
THELYPTERIDACEAE

金星蕨科 jin xing jue ke

Lin Youxing (林尤兴)1, Li Zhongyang (李中阳)2, Kunio Iwatsuki3, Alan R. Smith4

Plants terrestrial or on rocks. Rhizomes stout, dictyozeste radially symmetrical, branched or not, erect, ascending, or long creeping, with scales at apices; scales basiflexed, lanceolate or nearly ovate, brown, thick, luminae elongate, usually with grayish white short setae on dorsal side or ciliate along margins. Fronds clustered, approximate, or remote; stipes slender, stramineous, not articulate, with 2 crescent-shaped vascular bundles at base, usually scaly at bases, distally ± with grayish white uncinular acicular hairs, rarely with multicellular long hairs or stellate hairs. Fronds monomorphic, rarely subdimorphic, oblong-lanceolate or oblanceolate, sometimes ovate or ovate-triangular, usually pinnate-pinnatifid, sometimes 3- or 4-pinnate-pinnatifid, rarely 1-pinnate; pinnae symmetrical at bases; costae grooved adaxially but grooves not confluent with rachial grooves, or raised and with dense grayish acicular hairs, with expanded tuberculate aerophores at bases of pinnae. Laminae herbaceous or papery, sometimes somewhat leathery, green or dark brown-green when dry, both sides (particularly rachises, costae, and main veins adaxially) with grayish white uncinular acicular hairs, rarely glabrous, usually with orange or reddish orange, stalked or sessile spherical or club-shaped glands, occasionally small scaly along rachises and costae abaxially. Sori orbicular, oblong, or shortly linear, dorsifixated on veins, indusiate or exindusiate; indusia orbicular-reniform, fixed by deep notch, most ± hairy, persistent or hidden in sori, caducous, or not concentrated into sori but scattered along reticulate veins and exindusiate. Sporangia long stalked, usually with hairs or glandular hairs below annuli and at distal end of sporangial stalks. Spores bilateral, rarely tetrahedral, tuberculate, echinate, granular, or usually with a winged perispore. Prothalli green, cordate or narrowly cordate, usually with broad wings, symmetrical, usually with hairs or glands. x = 27–36 (lacking 28).

About 20 genera and ca. 1,000 species, more at lower elevations, very few tropical species above 4500 m: widespread in all tropical and subtropical zones of the world, less common in temperate zone, particularly more common in Asia; 18 genera (one endemic) and 199 species (102 endemic) in China.

The family* is very natural and is distinguished from others by having grayish white uncinular acicular hairs and pubescence throughout the plant. However, there are many different viewpoints about generic circumscription in the family. Ching recognized 18 genera (including Hypodematum) in his 1963 treatment (Acta Phytotax. Sin. 8: 289–335); soon afterward, in 1978 (Ching, Acta Phytotax. Sin. 16(3): 12–13), the number of recognized genera in China grew to 20 (Hypodematum was removed and placed in its own family). In 1971, Hulttum subdivided this family in the Paleotropics into 23 genera (Blumea 19(1): 17–52). In 1977, Pichi Sermolli, mainly following Holttum, circumscribed other genera for a total of 32 genera (Webbia 3(2): 213–512). In 1990, A. R. Smith divided the family into five genera (in Kramer & Green, Fam. Gen. Vasc. Pl. 1: 263–272), i.e., Thelypteris (including five subgenera), Phegopteris, Pseudophegopteris, Macrothelypteris, and Cyclotis (including 20 subgenera). Of the many systems, those of Hulttum and Pichi Sermolli divide the family most finely, with the greatest number of genera. Holttum (loc. cit.) segregated the following genera from Cyclotis s.l.: Anphineuron, Christella, Pneumatopteris, and Sphaerostephanos. Recognition of these genera was based on several characters, including whether the proximal pinnae were shortened or not, and whether the sporangia and sporangial stalks bore hairs or glandular hairs. Hulttum (loc. cit.) also segregated several genera (e.g., Parathelypteris and Coryphteris) from the classical Thelypteris s.l., the free-veined thelypteroids, by characters that included rhizome habit, laminar glands, and chromosome base number. Smith (loc. cit.: 265) noted: “Although many of Holttum’s genera seem natural (i.e., monophyletic), a combination of characters must be used to circumscribe them. Some of the characters concern minute glands and hairs and require 30 × magnification or greater for observation. Others require that complete specimens be at hand (including lower part of blade and stem). Even then, identification to genus may be difficult, as generic lines are not always sharp.” The question of generic delimitation within the family needs further study, but for now we adopt Ching’s system (1978), modified from Ching (1963).**

*In 1940, Ching established many new families (Sunyatsenia 5(4): 237), including Thelypteridaceae with 12 genera, but the names of these new families are nomina nuda and were not therefore validly published (Melbourne Code, Art. 38.1(a)). Only in 1970 were these families formally published by Pichi Sermolli.

**(1) Holttum set up the genus Anphineuron with mixed characters in 1971, which was also adopted by Ching in 1978. Among the 12 recognized species in China, three occur in China: the type species A. opulentum, which is similar to Cyclotis in venation and lemon-yellow glands; A. immersum, which is similar to Parathelypteris species in venation; and A. tonkinensis, which has already been removed to a new genus, Mesopteris. As Hulttum himself considered Anphineuron to be a provisional treatment, this genus is not adopted here.

(2) Trichoneuron Ching (Acta Phytotax. Sin. 10: 118, pl. 22. 1967) was based on a single gathering, and the collection locality was unknown. Later, this species was rediscovered by Prof. W. M. Chu in Pingbian, SE Yunnan. According to Prof. Chu’s study, it belongs to the genus Lastreopsis (Dryopteridaceae). It is, therefore, not included here.

