

**100. PHAIUS** Loureiro, Fl. Cochinch. 2: 517, 529. 1790.

鹤顶兰属 he ding lan shu

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

Herbs, terrestrial, with pseudobulbs, sometimes stemlike. Roots densely hairy. Pseudobulb sometimes stemlike, tufted, with few to many nodes, often sheathing, with several leaves on upper part. Leaves large, plicate, petiolate, apex acuminate to acute, with long, tubular sheath tightly embracing stem or sometimes equitant forming a pseudostem. Inflorescences 1 or 2, lateral on nodes of pseudobulb, higher or lower than leaves; peduncle with a few sparse sheaths; raceme with a few sparse or with many dense flowers, unbranched or rarely with a few branches at base; floral bracts large, apex acute; flowers ascending on raceme, often large. Sepals and petals subsimilar; lip adnate to column at base, separated from column or ± adnate to basal wings of column, base with short spur or spurless, nearly 3-lobed or unlobed, ± embracing column. Column long and stout, upper part enlarged, usually winged; rostellum large or inconspicuous, unlobed; stigma lateral; anther terminal, 2-locular; pollinia 8, waxy, in 2 groups, attached by caudicles to a sticky substance.

About 40 species: tropical Africa, Madagascar, tropical and subtropical Asia to Oceania; nine species (four endemic) in China.

- 1a. Plants with cylindrical stemlike pseudobulbs (15–)20–80 cm.
  - 2a. Pseudobulb stout, 3–5 cm in diam.; inflorescences shorter than 25 cm; flowers cream-white, not widely opening ..... 5. *P. columnaris*
  - 2b. Pseudobulb slender, less than 3 cm in diam.; inflorescences longer than 35 cm.
    - 3a. Flowers yellowish green ..... 1. *P. takeoi*
    - 3b. Flowers purplish red or pink.
      - 4a. Mid-lobe of lip with white hairy ridges adaxially ..... 3. *P. mishmensis*
      - 4b. Mid-lobe of lip glabrous ..... 4. *P. wenshanensis*
- 1b. Plants with conic, ovoid, or cylindrical-ovoid pseudobulbs 1–14 cm.
  - 5a. Inflorescences not exceeding leaves; leaves with yellow spots; flowers yellow ..... 2. *P. flavus*
  - 5b. Inflorescences exceeding leaves; leaves green.
    - 6a. Inflorescences (peduncle, rachis, floral bracts) with blackish brown scaly hairs ..... 8. *P. hainanensis*
    - 6b. Inflorescences glabrous.
      - 7a. Plants 20–35 cm tall; sepals and petals 1.5–2.2 cm ..... 9. *P. delavayi*
      - 7b. Plants ca. 100 cm or more tall; sepals and petals 4–7 cm.
        - 8a. Pseudobulb 6–8 cm; flowers nutant; petals lacking brown-red spots abaxially; spur shorter than 1 cm ..... 6. *P. tancarvilleae*
        - 8b. Pseudobulb 10–14 cm; flowers spreading; petals with brown-red spots above middle abaxially; spur longer than 1 cm ..... 7. *P. wallichii*

**1. *Phaius takeoi*** (Hayata) H. J. Su, Quart. J. Exp. Forest. Natl. Taiwan Univ. 3(4): 77. 1989.

长茎鹤顶兰 chang jing he ding lan

*Calanthe takeoi* Hayata, Icon. Pl. Formosan. 9: 111. 1920; *Phaius longicuris* Z. H. Tsi.

Plants to 100 cm tall. Pseudobulb stemlike, cylindrical, 20–40 × 1.3–2 cm. Leaves 5–8, on upper part of pseudobulb; blade green, elliptic or elliptic-lanceolate, 22–40 × 5–8 cm, glabrous, apex long acuminate. Inflorescences arising from basal or lower nodes of pseudobulb, not exceeding height of leaves, 30–55 cm, 4–10-flowered, glabrous; floral bracts persistent, ovate-lanceolate, 0.5–1 cm. Flowers widely opening, 4–5 cm in diam.; pedicel and ovary 2–2.5 cm, sparsely puberulent; sepals and petals pale yellowish green. Sepals subsimilar, oblong to oblanceolate, 2.8–3.5 × 0.7–1 cm, abaxially sparsely puberulent, apex obtuse. Petals obovate-lanceolate, 2.8–3 × 0.6–0.8 cm, apex obtuse to acute; lip white, often tinged yellow, nearly orbicular, 2–2.5 × ca. 2 cm, shallowly 3-lobed; lateral lobes subovate, margin undulate, apex obtuse; mid-lobe orbicular-square, margin undulate, apex emarginate and sinus mucronate; disk with 2 or 3 yellow to yellowish green ridges; spur yellow or greenish yellow, hornlike, 0.3–0.8 cm, apex unlobed, slightly hooked. Column

white, 1.5–2.5 cm, densely pubescent ventrally; rostellum ligulate; anther cap white. Fl. Oct–Nov.

