

## 10. CHEIROSTYLIS Blume, Bijdr. 413. 1825.

叉柱兰属 cha zhu lan shu

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

*Arisanorchis* Hayata; *Gymnochilus* Blume; *Mariarisqueta* Guinea.

Herbs, terrestrial or occasionally epiphytic, small. Rhizome decumbent, moniliform to terete, fleshy, with many contracted nodes; roots usually reduced to fine hairs and arranged along ridges on rhizome internodes, rarely fleshy and emerging from rhizome nodes. Stem erect, very short to elongate, glabrous, with 2 to several subrosulate or scattered cauline leaves. Leaves often withered at anthesis, ovate to cordate, with a short petiole-like base dilating into a tubular amplexicaul sheath. Inflorescence erect, terminal, racemose, very short to elongate, 1- to many flowered, glabrous to pubescent. Flowers resupinate, usually small, mostly not secund; ovary shortly pedicellate, twisted, fusiform, glabrous to pubescent. Sepals membranous, outer surface glabrous to pubescent, connate for half to almost entire length and forming a tube, or rarely free. Petals usually connivent with dorsal sepal; lip adnate to column margin at base, sometimes simple and entire though usually 3-partite; hypochile often dilated and saccate, containing fleshy, lobed or seriate (comblike) papillose calli; mesochile subtubular, short to elongate; epichile spreading, 2-lobed or rarely entire, margin lacinate, dentate, wavy, or entire. Column short, ventrally with 2 elongate armlike appendages (stelidia) parallel to rostellum; anther erect, ovoid, 2-locular; pollinia 2, each longitudinally 2-partite, granular-farinaceous, clavate, attached to solitary oblong viscidium; rostellum deeply bifid, 2 elongate arms erect, parallel; stigma lobes 2, separate, convex, rather large, placed laterally near apex of column and below rostellum. Capsule ellipsoid.

About 50 species: from tropical Africa through tropical Asia to New Guinea, Australia, and the Pacific islands; 17 species (eight endemic) in China.

Hayata considered species with an entire lip to comprise a distinct genus, *Arisanorchis*, but they conform to *Cheirostylis* in other respects (sepals basally fused and forming a tube, column with two elongate stelidia, rostellum deeply bifid) and are most likely peloric forms. A monographic revision of the genus is highly desirable given that overlapping species concepts remain a problem in separating taxa named from different regions. The endemic species of Taiwan and Hong Kong in particular remain poorly known and are in need of re-examination.

- 1a. Leafy stem elongate, (1.5–)3–8 cm; leaves cauline, scattered, sometimes becoming clustered toward apex of stem; inflorescence shorter than, equal to, or sometimes slightly longer than (but always less than 2 × as long as) leafy stem.
  - 2a. Leaves elliptic-oblong, 5–7 cm; sepals free, not forming a tube ..... 1. *C. tabiyahanensis*
  - 2b. Leaves usually ovate, 0.4–3.2 cm; sepals connate for 1/2–3/5 of length and forming a tube.
    - 3a. Leaves up to 0.7 cm; sepals 2.5–3 mm ..... 2. *C. pusilla*
    - 3b. Leaves 1–3.2 cm; sepals 3–11 mm.
      - 4a. Inflorescence to 1 cm, peduncle often enclosed by leaf bases and not visible beyond stem apex; ovary glabrous; petals 9–10 mm; hypochile calli comblike, composed of several seriate papillose appendages.
        - 5a. Apices of sepals acute; epichile without a tooth at apex between 2 lobes, lobes deeply 4- or 5-lacinate, each division 3–4 mm ..... 3. *C. octodactyla*
        - 5b. Apices of sepals obtuse; epichile with an acute tooth at apex between 2 lobes, lobes 5- or 6-lacinate, each division 1–2 mm ..... 4. *C. pingbianensis*
      - 4b. Inflorescence 2–7 cm, peduncle long, free of leaf bases and visible beyond stem apex; ovary pubescent or villous; petals 4–4.5 mm; hypochile calli bifid.
        - 6a. Leaves ovate to lanceolate, 1.5–2.2 cm, petiole-like base and sheath 1.5–1.8 cm; epichile lobes deeply 4- or 5-lacinate ..... 5. *C. tortilacinia*
        - 6b. Leaves ovate-orbicular, 2–3 cm, petiole-like base and sheath 0.7–0.9 cm; epichile lobes wavy to shallowly 2- or 3-dentate, teeth broad with acute tips ..... 6. *C. liukiensis*
- 1b. Leafy stem usually no more than 3 cm (rarely to 5 cm); leaves subrosulate or congested at base of stem; inflorescence at least 2 × as long as leafy stem.
  - 7a. Lip simple, entire; hypochile lacking papillose calli.
    - 8a. Ovary and outer surface of sepals glabrous; lip spatulate, 3–5 mm ..... 7. *C. clibborndyeri*
    - 8b. Ovary and outer surface of sepals pubescent; lip narrowly oblong, 6–8 mm ..... 8. *C. takeoi*
  - 7b. Lip 3-partite; epichile lobes dentate or lacinate at margin, hypochile containing papillose calli.
    - 9a. Sepals and petals 13–15 mm; lip 15–17 mm ..... 9. *C. griffithii*
    - 9b. Sepals and petals 3–6.5(–9) mm; lip 5–12 mm.
      - 10a. Hypochile shortly spurred ..... 17. *C. calcarata*
      - 10b. Hypochile saccate, never spurred.
        - 11a. Hypochile divided by a longitudinal septum into 2 parts, each part with (1 or)2 horn-shaped calli ..... 13. *C. malipoensis*

