

# 1. BURMANNIA Linnaeus, Sp. Pl. 1: 287. 1753.

水玉簪属 shui yu zan shu

Herbs, annual or perennial, mycotrophic, semi-mycotrophic, or autotrophic, sometimes rhizomatous. Stems simple, rarely branched. Basal leaves in a distinct rosette; cauline leaves bractlike, small. Flowers solitary or in terminal cymes. Perianth tube actinomorphic, cylindrical or trigonous, with 3 lateral wings or sometimes wings absent, without annulus at tube mouth; tepals generally 6, apically distinct; outer tepals larger than inner, unlobed; inner tepals often minute, occasionally lacking. Stamens 3, sessile or subsessile on perianth tube; connective with 0–2 apical and 0 or 1 basal appendages. Ovary trigonous, 3-loculed, with axile placentation; stigmas 2-labiate to funnel-shaped. Fruit capsular, with persistent perianth, dehiscence generally irregular.

About 57 species: tropical and subtropical regions; ten species (one endemic) in China.

- 1a. Plants with chlorophyll, autotrophic or semi-mycotrophic; basal rosette leaves present.
  - 2a. Basal leaves numerous; cauline leaves 1.5–8 cm; inflorescences 8–20-flowered ..... 1. *B. disticha*
  - 2b. Basal leaves few; cauline leaves 0.5–3 cm; inflorescences 1–6(–8)-flowered.
    - 3a. Stems to 40 cm tall; outer tepal margins double and prominent; inner tepal margins double ..... 2. *B. coelestis*
    - 3b. Stems to 24 cm tall; outer tepal margins single or double and shallow; inner tepal margins single.
      - 4a. Inflorescences 1–3(or 4)-flowered; flowers 3–8 mm; stamens sessile in perianth tube ..... 3. *B. chinensis*
      - 4b. Inflorescences (1–)3–5(–8)-flowered; flowers 9–14 mm; stamens with short filament, basally adnate to perianth tube ..... 4. *B. filamentosa*
- 1b. Plants without chlorophyll, holomycotrophic; basal rosette leaves absent.
  - 5a. Stems, leaves, and flowers ± purplish blue.
    - 6a. Perianth wings narrow or reduced to ribs; outer tepals ca. 1 mm ..... 7. *B. wallichii*
    - 6b. Perianth wings conspicuous, 1–2 mm wide; outer tepals 1.5–2 mm ..... 8. *B. itoana*
  - 5b. Stems, leaves, and flowers whitish or yellow.
    - 7a. Inflorescences (1–)3–13-flowered; inner tepals present, sometimes very small.
      - 8a. Perianth wings conspicuous, 1–2 mm wide; stamen connectives with a pendent basal spur; seeds fusiform ..... 5. *B. nepalensis*
      - 8b. Perianth wings reduced to ribs or absent; stamen connectives without a pendent basal spur; seeds subglobose ..... 10. *B. championii*
    - 7b. Inflorescences 1–4-flowered; inner tepals absent.
      - 9a. Stems to 20 cm; perianth tube 4.5–5.5 mm; perianth wings 3–5.5 mm wide; stamen connectives with 2 apical crests; seeds fusiform ..... 6. *B. oblonga*
      - 9b. Stems to 9 cm; perianth tube 3–4 mm; perianth wings 0.5–2.5 mm wide; stamen connectives with 1 apical crest; seeds ellipsoid ..... 9. *B. cryptopetala*

## 1. *Burmattia disticha* Linnaeus, Sp. Pl. 1: 287. 1753.

水玉簪 shui yu zan

Plants with chlorophyll, autotrophic, flowering when 12.5–70 cm tall. Stems green, robust. Basal rosette leaves numerous, linear-lanceolate, 0.2–1.7 × 0.3–2 cm. Cauline leaves linear, 1.5–8 × 0.2–1 cm. Inflorescences 8–20-flowered; bracts lanceolate, 0.5–2.4 cm. Flowers pedicellate, bluish purple or yellow, 1–2.6 cm. Perianth tube 3–8 mm; wings conspicuous, 1–3.5 mm wide; outer tepals triangular, 1.5–4.5 mm, margin double and shallow; inner tepals lanceolate, 1–2 mm, margin single or double and shallow. Stamens sessile; connectives with 2 apical crests and a pendent basal spur. Ovary ellipsoid, 6–12 mm. Capsule obovoid. Seeds ellipsoid. Fl. Apr–Jun, fr. Jun–Sep.  $2n = ca. 136$ .

