

## IRIDACEAE

鸢尾科 yuan wei ke

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Herbs perennial (or shrubs or annuals), with rhizomes, bulbs, or corms. Leaves alternate, often 2-ranked, often oriented edge-wise to aerial stem, usually sword-shaped to linear, parallel veined, base sheathing. Inflorescence sometimes a spike or reduced to a solitary flower, more often of monochasial, umbellate cymes, each enclosed in 2 opposed bracts (spathes) and termed a rhipidium, which may be solitary and terminal or numerous and variously arranged in racemes or panicles; bracts 1 to several. Flowers bisexual, showy, usually actinomorphic (often zygomorphic elsewhere). Perianth segments 6, in 2 whorls, inner and outer ones equal or differing in size and/or color; tube filiform or trumpet-shaped. Stamens (2 or)3; anthers extrorse. Ovary inferior (or superior), 3-loculed; ovules few to many; placentation axile. Style with filiform, slender, or petaloid branches. Fruit a loculicidal capsule. Seeds with or without aril and wings.

Between 70 and 80 genera and ca. 1800 species: nearly worldwide, especially S Africa, Asia, and Europe; three genera and 61 species (21 endemic, one introduced) in China.

The genera *Crocsmia* Planchon, *Eleutherine* Herbert, *Freesia* Ecklon ex Klatt, *Gladiolus* Linnaeus, *Moraea* Miller, *Sisyrinchium* Linnaeus, *Tigridia* Jussieu, and *Tritonia* Ker Gawler are represented in China by introduced, cultivated ornamentals. They were treated in FRPS but are not described in this account. Wu Zhengyi (editor's note) notes that there is evidence for the introduction and naturalization of the American genus *Eleutherine* in China, and he believes that there may also be disjunct, native occurrences in Yunnan and Indo-China.

*Belamcanda*, *Crocus*, and *Iris* all have medicinal value, and various species of *Iris* are grown in China as ornamentals.

Zhao Yu-tang. 1985. Iridaceae. In: Pei Chien & Ting Chih-tsun, eds., Fl. Reipubl. Popularis Sin. 16(1): 120–198.

- 1a. Plants cormous; aerial stem not developed at anthesis ..... 3. *Crocus*
- 1b. Plants rhizomatous; aerial stem developed at anthesis.
  - 2a. Style branches petaloid; outer and inner perianth segments differing greatly ..... 1. *Iris*
  - 2b. Style branches slender; outer and inner perianth segments ± similar ..... 2. *Belamcanda*

### 1. IRIS Linnaeus, Sp. Pl. 1: 38. 1753.

鸢尾属 yuan wei shu

*Pardanthopsis* (Hance) Lenz.

Herbs perennial, usually with short or long rhizomes (or bulbs), sometimes with swollen storage roots. Leaves mostly basal, 2-ranked, often oriented edgewise to aerial stem, sword-shaped to linear. Aerial stem developed, much shorter than or longer than leaves. Inflorescence of rhipidia arranged in racemes, panicles, or solitary. Flowers white, yellow, blue, violet, or purple, relatively large, often fragrant. Perianth tube usually trumpet-shaped, sometimes very narrowly so, very short to long; outer 3 perianth segments (falls) ornamented or not, with a crested, bearded, or beardless claw (haft), and an expanded, usually reflexed limb (blade), the beard or crest (when present) extending along midvein of proximal part of limb adaxially; inner 3 perianth segments (standards) smaller, never ornamented, erect or spreading. Stamens opposed to style branches and appressed to them; filaments free, flattened. Style with 3 colored, expanded, petaloid branches, arching over stamens, apex of branches extended as 2 lobes (crests) projecting beyond flaplike, abaxial stigma. Capsule globose, ellipsoid, or cylindric, apex beaked or not. Seeds pyriform, flattened and D-shaped, or irregularly angled, sometimes arillate.

About 225 species: temperate regions of the N hemisphere; 58 species (21 endemic) in China.

The following species were recorded in FRPS as being cultivated for ornament in China. Large species with bearded outer perianth segments: *Iris germanica* Linnaeus (with spathes at least partly green) and *I. pallida* Lamarck (with papery spathes). Large species with beardless outer perianth segments: *I. sibirica* Linnaeus (similar to *I. sanguinea*, but with scarious spathes and longer, unequal pedicels); *I. pseudacorus* Linnaeus (similar to *I. maackii*, but with leaves with an obvious midvein and larger flowers); and *I. versicolor* Linnaeus (similar to *I. laevigata*, but with a more branched flowering stem and smaller flowers). White forms can occur in most species and have been treated variously.

- 1a. Roots swollen, fusiform, tuberous; plants densely tufted with small growing point.
- 2a. Flowers dark violet, crest of outer perianth segments deeply fimbriate; plants stemless ..... 33. *I. barbatula*

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- 2b. Flowers pale violet, crest of outer perianth segments not deeply fimbriate; plants with or without stem.  
 3a. Flowering stems sometimes branched, more than 10 cm; perianth tube 2.5–3 cm ..... 31. *I. decora*
- 3b. Flowering stems always simple, very short (to 8 cm), or not emerging from ground; perianth tube 3–5 cm ..... 32. *I. collettii*
- 1b. Roots not tuberous; plants with rhizomes (sometimes very short).
- 4a. Flowering stems dichotomously branched; pedicels of fallen flowers persistent, exerted from spathes, stiff; outer perianth segments not crested.  
 5a. Flowering stems bearing well-developed, falcate leaves; perianth tube extremely short ..... 35. *I. dichotoma*  
 5b. Flowering stems bearing reduced leaves, leaves of basal fans erect or slightly incurved; perianth tube ca. 2 cm ..... 36. *I. subdichotoma*
- 4b. Flowering stems not or not obviously dichotomously branched; if pedicels of fallen flowers persistent and exerted, then outer perianth segments crested.
- 6a. Outer perianth segments with a toothed crest or beard of clavate hairs.  
 7a. Outer perianth segments with a crest.  
 8a. Plants with leafy stems; leaves alternate on stem or clustered into a terminal fan.  
 9a. Leaves alternate on stem, not clustered into a terminal fan; flowers pale reddish purple ..... 42. *I. milesii*  
 9b. Leaves clustered into a terminal fan; flowers violet, pale blue, or white.  
 10a. Flowers pale blue or white, 4–5.5 cm in diam. .... 39. *I. confusa*  
 10b. Flowers violet, 7.5–8 cm in diam. .... 40. *I. wattii*
- 8b. Plants with leaves in basal fans or tufts.  
 11a. Flowering stems with at least 4 lateral branches.  
 12a. Flowering stems with 5–12 branches; flowers 4.5–5.5 cm in diam. .... 37. *I. japonica*  
 12b. Flowering stems with 4 or 5 branches; flowers 7–8 cm in diam. .... 38. *I. formosana*
- 11b. Flowering stems simple or with 1 or 2 lateral branches.  
 13a. Rhizomes not obvious; roots thick; style branches ca. 1.5 cm wide, terminal lobes incurved toward center of flower ..... 34. *I. latistyla*  
 13b. Rhizomes obvious; roots slender; style branches narrower, terminal lobes not incurved toward center of flower.  
 14a. Rhizomes ca. 1 cm in diam.; leaves 1.5–3.5 cm wide; flowers ca. 10 cm in diam.; crest of outer perianth segments white, irregularly toothed ..... 41. *I. tectorum*  
 14b. Rhizomes less than 1 cm in diam.; leaves less than 1.5 cm wide; flowers less than 6 cm in diam.; crest of outer perianth segments yellow, low.  
 15a. Leaves 6–12 mm wide; rhizomes not filiform; capsule held at right angle to pedicel ..... 43. *I. speculatrix*  
 15b. Leaves 1–7 mm wide; rhizomes filiform; capsule erect ..... 44. *I. proantha*
- 7b. Outer perianth segments with a beard of clavate hairs.  
 16a. Plants surrounded by dense, fibrous remains of old leaf bases.  
 17a. Fibers strongly twisted and coiled ..... 52. *I. potaninii*  
 17b. Fibers ± straight.  
 18a. Rhizomes swollen, tuberlike; spathes 2-flowered; flowering stems to 35 cm; flowers ca. 6 cm in diam. .... 51. *I. leptophylla*  
 18b. Rhizomes neither swollen nor tuberlike; spathes 1-flowered; plants stemless or with flowering stems to 20 cm; flowers to 5 cm in diam.  
 19a. Flowers yellow ..... 53. *I. psammocola*  
 19b. Flowers violet or purple ..... 54. *I. tigridia*
- 16b. Plants usually without dense, fibrous remains of old leaf bases.  
 20a. Flowers yellow.  
 21a. Flowers ± flat, all parts spreading ..... 49. *I. narcissiflora*  
 21b. Flowers not flat, inner perianth segments ± erect.  
 22a. Leaves with swollen basal sheaths ..... 48. *I. curvifolia*  
 22b. Leaves without swollen basal sheaths.  
 23a. Rhizomes creeping ..... 45. *I. flavissima*  
 23b. Rhizomes compact.  
 24a. Spathes red flushed ..... 46. *I. bloudowii*  
 24b. Spathes green ..... 47. *I. mandshurica*
- 20b. Flowers violet-purple.  
 25a. Leaves glaucous, falcate, more than 1 cm wide ..... 50. *I. scariosa*  
 25b. Leaves not as above, often poorly developed at anthesis.  
 26a. Flowering stems developed.  
 27a. Flowers small, to 3 cm in diam., inner perianth segments spreading ..... 55. *I. goniocarpa*  
 27b. Flowers large, 6–7 cm in diam., inner perianth segments erect ..... 56. *I. cuniculiformis*

- 26b. Flowering stems not developed.
- 28a. Flowers pale to mauve-purple, blotched darker, perianth tube 5.5–6 cm, inner segments erect ..... 57. *I. kemaonensis*
- 28b. Flowers dark violet, obscurely mottled, perianth tube 4–14 cm, inner segments spreading ..... 58. *I. dolichosiphon*
- 6b. Outer perianth segments without a beard or crest.
- 29a. Flowers subtended by a single bract ..... 13. *I. anguifuga*
- 29b. Flowers subtended by 2 or more bracts (spathes).
- 30a. Rhizomes short; plants densely tufted, tufts surrounded by a tough collar of old leaf sheaths.
- 31a. Spathes ovate, inflated.
- 32a. Spathes with transverse veins ..... 23. *I. ventricosa*
- 32b. Spathes without transverse veins ..... 22. *I. bungei*
- 31b. Spathes ± lanceolate, not inflated
- 33a. Flowering stems obvious, emerging above ground.
- 34a. Flowers flat, outer and inner perianth segments spreading ..... 24. *I. farreri*
- 34b. Flowers funnellform, outer perianth segments ascending ..... 25. *I. songarica*
- 33b. Flowering stems not emerging above ground.
- 35a. Flowers yellow with dark violet markings, 3–5 cm in diam. .... 30. *I. kobayashii*
- 35b. Flowers violet or blue.
- 36a. Outer perianth segments very narrow, to 0.8 cm wide.
- 37a. Flowers to 5 cm in diam. (Qinghai) ..... 27. *I. qinghainica*
- 37b. Flowers more than 6 cm in diam. (E China) ..... 29. *I. cathayensis*
- 36b. Outer perianth segments more than 1 cm wide.
- 38a. Leaves ca. 2 mm wide; perianth tube to 8 cm ..... 26. *I. tenuifolia*
- 38b. Leaves ca. 3 mm wide; perianth tube to 14 cm ..... 28. *I. loczyi*
- 30b. Rhizomes elongate; stems and leaf bases usually without a tough collar of old leaf sheaths.
- 39a. Flowers yellow or whitish.
- 40a. Plants small; rhizomes long, slender.
- 41a. Flowers yellow ..... 14. *I. minutoaurea*
- 41b. Flowers white, with yellow signal patch on limb of outer perianth segments ..... 15. *I. odaesanensis*
- 40b. Plants robust; rhizomes stout.
- 42a. Ovary long and slender, apex beaklike.
- 43a. Outer perianth segments with expanded limb, abruptly contracted into narrow claw ..... 20. *I. halophila*
- 43b. Outer perianth segments oblanceolate, gradually narrowed toward base ..... 21. *I. lactea*
- 42b. Ovary short and thick.
- 44a. Flowering stems with several branches; leaves usually more than 1 cm wide (NE China) ..... 8. *I. maackii*
- 44b. Flowering stems simple; leaves less than 1 cm wide (SW China).
- 45a. Inner perianth segments erect; leaves glossy on 1 surface, dull on other; flanges of claw of outer perianth segments inconspicuous ..... 2. *I. forrestii*
- 45b. Inner perianth segments spreading obliquely; leaves dull on both surfaces; flanges of claw of outer perianth segments conspicuous, purple mottled ..... 1. *I. wilsonii*
- 39b. Flowers purplish, bluish, or violet.
- 46a. Plants stemless or with slender flowering stems to 25 cm; flowers to 5.5 cm in diam.
- 47a. Pedicels slender, 2–4 cm, exerted from spathes; spathes several flowered ..... 17. *I. henryi*
- 47b. Pedicels to 1 cm, not exerted from spathes; spathes 1-flowered.
- 48a. Perianth tube 5–7 cm ..... 16. *I. rossii*
- 48b. Perianth tube less than 1.5 cm.
- 49a. Spathes green, lanceolate, soft, membranous, apex finely acuminate ..... 18. *I. ruthenica*
- 49b. Spathes yellowish green, broadly lanceolate, hard, dry, membranous, apex obtuse or subacute ..... 19. *I. uniflora*
- 46b. Plants with stout flowering stems usually more than 25 cm; flowers usually more than 5.5 cm in diam.
- 50a. Inner perianth segments much reduced ..... 12. *I. setosa*
- 50b. Inner perianth segments conspicuous.
- 51a. Leaves with obvious midvein.
- 52a. Leaves narrowly linear, ca. 2 mm wide; spathes membranous, parallel veins not obvious ..... 10. *I. typhifolia*
- 52b. Leaves linear, 5–12 mm wide; spathes leathery, parallel veins obvious ..... 11. *I. ensata*
- 51b. Leaves without obvious midvein.
- 53a. Ovary long and slender, apex beaklike; perianth tube less than 1 cm.
- 54a. Outer perianth segments with expanded limb, abruptly contracted into narrow claw ..... 20. *I. halophila*

