

## DIPTERIDACEAE

双扇蕨科 *shuang shan jue ke*

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Rhizome long creeping, solenostelic or protostelic, covered with bristles or articulate hairs. Stipe with a single vascular bundle proximally and polystelic distally; lamina (sterile ones, at least) cleft into 2 or often more subequal parts; veins highly reticulate, with included veinlets. Sori exindusiate, discrete, compital (at intersection of connecting veins), scattered over surface, or fronds dimorphic and fertile ones covered with sporangia; sporangia maturing simultaneously or maturation mixed, with 4-seriate stalks; annuli almost vertical or slightly oblique; spores ellipsoid and monolete, or tetrahedral and trilete, surface smooth or rugulose, ca. 64 or ca. 128 per sporangium; gametophytes cordate-thalloid.  $x = 33$ .

Two genera and ca. 11 species: E and S China, India, C and S Japan, and from SE Asia to Melanesia and W Polynesia; two genera and five species in China.

The Dipteridaceae are a rather primitive group of ferns related to the Gleicheniaceae and distant from the Polypodiaceae, with the fossil record beginning in the Upper Triassic.

Lin Youxing. 2000. Dipteridaceae and Cheiroleuriaceae. *In*: Lin Youxing, ed., *Fl. Reipubl. Popularis Sin.* 6(2): 1–6.

- 1a. Fronds monomorphic, divided into 2 subequal fan-shaped halves, each with deeply incised lobes; sori discrete; spores monolete ..... 1. *Dipteris*  
1b. Fronds dimorphic; sterile lamina entire or lobed; sori acrostichoid; spores trilete ..... 2. *Cheiroleuria*

### 1. DIPTERIS Reinwardt, Syll. Pl. Nov. 2: 3. 1825.

双扇蕨属 *shuang shan jue shu*

*Phymatodes* C. Presl.

Plants evergreen, medium-sized to large, terrestrial or epilithic. Rhizomes long creeping, covered with coarse, very long-tapering, non-clathrate bristles resembling scales in dried material. Stipe non-articulate, remote; lamina divided into 2 subequal fan-shaped halves, each with deeply incised lobes; main veins repeatedly forked, remainder of veins finer and copiously anastomosing, with free included veinlets in areoles. Sori numerous, small, orbicular, borne on minor veins over most of abaxial surface of lamina; hairlike paraphyses sometimes present among sporangia; spores monolete, 64 or less per sporangium, pale and smooth.  $x = 33$ .

Eight species: from NE India, S China, and Ryukyu Islands to NE Queensland and Fuji; three species in China.

- 1a. Lamina lobes narrowly lanceolate, margin smooth, entire ..... 1. *D. wallichii*  
1b. Lamina lobes broadly lanceolate or ovate, margin coarsely toothed.  
2a. Lamina lobes 8–10, cleft to halfway, pale brown abaxially ..... 3. *D. chinensis*  
2b. Lamina lobes up to 20 or more, deeply cleft to 4/5 of lamina, glaucous abaxially ..... 2. *D. conjugata*

**1. *Dipteris wallichii*** (R. Brown) T. Moore, *Index Fil.* 80. 1857.

喜马拉雅双扇蕨 *xi ma la ya shuang shan jue*

*Polypodium wallichii* R. Brown in Hooker & Greville, *Icon. Filic.* 2: t. 168, 169. 1830.

Rhizome to 1 cm or more in diam., covered with appressed, copious, dark brown, stout, subulate bristles 4–6 mm, with long hairlike apex. Stipe brownish, up to 1 m, hard, smooth and shiny; lamina 30–50 × 30–40 cm, divided to base into 2 fan-shaped halves, each half deeply dichotomously cleft into 4 or 5 subequal lobes 3–4 cm wide; lobes rather deeply dichotomously cleft into 8–10 ultimate lobes in each half of lamina; lobes entire, coppery green abaxially, glossy green adaxially, lanceolate, leathery, glabrous; venation prominent

abaxially, horizontally transverse veinlets ± straight and thicker, forming narrow parallel areoles. Sori without paraphyses.

Terrestrial in forests; 1300–1400 m. SE Xizang [Bangladesh (Chittagong), Bhutan, NE India, Nepal].

**2. *Dipteris conjugata*** Reinwardt, Syll. Pl. Nov. 2: 3. 1825.

双扇蕨 *shuang shan jue*

*Phymatodes conjugata* (Reinwardt) C. Presl.

Rhizome to ca. 1 cm in diam., covered with hairlike scales; scales reddish brown, narrow, to 1.2 cm, stiff. Stipe stout, 40–120 cm, with hairlike scales at base, otherwise smooth and glabrous; lamina glaucous abaxially, dark green adaxially, 25–50 × 50–70 cm, leathery, glabrous, divided to

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base into 2 fan-shaped halves, each half deeply divided into 4 unequal lobes 4–5 cm wide, lobes less deeply divided 1 or more times, with 10–20 or more ultimate lobes in each half of lamina; lobe tapering into narrow, acute apices, margins coarsely toothed; venation prominent abaxially. Paraphyses club-shaped.

Terrestrial in clearings, ridges, forest margins; 500–1200 m. Hainan, Taiwan [Cambodia, India, Indonesia, Japan (S Ryukyu Islands), Malaysia, Philippines, Thailand, Vietnam; Pacific islands].