Moist broad-leaved forests, dense forests along valleys; 500–1400 m. C Taiwan, S Yunnan [Vietnam].

**2. *Phaius flavus*** (Blume) Lindley, Gen. Sp. Orchid. Pl. 128. 1831.

黄花鹤顶兰 huang hua he ding lan

*Limodorum flavum* Blume, Bijdr. 375. 1825; *Bletia flava* (Blume) Wallich ex Lindley; *B. woodfordii* Hooker; *Phaius maculatus* Lindley; *P. minor* Blume; *P. somae* Hayata; *P. tancarvilleae* (L'Héritier) Blume f. *veronicae* S. Y. Hu & Barretto; *P. undulatomarginatus* Hayata; *P. woodfordii* (Hooker) Merrill.

Plants 40–100 cm tall. Pseudobulb ovoid-conic, 5–10 × 1.5–4 cm. Leaves 4–8, on upper part of pseudobulb; blade normally green with yellow or white spots, ovate-elliptic or elliptic-lanceolate, 25–60 × 5–20 cm, glabrous, apex acuminate or acute. Inflorescences arising from basal or lower nodes of pseudobulb, normally not exceeding height of leaves, 50–90 cm, 8–25-flowered, glabrous; floral bracts persistent, ovate-lanceolate, 2.5–4 × 0.5–0.7 cm, glabrous. Flowers not widely opening, 4–7 cm in diam.; pedicel and ovary 2–3 cm, glabrous; sepals and

petals pale yellow to mid-yellow, sepals often green tipped, often turning indigo-blue when dried. Sepals subsimilar, oblong-obovate, 2.5–4 × 0.7–1.5 cm, glabrous, apex obtuse to subacute. Petals oblong-elliptic, 2.5–4 × 0.7–1.5 cm, apex obtuse-subacute; lip yellow with orange or brown marks, apical margin brown, obovate, 2.5–4.5 × 2.2–4.5 cm, shallowly 3-lobed; lateral lobes subobovate, margin undulate, apex rounded-truncate; mid-lobe orbicular, undulate-crested, apex emarginate; disk with 3 or 4 brown ridges, glabrous; spur slightly curved, white, conic, 0.5–0.8 × ca. 0.2 cm, apex obtuse. Column white, 1.5–2 cm, densely white pubescent ventrally; rostellum suborbicular; anther cap white. Fl. Apr–Oct.  $2n = 38, 42$ .

Shaded and humid places in forests; 300–2000 m. N Fujian, Guangdong, Guangxi, Guizhou, Hainan, N Hunan, Sichuan, Taiwan, SE Xizang, Yunnan [Bhutan, NE India, Indonesia, Japan, Laos, Malaysia, Nepal, New Guinea, Philippines, Sri Lanka, Thailand, Vietnam].

“*Plocoglottis* sp.” was reported by R. A. Rolfe to be found on Emei Shan in SC Sichuan based on a specimen collected by Faber (*No. 947*). *Plocoglottis* Blume is a genus similar in habit to *Phaius*, particularly *P. flavus*. We have collected orchids several times on Emei Shan and have found *P. flavus* but not *Plocoglottis*. It seems that the *Plocoglottis* species on Emei Shan may be a misidentification of this species.

**3. *Phaius mishmensis*** (Lindley & Paxton) H. G. Reichenbach, *Bonplandia* 5: 43. 1857.

紫花鹤顶兰 *zi hua he ding lan*

*Limatodis mishmensis* Lindley & Paxton, *Paxt. Fl. Gard.* 3: 36. 1852; *Calanthe crinita* Gagnepain; *C. ramosa* Gagnepain; *Phaius crinitus* (Gagnepain) Seidenfaden; *P. gracilis* Hayata.

