broadly ovate, oblique, 5–7 × 4.5–5.5 mm, 3-veined, margin slightly undulate, apex obtuse; lip obovate, 7–12 × 5–8 mm, base broadly cuneate, 3-lobed below middle; lateral lobes triangular, 2–3 × ca. 1 mm, margin crenulate, apex acute; mid-lobe obcordate-obovate, 5–9 × 5–9 mm, margin crenulate, apex notched to form 2 distinct lobules, sinus with a small acute tooth; spur pendulous, straight, conic-cylindric, 3–4 mm, slightly shorter than ovary, apex obtuse; viscidia ellipsoid; stigma lobes oblong. Fl. Aug.

- Grassy slopes; 3600–4200 m. SE Xizang, NW Yunnan.

5. *Amitostigma monanthum* (Finet) Schlechter, Repert. Spec. Nov. Regni Veg. Beih. 4: 94. 1919.

一花无柱兰 yi hua wu zhu lan

Peristylus monanthus Finet, Rev. Gén. Bot. 13: 523. 1901; *Amitostigma forrestii* Schlechter; *A. monanthum* var. *forrestii* (Schlechter) Tang & F. T. Wang; *A. nivale* Schlechter; *Orchis forrestii* (Schlechter) Soó; *O. monantha* (Finet) Soó; *O. nivalis* (Schlechter) Soó.

Plants 6–10 cm tall. Tubers ovoid to subglobose, ca. 5 mm in diam. Stem with 1 or 2 tubular sheaths at base, 1-leaved, occasionally pubescent. Leaf basal, erect to porrect, lanceolate, narrowly oblong, or oblanceolate-spatulate, 2–3 × 0.6–1 cm, apex acute or obtuse. Peduncle ebracteate; rachis 1-flowered; floral bract linear-lanceolate, 6–12 mm, usually exceeding ovary, apex acute. Flower pale purple, pink, or pure white, with purple spots on lip, rather large; ovary and pedicel 6–11 mm. Dorsal sepal erect, narrowly ovate, concave, 4–4.5 × 1.6–1.8 mm, 1-veined, apex obtuse; lateral sepals spreading to reflexed, narrowly oblong-elliptic, 4.5–5 × ca. 1.6 mm, apex subobtuse. Petals loosely connivent with dorsal sepal and forming a hood, ovate, slightly oblique, 3.8–4.4 × 1.6–2 mm, 1-veined, apex obtuse; lip ovate-orbicular, 8–10 × 8–10 mm, base shortly clawed, deeply 3-lobed below middle; disk finely papillate; lateral lobes suboblong-obovate, 4–5 × 1.8–3 mm, margin often slightly undulate, apex obtuse; mid-lobe broadly obovate, 6–7.5 × ca. 7 mm, much wider than lateral lobes, margin usually entire or sometimes slightly undulate, apex slightly emarginate to deeply notched to form 2 distinct lobules; spur pendulous, straight, cylindric, 2.5–4 mm, much shorter than ovary, apex obtuse; viscidia ovate; stigma lobes subsquare. Fl. Jul–Aug.

- Grassy slopes, alpine meadows, rocky soils and gravel along streams; 2800–4100 m. S Gansu, S Shaanxi, NW and W Sichuan, SE Xizang, NW Yunnan.

6. *Amitostigma pinguicula* (H. G. Reichenbach & S. Moore)

Schlechter, Repert. Spec. Nov. Regni Veg. Beih. 4: 94. 1919.

大花无柱兰 da hua wu zhu lan

Gymnadenia pinguicula H. G. Reichenbach & S. Moore, J. Bot. 16: 135. 1878; *Diplomeris chinensis* Rolfe; *Habenaria pinguicula* (H. G. Reichenbach & S. Moore) Bentham ex Rolfe; *Orchis pinguicula* (H. G. Reichenbach & S. Moore) Soó.

Plants 7–16 cm tall. Tubers ovoid, 10–15 mm in diam. Stem with 1 or 2 tubular sheaths at base, 1-leaved. Leaf subbasal, porrect, linear-oblanceolate, narrowly elliptic, oblong-ovate, or ligulate-oblong, 1.5–8 × 0.6–1.2 cm, apex subacute. Peduncle with 1 or 2 lanceolate sterile bracts; rachis 1- or rarely 2-flowered; floral bract linear-lanceolate, 5–6 mm, much shorter than ovary, apex acuminate. Flower rose-red to purplish red, rather large; ovary 9–17 mm including pedicel, very slender. Dorsal sepal erect, ovate, concave, 5–7 × 3–4 mm, 1-veined, apex acute; lateral sepals spreading to reflexed, ovate-lanceolate, slightly oblique, 6–8 × 3–4 mm, 2- or 3-veined, apex acute. Petals loosely connivent with dorsal sepal and forming a hood, broadly ovate, slightly oblique, 3.5–4.5 × ca. 3 mm, 3-veined, apex obtuse; lip flabellate, 11–15 × 13–19 mm, base cuneate, 3-lobed toward apex; lateral lobes broadly oblong-ovate, ca. 4 × 5 mm, apex truncate; mid-lobe broadly obovate, ca. 4 × 7.5 mm, apex truncate to slightly emarginate; spur horizontal to pendulous, straight to slightly curved, narrowly conic, 15–17 mm, usually exceeding ovary, gradually attenuate, apex acute; viscidia subovate; stigma lobes narrowly oblong. Fl. Apr–May.