Using only venation, the family may be divided into 3 tribes: 1. Tribe Thelypterideae Ching: Veins free; with two subtypes: (1) all veinlets reaching margins or nearly reaching margins above sinuses between segments, with the bottom of sinuses not cartilaginous (e.g., Parathelypteris); (2) proximal pair of veinlets from adjacent segments reaching cartilaginous sinuses but not united; or acroscopic veinlet of basal pair of veinlets reaching cartilaginous sinus, basiscopic veinlet reaching margin above sinus (e.g., Pseudocyclusorus and Mesopteris). 2. Tribe Gonipterideae Ching: Veins

---

1 Herbarium, Institute of Botany, Chinese Academy of Sciences, 20 Nanxincun, Xiangshan, Beijing 100093, People’s Republic of China.
2 State Key Laboratory of Systematic and Evolutionary Botany, Institute of Botany, Chinese Academy of Sciences, 20 Nanxincun, Xiangshan, Beijing 100093, People’s Republic of China.
3 815-29 Kamoshida, Aoba-ku, Yokohama 227-0033, Japan.
4 University Herbarium, University of California, 1001 Valley Life Sciences Building #2465, Berkeley, California 94720-2465, U.S.A.
partly combined; at least proximal pair of veinlets from adjacent segments united to form triangular areoles and this vein union producing a long or short excurrent veinlet; additional areoles may be produced in the same row, by subsequent vein unions of veinlets; excurrent veinlets may connect with more distal vein unions, or with a translucent line leading to a sinus, thus forming oblique rhomboid areoles (goniopteroid venation) (e.g., Cyclosorus, Ampelopteris), or squarish areoles (meniscioid venation) (e.g., Pronephrium, the areoles without included veinlets; 3. Tribe Dictyoclineae Ching: Veinlets between lateral veins all combined into irregular squarish or pentagonal areoles and each areole sometimes with simple or forked included veinlets.

The following taxon is excluded from the present treatment, pending further research: Thelypteris calvata Ching (Bull. Fan Mem. Inst. Biol. Bot. ser. 2, 1: 313. 1949), described from Guangdong.


Key 1

1a. Veins partly or entirely reticulate.
   2a. Veins entirely reticulate, with or without simple or forked included veinlets in areoles; sori scattered and attached along reticulate veins ................................................................. 18. Dictyocline

2b. Veins partly reticulate (venation goniopteroid or meniscioid), areoles produced all without included veinlets; sori orbicular or shortly linear.
   3a. Veins meniscioid, i.e., all veinlets joining into square or rectangular areoles; pinnae large, broadly lanceolate; sori orbicular when young and usually confluent when mature .......................................... 17. Pronephrium

3b. Veins goniopteroid, i.e., proximal pair of veinlets from adjacent segments or one pair of veinlets between veinlets of pinna joined to form into triangular areoles and producing an excurrent veinlet from these vein unions; excurrent veinlet or a line of translucent membrane at its end running to a sinus, several other pairs of veinlets connected to this excurrent vein or translucent membrane; pinnae small, narrowly lanceolate or triangular-lanceolate.
   4a. Pinnae pinnatifid; one long or short translucent membranous line at bottom of sinus on segments connected with excurrent veinlet, veins except proximal pair from second to fifth pairs of veinlets connected with excurrent veinlet or translucent membranous line and forming rhombic areoles, other veinlets reaching margins above sinus; laminae usually with orange or reddish orange spherical or club-shaped glands abaxially; sori indusiate ................................................... 14. Cyclosorus

4b. Pinnae pinnatifid or subentire, without translucent membranous line below sinus; except proximal pair of veins, other several pairs of veinlets connected with excurrent veinlet or reaching margins above sinus; laminae without glands abaxially; sori exindusiate.
   5a. Plants with gemmae in pinna axils, these gemmae potentially developing into new plants; laminae covered with both simple and stellate hairs; sori orbicular or suborbicular; sporangia glabrous .................................................................................................................. 16. Ampelopteris

5b. Plants lacking gemmae; laminae with only simple hairs; sori thick and shortly linear; sporangia each with several setae at top .................................................................................. 15. Stegnogramma

1b. Veins free.
   6a. Sori indusiate.

7a. Helophytes; lateral veins forked ........................................................................................................ 1. Thelypteris

7b. Terrestrial plants; veinlets usually simple (occasionally forked).
   8a. Costae glabrous adaxially (or occasionally with sparse caducous hairs); stipes with many scales on proximal parts .............................................................................................................. 2. Oreopteris

8b. Costae with dense persistent acicular hairs adaxially; stipes with sparse scales on proximal parts.
   9a. Costae rounded and raised adaxially; ends of veinlets not reaching margin; indusia small, or sometimes not developed.

   10a. Laminae oblong or broadly lanceolate, 2- or 3-pinnate, proximal pair of pinnae similar in shape and size or smaller than distal ones, throughout with unicellular hairs .............. 4. Metathelypteris

10b. Laminae triangular-ovate, 3- or 4-pinnate, proximal pair largest, throughout with multicellular hairs .................................................................................................................. 5. Macrothelypteris

9b. Costae grooved adaxially; veinlets reaching margins; indusia large, brown.