Wet thickets or grasslands; 400–3000 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, Yunnan [Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, New Guinea, Sri Lanka, Thailand, Vietnam; Australia].

## 2. *Burmattia coelestis* D. Don, Prodr. Fl. Nepal. 44. 1825.

三品一枝花 san pin yi zhi hua

Plants with chlorophyll, semi-mycotrophic, flowering when 10–40 cm tall. Stems green, slender. Basal rosette leaves few, linear-lanceolate, 0.5–2 cm × ca. 3 mm. Cauline leaves linear, 0.5–3 × 0.2–0.3 cm. Inflorescences (1 or)2–6(–8)-flowered; bracts lanceolate, 3–6 mm. Flowers pedicellate to subsessile, bluish purple with yellow tepals, 1–1.5 cm. Perianth tube 4.5–13 mm; wings conspicuous, 1.5–3 mm wide; outer tepals ovate-triangular, 1–2 mm, margin double and prominent; inner tepals triangular, 0.5–1 mm, margin double. Stamens sessile; connectives with 2 apical crests and a pendent basal spur. Ovary ellipsoid to obovoid, 3–7 mm. Capsule obovoid. Seeds ellipsoid. Fl. Jun–Oct, fr. Oct–Feb.  $2n = ca. 16$ .

Generally in wet grasslands; sea level to 300(–800) m. Guangdong, Guangxi, Hainan [Bangladesh, Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, New Guinea, Thailand, Vietnam; Australia].

## 3. *Burmattia chinensis* Gandoger, Bull. Soc. Bot. France 66: 290. 1919.

香港水玉簪 xiang gang shui yu zan

*Burmattia pusilla* (Wallich ex Miers) Thwaites var. *hongkongensis* Jonker.

Plants with chlorophyll, semi-mycotrophic, flowering when 4.5–20 cm tall. Stems green, slender. Basal rosette leaves few, lanceolate, 0.3–1.2 cm × 1–3 mm. Cauline leaves linear, 5–18 × ca. 2 mm. Inflorescences 1–3 (or 4)-flowered; bracts lanceolate, 5–6 mm. Flowers pedicellate to subsessile, purple or yellow, 3–8 mm. Perianth tube 4–6.5 mm; wings conspicuous, 1–3 mm wide; outer tepals broadly ovate, 1–3 mm, margin single or double and shallow; inner tepals spatulate, 0.5–1.2 mm, margin single. Stamens sessile; connectives with 2 apical crests and sometimes a pendent basal spur. Ovary ellipsoid to obovoid, 2.5–7 mm. Capsule obovoid. Seeds ellipsoid. Fl. Jun–Oct, fr. Jul–Jan.  $2n = ca. 32$ .

Generally in wet grasslands; (sea level to) 300–1300 m. Fujian, Guangdong, Guangxi, Hainan, Hunan, Jiangxi, Yunnan, Zhejiang [India, Laos, Thailand, Vietnam].

**4. *Burmanna filamentosa*** D. X. Zhang & R. M. K. Saunders, *Nordic. J. Bot.* 20: 392. 2001.

粤东水玉簪 yue dong shui yu zan

Plants with chlorophyll, semi-mycotrophic, flowering when 8–24 cm tall. Stems green, slender. Basal rosette leaves few, triangular-lanceolate, 0.5–1.4 cm × 2–3 mm. Cauline leaves linear, 5–15 × 1.5–3 mm. Inflorescences (1–)3–5(–8)-flowered; bracts lanceolate, ca. 5 mm. Flowers subsessile, bluish purple, 0.9–1.4 cm. Perianth tube 6–7.5 mm; wings conspicuous, 2–3 mm wide; outer tepals narrowly triangular, 1.5–3 mm, margin double and shallow; inner tepals lanceolate, 1–2 mm, margin single. Stamens with short filament, basally adnate to perianth tube; connectives with 2 apical crests but lacking a pendent basal spur. Ovary ellipsoid, 3–7 mm. Capsule obovoid. Seeds ellipsoid. Fl. and fr. Oct–Nov.