- Rocky soils in forests, moist grasslands, valleys; 200–400 m. NE Zhejiang.

Diplomeris chinensis is tentatively referred to the synonymy of this species.

7. *Amitostigma dolichocentrum* Tang, F. T. Wang & K. Y. Lang, Acta Phytotax. Sin. 20: 84. 1982.

长距无柱兰 chang ju wu zhu lan

Plants 6–8 cm tall. Tubers ovoid, ca. 5.5 mm. Stem with 2 tubular sheaths at base, 1-leaved, pubescent. Leaf subbasal, porrect, elliptic or ovate, 0.7–2 × 0.3–0.8 cm, apex acute. Peduncle with 1 foliaceous, ovate sterile bract; rachis 1-flowered; floral bract ovate-lanceolate, ca. 5 mm, much shorter than ovary, apex acuminate. Flower erect, color not recorded, rather large; ovary and pedicel 10–12 mm. Dorsal sepal erect, oblong-elliptic, 4–5 × 2.5–3 mm, 3-veined, apex obtuse; lateral sepals reflexed, oblong-obovate, oblique, 5–6 × 2–3 mm, 3-veined, apex obtuse. Petals loosely connivent with dorsal sepal and forming a hood, oblong-ovate, 4–5 × 2.5–3 mm, 3-veined, apex obtuse; lip orbicular-obovate, deeply 3-lobed near base, 8–10 × 8–10 mm; lateral lobes linear-oblong, slightly oblique, 5–6 × 1–1.3 mm, 1- or 2-veined, apex obtuse; mid-lobe spatulate, ca. 7 × 3–5 mm, 3–5-veined, margin slightly crenulate, apex obtuse-rounded; spur pendulous, cylindric, slightly incurved, 11–12 mm, ca. as long as to slightly exceeding ovary, neck wide, attenuate toward apex, apex obtuse. Fl. Jul.

- W Sichuan.

8. *Amitostigma tibeticum* Schlechter, Repert. Spec. Nov. Regni Veg. 20: 379. 1924.

西藏无柱兰 xi zang wu zhu lan

Orchis tibetica (Schlechter) Soó.

Plants 6–8 cm tall. Tubers ellipsoid to globose, ca. 5 mm in diam. Stem purple, with 1 or 2 tubular sheaths at base, 1-leaved. Leaf subbasal, erect, purple, ligulate, lanceolate, or oblanceolate, 2.5–3 × 0.5–0.6 cm, apex subacute or subobtuse. Peduncle ebracteate; rachis 1-flowered; floral bract oblong-lanceolate, 8–14 mm, exceeding ovary, apex subacute. Flower suberect, pinkish purple to mauve, rather large; ovary and pedicel 7–10 mm. Dorsal sepal erect, narrowly ovate-oblong, slightly concave, ca. 7 × 2–3 mm, 3-veined, apex obtuse; lateral sepals spreading to reflexed, sometimes twisted, narrowly ovate-oblong, slightly oblique, ca. 7 × 3.5 mm, 3-veined, apex obtuse. Petals loosely connivent with dorsal sepal and forming a hood, narrowly ovate, slightly oblique, ca. 6 × 3 mm, 2-veined; lip obovate to obcordate, 8–9 × ca. 6 mm, base broadly cuneate, 3-lobed below middle; lateral lobes ovate-triangular, oblique, 1.5–3.5 × 1–3 mm, margin irregularly serrate, apex acute or obtuse; mid-lobe obcordate, 4.5–6 × 4–5 mm, margin irregularly serrate, apex slightly emarginate; spur pendulous, cylindrical, slightly incurved, 8–9 mm, ca. as long as to slightly exceeding ovary, slightly attenuate, apex obtuse; viscidia ovoid; stigma lobes oblong. Fl. Aug.

• Alpine meadows; 3600–4400 m. SE Xizang, NW Yunnan.