- 54b. Outer perianth segments oblanceolate, gradually narrowed toward base ..... 21. *I. lactea*  
 53b. Ovary short and wide; perianth tube more than 1 cm.  
 55a. Flowering stems solid ..... 6. *I. clarkei*  
 55b. Flowering stems hollow.  
 56a. Claw of outer perianth segments with reticulate pattern (NE China) ..... 7. *I. sanguinea*  
 56b. Claw of outer perianth segments without reticulate pattern (mainly SW China).  
 57a. Flowers more than 9 cm in diam.; spathes short and broad, very unequal, apex acute or obtuse; stigma flap 2-lobed (NE China and cultivated) ..... 9. *I. laevigata*  
 57b. Flowers to 9 cm in diam.; spathes long and narrow, subequal, apex very acute; stigma flap triangular (SW China).  
 58a. Plants usually more than 70 cm; flowering stems usually branched ..... 5. *I. delavayi*  
 58b. Plants less than 70 cm; flowering stems simple.  
 59a. Flowers dark violet, limb of outer perianth segments with gold markings at base ..... 3. *I. chrysographes*  
 59b. Flowers paler, bluish to violet, limb of outer perianth segments with white or yellow-tinged patch at center marked with darker veins ..... 4. *I. bulleyana*

**1. *Iris wilsonii*** C. H. Wright, Bull. Misc. Inform. Kew 1907: 321. 1907.

黄花鸢尾 huang hua yuan wei

Rhizomes shortly creeping, thick. Leaves grayish green on both surfaces, linear, 25–55 cm × 5–8 mm, 3–5-veined, base surrounded by persistent fibers. Flowering stems 50–60 cm, hollow, 1- or 2-leaved; spathes 3, green, lanceolate, 6–9(–16) cm × 8–10 mm, 2-flowered, apex long acuminate. Flowers yellow, 6–10 cm in diam.; pedicel 3–11 cm. Perianth tube 0.5–1.2 cm; outer segments with purple-brown stripes and spots, obovate, 6–6.5 × ca. 1.5 cm, claw with conspicuous, dark purple auricles on both sides; inner segments slanting outward, oblanceolate, 4.5–5 cm × ca. 7 mm. Stamens ca. 3.5 cm. Ovary 1.2–1.8 cm. Style branches dark yellow, 4.5–6 cm. Capsule ellipsoid-cylindric, 3–4 × 1.5–2 cm, 6-ribbed, apex not beaked. Seeds brown, semiorbicular. Fl. May–Jun, fr. Jun–Aug.  $2n=40^*$ .

• Forest margins, hillsides, meadows, damp riversides; 2900–4300 m. Gansu, Hubei, Shaanxi, Sichuan, Yunnan.

There continues to be a great deal of confusion among the “Sibericae” irises of SW China, and a thorough revision is needed based on field and laboratory studies. Some of the difficulty arises because species nos. 2–5 were described from cultivated material. It seems to one of us (Noltie), from herbarium specimens, that no distinction can be made between the two yellow-flowered species, *Iris wilsonii* (the earlier described) and *I. forrestii*, and that *I. bulleyana* is merely a purple-flowered form of the same species. *Iris chrysographes* and *I. delavayi* are probably distinct, though very difficult to recognize in the herbarium. The distributions given in the present account should be treated with caution as they are largely based on herbarium material.

**2. *Iris forrestii*** Dykes, Gard. Chron., ser. 3, 47: 418. 1910.

云南鸢尾 yun nan yuan wei

Rhizomes shortly creeping, thick. Leaves grayish green and dull on 1 surface, yellow-green and glossy on other, linear, 11–50 cm × 2–7 mm, midvein absent, base surrounded by persistent fibers. Flowering stems 8–45 cm × 2–3 mm, hollow, 1–3-leaved; spathes 3, green, slightly reddish purple at margin, lanceolate, 5.5–7 × 1–1.2 cm, (1 or)2-flowered, apex acuminate. Flowers yellow, 6.5–7 cm in diam.; pedicel 2–5 cm. Perianth tube ca. 1.3 cm; outer segments obovate, with purple-brown

stripes and spots, claw with inconspicuous auricles; inner segments erect. Stamens ca. 3 cm; anthers brown-yellow. Ovary ca. 2 cm. Style branches pale yellow, 4–4.5 × 1.4–1.6 cm. Capsule ellipsoid, 4–4.5 × 1.5–1.8 cm, 6-ribbed, apex shortly beaked. Seeds semiorbicular. Fl. May–Jun, fr. Jul–Aug.  $2n=40$ .

Marshes in *Pinus* forests, hillsides, meadows, streamsides; 3000–4000 m. Sichuan, Xizang, Yunnan [Myanmar].

**3. *Iris chrysographes*** Dykes, Gard. Chron., ser. 3, 49: 362. 1911.

金脉鸢尾 jin mai yuan wei

Rhizomes shortly creeping, thick. Leaves grayish green on both surfaces, linear, 25–70 cm × 3–12 mm, midvein obscure. Flowering stems 25–50 cm, hollow. Spathes 3, green, lightly tinted reddish purple, lanceolate, 6.5–9 × 0.8–1.5 cm, 2-flowered, apex acuminate. Flowers very dark violet, velvety, 6–9 cm in diam.; outer segments narrowly obovate, limb with golden yellow stripes at base, 5.5–7 × 2.5–3.5 cm; inner segments spreading obliquely, narrowly lanceolate, ca. 6 × 1 cm. Stamens 4–4.5 cm; filaments purple; anthers violet. Ovary 3–3.5 cm × 5–7 mm. Style branches dark purple, 4.5–5 cm × 6–8 mm. Capsule ellipsoid, 4–6 × 1.7–2 cm, 3-angled, apex not beaked. Seeds maroon-brown, semiorbicular. Fl. Jun–Jul, fr. Aug–Oct.  $2n=40^*$ .

Forest margins, hillsides, meadows, streamsides; (1200–)3000–4000 m. Guizhou, Sichuan, Xizang, Yunnan [Myanmar].

**4. *Iris bulleyana*** Dykes, Gard. Chron., ser. 3, 47: 418. 1910.

西南鸢尾 xi nan yuan wei

Rhizomes creeping, thick. Leaves grayish green on both surfaces, linear, 15–45 cm × 3–10 mm, midvein absent, base reddish. Flowering stems 10–40(–70) cm × 4–6 mm, hollow, 2- or 3-leaved; spathes 2 or 3, green, slightly reddish brown at margin, 5.5–12 × 0.8–1.2 cm, (1 or)2-flowered. Flowers pale lilac or bluish violet to dark violet, rarely white, 6.5–7.5 cm in diam.; pedicel 2–6 cm. Perianth tube 1–1.2 cm; outer segments obovate, with darker lines and markings on central, whitish or yellowish patch, 4.5–5 × ca. 2.5 cm; inner segments ± erect, light violet, lanceolate, ca. 4 × 1.5 cm. Stamens ca. 2.5 cm; anthers milky white. Ovary ca. 2 cm. Style branches ca. 3.5 cm.

Capsule cylindrical, 4–5.5 × 1.5–1.8 cm, 3-angled, distinctly 6-veined, apex not beaked, obtuse. Seeds brown, semiorbicular, flat. Fl. Jun–Jul, fr. Aug–Oct.  $2n = 40$ .

Damp hillsides, meadows, streamsides; 2300–4300 m. Sichuan, Xizang, Yunnan [Myanmar].

White-flowered forms, which are restricted to Yunnan, have been recognized as *Iris bulleyana* f. *alba* Y. T. Zhao (Acta Phytotax. Sin. 18: 54. 1980).

**5. *Iris delavayi* Micheli, Rev. Hort. Paris 67: 398. 1895.**

长葶鸢尾 chang ting yuan wei

Rhizomes creeping, thick, ca. 1 cm in diam. Leaves grayish green, reddish at base, sword-shaped or linear, 50–80 × 0.6–1.5 cm, midvein absent, base surrounded by persistent fibers. Flowering stems shortly 1- or 2-branched near apex, 0.6–1.5 m × 5–7 mm, hollow, 3- or 4-leaved; spathes 2 or 3, green, tinted light reddish purple, broadly lanceolate, 7–11 × 1.8–2 cm, 2-flowered, apex acuminate. Flowers dark violet, ca. 9 cm in diam.; pedicel 3–6 cm. Perianth tube 1.6–1.8 cm; outer segments obovate, with central, dark purple- and white-mottled pattern, ca. 7 × 3 cm, apex retuse; inner segments obliquely spreading, oblanceolate, ca. 5.5 cm. Filaments pale purple; anthers milky yellow. Ovary 1.8–2 cm × ca. 7 mm. Style branches pale purple, ca. 5 × 1.6 cm. Capsule cylindrical to ellipsoid, 5–6.5 × 1.5–2.5 cm, 3-angled, apex not beaked. Seeds reddish brown, semiorbicular, flat, ca. 6 mm in diam. Fl. May–Jul, fr. Aug–Oct.  $2n = 40^*$ .

• Forest margins, meadows, damp places along ditches; 2400–4500 m. Guizhou, Sichuan, Xizang, Yunnan.

**6. *Iris clarkei* Baker, Handb. Irid. 25. 1892.**

西藏鸢尾 xi zang yuan wei

*Iris himalaica* Dykes.

Rhizomes creeping, cylindrical. Leaves grayish green and dull on 1 surface, glossy on other, sword-shaped, 30–60 × 0.8–1.8 cm. Flowering stems 2- or 3-branched, 45–90 cm × ca. 5 mm, solid, 2- or 3-leaved; spathes 3, green, broadly lanceolate, 7.5–9 cm, (1 or) 2-flowered. Flowers bluish violet, 7.5–8.5 cm in diam.; pedicel slender, 2.5–3.5 cm. Perianth tube green, ca. 1 cm × 5 mm; outer segments mottled darker on central, whitish patch, obovate, ca. 7 × 2.4–2.8 cm; inner segments obliquely spreading, pale violet, oblanceolate, 4–4.5 × ca. 1 cm. Anthers milky white. Style branches 4–4.5 cm × ca. 5 mm. Capsule oblong-ellipsoid, 3.5–5 × 1.2–2.5 cm, 3-angled, 6-veined. Seeds semiorbicular, flat. Fl. Jun–Jul, fr. Aug–Sep.  $2n = 40$ .

Damp places near streams and lakes; 2300–4300 m. Xizang, W Yunnan [Bhutan, NE India, Myanmar, Nepal, Sikkim].

**7. *Iris sanguinea* Donn ex Hornemann, Hort. Bot. Hafn. 1: 58. 1813.**

溪荪 xi sun

Rhizomes creeping, thick. Leaves linear, 20–60 cm × 5–13 mm, midvein obscure. Flowering stems sometimes with a short branch, 40–60 cm, solid, 1- or 2-leaved; spathes 3, green, often reddish at base, lanceolate, 5–7 × ca. 1 cm, 2-flowered, apex acuminate. Flowers bluish violet or white, 6–7 cm in

diam. Perianth tube 8–10 mm; outer segments obovate, claw with conspicuous, brown reticulate pattern on yellow background; inner segments erect, narrowly obovate, 4–5 × ca. 1.5 cm. Filaments white, ca. 3 cm; anthers yellow. Ovary 1.5–2 cm × 3–4 mm. Style branches ca. 3.5 cm × 5 mm. Capsule ellipsoid-cylindrical, 3.5–5 × 1.2–1.5 cm, 3-angled; fruiting pedicels equal, long. Fl. May–Jun, fr. Jul–Sep.

Damp meadows, sunny pond banks, mountain stream banks, hillsides; ca. 500 m. Heilongjiang, S Jiangsu, Jilin, Liaoning, Nei Mongol [Japan, Korea, Mongolia, Russia].

- 1a. Inner surface of leaf sheaths without silver-white, metallic gloss; flowers bluish violet or white; capsule glabrous ..... 7a. var. *sanguinea*
- 1b. Inner surface of leaf sheaths with silver-white, metallic gloss; flowers dark violet; capsule white pubescent ..... 7b. var. *yixingensis*

**7a. *Iris sanguinea* var. *sanguinea***

溪荪(原变种) xi sun (yuan bian zhong)

*Iris extremorientalis* Koidzumi; *I. nertschinskia* Loddiges; *I. sibirica* Linnaeus var. *orientalis* Baker; *I. sibirica* var. *sanguinea* (Donn ex Hornemann) Ker Gawler.

Inner surface of leaf sheaths without silver-white, metallic gloss. Flowers bluish violet or white, 6–7 cm in diam. Capsule broadly cylindrical, long, 3.5–5 × 1.2–1.5 cm, glabrous.  $2n = 28^*$ .

Damp meadows, sunny pond banks, hillsides; ca. 500 m. Heilongjiang, Jilin, Liaoning, Nei Mongol [Japan, Korea, Mongolia, Russia].

White-flowered forms, which occur in NE Heilongjiang and Japan, have been recognized as *Iris sanguinea* f. *albiflora* Makino (J. Jap. Bot. 6(11): 32. 1930).

**7b. *Iris sanguinea* var. *yixingensis* Y. T. Zhao, Acta Phytotax. Sin. 20: 99. 1982.**

宜兴溪荪 yi xing xi sun

Inner surface of leaf sheaths with silver-white, metallic gloss. Flowers dark violet. Capsule ca. 4.5 × 0.8–1 cm, white pubescent.

• Damp meadows, mountain stream banks. S Jiangsu.

Apparently now extinct.

**8. *Iris maackii* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 26: 541. 1880.**

乌苏里鸢尾 wu su li yuan wei

Rhizomes thick. Leaves grayish green, sword-shaped, 20–45 × 0.7–1.5 cm, midvein not obvious. Flowering stems several branched, more than 80 cm × 6–8 mm; spathes green, narrowly ovate to lanceolate, 4.5–5.5 × ca. 1.5 cm, membranous, 1- or 2-flowered. Flowers yellow, 5–5.5 cm in diam.; pedicel 1–3 cm. Perianth tube ca. 1 cm; outer segments ca. 4 × 1 cm; inner segments erect, narrowly oblanceolate, ca. 2.5 cm × 4 mm. Stamens ca. 2.5 cm; anthers yellow. Ovary ca. 2.5 cm × 2 mm. Style branches ca. 3 cm. Capsule ellipsoid-cylindrical, 6–9 × 1.5–1.8 cm, 6-ribbed, apex shortly beaked. Seeds maroon-brown, flat, ca. 7 × 5 mm. Fl. May, fr. Jun–Aug.

Damp places near ponds and lakes; near sea level to 300 m. E Heilongjiang, Liaoning [Russia (Far East)].