11a. Pinnae without tuberculate aerophores at pinna bases abaxially; proximal pairs of veins reaching margins above sinus; laminae herbaceous, abaxially usually with reddish orange spherical glands ................................................................. 3. Parathelypteris

11b. Pinnae each with a tuberculate aerophore at base abaxially; proximal pair of lateral veins from adjacent segments with acroscopic veinlet reaching cartilaginous bottom of sinus; laminae papery or leathery, abaxially without spherical glands ...... 12. Pseudocyclosorus

6b. Sori exindusiate.

12a. Sori orbicular.
13a. Laminae ovate-triangular, 3-pinnate; veinlets forked, not reaching margins; laminae throughout with multicellular long hairs ................................................................. 5. Macrothelypteris

13b. Laminae narrowly oblong or lanceolate, pinnate-pinnatifid; veinlets simple and reaching margins; laminae throughout with unicellular short hairs.

14a. Rachises at pinna bases abaxially with brown tuberculate aerophores; laminae ± brown when dry; segments without cartilaginous ridge at bottom of sinuses ............... 9. Cyclogramma

14b. Rachises at pinna bases abaxially without brown tuberculate aerophores; laminae green when dry; segments with a cartilaginous ridge at bottom of sinuses.

15a. Plants ± with acicular hairs; pinnae pinnatifid nearly to costae; segments falcate-lanceolate, proximal pair of veinlets nearly reaching translucent membrane or margin above sinus; sori close to costules ....................... 11. Glaphyropteridopsis

15b. Plants glabrous throughout; pinnae pinnatifid to 1/2 of distance to costae; segments triangular, proximal 3 pairs of veinlets reaching margin of translucent membrane below sinuses but not joined; sori not close to costules ............... 13. Mesopteris

12b. Sori thick and shortly linear, or oblong.

16a. Sori thick and shortly linear; veins simple; segments entire.

17a. Laminae brown or brownish green when dry, with full spreading acicular hairs on both surfaces; proximal 1 or 2 pairs of pinnae free, distal ones adnate to costae; veinlets expanded at ends of veins and reaching margin; sori attached on middle of veinlets; sporangia each with 2–6 acicular hairs at tops ................................................................. 10. Leptogramma

16b. Sori oblong or suborbicular; lateral veins ± forked; segments or ultimate pinnules pinnatifid.

18a. Plants small; stipes stramineous, not polished; laminae ovate-triangular or narrowly lanceolate; lateral pinnae decurrent along both sides of rachises and connected to each other; rachises and costae with more lanceolate scales, scales ciliate along margins; veinlets reaching margin ................................................................. 6. Phegopteris

18b. Plants usually taller and larger; stipes reddish brown or brownish stramineous, polished; laminae oblong, rarely broadly lanceolate; lateral pinnae not decurrent and free from each other; rachises and costae without scales; veinlets not reaching margin ............ 8. Pseudophegopteris

**Key 2 (artificial)**

1a. Veins partly or almost fully connected.

2a. Veins reticulate and forming regular areoles; sori scattered and attached along reticulate veins ............... 18. Dictyocline

2b. Veins partly joining; sori orbicular or shortly linear.

3a. Veins meniscioid ............................................................................................................................. 17. Pronephrium

3b. Veins goniopteroid.

4a. Plants of undeterminate growth, usually with gemmae in pinna axils, these gemmae potentially developing into new plants; laminae usually with mixed simple and stellate hairs ....................... 16. Ampelopteris

4b. Plants of determinate growth; laminae with only simple hairs.

5a. Segments with an elongate translucent membrane below sinus; laminae usually with orange or reddish orange, spherical or clavate glands abaxially; sori orbicular, indusiately ..................... 14. Cyclosorus

5b. Segments lacking translucent membranes below sinuses; laminae without glands abaxially; sori shortly linear, exindusiately ............................................................. 15. Siegnogramma

1b. Veins free.

6a. Tuberculate aerophores present at pinna bases abaxially.

7a. Proximal pair of veinlets on segments or acroscopic veinlet reaching sinus, others reaching margin above sinus; laminae with only acicular hairs on both surfaces ........................................ 12. Pseudocyclosorus

7b. Veinlets on segments all reaching margins above sinus; laminae ± with mixed hooked long hairs, except with acicular hairs ........................................................................ 9. Cyclogramma

6b. Tuberculate aerophores lacking at pinna bases abaxially.

8a. Segments each with a cartilaginous ridge at bottom of adjacent sinus and with a transparent membranous line below that.

9a. Plants ± with acicular hairs; pinnae pinnatifid nearly to costae; segments falcate-lanceolate, proximal pair of veinlets only reaching nearby line of transparent membrane below sinus or to margins above sinus; sori close to costules ........................................ 11. Glaphyropteridopsis

9b. Plants glabrous throughout; pinnae pinnatifid to 1/2 of distance to costules; segments triangular; proximal 3 pairs of veinlets reaching transparent membranous margins below sinus but not connected; sori not close to costules ........................................................................ 13. Mesopteris
8b. Segments without cartilaginous ridge at bottom of sinus, lacking a translucent membranous line below that.

10a. Laminae ovate-triangular or triangular, 3- or 4-pinnate; proximal pair of pinnae largest; veinlets not reaching margins; throughout with multicellular acicular hairs ................................. 5. Macrothelypteris

10b. Laminae oblong or broadly lanceolate, most often pinnate-pinnatifid, to 3-pinnate-pinnatifid, rarely simple or bipinnatifid; proximal pair of pinnae similar in size or smaller than more distal ones; throughout with unicellular acicular hairs.

11a. Costae densely covered with persistent grayish white acicular hairs adaxially.