- 11b. Hypochile lacking a longitudinal septum; calli bifid or comblike.  
 12a. Epichile lobes deeply lacinate, divisions narrowly linear; hypochile calli bifid.  
 13a. Rhizome moniliform, olive-green; leaves 0.8–1 cm wide, petiole-like base to 4 mm; lip 8–11.5 mm ..... 10. *C. monteiroi*  
 13b. Rhizome torose, reddish; leaves 1.2–1.7 cm wide, petiole-like base 4–10 mm; lip 5–6 mm ..... 11. *C. cochinchinensis*  
 12b. Epichile lobes irregularly dentate to wavy, teeth coarse, triangular with acute tips or truncate with obtuse tips; hypochile calli comblike, 3–6-toothed.  
 14a. Sepals and petals 5–6.5(–9) mm; lip 9–12 mm.  
 15a. Epichile deeply bilobed, apical margin obviously dentate ..... 12. *C. yunnanensis*  
 15b. Epichile shallowly bilobed, apical margin obscurely denticulate to wavy ..... 14. *C. thailandica*  
 14b. Sepals and petals 3–4 mm; lip 5–7 mm.  
 16a. Epichile lobes wavy to shallowly dentate, teeth truncate with obtuse tips; hypochile calli 2- or 3-lobed ..... 15. *C. jamesleungii*  
 16b. Epichile margin distinctly dentate, teeth triangular with acute tips; hypochile calli 4–6-lobed ..... 16. *C. chinensis*

**1. *Cheirostylis tabiyahanensis*** (Hayata) N. Pearce & P. J. Cribb, *Edinburgh J. Bot.* 56: 278. 1999.

东部叉柱兰 *dong bu cha zhu lan*

*Zeuxine tabiyahanensis* Hayata, *Icon. Pl. Formosan.* 6: 89. 1916; *Cheirostylis nemorosa* Fukuyama; *Macodes tabiyahanensis* (Hayata) S. S. Ying; *Z. nemorosa* (Fukuyama) T. P. Lin.

Plants 10–20 cm tall. Rhizome creeping, terete, short; roots emerging from rhizome nodes, cylindric, slender, densely pubescent. Stem ascending, 5–8 cm, 5- or 6-leaved. Leaves cauline to clustered at stem apex, elliptic-oblong, 5–7 × ca. 2.5 cm, base cuneate, apex acute; petiole-like base and sheath 1–2 cm. Inflorescence 6–7 cm, sparsely pubescent, with 2 or 3 sterile bracts; rachis 3–4 cm, subdensely 3–8-flowered; floral bracts lanceolate, 1.5–2 × ca. 0.4 cm, abaxially pubescent, apex acuminate. Flowers slightly nodding; ovary and pedicel 7–9 mm, sparsely pubescent. Sepals free, not spreading, green, tinged with pink, outer surface pubescent, 3-veined; dorsal sepal ovate, 8–10 × ca. 5 mm; lateral sepals oblong, 8–10 × ca. 4 mm. Petals appressed to dorsal sepal, white, obovate-oblong, falcate, 8–10 × ca. 4 mm, 2-veined; lip white, 8–10 mm, 3-partite; hypochile saccate, containing 2 several-toothed, papillose, comblike calli; mesochile thickened, ca. 2 mm, canaliculate with margin first incurved but slightly recurved distally; epichile transversely dilated, 2-lobed; lobes upturned, subsquare, ca. 4 mm, margin irregularly dentate, teeth shallow with obtuse tips. Column 3–4 mm; stelidia elongate, parallel and subequal to rostellum arms; anther triangular-ovoid, ca. 2 mm; pollinia ca. 1.5 mm; rostellum arms 2–2.5 mm. Fl. Mar–May.

- Broad-leaved forests; ca. 1000 m. S Taiwan.

This taxon, the generic placement of which has been questioned by several authors, was transferred most recently to *Cheirostylis* (Pearce & Cribb, *Edinburgh J. Bot.* 56: 278. 1999) on account of the shape of the lip, despite it having cylindric roots that emerge from the rhizome nodes and sepals that are not fused into a synsepal to form a tube.