There is a problem with this species, which was described solely on the basis of fruiting material and has been treated as a synonym of *Iris laevigata*. It seems that a large, yellow-flowered species indeed occurs in the far east of Russia; however, further study is needed to determine whether or not it is separable from *I. pseudacorus* Linnaeus.

**9. *Iris laevigata*** Fischer in Fischer & C. A. Meyer, Index Sem. Hort. Petrop. 5: 36. 1839.

燕子花 yan zi hua

*Iris phragmitetorum* Handel-Mazzetti.

Rhizomes creeping, thick, ca. 1 cm in diam. Leaves grayish green, sword-shaped or broadly linear, 40–100 × 0.8–1.5 cm, midvein absent, base surrounded by maroon-brown fibers. Flowering stems 22–60 cm, solid; spathes 3–5, very unequal, 6–8 × 1–1.5 cm, 2–4-flowered, proximal ones shorter, apex usually acute, distal ones longer, apex usually obtuse. Flowers dark blue or violet, 9–10 cm in diam.; pedicel 1.5–3.5 cm. Perianth tube ca. 2 cm; outer segments obovate or elliptic, with a central, white or yellow zone, limb 7.5–9 × 4–4.5 cm; inner segments erect, oblanceolate, 5–6.5 × 0.8–1.5 cm. Stamens ca. 3 cm; anthers white. Ovary ca. 2 cm × 5–7 mm. Style branches 5–6 × ca. 1.2 cm; stigmas 2-lobed. Capsule ellipsoid-cylindric, 6.5–7 × 2–2.5 cm, apex not beaked. Seeds brown, semiorbicular, flat, ca. 6.5 × 5 mm. Fl. May–Jun, fr. Jul–Aug.  $2n = 32, 36^*$ .

Banks of ponds and streams; 400–600 m (1900–3200 m in Yunnan). Heilongjiang, Jilin, Liaoning, Nei Mongol, Yunnan [Japan, Korea, Russia].

It is possible that the specimens from high elevations in Yunnan should be referred to *Iris delavayi*. It seems to one of us (Noltie) that *I. laevigata* in Yunnan is almost certainly only cultivated, though it perhaps becomes naturalized.

**10. *Iris typhifolia*** Kitagawa, Bot. Mag. (Tokyo) 48: 94. 1934.

北陵鸢尾 bei ling yuan wei

Rhizomes creeping. Leaves linear, twisted, 30–40 cm × ca. 2 mm at anthesis, ca. 90 cm × 6 mm in fruit, midvein distinct, base surrounded by persistent fibers, apex long acuminate. Flowering stems 50–60 cm, hollow, 2- or 3-leaved; spathes 3 or 4, green, reddish brown at margin, lanceolate, 5.5–6 × 1–1.2 cm, 2-flowered, apex acuminate. Flowers dark violet, 6–7 cm in diam.; pedicel 1–5 cm. Perianth tube ca. 5 mm; outer segments obovate, 5–5.5 × ca. 2 cm; inner segments erect, oblanceolate, 4.5–5 × 1–1.2 cm, apex retuse. Stamens ca. 3 cm; anthers yellow-brown. Ovary cylindric, 1.5–2 cm × 2–3 mm. Style branches ca. 3.5 × 1–1.2 cm. Capsule ellipsoid, 4.5–5 × 1.2–1.5 cm, 3-angled, 6-veined. Fl. May–Jun, fr. Jul–Sep.

• Damp areas near lakes. W Jilin, Liaoning, Nei Mongol.

**11. *Iris ensata*** Thunberg, Trans. Linn. Soc. London 2: 328. 1794.

玉蝉花 yu chan hua

*Iris ensata* var. *spontanea* (Makino) Nakai; *I. kaempferi* Siebold ex Lemaire; *I. kaempferi* var. *spontanea* Makino; *I. lae-*

*vigata* Fischer var. *kaempferi* (Siebold ex Lemaire) Maximowicz.

Rhizomes creeping, thick. Leaves linear, 30–80 cm × 5–12 mm, midvein distinct on both surfaces, apex acuminate. Flowering stems 25–100 cm, solid, 1–3-leaved; spathes 3, lanceolate, unequal, 4.5–7.5 × 0.8–1.2 cm, leathery, 2-flowered, veins distinct, raised, basal spathe shorter, apex usually acute, apical spathe longer, apex usually obtuse. Flowers dark reddish purple, 9–10 cm in diam.; pedicel 1.5–3.5 cm. Perianth tube 1.5–2 cm; outer segments obovate, mottled yellow at center, 7–8.5 × 3–3.5 cm; inner segments erect, narrowly lanceolate, ca. 5 cm × 5–6 mm. Stamens ca. 3.5 cm; anthers purple. Ovary cylindric, 1.5–2 cm × ca. 3 mm. Style branches purple, ca. 5 cm × 7–10 mm. Capsule ellipsoid, 4.5–5.5 × 1.5–1.8 cm, 6-ribbed, apex shortly beaked. Seeds maroon-brown, semiorbicular, flat. Fl. Jun–Jul, fr. Aug–Sep.  $2n = 24^*$ .

Damp areas along rivers and near lakes; 400–1700 m. Heilongjiang, Jilin, Liaoning, Shandong, Zhejiang [Japan, Korea, Russia].

*Iris ensata* is commonly cultivated in China in a wide range of forms, which have been included under var. *hortensis* Makino & Nemoto.

**12. *Iris setosa*** Pallas ex Link, Jahrb. Gewächsk. 1(3): 71. 1820.

山鸢尾 shan yuan wei

Rhizomes grayish brown, thick. Leaves sword-shaped, 30–60 × 0.8–1.8 cm, midvein absent, base surrounded by maroon-brown fibers. Flowering stems with 1–3 long, slender branches, 60–100 cm; spathes 3, green, ovate to lanceolate, 2–4 × 0.8–1.6 cm, 2-flowered, apex acuminate. Flowers violet or blue, 7–8 cm in diam.; pedicel slender, 2.5–3.5 cm. Perianth tube ca. 1 cm; outer segments broadly obovate, 4–4.5 × 2–2.5 cm, claw yellow, veined purple; inner segments erect, narrowly oblanceolate to subulate, short, ca. 2.5 cm. Stamens ca. 2 cm; anthers purple. Ovary ca. 1 cm. Style branches, ca. 3 × 1.6–2 cm. Capsule ellipsoid to ovoid, ca. 3 × 1.8–2 cm, 6-ribbed, apex not beaked. Seeds pale brown. Fl. Jul, fr. Aug–Sep.  $2n = 34, 36, 38$ .

Wet subalpine meadows, near ponds; 1500–2500 m. E Jilin, [Japan, Korea, Russia; North America (Alaska, E Canada)].

**13. *Iris anguifuga*** Y. T. Zhao & X. J. Xue in Y. T. Zhao, Acta Phytotax. Sin. 18: 56. 1980.

单苞鸢尾 dan bao yuan wei

Rhizomes thick, swollen at apex. Leaves linear, 20–30 cm × 5–7 mm, overwintering, parallel veins 3–6, base surrounded by sheaths and fibers. Flowering stems 30–50 cm, with 3–5 narrowly lanceolate leaves 8–12 cm × ca. 5 mm; spathe solitary, narrowly lanceolate, 10–13.5 cm × ca. 8 mm, 1-flowered. Flowers violet, ca. 10 cm in diam.; pedicel ca. 2.5 cm. Perianth tube ca. 3 cm; outer segments marked with brown lines or dots, fiddle-shaped or oblanceolate, 5–5.5 cm × ca. 8 mm, apex retuse, claw narrow; inner segments marked with bluish brown lines, oblanceolate, 4.5–5 cm × ca. 3 mm. Stamens ca. 2.5 cm; anthers bright yellow. Style branches 4.5–5 cm × ca. 6 mm. Capsule fusiform, 5.5–7 × 1.5–2 cm, 3-angled, yellowish brown pubescent, apex long beaked. Seeds globose, 4–5 mm in diam. Fl. Mar–Apr, fr. May–Jul.  $2n = 22^*$ .

• Hillsides, grasslands. Anhui, Guangxi, Hubei.

**14. *Iris minutoaurea*** Makino, J. Jap. Bot. 5: 17. 1928.

小黄花鸢尾 xiao huang hua yuan wei

*Iris minuta* Franchet & Savatier, Enum. Pl. Jap. 2: 42, 521. 1879, not Linnaeus f. (1782).

Rhizomes yellowish brown, long, slender. Roots much branched and matted, slender. Leaves narrowly linear, 5–16 cm × 2–7 mm, veins 3–5, midvein absent, apex acuminate. Flowering stems 7–10 cm, slender; spathes 2, lanceolate, 4–5 cm × 5–10 mm, 1-flowered, apex shortly acuminate. Flowers yellow, 2.5–3 cm in diam.; pedicel 1.5–2.5 cm, slender. Perianth tube 1.5–2 cm, slender; outer segments spreading, obovate, ca. 2.2 cm × 8 mm; inner segments erect, small, limb oblong, ca. 1.5 cm × 3–4 mm, apex obtuse and retuse, claw brown, very narrow. Stamens ca. 1 cm; anthers yellowish brown. Ovary ca. 1 cm × 2–3 mm. Style branches ca. 1.5 cm × 3 mm. Capsule globose. Fl. May, fr. Jun–Jul.  $2n = 22$ .

Forest margins, grassy hillsides. SE Liaoning [Japan, Korea].

**15. *Iris odaesanensis*** Y.N. Lee, Korean J. Bot. 17(1): 33. 1974.

朝鲜鸢尾 chao xian yuan wei

Rhizomes long, slender, stoloniferous. Leaves glaucous, 11–25 × 0.8–1.1 cm, elongating to 35 cm after anthesis, 10–12-ribbed. Flowering stems 9–13 cm; spathes 2, lanceolate, 3.3–6.2 × 0.1–0.4 cm, 2-flowered. Flowers white, 3–4 cm in diam.; pedicel long. Perianth tube short, 1–5 mm; limb of outer segments spreading, with central, yellow signal patch spreading into claw, obovate, 1.8–2.4 × 1–1.6 cm, apex rounded; inner segments white, obovate, 1.4–1.9 cm × 6–9 mm. Stamens 1–1.4 cm. Style branches white, linear, 1.5–2 cm × 3–4 mm. Capsule ovoid, 2.3–2.7 × 1.2–1.5 cm, strongly 3-angled, apex shortly beaked; fruiting pedicel long. Fl. Apr–May, fr. Jun–Jul.

Forest margins, meadows, damp hillsides along ditches; ca. 1500 m. Jilin [Korea].

**16. *Iris rossii*** Baker, Gard. Chron., n.s., 8: 809. 1877.

长尾鸢尾 chang wei yuan wei

Rhizomes creeping, slender, tough. Roots reddish maroon, long, slender, tough. Leaves linear or narrowly so, 4–10 cm × 2–5 mm, veins 2–4, base surrounded by yellow-brown, persistent sheaths and fibers, apex long acuminate. Flowering stems barely emerging above ground, with 2 or 3 linear leaves at base; spathes 2, narrowly lanceolate, 4–7 cm × 5–8 mm, 1-flowered, apex long acuminate. Flowers violet, 3.5–4 cm in diam.; pedicel ca. 1 cm. Perianth tube 5–7 cm, slender; outer segments spreading, obovate, ca. 3 × 0.8–1.2 cm; inner segments erect or inclined outward, oblong, narrowed into slender claw, ca. 2.5 cm × 8 mm. Stamens ca. 1.5 cm; anthers shorter than filaments. Ovary ca. 1 cm. Style branches ca. 2 cm. Capsule globose. Fl. Apr–May, fr. Jun–Aug.  $2n = 32$ .

Meadows at forest margins, sunny hillsides; ca. 100 m. E Liaoning [Japan, Korea].

**17. *Iris henryi*** Baker, Handb. Irid. 6. 1892.

长柄鸢尾 chang bing yuan wei

*Iris gracilipes* Pampanini (1915), not A. Gray (1858).

Rhizomes creeping, reddish brown, very slender. Leaves pale green, narrowly linear, 15–40 cm × ca. 2 mm, veins 1 or 2. Flowering stems slender, 9–25 cm, 1- or 2-leaved; spathes 2 or 3, green, narrowly lanceolate, 3–4 cm, 2-flowered, apex acuminate. Flowers white or pale violet, 2.5–3 cm in diam.; pedicel 2–4 cm, slender. Perianth tube short, 3–5 mm; outer segments marked yellow proximally, obovate, ca. 2 cm × 7 mm; inner segments obovate, smaller than outer, claw short. Stamens ca. 1 cm; anthers linear. Ovary 5–7 mm. Style branches ca. 1 cm. Capsule not seen. Fl. Apr–May, fr. Jun–Aug.

• Forest margins, grasslands in forests, grassy slopes on hot dry mountains; 1800–1900 m. Anhui, Gansu, Hubei, Hunan, Sichuan.

**18. *Iris ruthenica*** Ker Gawler, Bot. Mag. 28: t. 1123. 1808.

紫苞鸢尾 zi bao yuan wei

*Iris ruthenica* var. *brevituba* Maximowicz; *I. ruthenica* var. *nana* Maximowicz.

Rhizomes creeping, branched, 3–5 mm in diam. Roots fibrous. Leaves green or grayish green, linear, 7–25 cm × 1–3 mm, parallel veins 3–5, base surrounded by maroon-brown fibers, apex long acuminate. Flowering stems 2–20 cm, slender, 2- or 3-leaved; spathes 2, green, reddish purple at margin, lanceolate or broadly so, 2–3.5 cm × 8–10 mm, 1-flowered. Flowers violet, 3–5.5 cm in diam.; pedicel 6–10 mm. Perianth tube 0.5–1.5 cm; outer segments with white- and deep purple-mottled patterns, oblanceolate, ca. 4 cm × 8–10 mm; inner segments erect, narrowly oblanceolate, 3.2–3.5 cm × ca. 6 mm. Stamens ca. 2.5 cm; anthers milky white. Ovary ca. 1 cm. Style branches 3.5–4 cm. Capsule globose to ovoid, 1.2–1.5 cm, 6-veined, apex not beaked. Seeds globose or pyriform, with milky white aril. Fl. May–Jun, fr. Jul–Aug.  $2n = 84$ .

*Pinus* forests, grasslands, hillsides, sunny sandy places; 1800–3600 m. Anhui, Gansu, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang, Yunnan [Kazakhstan, Korea, Mongolia, Russia; E Europe].