12a. Costae rounded and raised adaxially; sporangia each sometimes with one multicellular hair expanded at tip on distal part of sporangial stalks ......................... 4. Metathelypteris

12b. Costae grooved adaxially; sporangial stalks sometimes each with a sessile spherical gland on distal part or sporangia each with one seta near annulus.  
13a. Veins not expanded at ends, reaching margins; sori orbicular, indusiate; sporangial stalks sometimes with 1–3 sessile spherical glands on distal parts ... 3. Parathelypteris

13b. Veins with minute expanded hydathodes at ends and not reaching margins; sori oblong or shortly linear, exindusiate; sporangia each usually with a seta near annulus ........................................ 7. Craspedosorus

11b. Costae without unicellular acicular hairs adaxially (occasionally with sparse caducous hairs).

14a. Rachises and costae with few small scales.

15a. Scales on rachises and costae with glands at apices, without cilia; pinnae sessile at bases, not adnate to rachises .......................................................... 2. Oreopteris

15b. Scales on rachises and costae without glands at tips but ciliate below tips; pinna bases adnate to rachises and decurrent ......................................................... 6. Phegopteris

14b. Rachises and costae without scales.

16a. Plants of marshes; veinlets forked; sori indusiate; sporangia each with several short setae near top of annulus .......................................................... 1. Thelypteris

16b. Plants terrestrial; veinlets simple; sori exindusiate; sporangia each with several acicular hairs.

17a. Sori orbicular; veinlets not reaching margins ..................................... 8. Pseudophegopteris

17b. Sori oblong or shortly linear; veinlets reaching margins ....................... 10. Leptogramma


沼泽蕨属 zhao ze jue shu
Lin Youxing (林尤兴); Kunio Iwatsuki

Lastrea Bory.

Plants small to medium-sized, of marshes and meadows. Rhizomes long creeping, black, glabrous, sparsely covered with scales at apices; scales ovate-lanceolate, with acicular hairs and unicellular glandular hairs on surfaces and along margins. Fronds remote or approximate, stipitate; stipes nearly black at bases and slightly acicular hairy, distally stramineous, glabrous; laminae oblong-lanceolate, not tapering or slightly tapering to bases, pinnate-pinnatifid, shorty acuminate at apices; pinnae mostly nearly flat spreading, lanceolate, bases truncate, symmetrical, pinnatifid, apices acute or shortly acuminate; segments ovate-triangular or oblong, shortlly pointed at apices; veins free, pinnate on segments, veinlets forked or simple, reaching margins. Laminae thickly herbaceous or somewhat leathery, both surfaces with few acicular hairs when young, glabrescent when old, costae each with a groove adaxially, abaxially raised, with some membranous small scales. Sori orbicular, dorsifixed on veinlets, located between costules and margins, in one line on each side of costules, usually ± covered by reflexed margins; indusia membranous, orbicular-reniform, greenish, deciduous or hidden in mature sori; sporangia each with 1 or 2 short capitate glandular hairs close to tops of annuli; spores bilateral, reniform, perispores transparent, echinate, exospor smooth. $x = 35$.

Four species: temperate regions of N Hemisphere, S tropical and S Africa, India, Madagascar, New Guinea, New Zealand; two species in China.

In the past, *Thelypteris* has been defined to contain most or all species in the family. More recent studies show that, using multiple additional characters, like types of hairs, glands, venation, lamina shape and dissection, indusial characters, aerophores, adaxial grooves, spores, and chromosome base numbers, natural groups can be utilized to define smaller subsets of *Thelypteris* s.l. Here, we adopt a narrow concept for classification.

1a. Plants 35–65 cm tall; fronds approximate, stipes 2–2.5 mm in diam. at bases; costae without scales abaxially ......... 1. *T. palustris*

1b. Plants 14–26 cm tall; fronds remote, stipes slender, ca. 0.5 mm in diam. at bases; costae with sparse easily deciduous, broadly ovate, brownish, membranous scales ........................................ 2. *T. fairbankii*
1. **Thelypteris palustris** Schott, Gen. Fil. t. 10. 1834.

**沼泽蕨** zhao ze jue

Plants 35–65 cm tall. Rhizomes long creeping, black, glabrous or with sparse reddish brown, ovate-lanceolate scales. Fronds approximate; stipes 20–40 cm, bases black, distally dark stramineous, polished, usually glabrous, or white pubescent when young; laminae lanceolate, 22–28 × 6–9 cm or sometimes slightly wider, bases almost tapering, pinnate-pinnatifid, apices shortly acuminate and pinnatifid; pinnae ca. 20 pairs, subopposite, flat- or obliquely spreading, usually slightly reflexed; proximal pair slightly shortened, middle pinnae lanceolate, 4–5 × 1–1.2 cm, bases truncate, pinnatifid nearly to costae, apices shortly acuminate; segments 5–7 × 3–5 mm, rounded-oblanceolate, sometimes slightly tapering at bases, laminae oblong-lanceolate, 4–5 × 1–1.2 cm, bases truncate, pinnatifid nearly to costae, apices shortly acuminate; segments 5–7 × 3–5 mm, rounded-oblanceolate, sometimes slightly tapering at bases.

Veins pinnate in segments, lateral veins 4–6 pairs, simple or forked and reaching margins, proximal pair arising from base of costa. Laminae papery, grass-green or yellowish green when dry, glabrous on both surfaces, glaucous, deciduous when mature. Spores smooth on surfaces of exospore, perispores translucent, echinate. 2n = 70.

Meadows, reed marshes; below 800 m. Heilongjiang, N Jiangsu, Jilin, Shandong, Sichuan, Xinjiang [widespread in temperate regions of the N Hemisphere].