9. *Amitostigma parceflorum* (Finet) Schlechter, Repert. Spec. Nov. Regni Veg. Beih. 4: 94. 1919.

少花无柱兰 shao hua wu zhu lan

Peristylus tetralobus Finet f. *parceflorus* Finet, Rev. Gén. Bot. 13: 525. 1901; *Orchis parceflora* (Finet) Handel-Mazzetti; *O. tetraloba* (Finet) Schlechter var. *parceflora* (Finet) Soó.

Plants 10–15 cm tall. Tubers subglobose, ca. 8 × 6 mm. Stem with 2 tubular sheaths at base, 1-leaved. Leaf cauline, porrect, linear to elliptic-lanceolate, ca. 3.5 × 0.4 cm, apex acute. Peduncle ebracteate; rachis 2–4 cm, laxly 3–5-flowered; floral bracts lanceolate, ca. 3 mm, much shorter than ovary, apex acute. Flowers rose-red; ovary and pedicel 7–9 mm. Dorsal sepal erect, ovate-oblong, slightly concave, 2–3 × ca. 1.3 mm, 1-veined, apex obtuse; lateral sepals spreading, oblong, slightly oblique, 2.2–3.5 × ca. 1.4 mm, 1-veined, apex obtuse. Petals erect or loosely connivent with dorsal sepal and forming a hood, ovate, oblique, 2–3 × ca. 1.7 mm, 1-veined, apex acute; lip oblong-obovate, 6–8 × ca. 4 mm, 3-lobed below middle; lateral lobes narrowly oblong, slightly falcate, 3–4 × ca. 1 mm, broadening slightly toward apex, apex truncate-obtuse; mid-lobe oblanceolate, ca. 5 × 3.5 mm, widening gradually from narrow base, deeply divided above middle to form 2 distinct lobules, sinus usually with a small tooth; spur pendulous, straight to slightly incurved, cylindrical, 4–6 mm, shorter than ovary, attenuate toward apex, apex acute; viscidia suborbicular; stigma lobes oblong. Fl. Jul.

• Forests; ca. 2000 m. Chongqing, NE Sichuan.

10. *Amitostigma tetralobum* (Finet) Schlechter, Repert. Spec. Nov. Regni Veg. Beih. 4: 95. 1919.

滇蜀无柱兰 dian shu wu zhu lan

Peristylus tetralobus Finet, Rev. Gén. Bot. 13: 524. 1901; *Amitostigma yunnanense* Schlechter; *Orchis tetraloba* (Finet) Schlechter; *O. tetraloba* var. *yunnanensis* (Schlechter) Soó.

Plants 7–26 cm tall. Tubers subglobose to oblong, 10–15 × 5–10 mm. Stem with 2 tubular sheaths at base, 1-leaved. Leaf cauline, porrect, linear-lanceolate, 2–8 × 0.3–0.8 cm, apex acute. Peduncle ebracteate or with 1 occasionally foliaceous sterile bract; rachis 1–3.5 cm, laxly to subdensely 3- to more than 10-flowered; floral bracts lanceolate, 3–6 mm, usually shorter than ovary, apex acute. Flowers secund, pink to pale purple; ovary and pedicel 6–9 mm. Dorsal sepal erect, oblong-ovate, concave, 2.5–3.3 × ca. 2 mm, 1-veined, apex obtuse; lateral sepals spreading to reflexed, ovate, slightly oblique, 3–4 × ca. 1.8 mm, 1-veined, apex obtuse. Petals loosely connivent with dorsal sepal and forming a hood, broadly ovate, slightly oblique, 2.8–3.5 × ca. 2 mm, 1-veined, apex obtuse; lip rhombic-obovate, 4.5–6(–8) × 3.5–4 mm, 3-lobed near middle; disk finely papillate; lateral lobes oblong-obovate, 2–3.5 × 1.6–2 mm, apex obtuse-truncate; mid-lobe oblong-obovate, 2.5–4 × ca. 2 mm, base attenuate, apex usually obtuse-truncate, or occasionally emarginate to shallowly notched to form 2 small lobules; spur ± pendulous, slightly incurved, cylindrical, 3.5–6 mm, slightly dilated toward apex, apex obtuse; viscidia narrowly elliptic; stigma lobes clavate. Fl. Jun–Aug.

• Rocky soils in forests, grassy slopes; 1500–2700 m. SW Sichuan, SW and W Yunnan.

11. *Amitostigma capitatum* Tang & F. T. Wang, Bull. Fan Mem. Inst. Biol. Bot. 7: 4. 1936.