*Iris ruthenica* is very variable and grades into *I. uniflora*. *Iris ruthenica* var. *nana* is said to have flowering stems only 5–5.5 cm, but, according to one of us (Noltie), the type of *I. ruthenica* is a similarly small plant, so var. *nana* cannot be maintained as distinct. *Iris ruthenica* var. *brevituba*, with a short perianth tube, is similarly not worth maintaining. White-flowered forms have been recognized as *I. ruthenica* f. *leucantha* Y. T. Zhao (Acta Phytotax. Sin. 18: 56. 1980).

**19. *Iris uniflora*** Pallas ex Link, Jahrb. Gewächsk. 1(3): 71. 1820.

单花鸢尾 dan hua yuan wei

*Iris ruthenica* Ker Gawler var. *uniflora* (Pallas ex Link) Baker.

Rhizomes creeping, branched, brown. Roots fibrous. Leaves linear, 5–20 cm × 4–10 mm at anthesis, 30–40 × 1–1.5 cm in fruit, midvein absent, base surrounded by brown, persistent fibers. Flowering stems slender, 1-leaved; spathes 2, yellowish green, with slightly reddish margin, broadly lanceolate, 2–3.5 cm × 8–10 mm, membranous, 1-flowered, apex obtuse.

Flowers violet, 4–4.5 cm in diam. Perianth tube ca. 1.5 cm; outer segments narrowly oblanceolate, ca. 3 cm × 8 mm; inner segments erect, narrowly lanceolate, ca. 3 cm × 3 mm. Stamens ca. 1.5 cm. Ovary ca. 5 mm. Capsule globose, 8–10 mm in diam., 6-ribbed. Fl. May–Jun, fr. Jul–Aug.

Forest margins, dry grasslands, hillsides, roadsides. Heilongjiang, Jilin, Liaoning, Nei Mongol [Korea, Mongolia, Russia].

*Iris uniflora* is almost certainly merely a variety of *I. ruthenica*, as treated by Baker (Handb. Irid. 4. 1892). A form with narrow leaves (2–6 mm wide at anthesis, ca. 10 mm wide in fruit) was described as *I. uniflora* var. *caricina* Kitagawa (Bot. Mag. (Tokyo) 49: 232. 1935), but it is scarcely worth recognizing.

**20. *Iris halophila* Pallas, Reise Russ. Reich. 3: 713. 1776.**

喜盐鸢尾 xi yan yuan wei

Rhizomes purple brown, thick, 1.3–3 cm in diam. Roots thick. Leaves erect or slightly curved, grayish green, sword-shaped, 20–60 × 1–2 cm, midvein absent. Flowering stems with 1–4 very short, lateral branches, thick, 20–40 cm × ca. 5 mm; spathes 3, green, 5.5–9 × ca. 2 cm, 2-flowered. Flowers yellow or violet, 5–7 cm in diam.; pedicel 1.5–3 cm. Perianth tube ca. 1 cm; outer segments fiddle-shaped, with a constriction between claw and limb, claw 2–3 × ca. 0.5 cm, limb oblong or oblanceolate, ca. 1.5 × 1 cm; inner segments oblanceolate, ca. 3.5 cm × 6–8 mm. Stamens ca. 3 cm; anthers yellow. Ovary 3.5–4 cm, distally attenuate into a long, slender beak. Style branches ca. 3.5 cm × 6 mm. Capsule greenish brown, ellipsoid-cylindric, 6–9 × 2–2.5 cm, with a pair of ridges at each angle, apex long beaked. Seeds pyriform, 5–6 mm in diam.; testa yellowish maroon, glossy, papery. Fl. May–Jun, fr. Jul–Aug.

Grasslands, hillsides, wet salty soils. Gansu, Xinjiang [Afghanistan, Kyrgyzstan, Mongolia, Pakistan, Russia, Uzbekistan; SW Asia, E Europe (Romania, Ukraine)].

One or two varieties occur in China; they are often treated as varieties or subspecies of the widespread *Iris spuria* Linnaeus.

- 1a. Flowers yellow ..... 20a. var. *halophila*  
1b. Flowers violet, or claw yellow ..... 20b. var. *sogdiana*

**20a. *Iris halophila* var. *halophila***

喜盐鸢尾(原变种) xi yan yuan wei (yuan bian zhong)

*Iris desertorum* Gueldenstaedt; *I. gueldenstaediana* Lepechin; *I. spuria* Linnaeus subsp. *halophila* (Pallas) B. Mathew & Wendelbo; *I. spuria* var. *halophila* (Pallas) Sims.

Flowers yellow.  $2n = 44, 66, 88$ .

Grasslands, hillsides, wet salty soils. Gansu, Xinjiang [Afghanistan, Mongolia, Russia; SW Asia, E Europe (Romania, Ukraine)].

**20b. *Iris halophila* var. *sogdiana* (Bunge) Grubov, Novosti Sist. Nizsh. Rast. 6: 30. 1970.**

蓝花喜盐鸢尾 lan hua xi yan yuan wei

*Iris sogdiana* Bunge, Mém. Acad. Imp. Sci. St.-Petersbourg Divers Savans 7: 507. 1851.

Flowers violet, or claw yellow.  $2n = 44$ .

?Gansu, ?Xinjiang [Afghanistan, Kyrgyzstan, Pakistan, Russia,

Uzbekistan; SW Asia (Iran)].

Records of this variety from China require confirmation.

**21. *Iris lactea* Pallas, Reise Russ. Reich. 3: 713. 1776.**

白花马蔺 bai hua ma lin

Rhizomes sheathed with reddish purple fibers, creeping, thick. Leaves basal, grayish green, linear, 14–70 cm × 3–7 mm, tough, drying prominently ribbed, midvein absent. Flowering stems 3–30 cm; spathes green, lanceolate, 4.5–10 × 0.8–1.6 cm, 2–4-flowered, apex acuminate. Flowers pale violet, or partly milky white or yellow, 5–7.5 cm in diam.; pedicel 4–7 cm. Perianth tube very short, ca. 3 mm; outer segments oblanceolate, 4.5–6.5 × 0.8–1.2 cm, apex obtuse or mucronate; inner segments erect, narrowly oblanceolate, 4.2–4.5 cm × 5–7 mm. Stamens 2.5–3.2 cm; anthers yellow. Ovary narrowly fusiform, very long, 3–4.5 cm, grooved. Capsule narrowly cylindric, 6.5–7.5 × 1–1.4 cm, 6-ribbed, apex shortly beaked; fruiting pedicels unequal, 4–10 cm. Seeds maroon-brown, pyriform. Fl. Apr–Jun, fr. Jun–Sep.

Hillsides, grasslands, roadsides; 600–3800 m. Anhui, Gansu, Hebei, Heilongjiang, Henan, Hubei, Jiangsu, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang, Xizang [Afghanistan, N India, Kazakstan, Korea, Mongolia, Pakistan, Russia].

- 1a. Outer perianth segments pale violet, or milky white with purple veins, inner segments pale violet ..... 21a. var. *lactea*  
1b. Outer perianth segments pale violet, inner segments yellow ..... 21b. var. *chrysantha*

**21a. *Iris lactea* var. *lactea***

白花马蔺(原变种) bai hua ma lin (yuan bian zhong)

*Iris biglumis* Vahl; *I. ensata* Thunberg var. *chinensis* (Fischer) Maximowicz; *I. iliensis* Poljakov; *I. lactea* var. *chinensis* (Fischer) Koidzumi; *I. longispatha* Fischer; *I. pallasii* Fischer var. *chinensis* Fischer.

Outer perianth segments pale violet, or milky white with purple veins; inner segments pale violet.  $2n = 40^*, 50^*$ .

Hillsides, grasslands, roadsides; 600–3800 m. Anhui, Gansu, Hebei, Heilongjiang, Henan, Hubei, Jiangsu, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang, Xizang [Afghanistan, N India, Kazakstan, Korea, Mongolia, Pakistan, Russia].

**21b. *Iris lactea* var. *chrysantha* Y. T. Zhao, J. Pl. Res. Lab. N. E. Forest. Coll. 9: 76. 1980.**

黄花马蔺 huang hua ma lin

Outer perianth segments pale violet; inner segments yellow.

- Plateau grasslands; ca. 3000 m. Xizang.

**22. *Iris bungei* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 26: 509. 1880.**

大苞鸢尾 da bao yuan wei

Plants densely tufted. Rhizomes knobby, woody. Leaves linear, 20–50 cm × 2–4 mm, veins 4–7, base surrounded by maroon-brown, 10–13 cm long, persistent sheaths. Flowering stems

not or only slightly emerging above ground, 12–15 cm; spathes 3, green, ovate, 8–10 × 3–4 cm, inflated, 2-flowered, transverse veins absent. Flowers pale violet, 5–7 cm in diam.; pedicel ca. 1.5 cm. Perianth tube filiform, 6–7 cm; outer segments oblong-ob lanceolate, 5–6 × 1.2–1.5 cm; inner segments erect, narrowly oblanceolate, 5–5.5 cm × 8–10 mm. Stamens ca. 3 cm. Ovary 4–4.5 cm. Style branches 5–5.5 cm. Capsule narrowly cylindrical, 8–9 × 1.5–2 cm, 6-veined, apex long beaked. Fl. May–Jun, fr. Jul–Aug.

Sandy grasslands, deserts, dunes. Gansu, Nei Mongol, Ningxia, Shanxi [Mongolia].

**23. *Iris ventricosa*** Pallas, Reise Russ. Reich. 3: 712. 1776.

囊花鸢尾 nang hua yuan wei

Rhizomes knobbly, woody. Roots tough. Leaves grayish green, linear, 20–50 cm × 3–4 mm, few veined, base surrounded by brown, persistent sheaths. Flowering stems 10–15 cm; spathes 3, yellowish green, ovate or broadly lanceolate, 6–8 × 2.5–4 cm, inflated, 2-flowered, transverse veins conspicuous between parallel veins, apex long acuminate. Flowers pale violet, 6–7 cm in diam.; pedicel 1–1.5 cm. Perianth tube 2.5–4 cm, slender; outer segments narrowly spatulate, 3.5–5 cm × 8–10 mm, midvein papillose; inner segments narrowly lanceolate or broadly linear, 3.5–4 cm × 7–8 mm. Stamens 3–3.5 cm; anthers yellowish purple. Ovary ca. 1.5 cm × 2.5–3 mm. Style branches 3.5–3.8 cm × ca. 6 mm. Capsule ellipsoid-cylindrical, 2.5–4 × ca. 1 cm, 3-angled, 6-veined, angles thickened, apical beak 2–4.5 cm. Fl. May, fr. Jul–Aug.

Sandy grasslands, dunes. Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Qinghai, Xinjiang [Mongolia, Russia].

**24. *Iris farreri*** Dykes, Gard. Chron., ser. 3, 57: 175. 1915.

多斑鸢尾 duo ban yuan wei

*Iris polysticta* Diels; *I. songarica* Schrenk ex Fischer & C. A. Meyer var. *gracilis* Maximowicz.

Plants densely tufted. Rhizomes knobbly, woody. Leaves grayish green, narrowly sword-shaped or linear, 17–70 cm × 2–8 mm, midvein absent, base surrounded by reddish purple, persistent sheaths and fibers. Flowering stems 10–40 cm × ca. 7 mm, 1- or 2-leaved; spathes 3, green, lanceolate, 7.5–12 × 1.6–2.5 cm, 2-flowered. Flowers whitish and violet, flattish, 7.5–9 cm in diam.; pedicel 4.5–9 cm. Perianth tube ca. 0.3 cm; outer segments spreading, fiddle-shaped, claw white or yellowish tinged, purple reticulate veined, oblong, 2.5–3 × 0.5–0.7 cm, limb whitish veined purple at center, violet at margin, oblanceolate, ca. 1.5 × 0.9 cm; inner segments spreading, violet, oblanceolate, 3.3–4.5 cm × 7–8 mm. Anthers pinkish, ca. 3 cm. Ovary distally attenuate into beak ca. 1 cm. Style branches violet, 3.5–4 cm. Capsule cylindrical, 3.5–7 × ca. 1.6 cm, apex beaked. Fl. Jun–Aug, fr. Jul–Sep.

• Open *Picea* forests, meadows, sunny banks and damp places near riversides; 2500–3700 m. Gansu, Qinghai, Sichuan, Xizang, Yunnan.

**25. *Iris songarica*** Schrenk ex Fischer & C. A. Meyer, Enum. Pl. Nov. 1: 3. 1841.

准噶尔鸢尾 zhun ga er yuan wei

Plants densely tufted. Rhizomes knobbly. Leaves grayish green, linear, 15–23 cm × 2–3 mm at anthesis, 70–80 cm × 7–10 mm in fruit, base surrounded by maroon-brown, persistent sheaths. Flowering stems 25–50 cm, glabrous, 3- or 4-leaved; spathes 3, green, 7–14 × 1.8–2 cm, 2-flowered, apex shortly acuminate. Flowers violet, funnellform, 8–9 cm in diam.; pedicel ca. 4.5 cm. Perianth tube 5–7 mm; outer segments ascending, fiddle-shaped, 5–5.5 × ca. 1 cm, limb ovate or elliptic; inner segments erect, oblanceolate, ca. 3.5 cm × 5 mm. Stamens ca. 2.5 cm; anthers brown. Ovary ca. 2.5 cm. Style branches ca. 3.5 × 1 cm. Capsule ovoid to cylindrical, 4–6.5 × 1.5–2 cm, leathery, 3-angled, reticulate veined, apex long beaked. Seeds maroon-brown, pyriform. Fl. Jun–Jul, fr. Aug–Sep.

Sunny grasslands, stony hillsides. ?Gansu, ?Ningxia, ?Qinghai, ?Shaanxi, ?Sichuan, Xinjiang [Afghanistan, Kazakhstan, Pakistan, Russia, Tajikistan, Turkmenistan, Uzbekistan; SW Asia (Iran)].

One of us (Noltie) suspects that Chinese records of *Iris songarica*, except those from Xinjiang, in fact refer to *I. farreri*, as does some of the description above. Zhao differentiates the two species mainly on flower color, which is no doubt variable. Noltie considers the shape of the flower to be much more important, being flattish in *I. farreri* but funnellform in the C Asian *I. songarica*.