Plants 40–140 cm tall. Pseudobulb stemlike, cylindrical, 30–80 × 0.6–1.5 cm. Leaves 4–7; blade green, elliptic or obovate-lanceolate, (10–)15–30 × 4–8 cm, glabrous, apex acute. Inflorescences arising from middle nodes of pseudobulb or axils of upper leaves above middle, ca. as tall as or taller than height of leaves, (30–)35–45 cm, sparsely 2–10-flowered, glabrous; floral bracts caducous, oblong-lanceolate, 3–4 cm, glabrous. Flowers not widely opening, 5–6 cm in diam.; pedicel and ovary 2–3 cm, glabrous; sepals and petals pale pink to dark red or purple-brown. Sepals similar, elliptic, 2.5–3.5 × 0.5–1.2 cm, glabrous, apex subacute. Petals oblanceolate, 2–3.5 × 0.4–0.7 cm, apex obtuse; lip white to pink, densely reddish brown spotted, obovate-triangular, 2–3.5 × 1.5–2.5 cm, 3-lobed; lateral lobes ovate, margins flat or slightly undulate, apex obtuse or rounded; mid-lobe subsquare or broadly obovate, margin undulate, apex emarginate to retuse; disk with 3 or 4 densely hirsute-pubescent ridges extending to mid-lobe; spur slightly curved, yellow-green, narrowly cylindrical, 1–1.6 × ca. 0.2 cm, apex obtuse. Column yellow or whitish, ca. 2.2 cm, densely villous ventrally; rostellum triangular. Fl. Oct–Jan.  $2n = 42, 44 + 4f, 50, 62$ .

Shaded and wet places in evergreen broad-leaved forests; 800–1400 m. NW Guangdong, Guangxi, C and S Taiwan, SE Xizang, S and SE Yunnan [Bhutan, NE India, Japan (Ryukyu Islands), Laos, Myanmar, Philippines, Thailand, Vietnam].

**4. *Phaius wenshanensis*** F. Y. Liu, *Acta Bot. Yunnan.* 13: 372. 1991.

文山鹤顶兰 *wen shan he ding lan*

Plants 55–100 cm tall. Pseudobulb stemlike, cylindrical, 40–50 × 0.6–1 cm. Leaves 6 or 7; blade elliptic, 10–34 × 5–12 cm, glabrous, apex acute. Inflorescences arising from lower or basal nodes of pseudobulb, not exceeding height of leaves, to 45 cm, sparsely 5- or 6-flowered, glabrous; floral bracts caducous, ca. 3 cm. Flowers widely opening, 6–8 cm in diam.; pedicel and ovary 2.5–3 cm, glabrous; sepals and petals yellow outside, purplish red or pink inside. Sepals subsimilar, elliptic, 3.8–4.2 × 1.4–1.6 cm, glabrous, apex obtuse. Petals oblanceolate, 3.7–3.9 × 1–1.2 cm, apex obtuse; lip lateral lobes densely purplish red spotted, obovate-triangular, ca. 3.5 × 3.2–3.7 cm, 3-lobed; lateral lobes subobovate, margin undulate, apex obtuse; mid-lobe broadly obovate, margin crisped, apex emarginate; disk with 2 or 3 yellow ridges, glabrous; spur yellow, horn-shaped, 2–2.3 × ca. 0.4 cm, apex forming a hook. Column yellow, with purplish red spots, ca. 2.7 cm, glabrous; anther cap pale yellow. Fl. Sep.

• Forests; ca. 1300 m. SE Yunnan.

**5. *Phaius columnaris*** C. Z. Tang & S. J. Cheng, *Bull. Bot. Res.*, Harbin 5(2): 141. 1985.

仙笔鹤顶兰 *xian bi he ding lan*

*Phaius guizhouensis* G. Z. Li.

Plants 60–100 cm tall. Pseudobulb cylindrical, resembling robust stems, 15–40 × 3–5 cm. Leaves 6 or 7, on upper part of pseudobulb; blade green, elliptic, 30–70 × 9–14 cm, apex acuminate. Inflorescence arising from first node of pseudobulb, not exceeding height of leaves, ca. 20 cm, ca. 12-flowered; floral bracts caducous, ovate-triangular, 1.5–2 × ca. 1.4 cm. Flowers not widely opening, 8–5.5 cm in diam.; pedicel and ovary 2–3.5 cm, with sparse brown hairs; sepals and petals cream-white with green tops on dorsal sepals. Sepals subsimilar, suboblong or falcate-oblong, 3.5–4.5 × 1.3–1.5 cm, glabrous, apex acute. Petals falcate-oblong, 3.3–4 × ca. 1.5 cm, apex acute; lip cream-white with adaxial surface tinged orange-red on mid-lobe, suborbicular, slightly 3-lobed; lateral lobes suborbicular, margin undulate, apex rounded; mid-lobe ovate, margin crisped, apex rounded-obtuse; disk with 2 or 3 yellow ridges, glabrous; spur yellowish green with whitish green stripes, narrowly conic or horn-shaped, short, 3.5–7 × 2–3 mm, apex slightly concave. Column cream-white, ventral side with orange-red stripes, ca. 2 cm, sparsely white hairy ventrally; anther cap cream-white. Fl. Jun.