头序无柱兰 tou xu wu zhu lan

Plants 8–14 cm tall. Tubers ellipsoid, 6–8 mm. Stem with 1 or 2 tubular sheaths at base, 1-leaved. Leaf cauline, porrect, narrowly elliptic to narrowly oblong, 3.5–5 × 0.5–1.5 cm, apex acute. Peduncle ebracteate; rachis 0.8–1 cm, densely several to more than 10-flowered; floral bracts lanceolate, 3–5 mm, nearly as long as ovary, apex acuminate. Flowers white; ovary and pedicel 4–6 mm. Dorsal sepal ovate-elliptic, concave, 2–2.2 × 1.5–1.7 mm, inner surface finely papillate, 1-veined, apex obtuse; lateral sepals ovate-elliptic, oblique, 2.5–3 × 2–2.2 mm, inner surfaces finely papillate, 1-veined, apex obtuse. Petals broadly ovate, oblique, 1.5–1.8 × 1.8–2 mm, inner surfaces finely papillate, 2-veined, apex obtuse; lip obovate, ca. 5 × 3.3 mm, concave at base, 3-lobed near middle; lateral lobes ovate-oblong, slightly oblique, ca. 1.5 × 0.5 mm, apex obtuse; mid-lobe oblong, ca. 1.6 × 0.5 mm, apex truncate and shallowly notched, sinus with a small, acute tooth; spur pendulous, globose, ca. 1 mm, apex rounded; viscidia oblong; stigma lobes clavate. Fl. Jul.

• Rocky soils and damp places in forests; 2600–3600 m. W Hubei, E and W Sichuan.

12. *Amitostigma gracile* (Blume) Schlechter, Repert. Spec. Nov. Regni Veg. Beih. 4: 93. 1919.

无柱兰 *wu zhu lan*

Mitostigma gracile Blume, Mus. Bot. 2: 190. 1856; *Amitostigma chinense* (Rolfe) Schlechter; *A. formosensis* (S. S. Ying) S. S. Ying; *A. yunkianum* Fukuyama; *Cynosorchis chinensis* Rolfe; *C. gracilis* (Blume) Kraenzlin; *Gymnadenia gracilis* (Blume) Miquel; *G. tryphiiformis* H. G. Reichenbach; *Orchis formosensis* S. S. Ying; *O. gracilis* (Blume) Soó; *O. gracilis* var. *chinensis* (Rolfe) Soó; *O. sooi* S. S. Ying; *O. yunkiana* (Fukuyama) S. S. Ying; *Ponerorchis formosensis* (S. S. Ying) S. S. Ying.

Plants 7–25 cm tall. Tubers ovoid to oblong-ellipsoid, 8–15 × 5–10 cm. Stem with 1 or 2 tubular sheaths at base, 1-leaved. Leaf usually basal, porrect, oblong to ovate-lanceolate, 3–12 × 0.8–3 cm, apex obtuse or acute. Peduncle with 1 sterile bract; rachis 0.5–4 cm, subdensely 5- to more than 15-flowered; floral bracts ovate-lanceolate, 2–3 mm, much shorter than ovary. Flowers often secund, pink, purplish red, or purple; ovary and pedicel 4–8 mm, usually straight. Dorsal sepal ovate, concave, 2–3 × 1.2–2 mm, 1-veined, apex obtuse; lateral sepals erect to spreading, ovate to obovate, slightly oblique, 2–3 × 1.2–1.8 mm, 1-veined, apex obtuse. Petals connivent with dorsal sepal and forming a hood, elliptic to ovate, oblique, 2–3 × ca. 2 mm, 1-veined, apex acute to obtuse; lip obovate, 3.5–5(–7) × 2.5–3.2 mm, 5–7(–9)-veined, base cuneate, 3-lobed above middle; lateral lobes linear-oblong to triangular, often falcate, 1–2 × 0.5–0.8 mm, apex obtuse-truncate or acute; mid-lobe obovate, 2–2.8 × 1.2–1.8 mm, larger than lateral lobes, apex truncate or obtuse-rounded, sometimes emarginate; spur pendulous, straight to very slightly incurved, cylindrical, 1–2.5(–3.5) mm, much shorter than ovary, apex obtuse; viscidia elliptic; stigma lobes subclavate. Fl. Jun–Jul, fr. Sep–Oct. $2n = 42$.

Damp rocky soils in forests, crevices, valleys; 200–3000 m. Anhui, N Fujian, Guangxi, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Liaoning, Shaanxi, Shandong, Sichuan, Taiwan, Zhejiang [Japan, Korea].

13. *Amitostigma trifurcatum* Tang, F. T. Wang & K. Y. Lang, Acta Phytotax. Sin. 20: 80. 1982.