**26. *Iris tenuifolia*** Pallas, Reise Russ. Reich. 3: 714. 1776.

细叶鸢尾 xi ye yuan wei

Rhizomes dark brown, knobbly, woody. Roots tough. Leaves grayish green, linear, twisted, 20–60 cm × 1.5–2 mm, midvein absent, base surrounded by reddish brown, persistent sheaths. Flowering stems not emerging above ground; spathes 3 or 4, lanceolate, 5–10 cm × 8–10 mm, 2- or 3-flowered, apex long acuminate. Flowers pale violet, 4–7 cm in diam.; pedicel slender, 3–4 mm. Perianth tube filiform, 4.5–8 cm; outer segments white tinged yellow at center, veined darker, violet at margin, spatulate, 4.5–6 × ca. 1.5 cm, papillose along midvein; inner segments erect, oblanceolate, ca. 5 cm × 5–9 mm. Stamens ca. 3 cm. Ovary cylindrical, 7–12 × ca. 2 mm. Style branches ca. 4 cm × 4–5 mm. Capsule ovoid, 3.2–4.5 × 1.2–1.8 cm, apex shortly beaked. Fl. Apr–May, fr. Aug–Sep.  $2n = 14^*$ .

Grassy slopes, fixed dunes, sandy and gravelly soil; 1300–3700 m. Gansu, Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Xinjiang, Xizang [Afghanistan, Kazakhstan, Mongolia, Pakistan, Russia].

**27. *Iris qinghainica*** Y.T.Zhao, Acta Phytotax. Sin. 18: 55. 1980.

青海鸢尾 qing hai yuan wei

Rhizomes knobbly. Leaves grayish green, linear, 5–25 cm × 2–3 mm, midvein absent, base surrounded by maroon-brown fibers. Flowering stems not emerging above ground; spathes 3, green, lanceolate, 6–10 × 0.6–1.8 cm, 1- or 2-flowered. Flowers violet, 4.5–5 cm in diam. Perianth tube filiform, 3–6 cm; outer segments narrowly oblanceolate, limb spreading, 3–3.5 cm × 5–8 mm; inner segments narrowly oblanceolate, ca. 3 cm × 4 mm. Stamens 1.8–2 cm. Ovary ca. 1.5 cm. Style branches ca. 2.5 cm × 3 mm. Capsule not seen. Fl. Jun–Jul, fr. Jun–Aug.

• Sunny grasslands, mountainsides, loess hills; 2500–3100 m. SW Gansu, NE Qinghai.

**28. *Iris loczyi*** Kanitz, Bot. Resl. Szech. Cent. As. Exped. 58. 1891.

天山鸢尾 tian shan yuan wei

*Iris tenuifolia* Pallas var. *thianschanica* Maximowicz; *I. thianschanica* (Maximowicz) Vvedensky.

Plants forming hard tussocks. Rhizomes knobbly. Leaves linear, 20–40 cm × ca. 3 mm, rigid, midvein absent, base surrounded by maroon-brown, persistent sheaths. Flowering stems not or only slightly emerging above ground; spathes 3, 10–15 × ca. 1.5 cm, 1- or 2-flowered, midvein distinct, apex acuminate. Flowers pale violet, veined darker, 5.5–7 cm in diam. Perianth tube filiform, to 14 cm; outer segments oblanceolate or narrowly obovate, ca. 6 × 1–2 cm; inner segments oblanceolate, 4.5–5 cm × 7–8 mm. Stamens ca. 2.5 cm. Ovary ca. 1.2 cm. Style branches ca. 4 cm × 8 mm. Capsule subsessile, reddish brown, ovoid to cylindrical, 4–7 × ca. 2 cm, 6-veined, apex shortly beaked. Fl. May–Jun, fr. Jul–Sep.

Sunny grasslands, hillsides. Gansu, Nei Mongol, Ningxia, Qinghai, Sichuan, Xinjiang, Xizang [Afghanistan, Mongolia, Russia, Tajikistan; SW Asia (Iran)].

This species has usually been considered to be restricted to C Asia, and would therefore be expected to occur in China only in Xinjiang and W Xizang. Two of us (Noltie and Mathew) have seen no material from China, so the records from the other, more eastern provinces should be viewed with caution and are likely to refer to the doubtfully separable *Iris tenuifolia*.

**29. *Iris cathayensis*** Migo, J. Shanghai Sci. Inst., Sect. 3, 4: 140. 1939.

华夏鸢尾 hua xia yuan wei

Leaves grayish green, linear, 15–25 cm × 3–4 mm at anthesis, ca. 45 cm × 6 mm in fruit, midvein absent, base surrounded by maroon-red, persistent sheaths. Flowering stems not emerging above ground; spathes 3 or 4, green, lanceolate, 8–12 × 1.2–2 cm, 2-flowered, midvein distinct, apex acuminate. Flowers violet 6–7.5 cm in diam.; pedicel filiform, 1.5–2 cm. Perianth tube 7–9 cm, slender, apex somewhat expanded; outer segments narrowly oblanceolate, 4–5.5 cm × ca. 5 mm; inner segments narrowly oblanceolate, 4–5 cm × ca. 5 mm, sparsely papillose along midvein. Stamens 2.8–3.5 cm; anthers blue. Ovary 1.3–1.5 cm. Style branches linear, 3.5–4 cm × ca. 3 mm. Capsule not seen. Fl. Apr, fr. Jun–Aug.

• Open hillsides, grasslands. Anhui, Hubei, Jiangsu, Zhejiang.

**30. *Iris kobayashii*** Kitagawa, J. Jap. Bot. 9: 249. 1933.

矮鸢尾 ai yuan wei

Rhizomes short, stout, woody. Leaves linear, slightly twisted, 10–20 cm × ca. 3 mm, midvein absent, base surrounded by yellowish brown, persistent sheaths. Flowering stems not emerging above ground; spathes 2 or 3, narrowly lanceolate, 6–8 cm × 8–10 mm, 2-flowered, apex long acuminate. Flowers yellow, purple spotted, 3–5 cm in diam.; pedicel ca. 1 cm. Perianth tube 4–5 cm, slender; outer segments narrowly oblanceolate, ca. 3 cm × 5 mm, limb spreading; inner segments erect,

narrowly oblanceolate, ca. 2 cm × 2–3 mm. Stamens 1.5–1.8 cm; anthers yellowish or purplish. Ovary ca. 1 cm. Style branches shorter and narrower than perianth segments. Capsule ellipsoid, ca. 2 cm × 7–8 mm, 6-ribbed, apex shortly beaked. Fl. May, fr. Jun–Aug.

• Dry hillsides. S Liaoning.

An endangered species.

**31. *Iris decora*** Wallich, Pl. Asiat. Rar. 1: 77. 1830.

尼泊尔鸢尾 ni bo er yuan wei

*Iris nepalensis* D. Don; *I. yunnanensis* H. Léveillé; *Junopsis decora* (Wallich) W. Schulze.

Plants densely tufted, with small growing point. Roots swollen, fusiform, tuberous. Leaves linear, 10–35(–60) cm × 2–8 mm, veins 2 or 3, base surrounded by brown fibers. Flowering stems sometimes shortly 1-branched, 10–25 cm × 2–3 mm; spathes 3, green, lanceolate, 4.5–9.5 cm, 2-flowered. Flowers violet or pale blue, 2.5–6 cm in diam. Perianth tube 2.5–3 cm; outer segments spreading, obovate, 2.5–4 × 0.8–1.8 cm, crest central, yellow, low, undulate; inner segments erect, narrowly elliptic, 2.5–4 × 0.5–1.2 cm. Stamens 1.5–2.5 cm; anthers yellowish white. Style branches 2–3.5 cm. Capsule ellipsoid to ovoid, 2–3.5 × ca. 1 cm, apex shortly pointed. Fl. Jun, fr. Jul–Aug.  $2n = 24$ .

Grassy hillsides on plateaus, open stony pastures, cliffs; 2800–3100 m. Sichuan, Xizang, Yunnan [Bhutan, N India, Nepal].

White-flowered forms from Yunnan have been described as *Iris decora* var. *leucantha* X. D. Dong & Y. T. Zhao (Bull. Bot. Res., Harbin 18: 150. 1998). Much further work needs to be undertaken on the *I. decora* group. According to one of us (Noltie), true *I. decora* is a large plant probably restricted to Bhutan, Nepal, and S Xizang. The plant commonly occurring in China is much smaller and grades into *I. collettii*.

**32. *Iris collettii*** J. D. Hooker, Bot. Mag. 129: t. 7889. 1903.

高原鸢尾 gao yuan yuan wei

Plants densely tufted, with small growing point. Roots swollen, fusiform, tuberous. Leaves basal, grayish green, linear or sword-shaped, 10–27 cm × 2–7 mm at anthesis, 20–35 cm × 3–9 mm in fruit, veins 2 or 3, base surrounded by brown fibers. Flowering stems simple, 2–8 cm or not developed; spathes 3, green, lanceolate, 2–5 cm, 2–4-flowered, apex acuminate. Flowers violet, 2–5 cm in diam. Perianth tube slender, 3–5 cm; outer segments spreading, elliptic-obovate, 2.5–3 cm, crest orange, low, undulate; inner segments erect, oblanceolate, 1.7–2.7 cm. Stamens ca. 1.3 cm; anthers yellow. Style branches ca. 2 cm. Capsule green, ovoid, 1.5–2.5 × 1.3–1.5 cm, apex shortly beaked. Seeds black-brown, arillate. Fl. May–Jun, fr. Jul–Aug.  $2n = 28$ .

Open *Pinus* and *Quercus-Pinus* forests, sunny dry grasslands on plateaus; 1700–3700 m. Sichuan, Xizang, Yunnan [NE India, Myanmar, ?Nepal, Thailand, Vietnam].

1a. Flowering stems developed, 2–8 cm ..... 32a. var. *collettii*  
1b. Flowering stems not developed ..... 32b. var. *acaulis*

**32a. *Iris collettii*** var. *collettii*

高原鸢尾(原变种) gao yuan yuan wei (yuan bian zhong)

*Iris duclouxii* H. Léveillé.

Flowering stems developed, 2–8 cm.

Open *Pinus* forests, sunny dry grasslands on plateaus; 1700–3500 m. Sichuan, Xizang, Yunnan [NE India, Myanmar, ?Nepal, Thailand, Vietnam].

**32b. *Iris collettii* var. *acaulis*** Noltie, *New Plantsman* 2: 136. 1995.

大理鸢尾 da li yuan wei

*Iris daliensis* X. D. Dong & Y. T. Zhao.

Flowering stems not developed.

• *Quercus-Pinus* forests; 2200–3700 m. Sichuan, Yunnan.

Until work on the *Iris decora* group has been completed, it seems unwise to recognize *I. daliensis* at the rank of species.

**33. *Iris barbatula*** Noltie & K. Y. Guan in Noltie, *New Plantsman* 2: 137. 1995.

小髯鸢尾 xiao ran yuan wei

Plants densely tufted, with small growing point. Roots swollen, fusiform, tuberous. Leaves linear, slightly curved, 9–19 cm × 2–5 mm at anthesis, to 30 × 1 cm in fruit, stiff, thickened veins 2 on 1 surface, 1 on other, base surrounded by brown fibers, apex finely acuminate. Flowering stems simple, not developed or to 4 cm; spathes 3, green, lanceolate, 2–4-flowered, longest one 2–6 cm. Flowers dark violet, 2–7 cm in diam. Perianth tube pale green, 3–10 cm, slender; outer segments oblanceolate, 3–5.2 × 0.7–1.3 cm, limb spreading, with white streaks radiating from a central, yellow, fimbriate crest; inner segments spreading, sometimes streaked white at base of limb, narrowly oblanceolate, 2.7–5 × 0.6–1 cm. Stamens ca. 2 cm; anthers cream. Style branches 3–4 cm; terminal lobes erect. Capsule ellipsoid, 2–2.5 × ca. 1.2 cm. Seeds pyriform, arillate. Fl. May–Jul, fr Sep.

• Grassy plateaus; 2400–3600 m. Yunnan.

**34. *Iris latistyla*** Y. T. Zhao, *Acta Phytotax. Sin.* 18: 61. 1980.

宽柱鸢尾 kuan zhu yuan wei

Rhizomes indistinct. Roots fleshy. Leaves grayish green, narrowly linear, 15–25 cm × 2–3 mm, veins 2 or 3, base surrounded by brown fibers. Flowering stems simple or 1-branched, 6–14 cm; spathes 3, green, narrowly lanceolate, 2.5–4.5 cm × 6–8 mm, 2-flowered, apex acuminate. Flowers violet, ca. 5 cm in diam. Outer perianth segments obovate, limb 3.5–4 × ca. 1.5 cm, with a crest; inner segments narrowly ovate or broadly lanceolate, ca. 3.5 × 1.5 cm. Style branches broad, ca. 4 × 1.5 cm; terminal lobes incurved toward center of flower. Fl. May–Jun, fr. Jul–Sep.

• Forest margins, grasslands near rice fields; 3100–4000 m. SE Xizang.

Two of us (Noltie and Mathew) have not seen the type of *Iris latistyla*, and consider the taxon to be doubtfully distinct from *I. decora*.

**35. *Iris dichotoma*** Pallas, *Reise Russ. Reich.* 3: 712. 1776.

野鸢尾 ye yuan wei

*Pardanthopsis dichotoma* (Pallas) Lenz.

Rhizomes erect, brown, very short, stout. Roots long, thick. Leaves in basal fans and alternate on flowering stems proximally, grayish green, sword-shaped, slightly curved, 15–35 × 1.5–3 cm, midvein absent. Flowering stems dichotomously branched, 40–60 cm, leafy; spathes 4 or 5, green, lanceolate, 1.5–2.3 cm, 3- or 4-flowered, apex obtuse. Flowers violet, pale blue, or cream with purplish brown markings, 4–4.5 cm in diam., spiralling after anthesis; pedicel exerted from spathes, 2–3.5 cm, stiff, persistent. Perianth tube extremely short; outer segments broadly oblanceolate, 3–3.5 × ca. 1 cm, claw striped with yellowish brown, limb with darker spots on a central, pale patch; inner segments narrowly obovate, ca. 2.5 cm × 6–8 mm, apex retuse. Stamens 1.6–1.8 cm. Ovary green, ca. 1 cm. Style branches flat, ca. 2.5 cm. Capsule yellowish green, cylindric, 3.5–5 × 1–1.2 cm. Seeds dark brown, elliptic, with small wings. Fl. Jul–Aug, fr. Aug–Sep.  $2n = 32^*$ .

*Quercus* forests, sandy grasslands, dry sunny areas; 200–2300 m. Anhui, Gansu, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi, Yunnan [Korea, Mongolia, Russia].

This species was treated by Goldblatt et al. (in Kubitzki, *Fam. Gen. Vasc. Pl.* 3: 326. 1998) under *Pardanthopsis* (Hance) Lenz, a monospecific genus between *Iris* and *Belamcanda*.