1a. **Thelypteris palustris** var. **palastris**

1b. **Thelypteris palustris** var. **pubescens** (G. Lawson) Fern. Rhodora 31: 34. 1929.

**毛叶沼泽蕨** mao ye zhao ze jue


Rachises, costae, and veins all glabrous.

Meadows, reed marshes, wet shaded places in forests; 200–800 m. Hebei, Heilongjiang, Henan, N Jiangsu, Jilin, Nei Mongolia, Shandong, Sichuan, Xinjiang [widely distributed in temperate regions of the N Hemisphere].

2. **Thelypteris fairbankii** (Beddome) Y. X. Lin, K. Iwatsuki & M. G. Gilbert, comb. nov.

**鳞片沼泽蕨** lin pian zhao ze jue

Basionym: Lastrea fairbankii Beddome, Ferns Brit. India, t. 254. 1866; Aspidium thelypteris (Linnaeus) Swartz var. squamigerum Schlechtdahl; L. thelypteris (Linnaeus) Bory var. squamigera (Schlechtdahl) Beddome; Nephrodium thelypteris (Linnaeus) Strempel var. squamigerum (Schlechtdahl) Hooker ["squamulosum"]; Thelypteris squamigera (Schlechtdahl) Ching ["squamulosa"].

Plants small, 14–26 cm tall. Rhizomes long creeping and branched, black, apices including stipe bases with sparse membranous, brownish ovate-lanceolate scales. Fronds remote; stipes slender, 6–18 cm, black at bases, distally stramineous, glabrous; laminae oblong-lanceolate or narrowly triangular-lanceolate, 8–10 × 3–5 cm, sometimes slightly tapering at bases, pinnate-pinnatifid, shortly acuminate and pinnatifid at apices; pinnae 10–12 pairs, alternate or subopposite, middle ones linear-lanceolate, 2–3 × 0.5–0.8 cm, truncate at bases, pinnatifid, shortly pointed at apices; segments oblong or triangular-lanceolate, usually reflexed at margins, entire, obtuse at apices. Veins pinnate in segments, lateral veins forked, veinslets reaching margins. Laminae somewhat leathery, glabrous, along rachises and costae sparsely pubescent adaxially, costae with sparse brownish, membranous, easily deciduous, ovate-lanceolate scales. Sori not seen.

Marshes. S Yunnan [S India; S Africa, Pacific islands (New Zealand)].


**假鳞毛蕨属** jia lin mao ye zhao ze jue

Lin Youxing (林尤兴); Kunio Iwatsuki

Plants medium-sized, terrestrial. Rhizomes short, erect or ascending. Fronds clustered; stipes dark stramineous, densely covered with large, thin, brown, lanceolate scales, distally gradually sparsely so; laminae oblong-lanceolate, gradually tapering to bases, pinnate-pinnatifid; proximal pinnae gradually shortened, proximal ones triangular auriculate, middle ones lanceolate, pinnatifid to narrow wings on both sides of costae. Veins pinnate, free, reaching margins. Sori orbicular, attached above middle of veinslets, far from costules; indusia orbicular-reniform, usually with glands along margins. Sporangia usually with stalked glands near annuli. Spores bi-lateral, reniform, perispores not evident and easily deciduous, granular. x = 34.

Three species: Europe, N India, E Asia to N America; two species in China.
1a. Rachises stramineous, with sparse bright brown or brownish membranous scales; laminae 20–30 cm wide, proximal 3 or 4 pairs of pinnae slightly shortened, proximal pair of pinnae triangular-lanceolate ........................... 1. O. quelpaertensis

1b. Rachises bright brownish stramineous, with sparse brownish short hairs; laminae 6–7 cm wide at middle or distal part, proximal 8–10 pairs of pinnae gradually shortened, proximal pair of pinnae with orbicular or triangular auricles ................................................................. 2. O. elwesii


亚洲假鳞毛蕨 亚 zhòu jia lin mao jue

Dryopteris quelpaertensis Christ, Bull. Acad. Int. Géogr. Bot. 20: 7. 1910 ["quelpartensis"]; Athyrium quelpaertensis (Christ) Ching; Ctenitis quelpaertensis (Christ) H. Itô; C. quelpaertensis var. yamamontana (Masamune) H. Itô; D. christianana Kodama ex Koidzumi; D. kamtschatcica Komarov; D. oreopteris (Ehrhart) Maxon var. fauriei (Christ) Miyabe & Kudô; D. yakamontana Masamune; Lastrea quelpaertensis (Christ) Copeland; L. quelpaertensis var. yakamontana (Masamune) Tagawa; Nephrodium montanum Baker var. fauriei Christ; Thelypteris quelpaertensis (Christ) Ching; T. quelpaertensis var. yakamontana (Masamune) Tagawa.

Plants (40–)70–105 cm tall. Rhizomes short, erect or ascending, densely covered with scales; scales bright brown, ovate-oblong-lanceolate, entire along margins, acuminate and with small club-shaped glands at apices. Fronds clustered; stipes 10–30 cm, bases dark brown, distally dark stramineous, including rachises covered with denser scales; scales bright brown or brownish, ovate, lanceolate, or linear, glandular at apices; laminae oblong-ob lanceolate, (13–)50–70 × (10–)20–30 cm, gradually tapering to bases, pinnate-pinnatifid, long acuminate and pinnatifid at apices; pinnae 20–35 pairs, opposite or alternate distally, proximal 3 or 4 pairs gradually shortened, proximal pair of pinnae triangular-lanceolate; middle pinnae (5–)10–15 × 1–2.5 cm, bases truncate, pinnatifid nearly to costae, apices long acuminate; segments usually longest at pinna bases, triangular-oblong, entire or shallowly undulate and usually recurved along margins, rounded-obtuse at apices. Veinlets free, simple or forked above middle and reaching margins. Laminae herbaceous, grayish green, covered with brownish linear scales and mixed grayish white pubescence, elsewhere glabrous. Sori orbicular, attached above middle of veinlets and close to margins; indusia orbicular-reniform, brown, membranous, usually with glandular projections along margins. Spores finely granular. 2n = 68.