三叉无柱兰 *san cha wu zhu lan*

Plants 24–36 cm tall. Tubers globose, 7–10 mm in diam. Stem with 2 tubular sheaths at base, 1-leaved. Leaf cauline, porrect, narrowly oblong-lanceolate, 5.5–7.5 × 0.5–0.7 cm, apex acute. Peduncle with 2 occasionally foliaceous sterile bracts; rachis 2–6 cm, subdensely 6–9-flowered; floral bracts lanceolate, 4–5 mm, shorter than ovary, apex acuminate. Flowers secund, rose-pink with darker spots on lip; ovary and pedicel 6–7 mm. Dorsal sepal erect, narrowly elliptic-lanceolate, 3–4 × 1–1.5 mm, 1-veined, apex subacute; lateral sepals spreading to reflexed, narrowly elliptic-lanceolate, slightly oblique, 3.2–4.2 × 1–1.5 mm, apex subacute. Petals forming a hood to erect, narrowly ovate-lanceolate, slightly oblique, 3–3.8 × ca. 1.5 mm, 1-veined, apex subacute; lip narrowly elliptic, 5–7.5 × 2.4–3 mm, with 5 stout, raised veins, 3-lobed below middle; lateral lobes lanceolate to narrowly triangular, 1–1.5 × ca. 0.3 mm, apex obtuse or acute; mid-lobe oblong-ligulate, 3.5–4 × 1–1.5 mm, apex obtuse; spur pendulous, subconic to broadly cylindrical, 1–

1.5 mm, apex obtuse; viscidia narrowly ovate, large; stigma lobes subclavate. Fl. Sep.

- Marshes, wet grasslands; ca. 2900 m. NW Yunnan.

14. *Amitostigma basifoliatum* (Finet) Schlechter, Repert. Spec. Nov. Regni Veg. Beih. 4: 92. 1919.

四裂无柱兰 *si lie wu zhu lan*

Peristylus tetralobus Finet f. *basifoliatum* Finet, Rev. Gén. Bot. 13: 525. 1901; *Orchis basifoliata* (Finet) Schlechter.

Plants 10–23 cm tall. Tubers subglobose, 5–10 mm. Stem with 2 tubular sheaths at base, 1-leaved. Leaf basal or cauline, porrect, narrowly oblong-lanceolate, 3.5–7 × 0.5–1.4 cm, apex acute. Peduncle ebracteate; rachis 0.5–3 cm, ± laxly 4- to densely more than 10-flowered; floral bracts ovate-lanceolate, 3–6 mm, shorter than ovary, apex acute to acuminate. Flowers secund, white often tinged pinkish red, with purple spots on lip; ovary and pedicel 6–10 mm. Dorsal sepal erect, ovate-oblong, concave, 3–3.5 × ca. 1.7 mm, 1-veined, apex obtuse; lateral sepals spreading to reflexed, oblong, oblique, 4–4.5 × ca. 2 mm, 1-veined, apex obtuse. Petals connivent with dorsal sepal and forming a hood, rhombic-ovate, 4–4.5 × ca. 2.5 mm, 1-veined, apex acute; lip broadly obovate, 5–7 × 7–9 mm, 3-lobed below middle; lateral lobes oblong, slightly falcate, 3–5 × 2–3 mm, apex irregularly obtuse-toothed; mid-lobe obovate-flabellate, 4–5 × 4–6 mm, base cuneate, apex truncate, irregularly crenulate to shallowly notched to form 2 small lobules, sinus often with a short obtuse tooth; spur pendulous, straight to slightly incurved, cylindrical, 2–3 mm, apex obtuse; viscidia ovoid; stigma lobes clavate-oblong. Fl. Jun–Jul.

- Damp places in forests, grassy slopes; 2600–3800 m. SW Sichuan, NE and NW Yunnan.

15. *Amitostigma faberi* (Rolfe) Schlechter, Repert. Spec. Nov. Regni Veg. Beih. 4: 93. 1919.

峨眉无柱兰 *e mei wu zhu lan*

Habenaria faberi Rolfe, Bull. Misc. Inform. Kew 1896: 201. 1896; *Gymnadenia faberi* (Rolfe) Rolfe; *Orchis faberi* (Rolfe) Soó.