• Wet open areas; 300–800 m. E Guangdong.

**5. *Burmanna nepalensis*** (Miers) J. D. Hooker, *Fl. Brit. India* 5: 666. 1888.

宽翅水玉簪 kuan chi shui yu zan

*Gonianthes nepalensis* Miers, *Trans. Linn. Soc. London* 18: 537. 1841 [“*Gonyanthes*”]; *Burmanna fadouensis* H. Li; *B. liukiensis* Hayata.

Plants without chlorophyll, holomycotrophic, flowering when 4–13 cm tall. Stems whitish, slender. Basal rosette leaves absent. Cauline leaves triangular, 2–3.5 × ca. 1 mm. Inflorescences (1–)3–9-flowered; bracts triangular-lanceolate, 2–3 mm. Flowers pedicellate, whitish or yellow, 4–7 mm. Perianth tube 1.5–2.5 mm; wings conspicuous, 1–2 mm wide; outer tepals oblong-ovate, 0.5–1.2 mm, margin single; inner tepals orbicular, very small, margin single. Stamens sessile; connectives with 2 apical crests and a pendent basal spur. Ovary subglobose, 1.5–3 mm. Capsule subglobose. Seeds fusiform. Fl. and fr. Jul–Dec.

Wet areas in forests; 400–1600 m. Fujian, Guangdong, Guangxi, Hunan, Taiwan, Yunnan [India, Indonesia, Japan, Nepal, Philippines, Thailand].

**6. *Burmanna oblonga*** Ridley, *J. Straits Branch Roy. Asiat. Soc.* 41: 33. 1904.

裂萼水玉簪 lie e shui yu zan

*Burmanna bifida* Gagnepain.

Plants without chlorophyll, holomycotrophic, flowering when 7–20 cm tall. Stems whitish, slender. Basal rosette leaves absent. Cauline leaves triangular, 1.5–3 × 1–2 mm. Inflorescences 1–4-flowered; bracts triangular-lanceolate, 2.5–3 mm. Flowers pedicellate to subsessile, whitish, 0.8–1.4 cm. Perianth tube 4.5–5.5 mm; wings conspicuous, 3–5.5 mm wide; outer tepals broadly oblong, ca. 2 mm, margin single; inner tepals absent. Stamens sessile; connectives with 2 apical crests and a pendent basal spur. Ovary globose to rhomboid, ca. 4 mm. Capsule subglobose. Seeds fusiform. Fl. and fr. Jul–Dec.

Wet evergreen forests; 800–1100 m. Hainan [Cambodia, Indonesia, Malaysia, Thailand, Vietnam].

**7. *Burmanna wallichii*** (Miers) J. D. Hooker, *Fl. Brit. India* 5: 666. 1888.

亭立 ting li

*Gonianthes wallichii* Miers, *Trans. Linn. Soc. London* 18: 537. 1841 [“*Gonyanthes*”].

Plants without chlorophyll, holomycotrophic, flowering when 4–11.5 cm tall. Stems purple, slender. Basal rosette leaves absent. Cauline leaves triangular-subulate, 1.5–3.5 × 1–1.5 mm. Inflorescences 1–3-flowered; bracts triangular-lanceolate, 2–3.5 mm. Flowers sessile, bluish purple, 5–10 mm. Perianth tube 2.5–5.5 mm; wings narrow or reduced to ribs, 0.2–0.8 mm wide; outer tepals ovate-triangular, ca. 1 mm, margin single; inner tepals orbicular, very small, margin single. Stamens sessile; connectives lacking apical crests, sometimes with a pendent basal spur. Ovary ellipsoid to subglobose, 1.5–3 mm. Capsule subglobose. Seeds ellipsoid. Fl. and fr. Jul–Nov.  $2n = 32$ .