**2. *Cheirostylis pusilla*** Lindley, *Gen. Sp. Orchid. Pl.* 489. 1840.

细小叉柱兰 *xi xiao cha zhu lan*

Plants 4–6 cm tall. Rhizome elongate, creeping, monili-

form, ca. 0.2 cm in diam. Stem erect, terete, 1.5–3 cm, 3–6-leaved. Leaves scattered along stem, green, ovate, 0.4–0.7 × 0.2–0.4 cm, glabrous, base truncate-rounded, apex acute; petiole-like base and sheath 0.2–0.4 cm. Inflorescence 1–2.5 cm, glabrous to very sparsely pubescent, with 1 or 2 sterile bracts; rachis to 0.4 cm, 1- or 2-flowered; floral bracts ovate, ca. 3 mm, shorter than ovary, apex acuminate. Flowers white, small, suberect; ovary cylindric-fusiform, 3–4.5 mm including pedicel, glabrous. Sepals 2.5–3 mm, connate for ca. 1/2 of length and forming a tube; free apical lobes ca. 1.2 mm, apex acute. Petals appressed to dorsal sepal, spatulate, slightly oblique, ca. 3 mm, 1-veined, apex obtuse; lip 4–6 mm, 3-partite; hypochile shallowly saccate, containing 2 bifid calli; mesochile ca. 1.5 mm, adaxially with glandular hairs; epichile ca. 2.5 × 3.5–4 mm, 2-lobed; lobes flabellate, ca. 2 mm, apex truncate and with irregular shallow notches. Column ca. 1.5 mm; stelidia linear; anther ovoid; rostellum arms ca. 1.5 mm. Fl. Oct.

Shaded forests; ca. 1300 m. S Yunnan (Menghai) [NE India, Malaysia, Thailand].

**3. *Cheirostylis octodactyla*** Ames, *Philipp. J. Sci., C.* 2: 314. 1907.

羽唇叉柱兰 *yu chun cha zhu lan*

*Cheirostylis inabae* Hayata; *C. oligantha* Masamune & Fukuyama.

Plants 5–15 cm tall. Rhizome creeping, torose to moniliform, 0.2–0.5 cm in diam., sometimes branching; roots hairlike, in raised bands along rhizome internodes. Stem ascending, pale reddish brown, 4–5 cm, fleshy, 3–6-leaved. Leaves scattered along stem, abaxially pale green, adaxially green, ovate to elliptic, sometimes orbicular-cordate, 1–3.2 × 0.5–1.5 cm, glabrous, base obtuse-rounded or cordate, apex acute; petiole-like base and sheath 0.3–0.8 cm. Inflorescence less than 1 cm, (1 or) 2- or 3-flowered; peduncle often enclosed by leaf bases and not visible beyond stem apex; floral bracts pale green, ovate, 3–4 mm, shorter than ovary, apex acuminate. Flowers white, tubular; ovary green, cylindric-fusiform, 8–10 mm including pedicel, glabrous. Sepals 8–10 mm, 1-veined, connate for ca. 2/3 of length and forming a tube ca. 4 mm in diam.; free apical lobes

triangular, 2–3.5 mm, apex acute. Petals appressed to dorsal sepal, white, narrowly spatulate, oblique, 9–10 × 2.5–3 mm, 1-veined, apex obtuse; lip 10–11 mm, 3-partite; hypochile shallowly saccate, containing 2 comblike calli, each 7- or 8-toothed; mesochile ca. 7 × 2 mm; epichile with 2 green spots at base, ca. 3 × 8 mm, 2-lobed; lobes 3–5.3 mm, 4- or 5-laciniate, each division 3–4 mm. Column ca. 3 mm; stelia straight, linear, nearly as long as rostellum arms; anther ovoid; rostellum arms ca. 2 mm. Capsule ellipsoid, 1–1.4 cm, borne on elongated peduncle. Fl. Sep.

Damp places in forests, mountain ridges; 1000–2400 m. Taiwan [Philippines, S Vietnam].

**4. *Cheirostylis pingbianensis*** K. Y. Lang, Acta Phytotax. Sin. 34: 635. 1996.

屏边叉柱兰 ping bian cha zhu lan

Plants 5–10 cm tall. Rhizome elongate, creeping, torose. Stem erect, terete, ca. 5 cm, fleshy, 4–8-leaved. Leaves green, cauline, ovate, 1–2.5 × 0.8–1.7 cm, base rounded, apex acute; petiole-like base and sheath 1–1.5 cm. Inflorescence extremely short, to 1 cm, 2- or 3-flowered; peduncle often enclosed by leaf bases and not visible beyond stem apex; floral bracts green, ovate, shorter than ovary, apex acuminate. Flowers glabrous; ovary cylindrical-fusiform, 10–12 mm including pedicel, glabrous. Sepals 10–11 mm, connate for ca. 3/5 of length and forming a tube; free dorsal lobe ca. 3.5 mm and lateral lobes ca. 1.8 mm, apex slightly obtuse. Petals appressed to dorsal sepal, narrowly spatulate, slightly oblique, ca. 9 × 2 mm, base attenuate, apex obtuse; lip 8–13 mm, 3-partite; hypochile slightly saccate, ca. 1.5 mm, containing 2 comblike calli; mesochile ca. 4.5 × 2 mm; epichile ca. 2 × 4 mm, 2-lobed and with an acute tooth between 2 lobes; margin of lobes 5- or 6-laciniate, each linear division 1–2 mm. Column ca. 2.5 mm; stelia linear, ca. 3 mm; anther broadly ovoid, ca. 1.5 mm; rostellum arms to 3.5 mm. Fl. Sep–Oct.

• Shaded humid areas in dense forests; ca. 2100 m. SE Yunnan.

This species is clearly closely related to *Cheirostylis octodactyla*. More material is required on which to base a critical comparison.