锡金假鳞毛蕨 xi jin jia lin mao jue


Plants 35–45 cm tall. Rhizomes creeping including stipe bases covered with brown ovate thin scales. Fronds sparse; stipes 30–32 cm, blackish brown proximally, upward to rachises bright brownish stramineous, subglabrous abaxially, along grooves pubescent adaxially; laminae ob lanceolate, 30–32 × 5–7 cm, gradually tapering to bases, pinnate-pinnatifid, acuminate at apices; pinnae ca. 10 pairs, gradually reduced from middle of lamina downward, opposite or alternate, proximal pair of pinnae orbicular-auriculate, 5–8 × 5–8 mm, middle ones alternate, spreading or slightly ascending, 3–4.5 cm, to 1 cm wide, pinnatifid to 2/3 of distance to costae; segments ca. 5 × 4 mm (basal acroscopic part minutely longer), ligulate, rounded-obtuse at apices. Veinlets impressed adaxially, abaxial sides minutely raised, veinlets simple or forked, 3 or 4 pairs per segment, all reaching margins above sinuses. Laminae papery, brownish green when dry adaxially, grayish green abaxially, glabrous on both surfaces, with more orange-yellow glands abaxially. Sori attached on ends of single veinlet or acroscopic veinlet on forked veins; indusia membranous, brown, glabrous, persistent.

Stream sides in subalpine coniferous forests; ca. 3100 m. Yunnan [India (Sikkim)].


金星蕨属 jin xing jue shu

Lin Youxing (林尤兴); Kunio Iwatsuki


Plants small to medium-sized, terrestrial plants, rarely in marshes or meadows. Rhizomes long creeping or short and decumbent, ascending or erect, glabrous or with scales or rusty yellow hairs. Fronds remote, approximate, or clustered; stipes stramineous or castaneous, ± polished, bases sometimes nearly black and glabrous or with spreading, grayish white, multilocular acicular hairs, distally glabrous or pubescent; laminae ovate-oblong, oblong-lanceolate, or lanceolate, tapering or not tapering to bases, pinnate-pinnatifid, acuminate and pinnatifid at apices; lateral pinnae mostly narrowly lanceolate to linear-lanceolate, bases symmetrical, truncate or broadly cuneate, not adnate to rachises, sessile or occasionally shortly stalked, apices acuminate; proximal pinnae not
shortened or 1 to several pairs of pinnae obviously shortened, even reduced to small auricles, pinnatifid; segments mostly oblong, rectangular, or subsquare, margins entire or ± serrate, apices rounded-obtuse, sometimes pointed or with sinuuslike angles. Veinlets pinnate, free, simple and all reaching margins. Laminae herbaceous or papery, when dry yellowish green, sometimes brownish green or nearly black, both surfaces ± with pubescent or acicular hairs, rarely glabrous when dry, sometimes with orange-yellow or reddish purple glands abaxially; costae grooved adaxially, densely covered with short setae, rounded and raised abaxially and usually ± with acicular hairs, rarely glabrous. Sori orbicular, medium-sized, dorsifixed at middle or near ends of veinlets, located between main veins and margins or slightly closer to margins; indusia large and orbicular-reniform, sometimes horseshoe-shaped, when dry brown, membranous, glabrous or hairy, usually persistent. Spores bilateral, orbicular-reniform, perispores thin and transparent, corrugate, ± finely reticulate on surfaces. x = 8, 9, 31.

About 60 species: tropical and subtropical regions of E Asia, SE Asia to Pacific islands; 24 species (11 endemic) in China.

*Parathelypteris* is very similar to *Metathelypteris* in shape, but it differs by the costae grooved adaxially; the veinlets usually simple, not forked, and reaching margins; and the indusia larger and readily discerned.


1a. Stipes stramineous, glabrous or sparsely shortly hairy near bases; sori usually attached near ends of veinlets and close to margins.

2a. Several pairs of pinnae on proximal part of lamina clearly shortened.

3a. Plants short and small, usually no more than 40 cm; rhizomes long creeping; middle pinnae no more than 3.5 cm; pinnae with more multicellular (usually 3–7 cells) acicular hairs abaxially along costae .......................................................... 1. *P. beddomei*

3b. Plants more than 40 cm tall; rhizomes stronger, creeping or ascending; middle pinnae usually over 4 cm; pinnae usually with unicellular acicular hairs abaxially along costae, sometimes with 2- or 3-celled hairs.

4a. Pinnae 3 or 4 pairs on proximal part of lamina gradually shortened, proximal pair of pinnae 1–2 cm, not auriculate .............................................................................................................. 2. *P. changbaishanensis*

4b. Pinnae 5–8 pairs on proximal part of lamina gradually shortened, proximal pair of pinnae reduced to small auricles or lacking.

5a. Laminae without glands or occasionally with few orange-yellow spherical glands abaxially; rhizomes long creeping, subglabrous .......................................................... 3. *P. nipponica*

5b. Laminae with more orange-yellow spherical glands abaxially; rhizomes ascending or creeping, densely rusty yellow pubescent.