Plants 3.5–15(–21) cm tall. Tubers ovoid, 5–10 mm. Stem with 1 or 2 tubular sheaths at base, 1-leaved. Leaf cauline, porrect, linear-lanceolate to narrowly oblong-elliptic, 3–6 × 0.5–1.3 cm, apex acute or obtuse. Peduncle with 1 sterile bract; rachis 1.5–8 cm, several to more than 10-flowered (rarely 1- or 2-flowered); floral bracts ovate-lanceolate, ca. 3 mm, much shorter than ovary, apex acuminate. Flowers often secund, pinkish purple; ovary and pedicel 8–10 mm. Dorsal sepal broadly oblong-elliptic, concave, 2.5–3.5 × 2–3 mm, 1-veined, apex obtuse; lateral sepals spreading, broadly ovate, slightly oblique, 3–4 × 2–3 mm, 1-veined. Petals connivent with dorsal sepal and forming a hood, broadly ovate-orbicular, slightly oblique, 2–3 × 2.5–3 mm, 1-veined, margin somewhat undulate, apex obtuse; lip broadly ovate-orbicular, 6–7.5 × 6.2–7.5 mm, base cuneate, 3-lobed below middle; disk densely papillate; lateral lobes overlapping mid-lobe, oblong, slightly falcate, 2.5–3.8 × ca. 1.5 mm, apical margin crenate, apex obtuse; mid-lobe obovate, 3–4.2 × 6–7 mm, base cuneate and shortly

clawed, apical margin irregularly crenate, deeply notched toward apex to form 2 distinct lobules, sinus with an obtuse tooth; spur pendulous, slightly incurved, cylindric-clavate, 5–6 mm, slightly dilated toward apex, apex obtuse; viscidia ovate-lanceolate; stigma lobes clavate. Fl. Jul.

• Forests, scrub, valleys, crevices, alpine grasslands, grassy slopes; (600–)2300–4300 m. NE Guizhou, Sichuan, NW Yunnan.

16. *Amitostigma gonggashanicum* K. Y. Lang, *Acta Phytotax. Sin.* 22: 312. 1984.

贡嘎无柱兰 *gong sha wu zhu lan*

Plants 16–30 cm tall. Tubers ovoid to globose, 10–15 × ca. 10 mm. Stem with 2 tubular sheaths at base, 1-leaved. Leaf cauline, erect, narrowly oblong-elliptic, 5.5–8 × 0.6–1.6 cm, apex acute. Peduncle ebracteate; rachis 2.5–5 cm, subdensely 3–14-flowered; floral bracts lanceolate or ovate-lanceolate, shorter than ovary, apex acute. Flowers purplish red, 1–2 cm in diam., lip white; ovary and pedicel 15–20(–25) mm. Dorsal sepal erect, oblong-ovate, ca. 7 × 3.5 mm, 3-veined, apex obtuse; lateral sepals spreading, oblong-ovate, slightly oblique, ca. 7.2 × 3.5 mm, 3-veined, apex obtuse. Petals connivent with dorsal sepal and forming a hood, ovate, ca. 6 × 4 mm, 3(–5)-veined, apex obtuse; lip broadly ovate, ca. 13 × 13 mm, with a dense cluster of hairs near base, deeply 3-lobed near base; lateral lobes obovate, ca. 4 × 4 mm, margin undulate, apex obtuse; mid-lobe broadly obovate, ca. 7 × 6 mm, margin undulate, deeply notched toward apex to form 2 distinct lobules, sinus with a small obtuse tooth; spur pendulous, cylindric-conic, ca. 4 mm, apex obtuse; viscidia ovate; stigma lobes elliptic. Fl. Jun–Jul.

• Forests; 2400–3800 m. SW Sichuan.

17. *Amitostigma alpestre* Fukuyama, *Bot. Mag. (Tokyo)* 49: 664. 1935.

台湾无柱兰 *tai wan wu zhu lan*

Orchis alpestre (Fukuyama) S. S. Ying.

Plants 5–20 cm tall. Tubers ovoid to subglobose, 5–7 × 3–4 mm. Stem with 2 tubular sheaths at base, (1 or)2-leaved. Leaves cauline, erect to porrect, usually widely spaced, oblanceolate to linear, 3.5–7.5 × 0.5–1 cm, apex acute. Peduncle ebracteate; rachis less than 1 cm, 2–4-flowered; floral bracts green or purple, lanceolate, 5–7 mm, slightly shorter than ovary, apex acuminate. Flowers often secund, pale pink to white with darker pink spots on lip; ovary and pedicel 5–8 mm. Dorsal sepal erect, ovate-oblong, concave, 4–5 × 2–2.5 mm, 1-veined, apex obtuse; lateral sepals spreading, narrowly elliptic or ovate-oblong, slightly oblique, 5–6.5 × 2–3 mm, 3-veined, apex acute. Petals connivent with dorsal sepal and forming a hood, ovate-lanceolate, slightly oblique, 4–5 × 1.4–1.6 mm, 1–3-veined, apex obtuse; lip obovate, 5–6.5 × 4.5–5.5 mm, 3-lobed near middle; disk finely papillate; lateral lobes ovate-oblong, falcate, 2.8–3.5 × ca. 0.5 mm, apex acute or obtuse; mid-lobe obovate-quadrate, 4–4.5 × ca. 4.5 mm, apex truncate and shallowly notched to form 2 lobules, sinus with a small tooth; spur pendulous, slightly incurved, cylindric, 4–4.5 mm, shorter than ovary, slightly attenuate toward apex, apex obtuse; viscidia

ovate. Fl. Jul.