• Open places between rocks in limestone forests; 200–1700 m. N Guangdong, SW Guizhou, S Yunnan (Mengla).

**6. *Phaius tancarvilleae*** (L’Héritier) Blume, *Mus. Bot.* 2: 177. 1856 [“*tankervillii*”].

鹤顶兰 *he ding lan*

*Limodorum tancarvilleae* L’Héritier, *Sert. Angl.* 28. 1789; *Bletia tancarvilleae* (L’Héritier) R. Brown; *Phaius grandifolius* Loureiro; *P. grandifolius* var. *superbus* Houtte; *P. sinensis* Rolfe; *P. tancarvilleae* var. *superbus* (Houtte) S. Y. Hu.

Plants (60–)100–200 cm tall. Pseudobulb conic, ovoid, or subglobose, (2.5–)6–8 × 3–6 cm. Leaves 2–6, on upper part of pseudobulb; blade green, elliptic-lanceolate, 30–100 × 8–20 cm, glabrous, apex acuminate. Inflorescences arising from base of pseudobulb or axils of leaves, exceeding height of leaves,

50–200 cm, loosely 10–25-flowered, glabrous; floral bracts usually caducous, lanceolate, 4–5.5 × ca. 1.8 cm, glabrous. Flowers nutant, widely opening, large, 7–12.5 cm in diam.; pedicel and ovary 2.5–4.5 cm, glabrous; sepals and petals whitish outside, reddish brown or brown inside. Sepals similar, oblong-lanceolate, 4–6.5 × 1–1.5 cm, glabrous, apex acuminate to acute. Petals lanceolate-oblong, 4–6.5 × 0.8–1.5 cm, apex acuminate to acute; lip white toward base, pink or red-pink toward entrance with white stripes on inside, 3.5–6 × 2–5 cm, broadly rhombic-ovate, shallowly 3-lobed; lateral lobes short, margin undulate, apex rounded; mid-lobe orbicular or transversely oblong, margin slightly undulate, apex truncate and emarginate or rounded and mucronulate; disk usually with 2 or 3 ridges, densely puberulent; spur hooked, whitish yellow, narrowly cylindrical, 0.6–1 × 0.1–0.2 cm, apex unequally 2-lobed or unlobed. Column white, 2–2.2 cm, puberulent ventrally; rostellum subligulate. Fl. Mar–Jun.  $2n = 38, 44 + 4B, 46, 48, 52$ .

Shaded and damp places in forests, at forest margins, along valleys, or by streamsides; 700–1800 m. Fujian, Guangdong, Guangxi, Hainan, Taiwan, SE Xizang, Yunnan [widely distributed in tropical and subtropical Asia and Oceania].

**7. *Phaius wallichii*** Lindley in Wallich, Pl. Asiat. Rar. 2: 46. 1831.

大花鹤顶兰 da hua he ding lan

*Phaius magniflorus* Z. H. Tsi & S. C. Chen.

Plants to 100 cm tall (occasionally taller). Pseudobulb fusiform or cylindrical-ovoid, 10–14 × 4.5–5.7 cm. Leaves ca. 4; blade green, oblong-elliptic, 49–70 × 15–24 cm, glabrous, apex acuminate. Inflorescences arising from lower nodes of pseudobulb, ca. as tall as or taller than height of leaves, to 100 cm, more than 10-flowered, glabrous; floral bracts caducous, ovate-lanceolate, ca. 6 cm, glabrous. Flowers widely opening, to 14 cm in diam.; pedicel and ovary ca. 5.5 cm, glabrous; sepals and petals yellow-green outside, inside brown-red with yellow-green at apex, petals densely brownish red spotted above middle. Sepals subsimilar, oblong-lanceolate, ca. 7 × 1.5 cm, glabrous, apex shortly acuminate. Petals oblong-lanceolate, ca. 6.3 × 1.2 cm, apex shortly acuminate; lip red with yellow stripes toward base, white at entrance turning cream-yellow with age, ca. 5.5 × 5.3 cm, broadly ovate-triangular, shallowly 3-lobed; lateral lobes short, margin slightly undulate, apex rounded; mid-lobe ovate-triangular, margin slightly undulate, apex acute; disk with yellow veins; spur yellow, narrowly cylindrical, bowl-like, 1–2 cm, apex unequally 2-lobed or unlobed. Column pale yellowish green, ca. 2 cm, pubescent on dorsal surface in upper half; rostellum ligulate; anther cap yellowish white. Fl. May–Jun.