**5. *Cheirostylis tortilacinia*** C. S. Leou, Quart. J. Exp. Forest. Natl. Taiwan Univ. 4(4): 72. 1990.

和社叉柱兰 he she cha zhu lan

*Cheirostylis chinensis* Rolfe var. *tortilacinia* (C. S. Leou) S. S. Ying.

Plants 6–7 cm tall. Rhizome ascending, green, tinged with brown, moniliform, 3–10 cm, 10–15-noded. Stem erect, more than 4 cm, fleshy, 2–6-leaved. Leaves cauline, ovate to lanceolate, 1.5–2.2 × 1–2 cm, membranous, glabrous, base rounded to truncate, apex acute; petiole-like base and sheath brownish, 1.5–1.8 cm, glabrous. Inflorescence 2–5 cm, pubescent, with 1–3 sterile bracts; rachis less than 1 cm, 1–6-flowered; floral bracts ovate-lanceolate, shorter than ovary, abaxially hairy, apex acuminate. Flowers small; ovary brownish green, villous. Sepals brownish green, 3–5 mm, basal 1/2 connate and forming a tube, outer surface villous; free lateral lobes longer than dorsal lobe. Petals appressed to dorsal sepal, white, spatulate, oblique,

ca. 4.5 mm; lip white, 3-partite; hypochile saccate, containing 2 bifid glands; mesochile short, adaxially with glandular hairs; epichile often curved or twisted, with 2 green spots at base, deeply 2-lobed; lobes somewhat square in outline, 2–2.5 mm, deeply 4- or 5-laciniate. Column erect, ca. 3 mm; stelia elongate, triangular at apex, ca. 1.5 mm; anther adaxially pink, ca. 2 mm; pollinia ca. 1.5 mm, attached to slender, attenuate viscidium; rostellum arms ca. 1.5 mm. Fl. Jan.

• Bamboo forests; ca. 1000 m. C Taiwan.

**6. *Cheirostylis liukuensis*** Masamune, J. Soc. Trop. Agric. 2: 36. 1930.

琉球叉柱兰 liu qiu cha zhu lan

*Cheirostylis kanashiroi* Ohwi.

Plants 5–9 cm tall. Rhizome creeping, purplish brown, torose to moniliform, sometimes branching; roots hairlike, in tufts on rhizome internodes. Stem erect, brownish, elongate, 4–5 cm, fleshy, 3- or 4-leaved. Leaves scattered along stem, abaxially reddish purple, adaxially dark grayish green, ovate to ovate-orbicular, 2–3 × 1–2 cm, glabrous, base rounded or slightly cordate, apex acute; petiole-like base and sheath 0.7–1 cm. Inflorescence 4–7 cm, pubescent, with 2–4 sterile bracts; rachis 1–1.5 cm, 5–9-flowered; floral bracts ovate, concave, 7–9 mm, often slightly longer than ovary, apex acuminate. Flowers often secund; ovary cylindrical-fusiform, 5–8 mm including pedicel, pubescent. Sepals white, tinged with reddish brown, 4.5–5 mm, connate for ca. 2/3 of length and forming a tube, sparsely pubescent on outer surface; tube 2.1–2.7 mm in diam.; free apical lobes triangular. Petals appressed to dorsal sepal, white, obliquely oblong or oblanceolate, 4–4.5 × 0.7–2 mm, 1-veined, apex obtuse; lip white, 6–7 mm, 3-partite; hypochile shallowly saccate, containing 2 bifid calli; mesochile 2–3 mm, narrow; epichile dilated, with a pair of diffuse green spots at base, 2-lobed; lobes widely diverging, subsquare, 2–2.5 mm, margin wavy to shallowly 2- or 3-dentate, teeth broad with acute tips. Column 2–2.4 mm; stelia elongate, slightly incurved and embracing rostellum arms; anther broadly ovoid, ca. 1.5 mm; pollinia ca. 1.2 mm; rostellum arms ca. 1.2 mm. Fl. Jan–Feb.

Forests, bamboo forests; 200–800 m. Hong Kong, Taiwan [Japan (Ryukyu Islands)].

**7. *Cheirostylis clibborndyeri*** S. Y. Hu & Barretto, Chung Chi J. 13(2): 15. 1976.

叉柱兰 cha zhu lan

*Cheirostylis derchiensis* S. S. Ying; *C. hungyehensis* T. P. Lin.

Plants 13–17 cm tall. Rhizome olive-green to pale yellow, moniliform, 7–12 cm; roots hairlike, in narrow lines along rhizome internodes. Stem ascending, 1–2 cm, 2–5-leaved. Leaves subrosulate, abaxially slightly paler green and tinged with purple, adaxially dark green, ovate, 1–3.5 × 1.5–2.5 cm, abaxially sometimes with variegated venation and minutely hairy, base cordate, apex acute; petiole-like base and sheath pink to red, 1–1.5 cm, glabrous. Inflorescence pink, 10–15 cm, pubescent, with 1–4 sterile bracts; rachis 1.5–2 cm, 5–7-flowered; floral