• Alpine grasslands, rocky patches; 2500–3800 m. C and N Taiwan.

18. *Amitostigma yuanum* Tang & F. T. Wang, *Bull. Fan Mem. Inst. Biol. Bot.* 10: 26. 1940.

齿片无柱兰 *chi pian wu zhu lan*

Plants 7.5–15 cm tall. Tubers globose, 3–5 mm in diam. Stem with 1 or 2 tubular sheaths at base, 2-leaved. Leaves cauline, erect to porrect, widely spaced, narrowly ovate, oblong-lanceolate, or oblanceolate, 0.6–3.5 × 0.3–0.6 mm, apex acute. Peduncle ebracteate; rachis 1- or 2-flowered; floral bracts narrowly ovate to oblong-lanceolate, 7–8 mm, ca. as long as ovary, apex acute or acuminate. Flowers pink or white, 1–1.5 cm in diam.; ovary and pedicel 7–8 mm. Dorsal sepal erect, concave, oblong, ca. 4 × 1.5–2 mm, 1-veined, apex obtuse; lateral sepals reflexed, ovate-oblong, slightly oblique, ca. 5 × 2.5 mm, 1-veined, apex acute. Petals loosely connivent with dorsal sepal and forming a hood, ovate, ca. 3 × 2 mm, 3-veined, margin crenulate, apex acute; lip orbicular to transversely elliptic, ca. 7 × 8.5 mm, 3-lobed toward apex; disk finely papillate; lateral lobes quadrate, oblique, ca. 2 × 2.5 mm, slightly widened toward apex, 3-veined, apical margin crenulate, apex truncate; mid-lobe subquadrate, smaller than lateral lobes, ca. 1.3 × 2 mm, 3-veined, apex truncate and shallowly notched, sinus with a small acute tooth; spur pendulous, straight to slightly incurved, cylindric, 5–7 mm, slightly shorter than ovary, slightly attenuate toward apex, apex obtuse; viscidia ellipsoid; stigma lobes oblong. Fl. Jul–Aug.

• On moss in *Rhododendron* thickets, alpine grasslands; 3000–3700 m. SE Xizang, NW Yunnan.

19. *Amitostigma papilionaceum* Tang, F. T. Wang & K. Y. Lang, *Acta Phytotax. Sin.* 20: 83. 1982.

蝶花无柱兰 *die hua wu zhu lan*

Plants 2–3.5 cm tall. Tubers oblong, 6–10 × ca. 4 mm. Stem with tubular sheaths at base, 2-leaved. Leaves basal, subopposite, porrect, ovate-orbicular, elliptic, or lanceolate, 0.3–0.7 × 0.1–0.6 cm, slightly fleshy, apex acute. Peduncle ebracteate; rachis 1-flowered; floral bract ovate-lanceolate, ca. 3 mm, much shorter than ovary, apex acute. Flower horizontal to erect, pale purple, with dark purple spots at base of lip, rather large; ovary and pedicel ca. 7 mm. Dorsal sepal erect, ovate-lanceolate, concave, 4–5 × 1.3–1.5 mm, 1-veined, apex subobtusate; lateral sepals spreading, oblong-lanceolate, slightly oblique, 4–5 × 1.3–1.5 mm, 1-veined, apex subobtusate. Petals connivent with dorsal sepal and forming a hood, ovate, slightly oblique, 4.5–5.5 × 2–2.5 mm, 1- or 2-veined, apex subobtusate; lip broadly elliptic-obovate, 7–9 × 5–8 mm, deeply 3-lobed below middle; lateral lobes linear-oblong, 3–4.5 × 1–2 mm, 1-veined, apex obtuse; mid-lobe spatulate to obovate, 5–5.5 × 4–5 mm, 3-veined, margin denticulate, apex rounded; spur pendulous, globose, 1.5–2 mm, apex rounded. Fl. Jul.

• Rocky soils, cliffs; ca. 2500 m. NW Sichuan.

20. *Amitostigma bifoliatum* Tang & F. T. Wang, Bull. Fan Mem. Inst. Biol. Bot. 7: 127. 1936.