Wet areas in dense forests; sea level to 700 m. Guangdong, Hainan, Yunnan [Myanmar, Thailand, Vietnam].

**8. *Burmanna itoana*** Makino, *Bot. Mag. (Tokyo)* 27: 1. 1913.

纤草 xian cao

*Burmanna pingbienensis* H. Li; *B. takeoi* Hayata.

Plants without chlorophyll, holomycotrophic, flowering when 5–15 cm tall. Stems light blue, slender. Basal rosette leaves absent. Cauline leaves ovate-lanceolate, 2.5–3.5 × 1.5–2.5 mm. Inflorescences 1–3-flowered; bracts ovate-lanceolate, ca. 5 mm. Flowers pedicellate, bluish purple, 8–11 mm. Perianth tube 3.5–5.5 mm; wings conspicuous, 1–2 mm wide; outer tepals ovate-triangular, 1.5–2 mm, margin single; inner tepals orbicular, very small, margin single. Stamens sessile; connectives with an apical crest and a pendent basal spur. Ovary subglobose, 2–3.5 mm. Capsule subglobose. Seeds ellipsoid. Fl. and fr. Jun–Dec.

Wet evergreen forests; 300–1200 m. Guangdong, Guangxi, Hainan, Taiwan, Yunnan [Japan].

**9. *Burmanna cryptopetala*** Makino, *Bot. Mag. (Tokyo)* 27: 3. 1913.

透明水玉簪 *tou ming shui yu zan*

*Burmannia cryptopetala* var. *daxikangensis* Y. B. Chang & Z. Wei [“*baxikangensis*”]; *B. daxikangensis* (Y. B. Chang & Z. Wei) S. C. Chen & H. Li.

Plants without chlorophyll, holomycotrophic, flowering when 5–9 cm tall. Stems whitish, slender. Basal rosette leaves absent. Cauline leaves ovate-lanceolate, 3–3.5 × 1.5–2.5 mm. Inflorescences 1–3-flowered; bracts ovate-lanceolate, ca. 3 mm. Flowers pedicellate, whitish with yellow tepals, 1–1.2 cm. Perianth tube 3–4 mm; wings conspicuous, 0.5–2.5 mm wide; outer tepals triangular, 1.5–2 mm, margin single; inner tepals absent. Stamens sessile; connectives with an apical crest and a pendent basal spur. Ovary subglobose, 3.5–5 mm. Capsule subglobose. Seeds ellipsoid. Fl. and fr. Jun–Nov.

Wet areas in dense forests; 200–800 m. Guangdong, Hainan, Zhejiang [Japan].

**10. *Burmannia championii*** Thwaites, Enum. Pl. Zeyl. 325. 1864.

头花水玉簪 *tou hua shui yu zan*

*Burmannia dazielii* Rendle; *B. hunanensis* K. M. Liu & C. L. Long.

Plants without chlorophyll, holomycotrophic, flowering when 3–22 cm tall. Stems whitish, slender. Basal rosette leaves absent. Cauline leaves ovate-triangular, 1.5–6 × 1–3 mm. Inflorescences 3–13-flowered; bracts ovate-triangular, 1.5–6 mm. Flowers pedicellate or sessile, whitish with yellow tepals, 5–11 mm. Perianth tube 3–5 mm; wings reduced to ribs or absent; outer tepals narrowly triangular, 1.5–3 mm, margin single; inner tepals spatulate, 0.8–1.4 mm, margin single. Stamens sessile or with a short filament, basally adnate to perianth; connectives sometimes with 2 small apical crests but lacking a pendent basal spur. Ovary ellipsoid to obovoid, 2.5–3.5 mm. Capsule subglobose. Seeds subglobose. Fl. and fr. May–Aug.

Wet areas in forests; sea level to 1700 m. Fujian, Guangdong, Guangxi, Hunan, Taiwan [India, Indonesia, Japan, Malaysia, New Guinea, Sri Lanka, Thailand; Pacific islands].