6a. Rhizomes ascending; rachises with glaucous fine acicular hairs abaxially; indusia with dense setae .......................................................... 4. *P. qinlingensis*

6b. Rhizomes long creeping, densely rusty yellow hairy; rachises subentire abaxially; indusia glabrous or occasionally with 1 or 2 setae ................................................. 5. *P. borealis*

2b. Proximal pinnae not shortened or slightly shortened.

7a. Plants usually not more than 20 cm tall; middle pinnae 1.5–2 × 4–8 cm; segments 2–5 pairs; indusia horseshoe-shaped.

8a. Pinnae subglabrous abaxially, nearly without glands; indusia larger and subglabrous, occasionally with few grayish white setae ........................................... 6. *P. cystopteroides*

8b. Costae and costules abaxially with sparse grayish white fine acicular hairs and orange-yellow orbicular glands; indusia small and with more setae .................................................. 7. *P. grammotoideus*

7b. Plants 25–60 cm tall, or 2–3 m tall.

9a. Plants 2–3 m tall; lateral pinnae 25–30 × 2–2.5 cm; segments 60–70 pairs per pinna; pinna glands confined to veinlets ........................................................................ 11. *P. subimmersa*

9b. Plants 25–60 cm tall; middle pinnae 2–6 × ca. 1 cm; segments 6–20 pairs; pinnae glands scattered abaxially.

10a. Costae glabrous abaxially; segments of fertile fronds crenate along margins .......... 8. *P. serrutula*

10b. Costae ± with acicular hairs; segments of fertile fronds entire along margins.

11a. Middle pinnae 2–3 cm, acute at apices; segments 6–10 pairs; proximal several pairs of pinnae minutely shortened; costae with only few acicular hairs abaxially .............. 9. *P. angustifrons*

11b. Middle pinnae ca. 4.5 cm, acuminate at apices; segments more than 15 pairs; proximal pinnae not shortened; costae with more acicular hairs abaxially .................. 10. *P. glanduligera*

1b. Stipes in part or whole (usually up to rachis) castaneous or castaneous-brown, rarely stramineous, bases glabrous or with spreading grayish white acicular hairs; sori usually dorsifixed on middle of veinlets, located between costa and margins.
12a. Laminae without reddish purple spherical glands abaxially.
13a. Stipes with dense unicellular grayish white short acicular hairs; lamina with similar dense hairs on both surfaces ................................................................. 20. P. castanea
13b. Stipes with spreading multicellular acicular long hairs at bases.
14a. Segments 2–4 sinuosity angular at apices.
15a. Rhizomes short and erect; bases of stipes mixed with few spreading multicellular long acicular hairs and, including above bases, with grayish white unicellular short setae; indusia sparsely pubescent .................................................. 21. P. pauciloba
15b. Rhizomes short, decumbent or ascending; stipes with dense spreading multicellular acicular long hairs, distally subglabrous; indusia densely shortly setaceous .................. 22. P. angulariloba
14b. Segments not sinuosity angular at apices.
16a. Laminae dark green or nearly black when dry; pinnae abaxially densely pubescent along costae, veins and interval sparsely shortly hairy; indusia glabrous or occasionally very sparsely pubescent when dry ................................................. 23. P. nigrescens
16b. Laminae grayish green when dry; pinnae with dense multicellular beardlike long acicular hairs; indusia densely pubescent ........................................ 24. P. indochinensis

12b. Pinnae with reddish purple spherical large hairs abaxially.
17a. Stipes glabrous at bases.
18a. Laminae lanceolate; middle pinnae narrower, 0.8–1.2 cm wide, glabrous or occasionally very sparsely greyish white pubescent abaxially; indusia glabrous or with sparse short hairs; stipes castaneous-brown, never stramineous .................................. 18. P. chinensis
18b. Laminae ovate-oblong; middle pinnae 1.3–1.6 cm wide, usually greyish white pubescent abaxially, rarely glabrous; stipes usually coetaneous, occasionally stramineous ........................................ 19. P. japonica
17b. Stipes with spreading 2- or 3-celled greyish white acicular hairs at bases.
19a. Laminae abaxially with long acicular hairs along costae.
20a. Rachises usually hairy abaxially; lateral pinnae 12–15 pairs; segments ± angular at apices, 3–6 veinlets per segment; laminae with reddish purple glands abaxially .................. 12. P. chingii
20b. Rachises usually glabrous abaxially, lateral pinnae 18–30 pairs; segments rounded-obtuse or rounded-truncate at apices and not angular, 7 or 8 pairs of veinlets per segment; laminae with denser reddish purple glands abaxially.
21a. Indusia with dense greyish white acicular long hairs ........................................ 13. P. petelotii
21b. Indusia glabrous or occasionally with few short setae ................................ 14. P. hirsutipes
19b. Laminae with short hairs or subglabrous abaxially along rachises.
22a. Laminae glabrous or with few short acicular hairs abaxially; indusia glabrous or occasionally with short setae .......................................................... 15. P. caudata
22b. Laminae with dense short acicular hairs abaxially; indusia hairy also.
23a. Indusia large, close to each other, densely shortly setaceous .................. 16. P. trichochlamys
23b. Indusia medium-sized, separate from each other, sparsely pubescent .......... 17. P. caoshanensis


长根金星蕨 chang gen jin xing jue

Nephrodium beddomei Baker in Hooker & Baker, Syn. Fil. 267. 1867; Aspidium beddomei (Baker) Prantl; Dryopteris beddomei (Baker) Kuntze; Lastrea beddomei (Baker) Beddome; Thelypteris beddomei (Baker) Ching; Wagneriopteris beddomei (Baker) A. Löve & D. Löve.