**36. *Iris subdichotoma*** Y. T. Zhao, *Acta Phytotax. Sin.* 18: 57. 1980.

中甸鸢尾 zhong dian yuan wei

Rhizomes obscure. Roots thick. Leaves in basal fans, grayish green, sword-shaped, slightly curved, 22–40 × 1.1–2 cm, midvein absent, base surrounded by brown fibers. Flowering stems 2–5-branched, 25–40 cm, bearing only reduced leaves; spathes 3–5, green, 2.5–3.5 cm, 2–4-flowered. Flowers pale bluish to violet, 4.5–5 cm in diam.; pedicel exerted from spathes, 3–4 cm, stiff, persistent. Perianth tube ca. 2 cm; outer segments oblanceolate, ca. 4 × 7 cm; inner segments narrowly oblanceolate, ca. 3 cm × 4 mm. Stamens ca. 2.2 cm. Ovary ca. 1.5 × 0.5 cm. Style branches ca. 3 cm. Capsule cylindric, 5–6 × ca. 1 cm, 6-ribbed. Seeds maroon-brown, 7.5–8.5 mm, with small wings. Fl. Jun–Aug, fr. Jul–Sep.

• Grasslands, open hillsides or banks near riversides; 1800–2700 m. NW Yunnan.

**37. *Iris japonica*** Thunberg, *Trans. Linn. Soc. London* 2: 327. 1794.

蝴蝶花 hu die hua

*Iris chinensis* Curtis (1797), not Bunge (1833); *I. fimbriata* Ventenat.

Rhizomes dimorphic: suberect, thick; creeping, long, slender. Leaves basal, dark or yellowish green, glossy on 1 surface, dull on other, reddish purple at base, sword-shaped, 25–60 × 1.5–3 cm, midvein absent. Flowering stems erect, with 5–12 short, slender branches near apex; spathes 3–5, broadly lanceolate, 0.8–1.5 cm, 2–4-flowered, apex obtuse. Flowers pale bluish, 4.5–5.5 cm in diam.; pedicel 1.5–2.5 cm, stiff, persistent. Perianth tube 1.1–1.5 cm; outer segments obovate or elliptic, 2.5–3 × 1.4–2 cm, limb spreading, with blue blotching around central, yellow patch around prominent, yellow crest, margin

denticulate, undulate, apex retuse; inner segments spreading obliquely, elliptic or narrowly obovate, 2.8–3 × 1.5–2.1 cm, margin denticulate, undulate. Stamens 0.8–1.2 cm; anthers white. Ovary 7–10 mm. Style branches pale blue; terminal lobes fimbriate. Capsule ellipsoid-cylindric, 2.5–3 × 1.2–1.5 cm, apex not beaked. Seeds dark brown, with small aril. Fl. Mar–Apr, fr. May–Jun.  $2n = 24^*$ , 28, 34, 36, 54, 56\*.

Open forest margins, wet grasslands; 500–800 m (2400–3400 m in SW China). Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangsu, Jiangxi, Qinghai, Shaanxi, Shanxi, Sichuan, Xizang, Yunnan, Zhejiang [Japan, Myanmar].

This species is widely cultivated and it is possible that the high-elevation plants from SW China are not native but naturalized; however, they merit further investigation. White-flowered forms from Zhejiang have been recognized as *Iris japonica* f. *pallascens* P. L. Chiu & Y. T. Zhao (in Y. T. Zhao, *Acta Phytotax. Sin.* 18: 58. 1980).

**38. *Iris formosana*** Ohwi, *Acta Phytotax. Geobot.* 3: 115. 1934.

台湾鸢尾 tai wan yuan wei

Rhizomes erect, thick, producing slender stolons. Leaves grayish green on 1 surface, bright green on other, sword-shaped, 30–40 × 2–2.5 cm, veins 3–5. Flowering stems 4- or 5-branched, 30–40 cm; spathes 4–6, green, 3–5-flowered, margin membranous. Flowers whitish, 7–8 cm in diam. Perianth tube ca. 1 cm; outer segments obovate, 4–5 × ca. 2.5 cm, limb reflexed, with blue lines and yellow-brown spots around prominent crest, margin denticulate, undulate; inner segments spreading obliquely, pale blue, oblanceolate to oblong, 2.5–3 × ca. 1.5 cm, adaxially with dense, glandular trichomes, margin slightly denticulate. Anthers oblong to linear, 8–9 mm; filaments white, ca. 1.5 cm. Ovary ca. 1 cm. Style branches pale blue, ca. 2 cm × 6–7 mm; terminal lobes fimbriate. Capsule oblong to ovoid-cylindric, apex with persistent perianth tube.  $2n = 28^*$ .

- Forest margins, hillsides, roadsides; 500–1000 m. NE Taiwan.

Two of us (Noltie and Mathew) consider this species to be doubtfully distinct from *Iris japonica*.

**39. *Iris confusa*** Sealy, *Gard. Chron.*, ser. 3, 102: 414. 1937.

扁竹兰 bian zhu lan

Rhizomes creeping, stout. Stems erect, canelike, to 1.2 m, flattened, with prominent scars and bases of old leaf sheaths. Leaves 10 or more clustered into a terminal fan, yellowish green, glossy on 1 surface, somewhat glaucous on other, sword-shaped, 28–80 × 3–6 cm, veins obscure. Flowering stems with 5–8 slender branches near apex; spathes 4–6, ca. 1.5 cm, membranous, 3–5-flowered. Flowers white or bluish tinged, 4–5.5 cm in diam.; pedicel 1.5–2 cm, stiff, persistent. Perianth tube ca. 1.5 cm; outer segments elliptic, 2–3 × 1.5–2 cm, limb spreading, spotted yellow around crest, margin undulate, apex retuse; inner segments broadly lanceolate, ca. 2.5 × 1 cm, apex retuse. Stamens ca. 1.5 cm; anthers yellow. Ovary ca. 6 mm. Style branches pale blue, ca. 2 cm × 8 mm; terminal lobes fimbriate. Capsule ellipsoid, 2.5–3.5 × 1–1.4 cm, 6-ribbed, reticulate veined. Seeds dark brown. Fl. Apr, fr. May–Jul.  $2n = 30^*$ .

- Forest margins, open groves, hillsides grasslands, ditches; 1600–2400 m. Guangxi, Guizhou, Sichuan, Yunnan.

**40. *Iris wattii*** Baker, *Handb. Irid.* 17. 1892.

扇形鸢尾 shan xing yuan wei

Rhizomes thick, ca. 1 cm in diam.; nodes distinct. Stems 50–100 × 1–1.5 cm, flattened, with prominent scars and bases of old leaf sheaths. Leaves 10 or more clustered into a terminal fan, yellowish green, broadly sword-shaped, 50–70 × 5–7 cm, veins ca. 10, apex acuminate. Flowering stems with 5–7 short, stout branches near apex, 30–50(–100) cm; spathes 3–5, green, narrowly ovate, 1.5–2.5 × ca. 1 cm, 2–6-flowered, apex obtuse. Flowers bluish violet, 7.5–8 cm in diam.; pedicel 1.5–3 cm, stout, persistent. Perianth tube ca. 2 cm; outer segments obovate, mottled darker, or with linear patterns around irregular, yellowish crest, 4.5–6 × 2.4–4 cm, margin undulate; inner segments spreading, narrowly obovate, 3.5–4 × 1–1.3 cm. Stamens ca. 3 cm; anthers yellow. Ovary green, 7–8 mm. Style branches pale blue, 3–3.5 cm × 8–10 mm; terminal lobes fimbriate. Capsule cylindric, 2.8–4.5 × 1.3–1.5 cm, apex mucronate but not beaked. Seeds brown, semiorbicular. Fl. Apr, fr. May–Aug.  $2n = 30$ .

Grasslands at forest margins, wet riversides; 1800–2200 m. Xizang, Yunnan [NE India, Myanmar].

**41. *Iris tectorum*** Maximowicz, *Bull. Acad. Imp. Sci. Saint-Petersbourg* 15: 380. 1871.

鸢尾 yuan wei

*Iris chinensis* Bunge (1833), not Curtis (1797); *I. rosthornii* Diels.

Rhizomes creeping, thick. Roots slender. Leaves mainly in basal fans, yellowish green, broadly sword-shaped, curved, 15–50 × 1.5–3.5 cm, base surrounded by fibers. Flowering stems 1- or 2-branched, 20–40 cm, 1- or 2-leaved; spathes 2 or 3, green, lanceolate, 3.5–7.5 × 2–2.5 cm, 1- or 2-flowered, apex acuminate. Flowers bluish violet, ca. 10 cm in diam.; pedicel to 1 cm. Perianth tube slender, to 3 cm; outer segments mottled darker around conspicuous, white, irregularly toothed crest, broadly ovate, 5–7 × ca. 4 cm, apex retuse; inner segments spreading horizontally at anthesis, elliptic, 4.5–5 × ca. 3 cm. Stamens ca. 2.5 cm; anthers bright yellow. Ovary cylindric, 1.8–2 cm. Style branches pale bluish violet, ca. 3.5 cm. Capsule ellipsoid or obovoid, 4.5–6 × 2–2.5 cm. Seeds black-brown, pyriform, with very small aril. Fl. Apr–May, fr. Jun–Aug.  $2n = 24, 28, 32$ .

Forest margins, sunny banks, meadows, damp places, beside water; 500–3500 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangsu, Jiangxi, Qinghai, Shaanxi, Shanxi, Sichuan, Xizang, Yunnan, Zhejiang [Japan, Korea, ?Myanmar].

White-flowered plants have been recognized as *Iris tectorum* f. *alba* (Dykes) Makino (*Ill. Fl. Nipp.* 714. 1940, based on *I. tectorum* var. *alba* Dykes, *Gen. Iris*, 103. 1913). The native distribution and ecology of *I. tectorum* are uncertain because the species is very widely cultivated and naturalized in China. It is also cultivated in Bhutan (where it has become naturalized), and India.

**42. *Iris milesii*** Foster, *Gard. Chron.*, n.s., 20: 231. 1883.

红花鸢尾 hong hua yuan wei

Rhizomes thick, 1–1.5 cm in diam., stout; nodes distinct. Leaves alternate on stems, grayish green, broadly sword-shaped, 40–60 × 2.5–5 cm. Flowering stems erect, 2–4-branched, 60–90 cm, leafy proximally; branches 15–20 cm; spathes several, 2.5–

3.5 × 2–2.5 cm, 3- or 4-flowered. Flowers pale reddish purple, 7–8 cm in diam.; pedicel 2.5–4 cm. Perianth tube 1–1.5 cm; outer segments obovate, marked with dark lines and mottling proximally, crest orange-yellow; inner segments narrowly obovate, 4–5 cm, apex retuse. Stamens ca. 2.5 cm; anthers milky white. Ovary cylindrical, ca. 3 cm, 3-angled. Style branches pale reddish purple, ca. 3 cm; terminal lobes fimbriate. Capsule ovoid-globose, reticulate veined. Seeds black-brown, pyriform, with white aril. Fl. Apr–May, fr. Jun–Aug.  $2n = 26$ .

Forest margins on hillsides, open groves, wet places. Sichuan, Xizang, Yunnan [NW India].

Two of us (Noltie and Mathew) have seen no Chinese specimens of this species, which otherwise occurs in NW India (the type locality). Such a disjunct distribution seems unlikely, and it is possible that the Chinese plants represent an as yet undescribed taxon.

**43. *Iris speculatrix*** Hance, J. Bot. 13: 196. 1875.

小花鸢尾 xiao hua yuan wei

*Iris cavaleriesi* H. Léveillé; *I. grijsii* Maximowicz.

Rhizomes creeping, brown. Roots thick. Leaves dark green, glossy, linear, 15–40 cm × 4–12 mm, veins 3–5, base with fibers. Flowering stems 12–25 cm, 1- or 2-leaved; spathes 2 or 3, green, narrowly lanceolate, 5.5–8 cm, 1- or 2-flowered, apex acuminate. Flowers violet or light blue, 5.6–6 cm in diam.; pedicel 3–7 cm. Perianth tube ca. 5 mm; outer segments spreading, spatulate, with a central, white, 2-lobed patch, 3–4 × 0.9–1.3 cm, crest yellow, low; inner segments erect, narrowly oblanceolate, 3–3.7 × 0.9–1 cm. Stamens ca. 1.2 cm; anthers white. Ovary fusiform, 1.6–2 cm × ca. 0.5 mm. Style branches ca. 2.5 cm × 7 mm. Capsule held at right angle to pedicel, narrowly ellipsoid, ca. 3 cm, apex long beaked. Seeds dark brown, angled, with aril drying as a pale brown wing. Fl. May, fr. Jul–Aug.

• Forest margins, open groves, roadsides; 500–1800 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangsu, Jiangxi, Qinghai, Shaanxi, Shanxi, Sichuan, Xizang, Yunnan, Zhejiang.

White-flowered forms have been described as *Iris speculatrix* var. *alba* V. H. C. Jarrett. (Sunyatsenia 3: 265. 1937)

**44. *Iris proantha*** Diels, Svensk Bot. Tidskr. 18: 427. 1924.

小鸢尾 xiao yuan wei

Rhizomes long, slender. Roots slender. Leaves yellowish green, narrowly linear, 5–27 cm × 1–7 mm at anthesis, 40–55 cm × 7–8 mm in fruit, veins 1 or 2. Flowering stems 5–28 cm, 1- or 2-leaved; spathes 2, green, narrowly lanceolate, 3.5–5.5 cm × ca. 6 mm, 1-flowered. Flowers pale violet, 3.5–5 cm in diam.; pedicel 6–10 mm. Perianth tube 2.5–3(–5) cm; outer segments obovate, with central, horseshoe-shaped, mottled pattern, ca. 2.5 × 1–1.2 cm, crest borne on midvein, yellow, low; inner segments erect, narrowly oblanceolate, 2.2–2.5 cm × ca. 7 mm. Stamens white, ca. 1 cm. Ovary green, 4–5 mm. Style branches pale violet, ca. 1.8 cm × 4 mm. Capsule globose, 1.2–1.5 cm in diam., apex shortly beaked. Fl. Mar–Apr, fr. May–Jul.

• Forests, forest margins, open groves, hillsides, grasslands, open fields, roadsides. Anhui, Henan, Hubei, Hunan, Jiangsu, Zhejiang.