棒距无柱兰 *bang ju wu zhu lan*

Plants 6.5–17 cm tall. Tubers ovoid to ellipsoid, ca. 10 × 5–6 mm. Stem with 2 tubular sheaths at base, 2-leaved. Leaves basal, subopposite, erect to porrect, broadly ovate to ovate-lanceolate, 1.5–3 × 0.4–0.8 cm, apex acute to acuminate. Peduncle ebracteate; rachis 2–5 cm, subdensely several to more than 10-flowered; floral bracts lanceolate, shorter than ovary, apex acuminate. Flowers mostly secund, pale purple; ovary and pedicel ca. 8 mm. Dorsal sepal elliptic-ovate, concave, ca. 4 × 2 mm, 1-veined, apex acute; lateral sepals reflexed, ovate-lanceolate, slightly oblique, ca. 4 × 2 mm, 1-veined, apex acute. Petals connivent with dorsal sepal and forming a hood, ovate, oblique, ca. 3.5 × 1.5 mm, 1-veined, apex acute; lip rhombic, ca. 6 × 5–7 mm, 3-lobed below middle; disk finely papillate; lateral lobes linear; mid-lobe cuneate-oblong, ca. 3 mm, apex slightly dilated and irregularly serrulate; spur pendulous, slightly incurved, cylindrical-clavate, ca. 3 mm, neck contracted, apex obtuse; viscidia elliptic; stigma lobes clavate. Fl. Aug–Sep.

• Damp places, shrubby slopes, grasslands; 700–1200 m. S Gansu, N Sichuan.

21. *Amitostigma wenshanense* W. H. Chen, Y. M. Shui & K. Y. Lang, Acta Bot. Yunnan. 25: 521. 2003.

文山无柱兰 *wen shan wu zhu lan*

Plants ca. 20 cm tall. Tubers oblong, ca. 40 × 15 mm. Stem with 1 or 2 tubular sheaths at base, 2-leaved. Leaves basal, subopposite, erect to porrect, oblong-ob lanceolate, 6–6.5 × 1–1.6 cm, apex acute. Peduncle ebracteate; rachis 1.5–2.5 cm, subdensely 6–9-flowered; floral bracts ovate-lanceolate, 1.5–2.5 mm, shorter than ovary, apex acute. Flowers not secund; ovary and pedicel ca. 8 mm. Dorsal sepal oblong-lanceolate, ca. 3 × 2 mm, 1-veined, apex obtuse; lateral sepals reflexed, obovate, oblique, ca. 4 × 2.5 mm, 1-veined, apex acute. Petals connivent with dorsal sepal and forming a hood, ovate, oblique, ca. 3 × 2 mm, 1-veined, apex acute; lip ovate, 4.5–5 × ca. 1.5 mm, 3-lobed above middle; disk with 2 short longitudinal lamellae; lateral lobes ovate; mid-lobe lanceolate, ca. 1.8 mm, apex obtuse; spur pendulous, slightly incurved, subglobose, ca. 1.3 mm, apex rounded. Fl. Aug.

• Damp places in forests; ca. 3000 m. Yunnan.

22. *Amitostigma physoceras* Schlechter, Acta Horti Gothob. 1: 133. 1924.

球距无柱兰 *qiu ju wu zhu lan*

Orchis physoceras (Schlechter) Soó.

Plants 6–11 cm tall. Tubers subglobose, ca. 10 mm in diam. Stem 2-leaved. Leaves basal, subopposite, usually appressed to substratum, ovate to ovate-lanceolate, 1–2 × 0.7–1.4 cm, apex acute to subacuminate. Peduncle ebracteate; rachis to 6 cm, subdensely 3–10-flowered; floral bracts lanceolate, much shorter than ovary, apex acuminate. Flowers secund, pinkish purple; ovary and pedicel 5–9 mm. Dorsal sepal erect, lanceolate to ovate-lanceolate, concave, ca. 5 × 2 mm, 1-veined, apex

acuminate; lateral sepals reflexed, lanceolate to ovate-lanceolate, slightly oblique, concave, ca. 5 × 2 mm, 1-veined, apex

acuminate. Petals ovate-lanceolate, ca. 5×3 mm, 1-veined, apex acute; lip ovate, ca. 9×7 – 8 mm, base broadly cuneate, deeply 3-lobed; disk finely papillate; lateral lobes slightly diverging, obovate-subrhombic, oblique, ca. 3 mm, apical margin subcrenulate, apex obtuse; mid-lobe suborbicular-obovate, ca. 5×4 mm, margin irregularly denticulate, apex obtuse; spur pendulous, with a short, contracted neck and then dilated and globose, ca. 3 mm, much shorter than ovary; viscidia elliptic; stigma lobes clavate. Fl. Jul–Aug.

• Forests, damp places along cliffs, valleys; 2000–2700 m. NW and W Sichuan.