**3. *Dipteris chinensis*** Christ, Bull. Acad. Int. Géogr. Bot. 13: 109. 1904.

中华双扇蕨 *zhong hua shuang shan jue*

Rhizome 6–8 mm in diam., densely covered with scales; scales brown, subulate-lanceolate, stiff, margin entire. Stipe stramineous to brown, 30–100 cm, glabrous except base with scales; lamina pale brown abaxially, green adaxially, 20–30 × 30–60 cm, leathery, hairy abaxially when young, divided to base into 2 fan-shaped halves, each half deeply divided into 3–5 unequal lobes 5–8 cm wide, lobes less deeply divided, with 6–10 ultimate lobes in each half of lamina; lobe tapering into narrow, acute apices, margins coarsely toothed; venation prominent abaxially. Paraphyses club-shaped.

In shrubs; 500–2100 m. Chongqing, Guangdong, Guangxi, Guizhou, Yunnan [N Myanmar, N Vietnam].

## 2. *CHEIROPLEURIA* C. Presl, Epimel. Bot. 189. 1851.

燕尾蕨属 *yan wei jue shu*

Plants evergreen, terrestrial or epilithic, medium-sized, Rhizome creeping or subscandent, protostelic, rarely branching, covered with long, uniseriate, pale brown, multicellular hairs; scales absent. Fronds dimorphic; stipes ± approximate, hairy at base only, non-articulate. Sterile lamina subleathery, entire or lobed, rarely to 4-lobed; main veins dichotomously forked with anadromous branching, smaller veins areolate with smaller areoles included in larger ones and numerous free included ultimate veinlets, all veins ± prominent; stomata paracytic. Fertile lamina simple, long, narrow, with 3 longitudinal main veins, abaxially almost wholly covered with sporangia. Sporangia of mixed maturation, intermingled with hairlike paraphyses with swollen terminal cell; spores ca. 128 per sporangium, trilete, tetrahedral, with prominent ridge near aperture, surface smooth to rugulose.  $x = 33$ .

Three species: from S Japan, China, and Indochina to E Malesia; two species in China.

- 1a. Sterile lamina often deeply forked, or 2-forked into 3 lobes, or entire, angles of sinus 60°–70°, main veins 6–8 at base of lamina ..... 1. *C. bicuspis*  
 1b. Sterile lamina often entire, rarely shallowly forked distally, angles of sinus 30°–40°, main veins 3 or 4 at base lamina ..... 2. *C. integrifolia*

**1. *Cheiropleuria bicuspis*** (Blume) C. Presl, Epimel. Bot. 189. 1851.

燕尾蕨 *yan wei jue*

*Polypodium bicuspe* Blume, Enum. Pl. Javae 2: 125. 1828; *Acrostichum bicuspe* (Blume) Hooker.

Rhizome creeping, short, densely covered with hairs; hairs soft, pale brown, to 5 mm or more, multicellular. Stipes approximate, glabrous except near base; stipes of sterile fronds 20–30 cm, of fertile fronds up to 40–50 cm. Sterile lamina ovate, often deeply forked, or 2-forked into 3 lobes, or entire, base rounded, apex acute, sinus angles 60°–70°; main veins 6–8 at base of lamina, veinlets anastomosing, areoles with branching included veinlets. Fertile lamina simple, elliptic, 10–20 × 1–2 cm, thickly papery, abaxial surface wholly covered with sporangia in acrostichoid condition except on main veins and narrow strip at margins. Paraphyses abundant, club-shaped.

Terrestrial in forests; 1200–1300 m. Guizhou (Libo), Hainan, ?Taiwan [Indonesia, Japan, Malaysia, New Guinea, Thailand, Vietnam].

**2. *Cheiropleuria integrifolia*** (D. C. Eaton ex Hooker) M. Kato, Y. Yatabe, Sahashi & N. Murakami, Blumea 46: 522. 2001.

全缘燕尾蕨 *quan yuan yan wei jue*

*Acrostichum bicuspe* (Blume) Hooker var. *integrifolia* D. C. Eaton ex Hooker, Sp. Fil. 5: 272. 1864; *Cheiropleuria bicuspis* (Blume) C. Presl var. *integrifolia* (D. C. Eaton ex Hooker) D. C. Eaton ex Matsumura & Hayata.

Rhizome creeping, short, densely covered with hairs; hairs soft, pale brown, to 5 mm or more, multicellular. Stipes approximate, glabrous except near base; stipes of sterile fronds 15–25 cm, of fertile fronds 15–25 cm or longer. Sterile lamina ovate, entire, rarely shallowly forked distally, base rounded, apex acute or lobed, sinus angles 30°–40°; main veins 3 or 4 at base of lamina, veinlets anastomosing, areoles with branching included veinlets. Fertile lamina simple, elliptic, 5–10 × 1–1.5 cm, papery, abaxial surface wholly covered with sporangia in acrostichoid condition except on main veins and narrow strip at margins. Paraphyses abundant, club-shaped.

Terrestrial in forests; 500–800 m. Guangdong, Guangxi, Taiwan [S Japan].

*Cheiropleuria integrifolia* is distinct from *C. bicuspis* by the normal condition of entire fronds, with fewer (3 or 4) main veins, and the narrower divergent angle in the lobed lamina. In China, lobed and unlobed individuals often occur in the same population and even on the same rhizome. Further studies on Chinese populations are needed.