1a. Flowering stems 5–7 cm; flowers 3.5–4 cm in diam. .... 44a. var. *proantha*

1b. Flowering stems 20–28 cm; flowers ca. 5 cm in diam. .... 44b. var. *valida*

**44a. *Iris proantha* var. *proantha***

小鸢尾(原变种) xiao yuan wei (yuan bian zhong)

*Iris pseudorossii* S. S. Chien.

Leaves 5–20 cm × 1–2.5 mm at anthesis, 40–50 cm × ca. 7 mm in fruit. Flowering stems 5–7 cm. Flowers 3.5–4 in diam.  $2n = 32^*$ ,  $44^*$ .

• Forest margins, open groves, hillsides, grasslands. Anhui, Henan, Hubei, Hunan, Jiangsu, Zhejiang.

**44b. *Iris proantha* var. *valida*** (S. S. Chien) Y. T. Zhao, Acta Phytotax. Sin. 20: 100. 1982.

粗壮小鸢尾 cu zhuang xiao yuan wei

*Iris pseudorossii* S. S. Chien var. *valida* S. S. Chien, Contr. Biol. Lab. Chin. Assoc. Advancem. Sci., Sect. Bot. 6: 74. 1931.

Leaves ca. 27 cm × 7 mm at anthesis, ca. 55 cm × 8 mm in fruit. Flowering stems 20–28 cm. Flowers ca. 5 cm in diam.

• Forests, open fields, roadsides. Zhejiang.

**45. *Iris flavissima*** Pallas, Reise Russ. Reich. 3: 715. 1776.

黄金鸢尾 huang jin yuan wei

*Iris dahurica* Herbert ex Klatt.

Rhizomes creeping, branched, long. Roots thick. Leaves linear, 5–15 cm × 1.5–3 mm at anthesis, ca. 30 cm × 5 mm in fruit, midvein absent, base surrounded by brown fibers. Flowering stems short; spathes 2 or 3, narrowly lanceolate, 1- or 2-flowered, apex acuminate. Flowers yellow, 4–5 cm in diam. Perianth tube 2.5–3.5 cm; outer segments elliptic to ovate, with brown, linear patterns; inner segments erect, oblanceolate, 2.5–3 cm × ca. 4 mm. Stamens ca. 2 cm; anthers yellow. Ovary cylindrical. Style branches bright yellow, ca. 2.5 cm. Capsule ellipsoid, 3.5–4.5 × 1–1.5 cm, apex acute. Fl. Apr–May, fr. Jun–Aug.  $2n = 22$ ,  $26^*$ .

Dry grasslands, fixed desert fields. W Heilongjiang, W Jilin, Nei Mongol, Ningxia, Xinjiang [Kazakhstan, Mongolia, Russia].

*Iris flavissima* is here treated as a distinct, E Asian species, but is often placed in synonymy under the widespread, Eurasian species *I. humilis* Georgi (*I. arenaria* Waldstein & Kitabel).

**46. *Iris bloudowii*** Ledebour, Icon. Fl. Ross. 2: 5. 1830.

中亚鸢尾 zhong ya yuan wei

*Iris flavissima* Pallas var. *bloudowii* (Ledebour) Baker; *I. flavissima* var. *umbrosa* Bunge.

Rhizomes not widely creeping, thick. Roots thick. Leaves grayish green, sword-shaped, slightly curved, 8–12 cm × 4–8 mm at anthesis, 15–25 × 0.8–1.2 cm in fruit, midvein absent, veins 5 or 6, apex shortly acuminate. Flowering stems 8–10 (–30) cm, base with erect, slender, sheathlike leaves persisting as fibers; spathes 2 or 3, with some reddish color, oblong-lanceolate, ca. 4 × 1.6–2 cm, 2-flowered, apex obtuse. Flowers bright yellow, 5–5.5 cm in diam.; pedicel 6–10 mm. Perianth tube 1–1.5 cm; outer segments obovate, ca. 4 × 2 cm,

beard yellow; inner segments erect, oblanceolate, 3–4.5 × 1–1.2 cm. Stamens 1.8–2.2 cm. Ovary ca. 1.5 cm. Style branches bright yellow, ca. 2.5 cm. Capsule narrowly ovoid, apex acute, obscurely beaked. Seeds dark brown, ellipsoid, ca. 5 × 3 mm, with white aril. Fl. May, fr. Jun–Aug.

Grasslands at forest margins, sunny dunes. Xinjiang [Kazakstan, Mongolia, Russia].

**47. *Iris mandshurica*** Maximowicz, Bull. Acad. Imp. Sci. Saint-Pétersbourg 26: 530. 1880.

长白鸢尾 chang bai yuan wei

Rhizomes not widely creeping, thick. Roots fleshy. Leaves slightly curved, 10–15 × 0.5–1 cm at anthesis, ca. 30 × 1.5 cm in fruit, veins 2–4, base surrounded by fibers, apex shortly acuminate. Flowering stems 15–20 cm, base with erect, slender, sheathlike leaves; spathes 3, green, broadly lanceolate, 3.5–5 × 1–1.8 cm, 1- or 2-flowered, apex acuminate. Flowers yellow, 4–5 cm in diam.; pedicel 6–7 cm. Perianth tube 2–2.5 cm; outer segments with brown, linear patterns, obovate, 4–4.5 × 1.5–2 cm, beard yellow, dense; inner segments erect, narrowly elliptic, ca. 3.5 cm. Stamens ca. 2 cm; anthers yellow. Ovary 1–1.2 cm. Style branches ca. 3 cm × 4–5 mm. Capsule fusiform, ca. 6 × 1.5 cm, 6-veined, apex long beaked. Fl. May, fr. Jun–Aug.  $2n = 14^*$ , 34.

Open groves, sunny banks; 400–800 m. Heilongjiang, Jilin, Liaoning [Korea, Russia].

**48. *Iris curvifolia*** Y. T. Zhao, Acta Phytotax. Sin. 20: 99. 1982.

弯叶鸢尾 wan ye yuan wei

Rhizomes creeping, thick, ca. 2 cm in diam. Roots few branched, thick. Leaves glaucous green, falcate, 10–20 × 1–1.5 cm, middle part slightly wider. Flowering stems 8–12 cm, leafless, base with swollen, curved, sheathlike leaves with persistent bases; spathes 3, lanceolate, 5–6 × 1.3–1.8 cm, membranous, 2-flowered, apex acuminate. Flowers bright yellow with dark brown lines, 4.5–6 cm in diam. Perianth tube 2–3 cm; outer segments obovate, ca. 4.5 × 1.5 cm, beard pale yellow; inner segments oblanceolate, ca. 4 × 1.3 cm. Stamens ca. 2.2 cm; anthers yellow. Ovary cylindric, 1.8–2.2 cm. Style branches ca. 3 cm × 4 mm. Capsule oblong-ellipsoid, ca. 4 × 2 cm, apex rounded, shortly beaked. Seeds reddish brown, pyriform, asymmetric. Fl. May–Jun, fr. Jul–Sep.

• Grasslands on hillsides. Xinjiang.

**49. *Iris narcissiflora*** Diels, Svensk Bot. Tidskr. 18: 428. 1924.

水仙花鸢尾 shui xian hua yuan wei

Rhizomes very short, producing slender stolons. Leaves linear, 12–25 cm × 2–3 mm, midvein absent, apex obtuse or acute. Flowering stems simple, 20–30 cm, slender; spathes 2, purple, lanceolate, 2.5–3.3 × ca. 1.2 cm, rigid, 1-flowered. Flowers sessile, yellow, flat, 5–5.5 cm in diam. Perianth tube 3–4 mm; outer segments spreading horizontally, elliptic or obovate, ca. 3.5 × 2.5 cm, beard narrow, sparse; inner segments spreading horizontally, narrowly ovate, 2.8–3 × ca. 1.6 cm. Stamens ca. 1.3 cm. Ovary ca. 1.5 cm. Style branches spreading, ca. 1.5 cm × 8 mm; terminal lobes irregularly toothed. Fl. Apr–May, fr. Jun–Aug.

• Open places in forests, forest margins, hillside grasslands. Sichuan.

**50. *Iris scariosa*** Willdenow ex Link, Jahrb. Gewächsk. 1(3): 71. 1820.

膜苞鸢尾 mo bao yuan wei

Rhizomes creeping, thick, 1.5–2.2 cm in diam., tough. Leaves grayish green, falcate, 10–18 × 1–1.8 cm, base surrounded by brown fibers. Flowering stems ca. 10 cm, leafless; spathes 3, broadly lanceolate, 4–5.5 × 1.5–2 cm, membranous, 2-flowered, margin reddish purple, apex shortly acuminate. Flowers violet, 5.5–6 cm in diam.; pedicel short. Perianth tube ca. 1.5 cm; outer segments obovate, ca. 6 × 1.5 cm, beard yellow; inner segments erect, oblanceolate, ca. 5 × 0.5 cm. Stamens ca. 1.8 cm. Ovary ca. 1.5 cm. Style branches pale purple, ca. 3.5 cm. Capsule narrowly ovoid, prominently 6-veined, apex obscurely beaked, beak slightly thickened and ringlike at tip. Fl. Apr–May, fr. Jun–Aug.  $2n = 24$ .

Sunny stony hillsides, beside ditches. Xinjiang [Kazakstan, Russia].

**51. *Iris leptophylla*** Lingelsheim ex H. Limpricht, Repert. Spec. Nov. Regni Veg. Beih. 12: 325. 1922.

薄叶鸢尾 bo ye yuan wei

*Iris sichuanensis* Y. T. Zhao.

Plants with fibers and sheathlike leaves at base. Rhizome swollen, tuberlike, 1.2–1.5 cm in diam. Roots thick. Leaves grayish green, linear, 25–35 × 0.5–1 cm, midvein distinct, apex long acuminate. Flowering stems 10–35 cm; spathes 3 or 4, green, broadly lanceolate, 4–8 × 1.5–1.8 cm, 2-flowered, apex acute to acuminate. Flowers violet, ca. 6 cm in diam.; pedicel very short. Perianth tube 4–5 cm; outer segments obovate, 5–5.5 × ca. 2 cm, beard yellow; inner segments erect, narrowly lanceolate, ca. 4 × 1 cm. Stamens ca. 4 cm. Ovary 2.5–3 cm. Style branches ca. 4.5 cm. Capsule ovoid-cylindric, ca. 4 × 1.3 cm, apex acute. Fl. Apr–Jun, fr. May–Jul.

• Grasslands on hillsides, rocky slopes; 2600–3200 m. Gansu, Sichuan.

**52. *Iris potaninii*** Maximowicz, Bull. Acad. Imp. Sci. Saint-Pétersbourg 26: 528. 1880.

卷鞘鸢尾 juan qiao yuan wei

Rhizomes erect, short, tough. Roots thick. Leaves linear, 4–16 cm × 2–4 mm at anthesis, ca. 20 cm × 3–4 mm in fruit, base surrounded by dense, strongly curled fibers, apex rather abruptly contracted, subacute. Flowering stems not emerging above ground; spathes 2, narrowly lanceolate, 4–4.5 cm, membranous, 1-flowered. Flowers yellow, dark violet, or purplish blue, 3.5–5 cm in diam. Perianth tube 1.5–3.7 cm; outer segments strongly marked around yellow, dense beard, obovate, 3–4 × 1.2–1.5 cm, apex retuse; inner segments erect, oblanceolate, 2.5–3 × 8–10 mm, apex retuse. Stamens ca. 1.5 cm; anthers purple. Ovary ca. 7 mm. Style branches ca. 2.8 cm × 6 mm. Capsule broadly ellipsoid, 2.5–3 × 1.3–1.6 cm, apex shortly beaked; valves remaining united apically. Seeds pyriform, ca. 3 mm in diam., arillate. Fl. May–Jun, fr. Jul–Sep.  $2n = 22$ .

Stony or dry hillsides; 3200–5000 m. Gansu, Qinghai, Sichuan, Xizang [Mongolia, Russia].

- 1a. Flowers yellow ..... 52a. var. *potaninii*  
1b. Flowers dark violet or purplish blue ..... 52b. var. *ionantha*

**52a. *Iris potaninii* var. *potaninii***

卷鞘鸢尾(原变种) juan qiao yuan wei (yuan bian zhong)

*Iris thoroldii* Baker.

Flowers yellow.

Stony or dry hillsides; 3200–5000 m. Gansu, Qinghai, Sichuan, Xizang [Mongolia, Russia].

**52b. *Iris potaninii* var. *ionantha*** Y. T. Zhao, Acta Phytotax. Sin. 18: 59. 1980.

蓝花卷鞘鸢尾 lan hua juan qiao yuan wei

Flowers dark violet or purplish blue; outer perianth segments with darker and sometimes also white lines radiating from beard.

Gansu, Qinghai, Sichuan, Xizang [Mongolia, Russia].

**53. *Iris psammocola*** Y. T. Zhao, Acta Phytotax. Sin. 30: 181. 1992.

沙生鸢尾 sha sheng yuan wei

Rhizomes not creeping, obconical, short. Roots slender. Leaves narrowly linear, 8–13 cm × 2–4 mm, base surrounded by dense, straight fibers, apex gradually narrowed, very acute. Flowering stems not emerging above ground, 3–4 cm, slender; spathes 2, lanceolate, 3.5–4 cm × ca. 8 mm, membranous, 1-flowered, midvein distinct. Flowers yellow, 4–5 cm in diam.; pedicel very short. Perianth tube slender, 4–4.5 cm; outer segments spreading, limb obovate, ca. 4 × 1.5 cm, beard of hairs, apex rounded; inner segments erect, oblanceolate, ca. 3.5 × 4 cm. Stamens ca. 1.5 cm. Style branches ca. 3.5 cm. Fl. Apr–May.

- Desert dunes. Ningxia.

**54. *Iris tigridia*** Bunge ex Ledebour, Fl. Altaic. 1: 60. 1829.

粗根鸢尾 cu gen yuan wei

Rhizomes very short. Roots thick, transversely wrinkled when dry. Leaves deep or grayish green, glossy, narrowly linear, 5–30 cm × 1.5–6 mm, midvein absent, base surrounded by dense, straight fibers, apex gradually narrowed, very acute. Flowering stems not or barely emerging above ground, or 10–20 cm, slender; spathes 2, yellowish green, membranous, 1-flowered. Flowers dark blue, violet, or light purple, 3.5–5 cm in diam.; pedicel ca. 5 mm. Perianth tube ca. 2 cm; outer segments darker mottled at margin, narrowly oblanceolate, 3–4 × 1–1.5 cm, beard of yellow hairs; inner segments flaring outward, oblanceolate, 2.5–2.8 × 0.4–0.7 cm, apex retuse. Stamens ca. 1.5 cm. Ovary ca. 1.2 cm. Style branches ca. 2.3 cm. Capsule narrowly ovoid, apex with persistent perianth tube. Seeds brown, pyriform, with yellowish white aril. Fl. May, fr. Jun–Aug.