bracts sheathing, ovate-lanceolate, 5–6 × 1–2 mm, apex acute. Flowers not widely spreading; ovary and pedicel 5–10 mm, glabrous. Sepals greenish brown, 4–4.5 mm, connate for ca. 3/5 of length and forming a tube, glabrous on outer surface; free apical lobes pink, triangular, 1.8–2 mm, apex obtuse. Petals appressed to dorsal sepal, white with single green vein, ovate to ovate-lanceolate, 2–5 × 1–1.5 mm, apex obtuse; lip simple, white, tinged with green, spatulate, 3–5 × 1–2.3 mm, glabrous, base attenuate, margin entire, apex obtuse. Column 2–3 mm; stelia variable, parallel to rostellum or reflexed, usually much shorter than rostellum arms; anther broadly ovoid, ca. 1.5 mm; viscidium 1–1.5 mm; rostellum arms elongate, 1–1.5 mm. Fl. Mar–Apr.

• Damp rocks in forests and along valleys; 300–1500 m. Hong Kong, C and S Taiwan.

**8. *Cheirostylis takeoi*** (Hayata) Schlechter, Repert. Spec. Nov. Regni Veg. Beih. 4: 171. 1919.

全唇叉柱兰 *quan chun cha zhu lan*

*Arisanorchis takeoi* Hayata, Icon. Pl. Formosan. 4: 110. 1914; *A. tairae* Fukuyama; *Cheirostylis anomala* Ohwi; *C. eglandulosa* Averyanov; *C. tairae* (Fukuyama) Masamune; *C. tatewakii* Masamune; *Goodyera tatewakii* (Masamune) S. S. Ying.

Plants 12–22 cm tall. Rhizome creeping, moniliform, to 1.5 cm in diam.; roots hairlike, in 2–4 rows along rhizome internodes. Stem ascending, 1–2 cm, 2–6-leaved. Leaves often absent or withered at anthesis, subrosulate, pale green, ovate or broadly ovate, 2.5–4 × 2.5–3.5 cm, base rounded or subcordate, apex acute; petiole-like base and sheath 1–1.2 cm. Inflorescence 10–18 cm, sparsely pubescent, with 2 or 3 sheathing sterile bracts; rachis ca. 1 cm, 2–5-flowered; floral bracts ovate to ovate-lanceolate, 4–6 mm, equal in length to ovary, apex acuminate. Flowers barely opening, small; ovary and pedicel green, cylindric-fusiform, 5–6 mm, sparsely pubescent. Sepals greenish, 5–6 mm, connate for ca. 3/5 of length and forming a tube, sparsely pubescent on outer surface; tube slightly contracted at middle, 3–4 mm in diam.; apical lobes triangular. Petals appressed to dorsal sepal, whitish, oblong, oblique, falcate, 5–6 × ca. 1.5 mm, 1-veined, apex obtuse; lip simple, white, narrowly oblong, 6–8 × 2–2.5 mm, entire, lateral margins incurved, apex obtuse to subacute, recurved. Column 2–3.7 mm; stelia variable, parallel to rostellum or malformed, green, usually much shorter than rostellum arms; anther ovoid, ca. 1.5 mm; pollinia ca. 1.5 mm; viscidium ca. 2 mm; rostellum arms elongate, 1.5–2 mm. Fl. Mar.

Broad-leaved forests; 100–1400 m. Taiwan [Japan (Ryukyu Islands), N Vietnam].

**9. *Cheirostylis griffithii*** Lindley, J. Proc. Linn. Soc., Bot. 1: 188. 1857.

大花叉柱兰 *da hua cha zhu lan*

*Cheirostylis macrantha* Schlechter.

Plants 15–20 cm tall. Rhizome creeping, terete to torose; roots hairlike, in raised bands along rhizome internodes. Stem erect, short to occasionally elongate, 2–5 cm, fleshy, 3- or 4-

leaved. Leaves often withered at anthesis, congested to rarely well spaced, ovate, 1.8–2.5 × 1.2–2 cm, base subrounded, apex acuminate; petiole-like base and sheath 0.8–1.4 cm. Inflorescence 8–15 cm, sparsely villous, with 2 or 3 sterile bracts; rachis 1–2.5 cm, 1–3-flowered; floral bracts lanceolate, 7–9 mm, shorter than or ca. as long as ovary, apex acuminate. Flowers whitish, rather large; ovary 11–13 mm including pedicel, pubescent. Sepals 13–15 mm, basal 1/2 connate and forming a tube, outer surface sparsely pubescent; free apical lobes acute, spreading. Petals narrowly oblong, oblique, falcate, 13–15 × 2–2.5 mm, apex obtuse; lip 15–17 mm, 3-partite; hypochile slightly saccate, ca. 2 mm, containing 2 comblike calli, each callus 8- or 9-toothed; mesochile 5–7 mm; epichile orbicular, 5–6 × 6–7 mm, base with 2 green spots, 2-lobed; lobes deeply lacinate with 8–10 divisions, each division 1–3.5 mm. Column 2.5–3 mm; stelia straight, linear, ca. 3 mm, ca. as long as rostellum arms; anther ovoid, ca. 2 mm; rostellum arms spatulate, ca. 3 mm. Fl. Sep.  $2n = 26$ .

Damp places in forests; 2200–2300 m. C Yunnan [India, Myanmar, Nepal, Thailand].