Shaded and damp places in forests or along valleys; 700–1000 m. Hong Kong, Xizang, S Yunnan [Bhutan, NE India, Vietnam].

**8. *Phaius hainanensis*** C. Z. Tang & S. J. Cheng, Acta Phytotax. Sin. 20: 199. 1982.

海南鹤顶兰 hai nan he ding lan

Plants 50–80 cm tall. Pseudobulb ovoid-conic, 5–9 × 3.5–5 cm. Leaves ca. 4; blade green, oblong-ovate or broadly lanceolate, 25–70 × 6–12 cm, with brown scaly hairs, apex acuminate. Inflorescences arising from base of pseudobulb, ca. 40 cm, 5–12-flowered, exceeding height of leaves, with sparse blackish brown scaly hairs; floral bracts caducous, ovate, 3–5.5 × ca. 2.5 cm, with sparse blackish brown scaly hairs. Flowers widely opening, 8–9 cm in diam.; pedicel and ovary ca. 3 cm; sepals and petals white, turning yellow with age. Sepals similar, ovate-lanceolate or lanceolate, ca. 4.3 × 1.2 cm, abaxially with yellowish brown bristles, apex acuminate and hooked. Petals obovate-lanceolate, ca. 4 × 1.2 cm, apex acuminate and hooked; lip yellow toward base and turning deep yellow with age, ivory white at entrance, obovate, ca. 4 × 3.2 cm, 3-lobed; lateral lobes suborbicular, margin slightly undulate, apex obtuse; mid-lobe broadly suborbicular, margin crisped, apex rounded; disk with 3 yellow ridges, glabrous; spur curved, pale yellow, cylindrical, 1.6–1.8 × ca. 0.2 cm, apex unequally 2-lobed. Column ca. 1.3 cm, sparsely pubescent ventrally. Fl. May.

• Crevices along valleys; 100–200 m. C Hainan.

**9. *Phaius delavayi*** (Finet) P. J. Cribb & Perner, Alpine Gardener 70: 293. 2002.

少花鹤顶兰 shao hua he ding lan

*Calanthe delavayi* Finet, Bull. Soc. Bot. France 46: 434. 1900; *C. coelogyniformis* Kraenzlin.

Plants 20–35 cm tall. Pseudobulb subglobose, 1–2 × 0.8–1.5 cm. Leaves 3 or 4, on upper part of pseudobulb; blade green, elliptic or obovate-lanceolate, 12–22 × 3–5.5 cm, glabrous, apex acute. Inflorescences arising from leaf axis, exceeding height of leaves, 25–30 cm, sparsely 2–7-flowered, glabrous; floral bracts persistent, lanceolate, 1.2–3 × 0.3–0.6 cm, glabrous. Flowers widely opening, purplish red or yellowish; pedicel and ovary 1.5–2.3 cm, glabrous; sepals and petals with purple spots on margins. Sepals similar, oblong-lanceolate, 1.5–2.2 × 0.3–0.6 cm, glabrous, apex acuminate. Petals narrowly oblong to obovate-lanceolate, 1.5–2 × 0.3–0.4 cm, apex acuminate; lip white with purple marks and purple flush, subrhombic, ca. 2 × 2 cm, shallowly 3-lobed, apical margin erose, apex subtruncate and emarginate; disk with 3 shortly hairy ridges; spur straight, purple-red or yellow, cylindrical, 0.6–1 × ca. 0.15 cm, apex obtuse. Column 0.7–0.8 cm, pubescent ventrally; rostellum nearly square. Fl. Jun–Sep.

• Streamsides, mixed forests; 2700–3500 m. S Gansu, SE to W Sichuan, SE Xizang, SW Yunnan.