Forest margins, dry hillsides, sandy grasslands, grasslands on sunny hillsides, dunes. Gansu, Heilongjiang, Jilin, Liaoning, Nei Mon-

gol, Qinghai, Shanxi, Sichuan [Kazakhstan, Mongolia, Russia].

- 1a. Flowering stems not or barely emerging  
above ground ..... 54a. var. *tigridia*  
1b. Flowering stems 10–20 cm ..... 54b. var. *fortis*

**54a. *Iris tigridia* var. *tigridia***

粗根鸢尾(原变种) cu gen yuan wei (yuan bian zhong)

*Iris pandurata* Maximowicz

Leaves 5–13 cm × 1.5–2 mm at anthesis, ca. 30 cm × 3 mm in fruit. Flowering stems not or barely emerging above ground. Flowers 3.5–3.8 cm in diam.  $2n = 38$ .

Dry hillsides, sandy grasslands, dunes. Gansu, Heilongjiang, Jilin, Liaoning, Nei Mongol, Qinghai, Shanxi, Sichuan [Kazakhstan, Mongolia, Russia].

**54b. *Iris tigridia* var. *fortis*** Y. T. Zhao, Acta Phytotax. Sin. 18: 60. 1980.

大粗根鸢尾 da cu gen yuan wei

Leaves 10–20 cm × 3–6 mm. Flowering stems 10–20 cm. Flowers 4.5–5 cm in diam.

- Forest margins, grasslands on sunny hillsides. C Jilin, E Nei Mongol, Shanxi.

*Iris ivanovae* Doronkin (Fl. Sibir., Araceae-Orchidaceae, 117. 1987) was recorded in its protologue not only from Mongolia and Russia (Siberia) but also from China. No specimens have been seen by the present authors, but it is said to differ from *I. tigridia* in having narrower leaves (to 2 mm wide), narrowly lanceolate spathes, smaller flowers (to 3.5 cm in diam.), and outer perianth segments abruptly narrowed into a filiform claw.

**55. *Iris goniocarpa*** Baker, Gard. Chron., n.s., 6: 710. 1876.

锐果鸢尾 rui guo yuan wei

*Iris gracilis* Maximowicz; *I. goniocarpa* var. *tenella* Y. T. Zhao.

Rhizomes erect, very short. Roots slender. Leaves yellowish green, linear, 10–25 cm × 2–3 mm, midvein obscure, apex acute. Flowering stems 10–25 cm, leafless or 1- or 2-leaved; spathes 2, green, lanceolate, 2–4 cm × 5–8 mm, 1-flowered, apex recurved, acuminate. Flowers violet, 2.5–3 cm in diam.; pedicel short or absent. Perianth tube 1.5–2 cm; outer segments with deep purple mottling, obovate to elliptic, beard of white-based, yellow-tipped hairs, apex retuse; inner segments spreading, oblong, 1.8–2.2 cm × ca. 5 mm, apex retuse or truncate. Stamens ca. 1.5 cm; anthers yellow. Ovary 1–1.5 cm. Style branches ca. 1.8 cm. Capsule ellipsoid, 3.2–4 × 1.2–1.8 cm in diam., 3-angled, apex shortly beaked. Fl. May–Jun, fr. Jun–Aug.

Alpine grasslands; 3000–4000 m. Gansu, Hubei, Qinghai, Shaanxi, Sichuan, Yunnan, Xizang [Bhutan, Myanmar, Nepal, Sikkim]

**56. *Iris cuniculiformis*** Noltie & K. Y. Guan in Noltie, New Plantsman 2: 131. 1995.

大锐果鸢尾 da rui guo yuan wei

*Iris goniocarpa* Baker var. *grossa* Y. T. Zhao.

Plants clump-forming. Rhizomes erect, very short. Leaves dull green, linear, 13.5–30 cm × 2–9 mm, midvein obscure, apex slightly curved, abruptly contracted, minutely acute. Flowering stems 14–30 cm, base with 2 or more leaflike bracts; spathes 2, purplish brown basally, green distally, elliptic, 3–5 cm, 1-flowered, apex recurved, subacute to acute, membranous. Flowers lilac to pinkish violet, 6–7 cm in diam. Perianth tube 1–2 cm, stout; outer segments with deep purple mottling on whitish area around beard, 4.3–5.5 × 1.9–2.3 cm, limb oblong, beard of white-based, yellow-tipped hairs, apex truncate; inner segments erect, 3–4 × 1–1.2 cm, limb oblong, apex retuse or truncate. Anthers cream, 1–1.4 cm. Style branches 2.8–3.3 cm. Fl. May–Jul, fr. Jun–Aug.

• Grassy plateaus; 3100–4000 m. Sichuan, Yunnan.

**57. *Iris kemaonensis*** Wallich ex Royle, Ill. Bot. Himal. Mts. 1: 372. 1839.

库门鸢尾 *ku men yuan wei*

Rhizomes short. Roots slender. Leaves yellowish green, linear, 6–10 cm × 2–6 mm at anthesis, to 34 cm × 3–7 mm in fruit, midvein absent, apex apiculate. Flowering stems not emerging above ground; spathes 2 or 3, green, broadly lanceolate, 5–6 cm × 1–1.8 mm, 1-flowered, apex acuminate. Flowers pale purple to mauve-purple, blotched darker, 5–6 cm in diam.; pedicel 1–1.5 cm. Perianth tube trumpet-shaped, 5.5–6 cm; outer segments spatulate, 4–5 × ca. 1.5 cm, claw and base of limb with dense beard of white-based, yellow-tipped hairs, apex of limb truncate; inner segments erect, oblanceolate, ca. 4 × 1 cm. Stamens 2–2.3 cm. Ovary ca. 6 cm. Style branches ca. 3.2 cm × 6 mm. Capsule globose, 2–2.5 × 1.5–1.8 cm, shortly beaked. Seeds reddish brown, with milky yellow aril.  $2n = 22, 24$ .

Alpine pastures; 3500–4200 m. Xizang [Bhutan, N India, Nepal].

There has been confusion between this species and *Iris dolichosiphon*. According to one of us (Noltie), *I. kemaonensis* is characterized by its shorter perianth tube, erect inner perianth segments, and the usually paler background color of its flowers, which are strongly mottled; it is more western in distribution, and in China is probably restricted to Xizang.

**58. *Iris dolichosiphon*** Noltie, Kew Mag. 7: 9. 1990.

长管鸢尾 *chang guan yuan wei*

Rhizomes short. Leaves linear, 3–23 cm × 2–7 mm at anthesis, to 55 × 1.4 cm in fruit, midvein indistinct, apex curved, minutely acuminate. Flowering stems short, base with sheathlike leaves; spathes membranous when dry, 1-flowered. Flowers very dark violet, slightly mottled, 3–8.5 cm in diam. Perianth tube 4–14 cm; outer segments spatulate, 2.3–4.3 × 0.8–1.8 cm, abruptly narrowed into a 0.7–1 cm long claw, claw and base of limb with dense beard of white-based, orange-tipped, clavate hairs, limb elliptic, apex blunt or retuse; inner segments spreading or reflexed, 2–3.6 × 0.5–1.5 cm, claw 4–6 mm, limb oblong, apex retuse or truncate. Stamens 1.7–2.2 cm; anthers orange or pale violet, 8–10 mm. Style branches dark violet, paler at margin, 1.5–2.8 × 0.8–1.5 cm. Capsule borne at ground level, narrowly ellipsoid, ca. 5 cm, apex acute; valves remaining united apically. Seeds ca. 3.5 mm, arillate. Fl. May–Jun, fr. Sep.  $2n = 22$ .

Among shrubs, alpine meadows, open grassy hillsides, limestone cliffs; 2700–4300 m. Sichuan, Xizang, Yunnan [Bhutan, NE India, Myanmar].

- 1a. Flowers 6–8.5 cm in diam.; perianth tube 7–14 cm ..... 58a. subsp. *dolichosiphon*
- 1b. Flowers 3–6 cm in diam.; perianth tube 4–7 cm ..... 58b. subsp. *orientalis*

**58a. *Iris dolichosiphon*** subsp. *dolichosiphon*

长管鸢尾(原亚种) *chang guan yuan wei* (*yuan ya zhong*)

Leaves 10–23 cm × 4–7 mm at anthesis, to 55 × 1.4 cm in fruit. Flowers 6–8.5 cm in diam.; perianth tube 7–14 cm.

Among shrubs, open grassy hillsides; 2700–4100 m. Xizang [Bhutan].

**58b. *Iris dolichosiphon*** subsp. *orientalis* Noltie, New Plantsman 2: 135. 1995.

东方鸢尾 *dong fang yuan wei*

Leaves 3–11 cm × 2–4 mm at anthesis, to 40 cm × 4 mm in fruit. Flowers 3–6 cm in diam.; perianth tube 4–7 cm.

Among shrubs, alpine meadows, limestone cliffs; 3000–4300 m. Sichuan, Yunnan [NE India, Myanmar].

One of us (Zhao) has not seen the types of either of these subspecies.

## 2. **BELAMCANDA** Adanson, Fam. Pl. 2: 60, 524. 1763, nom. cons.

射干属 *she gan shu*

*Pardanthus* Ker Gawler.

Herbs perennial, rhizomatous. Rhizome knobbly. Aerial stem well developed, erect, leafy. Leaves cauline, 2-ranked, oriented edgewise to aerial stem, sword-shaped. Inflorescence a ± dichotomously branched panicle of rhipidia. Perianth tube short; segments ± similar, outer ones somewhat larger than inner. Stamens inserted at base of perianth segments. Style 1, slender, 3-lobed at apex. Capsule obovoid or ellipsoid. Seeds black, glossy.

One species: Bhutan, China, India, Japan, Korea, Myanmar, Nepal, Philippines, Russia, Vietnam, and probably elsewhere in SE Asia.

*Belamcanda* might be better placed in *Iris*: chromosomal, gene sequence, and gross morphological data all show it to be the closest relative of *Iris dichotoma*.

**1. *Belamcanda chinensis*** (Linnaeus) Redouté, Liliac. 3: t. 121. 1805.

射干 she gan

*Ixia chinensis* Linnaeus, Sp. Pl. 1: 36. 1753; *Belamcanda chinensis* var. *taiwanensis* S. S. Ying; *B. pampaninii* H. Léveillé; *B. punctata* Moench; *Pardanthus chinensis* (Linnaeus) Ker Gawler.

Rhizome pale brown. Stems 1–1.5 m. Leaves 20–60 × 2–4 cm, midvein obscure, apex acuminate. Flowers reddish orange with dark spots, 3–4 cm in diam.; pedicel slender, ca. 1.5 cm. Outer perianth segments obovate or elliptic, ca. 2.5 × 1 cm, base cuneate, apex obtuse. Stamens 1.8–2 cm. Style equaling perianth segments, lobes spreading. Capsule 2.5–3 × 1.5–2.5

cm, apex not beaked. Seeds ca. 5 mm in diam. Fl. Jun–Aug, fr. Jul–Sep.  $2n = (16, 27), 32$ .

Near sea level to 2200 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Ningxia, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Bhutan, India, Japan, Korea, Myanmar, Nepal, Philippines, Russia, Vietnam, and probably elsewhere in SE Asia].

Plants are usually cultivated, and the rhizomes are used in traditional Chinese medicine.

### 3. CROCUS Linnaeus, Sp. Pl. 1: 36. 1753.

番红花属 fan hong hua shu

Herbs small, perennial, cormous. Corms oblate, covered with a tunic. Leaves few, all basal, green, linear, adaxially with pale, median stripe, base surrounded by membranous, sheathlike leaves. Aerial stem not developed. Flowers emerging from ground, with peduncle and ovary subterranean. Perianth white, yellow, or lilac to dark purple; tube long, slender; segments similar, equal or subequal. Stamens inserted in throat of perianth tube. Style 1, slender, distally with 3 to many branches. Capsule small, ellipsoid or oblong-ellipsoid.

About 80 species: C and W Asia, Europe, Mediterranean region; two species (one introduced) in China.

1a. Perianth purple; style 3-branched at apex, branches deep red, 2.5 cm or more; plants cultivated ..... 2. *C. sativus*

1b. Perianth white, striped or spotted gray or blue abaxially; style 3-lobed at apex, lobes white to deep yellow, short;

plants wild ..... 1. *C. alata*

**1. *Crocus alata*** Semenov & Regel in Regel & Herder, Bull. Soc. Imp. Naturalistes Moscou 41(1): 434. 1868.

白番红花 bai fan hong hua

Corms 1.2–2 cm in diam.; tunic yellowish brown, membranous. Leaves 6–15, 8–10 cm × ca. 2 mm at anthesis, ca. 20 cm × 5 mm in fruit. Flowers fragrant. Perianth white with yellow center, striped or spotted gray or blue abaxially; tube 2.5–6 cm; segments narrowly oblanceolate, outer ones ca. 2.5 cm × 6–8 mm, inner ones narrower than outer. Stamens ca. 2.5 cm; anthers orange-yellow. Style filiform, 3-lobed at apex; lobes white to deep yellow, short. Capsule ellipsoid, ca. 1.2 cm × 8 mm. Seeds light to reddish brown, ovoid, with small, white appendage. Fl. May–Jun, fr. Jul–Aug.  $2n = 20$ .

Mountain slopes, riverside grasslands; 1200–3000 m. NW Xinjiang [Kazakhstan, Kyrgyzstan, Uzbekistan].

**2. *Crocus sativus*** Linnaeus, Sp. Pl. 1: 36. 1753.

番红花 fan hong hua

Corms ca. 3 cm in diam.; tunic light yellow or yellowish brown, reticulate fibrous. Leaves 9–15, 15–20 cm × 2–3 mm. Flowers 1 or 2, fragrant. Perianth purple; segments oblanceolate, 4–5 cm, apex obtuse. Stamens ca. 2.5 cm; anthers yellow, apex slightly curved, pointed. Style 3-branched at apex; branches recurved, deep red, 2.5 cm or more. Fertile seeds not produced.

Cultivated throughout China [widely cultivated elsewhere, probably of hybrid origin in E Mediterranean region].

The style and stigmas are used medicinally, in cooking, and in the preparation of saffron dye.