**10. *Cheirostylis monteiroi*** S. Y. Hu & Barretto, Chung Chi J. 13(2): 15. 1976.

箭药叉柱兰 *jian yao cha zhu lan*

Plants 9–13 cm tall. Rhizome olive-green, moniliform, with 4–6 nodes, internodes 5–15 mm, nodes 6–10 mm in diam.; roots hairlike, in narrow rows along rhizome internodes. Stem erect, short, ca. 2.5 cm, 2- or 3-leaved. Leaves congested, green with dark green venation, ovate, 1.2–1.6 × 0.8–1 cm, midvein conspicuous on both surfaces, base subcordate, apex acute or acuminate; petiole-like base and sheath purplish green, 0.3–0.4 cm. Inflorescence 7–9 cm, slender, pubescent, with 3–7 sterile bracts; rachis ca. 1 cm, 2–8-flowered; floral bracts purplish red, cymbiform, ca. 7 mm. Flowers small, glabrous; ovary and pedicel cylindric, 5–6 × 1.5–2 mm, glabrous. Sepals olive-green, tinged with pinkish red, ca. 5 mm, connate for ca. 3/5 of length and forming a tube; tube ca. 3 mm, base slightly swollen; free apical lobes ca. 2 mm. Petals appressed to dorsal sepal, white, oblanceolate, oblique, ca. 5 × 1.5 mm; lip 8–11.5 mm, 3-partite; hypochile saccate, fleshy, margin incurved, containing 2 bifid calli; mesochile short; epichile nearly orbicular in outline, ca. 7 mm, 2-lobed; lobes white, tinged with green at middle, margin deeply 5–8-lacinate, each division ca. 2 mm. Column cylindric, ca. 3 mm; stelia ca. 1.5 mm, acuminate; anther yellow, broadly ovoid, ca. 1 mm; viscidium linear-lanceolate, ca. 1 mm; rostellum arms ca. 1.5 mm. Fl. Mar–May.

• In shade on damp rocks, along streams in forests; ca. 300 m. Hong Kong.

**11. *Cheirostylis cochinchinensis*** Blume, Coll. Orchid. 55. 1858–1859.

雉尾叉柱兰 *zhi wei cha zhu lan*

*Cheirostylis taichungensis* S. S. Ying.

Plants 7–14 cm tall. Rhizome reddish, torose, 4–10 × 0.2–0.5 cm, internodes 1–1.4 cm; roots hairlike, in rows along rhizome internodes. Stem erect, 1.5–3 cm, 2–4-leaved. Leaves subrosulate, ovate to ovate-oblong, 1.5–3 × 1.2–1.7 cm, papery,

glabrous, adaxially with dark green reticulate venation, abaxially paler, base obtuse, apex obtuse or subacute; petiole-like base and sheath reddish at base, 0.4–1 cm. Inflorescence 5–12 cm, slender, pubescent at base, becoming ± glabrous above, with 2 or 3 sterile bracts; rachis 1–3 cm, 3–10-flowered; floral bracts lanceolate to linear-lanceolate, 2–3 × ca. 1 mm, glabrous, apex acuminate. Flowers small; ovary and pedicel greenish brown, 5–8 mm, glabrous. Sepals pale greenish brown or white, 4–4.5 mm, basal 1/2 connate and forming a tube, slightly pubescent or glabrous; free apical lobes triangular, 2–2.7 mm, apex obtuse. Petals white, obliquely falcate, 4–5 × 1–1.5 mm, 1-veined, apex obtuse; lip white, 5–6 mm, longer than sepals, 3-partite; hypochile saccate, containing 2 bifid calli and often with keel at center; mesochile short; epichile white, with green patch near base, orbicular in outline, 7–9 mm, 2-lobed; lobes suborbicular or flabellate, margin lacinate with 7–9 deep linear divisions, each division 1–1.5 mm. Column erect, 2.4–3 mm; stelia straight, parallel to rostellum arms and equal in length; anther ovoid, 1.5–2 mm, apex with 1 triangular reddish brown spot; pollinia ca. 1.2 mm; rostellum arms ca. 2 mm. Fl. Feb–May.

Forests; 700–2500 m. S Taiwan [Vietnam].

**12. *Cheirostylis yunnanensis*** Rolfe, Bull. Misc. Inform. Kew 1896: 201. 1896.

云南叉柱兰 *yun nan cha zhu lan*

*Cheirostylis josephii* Schlechter; *C. munnacampensis* A. N. Rao; *C. pabongensis* Lucksom.

Plants 10–18 cm tall. Rhizome moniliform, 1–3.5 × 0.6–1.5 cm; roots in broad, raised bands along rhizome internodes. Stem pale green, usually less than 1 cm, 2- or 3-leaved. Leaves congested, often withered or absent at anthesis, green, ovate, 1.5–3.5 × 0.8–2 cm, membranous, base subrounded, apex acute; petiole-like base and sheath 0.6–1.5 cm. Inflorescence 8–16 cm, sparsely villous, with 3 or 4 sterile bracts; rachis 0.4–2 cm, 2–5(–10)-flowered; floral bracts ovate, concave, 5–6.5 mm, shorter than ovary, abaxially villous, apex acuminate. Flowers often erect; ovary cylindrical-fusiform, 7–9 mm including pedicel, sparsely villous. Sepals 5–6.5 mm, basal 1/2 connate and forming a tube, membranous, outer surface sparsely villous, 1-veined; free apical lobes triangular-ovate, 2.5–3 mm, apex subobtusate. Petals appressed to dorsal sepal, white, narrowly oblanceolate-oblong, oblique, 5–6.5 × 1.5–1.8 mm, membranous, 1-veined, entire or sometimes with 2 or 3 obtuse teeth, apex obtuse; lip erect, white, 9–12 mm, 3-partite; hypochile saccate, containing 2 comblike calli, each callus 3- or 4-toothed; mesochile ca. 2 mm, narrow, with 2 lamellae; epichile with green spots at base, flabellate, 5–6 mm, deeply 2-lobed; lobes 4–6 mm wide, margin irregularly 5–7-dentate, teeth triangular with acute tips. Column ca. 2.5 mm; stelia erect, nearly as long as rostellum arms; anther ovoid, ca. 1 mm; rostellum arms ca. 1.5 mm. Fl. Mar–Apr.

In shade on rocky soils in forests, along streams; 200–1800 m. Guangdong, Guangxi, S Guizhou, Hainan, S Hunan, W Sichuan, S Yunnan [India (Sikkim), Myanmar, Thailand, Vietnam].

**13. *Cheirostylis malipoensis*** X. H. Jin & S. C. Chen, Acta

Phytotax. Sin. 45: 797. 2007.

麻栗坡叉柱兰 *ma li po cha zhu lan*

Plants 10–12 cm tall. Rhizome creeping, 8–20 × 2–2.5 mm, fleshy, nodes slightly contracted. Stem erect, 5–30 mm, 1–4-leaved. Leaves green, often reticulated with dark green, ovate-cordate, 1.2–2 × 0.9–1.2 cm, apex acute to subacuminate; petiole-like base and sheath 0.6–0.8 cm. Inflorescence 6–9 cm, pubescent, with 2 or 3 sterile bracts; rachis short, usually less than 1 cm, 2–4-flowered; floral bracts ovate-lanceolate, 7–9 mm, apex acuminate. Flowers white; pedicel and ovary 4–6 mm, sparsely villous. Sepals 4–5 mm, basal 1/2 connate and forming a tube, sparsely villous on outer surface toward base; free apical lobes triangular-ovate, 2–2.5 mm, subobtusate. Petals appressed to dorsal sepal, narrowly lanceolate-oblong, 3.5–4 × ca. 1.5 mm; lip 6–9 mm, 3-partite; hypochile saccate, ca. 2 × 1.5 mm, divided by a longitudinal septum into 2 parts, each part with 2 horn-shaped calli (rarely with just 1 callus on each side); mesochile ca. 1 mm; epichile with 2 green or beige spots at base, deeply bilobed; lobes flabellate, ca. 4 × 4 mm, apical margin 3–5-toothed. Column 1–2 mm; stelia ca. 1 mm, slightly longer than rostellum arms. Fl. Dec–Feb.

• Forests on limestone mountains, thickets; ca. 1100 m. SE Yunnan.

**14. *Cheirostylis thailandica*** Seidenfaden, Dansk Bot. Ark. 32(2): 74. 1978.

反瓣叉柱兰 *fan ban cha zhu lan*

Plants 12–25 cm tall. Rhizome creeping, swollen, ca. 1 cm in diam. Stem erect, 1–3 cm, often 3- or 4-leaved. Leaves ± withered at anthesis, broadly lanceolate, 2–6 × 1.5–2 cm, thinly textured; petiole-like base and sheath ca. 1 cm. Inflorescence 11–22 cm, pubescent, with several sterile bracts; rachis short, 3- or 4-flowered; floral bracts lanceolate, small, pubescent; pedicel and ovary ca. 5 mm, pubescent. Sepals green-brown, ca. 8 mm, basal 2/3 connate and forming a tube; free apical lobes triangular. Petals not appressed to dorsal sepal, whitish, suboblong, ca. 9 × 2.5 mm, 1-veined, apex recurved; lip whitish, ca. 12 mm, slightly 3-partite; hypochile saccate, inside containing 2 comblike calli; mesochile ca. 4 mm, margin involute; epichile with 2 green spots at base, shallowly bilobed; lobes somewhat flabellate, apical margin irregularly denticulate to wavy. Column ca. 4 mm; stelia ca. 2 mm; rostellum arms ca. 1.5 mm. Fl. Feb.

In shade of open forests; ca. 1200 m. S Yunnan [Thailand].

**15. *Cheirostylis jamesleungii*** S. Y. Hu & Barretto, Chung Chi J. 13(2): 13. 1976.

粉红叉柱兰 *fen hong cha zhu lan*

Plants ca. 11 cm tall. Rhizome creeping, olive-green, moniliform, 4–5 × 0.3–0.6 cm. Roots minute, in rows along rhizome internodes. Stem erect, ca. 1 cm, with 2 or 3 small leaves. Leaves subrosulate, reddish green with dark green reticulate veins, cordate, 3–8 × 3–8 cm, base truncate, apex acute. Inflorescence ca. 10 cm, slender, with 4 sterile bracts, sparsely villous; rachis less than 1 cm, 2- or 3-flowered; floral bracts

pink, cymbiform, shorter than ovary, membranous, 1-veined. Flowers small; ovary and pedicel pink, ca.  $5 \times 2$  mm, sparsely villous. Sepals green, tinged with pink, ca. 4 mm, basal 1/2 connate and forming a tube, outer surface villous at base; free apical lobes triangular, ca. 2 mm. Petals white, lanceolate, oblique, ca.  $4 \times 1$  mm; lip white, ca. 5 mm, 3-partite; hypochile saccate, containing 2 2- or 3-lobed calli; mesochile short, margin incurved; epichile dilated, subrectangular, ca.  $3 \times 5$  mm, 2-lobed; lobes subsquare, margin wavy to shallowly 5- or 6-dentate, teeth broad, truncate with obtuse tips. Column 1.5–2 mm; stielidia acuminate, ca. 0.8 mm; anther ovoid, ca. 1 mm, apex obtuse; viscidium ca. 1 mm; rostellum arms ca. 1 mm. Fl. Mar.

• Damp soils and mossy rocks, in shade by streams; ca. 600 m. Hong Kong.

**16. *Cheirostylis chinensis*** Rolfe, Ann. Bot. (Oxford) 9: 158. 1895.

中华叉柱兰 zhong hua cha zhu lan

*Cheirostylis philippinensis* Ames; *C. taiwanensis* Yamamoto.

Plants 6–20 cm tall. Rhizome creeping, torose to moniliform, to 10 cm; roots in rows along rhizome internodes. Stem ascending, pale green, 1–3 cm, 2–4-leaved. Leaves subrosulate, green, ovate or broadly ovate,  $1-3 \times 0.7-1.7$  cm, membranous, base rounded, apex acute; petiole-like base and sheath 0.3–1 cm. Inflorescence 5–18 cm, pubescent, with 3 or 4 sterile bracts; rachis 1–3 cm, 2–6-flowered; floral bracts oblong-lanceolate, concave, 5–8 mm, nearly as long as ovary, abaxially hairy, apex long acuminate. Flowers small; ovary green, cylindrical-fusiform, 7–8 mm including pedicel, sparsely pubescent. Sepals 3–4 mm, basal 1/2 connate and forming a tube, membranous, outer surface sparsely pubescent, 1-veined; free apical lobes triangular-ovate, ca. 1.8 mm, apex subobtusate. Petals appressed to dorsal sepal, white, narrowly oblanceolate-oblong, oblique, falcate,  $3-4 \times 1.2-1.5$  mm, membranous, 1-veined, apex obtuse; lip erect, white, 5–7 mm, 3-partite; hypochile saccate, containing 2 comblike calli, each callus (4 or) 5- or 6-toothed; mesochile ca. 1 mm, narrow; epichile with 2 green spots at base, flabellate, ca. 3.5 mm, 2-lobed; lobes ca. 3 mm, margin 4- or 5-dentate, teeth triangular with acute tips. Column ca. 2.5 mm; stielidia erect, nearly as long as rostellum; anther pinkish, ovoid, ca. 1.5 mm; viscidium narrowly oblong, ca. 1 mm; rostellum arms ca. 1.5 mm. Fl. Jan–Mar.

Damp rocky soils in forests, along streams; 200–800 m. Guangxi, Guizhou, Hainan, C and S Taiwan [Myanmar, Philippines, Vietnam].

**17. *Cheirostylis calcarata*** X. H. Jin & S. C. Chen, Acta Phytotax. Sin. 45: 797. 2007.

短距叉柱兰 duan ju cha zhu lan

Plants ca. 15 cm tall. Rhizome almost vertical, ca.  $3.5 \times 1$  cm, fleshy, nodes slightly contracted. Stem short, 4- or 5-leaved. Leaves withered at anthesis, clustered, lanceolate,  $1.5-4.5 \times 0.7-1.2$  cm; petiole-like base and sheath 1–2.5 cm. Inflorescence ca. 14 cm, pubescent, with 2 or 3 sterile bracts; rachis short, 1–5-flowered; floral bracts ovate to lanceolate, 5–

10 mm, glabrous. Flowers white; pedicel and ovary ca. 8 mm, glandular hairy. Sepals 6–7 mm, connate for ca. 3/5 of length and forming a  $\pm$  curved tube; free apical lobes triangular, ca. 2 mm. Petals appressed to dorsal sepal, spatulate, ca.  $10 \times 1$  mm; lip ca. 1.6 cm, 3-partite; hypochile saccate and shortly spurred, ca. 2 mm, inside with 2 3- or 4-lobed calli; mesochile ca. 6 mm; epichile with 2 green spots at base, deeply bilobed; lobes ca.  $10 \times 7$  mm, 4- or 5-laciniate, each division 1.5–2.5 mm. Column

Flora of China 25: 57–63. 2009.

ca. 2.5 mm; stielidia ca. 4 mm, slightly longer than rostellum  
arm. Fl. Mar.

- Forests on limestone mountains; ca. 1200 m. S Yunnan.

Flora of China 25: 57–63. 2009.