Plants 20–30(–40) cm tall. Rhizomes extremely long creeping, with sparse brown ovate small scales and dense brownish long hairs when young. Fronds remote or approximate; stipes slender, 4–10 cm, stramineous and glabrous; laminae oblanceolate, 15–25(–30) × 3–4(–6) cm, gradually tapering to bases, pinnate-pinnatifid, aciculate and pinnatifid at apices; pinnae 20–24(–30) pairs, alternate, sessile, obliquely spreading, proximal 7–9 pairs gradually shortened into small auricles, proximal pair of pinnae only 1–2 cm, middle pinnae lanceolate, 1.5–3.5 × 0.4–0.5 cm, bases minutely broadened, symmetrical, rounded-truncate, pinnatifid to narrow wing on both sides of costae, apices shortly acuminate; segments 10–14 pairs, oblong, entire, rounded at apices. Veins visible on both sides, veinlets pinnate, free, simple, reaching margins, 3 or 4 pairs per segment, proximal pair arising from bases of costae. Laminae herbaceous, yellowish brown when dry, abaxially with greyish white 3–7-celled fine long hairs along costae and veins, also with few orange-yellow spherical glands, adaxially with unicellular short acicular hairs along costae and veins. Sori small, 2 or 3 pairs per segment, attached near ends of veinlets, close to margins; indusia orbicular-reiniform, small, brown, thickly membranous, glabrous, persistent. 2n = 62.

Mountain meadows, streambeds, wetlands; 600–2500 m. Taiwan, Zhejiang [S India, Indonesia, Japan, Malaysia, Philippines].

Parathelypteris beddomei is similar to P. nipponica in outline but differs by plants thinner, rhizomes extremely slender, pinnae covered with more multicellular long acicular hairs, and growth in wet habitats.

Plants 45–60 cm tall. Rhizomes long creeping, nearly black and glabrous. Fronds approximate; stipes 15–25 cm, bases nearly black, occasionally covered with few dark brown ovate scales, distally stramineous, glabrous or sometimes with sparse grayish white fine and long hairs; laminae oblong-lanceolate, 25–35 × 8–12 cm, clearly tapering to bases, pinnate-pinnatifid, acuminate and pinnatifid at apices; pinnae 20–25 pairs, alternate, obliquely spreading, sessile, proximal 3 or 4 pairs gradually shortened, proximal pair of pinnae 1–2 cm, lanceolate and reflexed proximally; middle pinnae linear-lanceolate, 4–6 × 0.9–1.3 cm, bases minutely broadened, symmetrical, subtruncate, pinnatifid nearly to costae, apices acuminate; segments ca. 15 pairs, proximal pair slightly longer, middle ones oblong, 4–6 × 2–3 mm, sparsely shallowly and thickly serrate along margins, rounded-oblolute at apices. Veinlets visible, obliquely distally, 5(or 6) pairs per segment, proximal pair arising from bases of costae. Laminae thinly herbaceous, grass-green when dry, abaxially with orange-yellow spherical glands, costae villous, sparsely so along costules; adaxially with denser appressed short acicular hairs along grooves and veins. Sori small, orbicular, 3 or 4 pairs per segment, dorsifixed above middle of veinlets, slightly closer to margins; indusia small, orbicular-reniform, grayish yellow, membranous, hairy, persistent.

● Meadows; 600–1400 m. Jilin (Changbai Shan).

Parathelypteris changbaishanensis is similar to P. nipponica in outline but differs by proximal 2–4 pairs of pinnae shortened, pinnae with dense orange-yellow spherical glands and villous abaxially, and growth in meadows.


中日金星蕨 zhong ri jin xing jue

Aspidium nipponicum Franchet & Savatier, Enum. Pl. Jap. 2: 242, 636. 1879; Dryopteris nipponica (Franchet & Savatier) C. Christensen; Lastreopsis nipponica (Franchet & Savatier) CopeLAND; Thelypteris nipponica (Franchet & Savatier) Ching; Wagneriopsis nipponica (Franchet & Savatier) A. Löve & D. Löve.

Plants 40–60 cm tall. Rhizomes long creeping, subglabrous. Fronds approximate; stipes 10–20 cm, bases dark brown, ± covered with reddish brown broadly ovate scales, distally bright stramineous, glabrous; laminae oblong-lanceolate, 30–40 × 7–10 cm, gradually tapering to bases, pinnate-pinnatifid, acuminate and pinnatifid at apices; pinnae 25–33 pairs, proximal 5–7 pairs subopposite, proximally gradually reduced into small auricles, lowest ones tuberculaten; middle pinnae alternate, sessile, spreading, lanceolate, 4–5 × 0.7–1.2 cm, bases slightly broadened, symmetrical, truncate, pinnatifid nearly to costae, apices acuminate; segments ca. 18 pairs, slightly obliquely spreading, oblong, 3–5 × ca. 2 mm, entire or shallowly thickly serrate, rounded-obtuse at apices. Veinlets evident, simple, 4 or 5 pairs per segment. Laminae herbaceous, grass-green when dry, abaxially with grayish white, spreading, unicellular and mixed with few multicellular acicular hairs along costae and margins, interstitial region with dense micro-glandular hairs and few orange-yellow spherical glands; adaxially subglabrous except costae and veins with short acicular hairs. Sori orbicular, medium-sized, 3 or 4 pairs per segment, dorsifixed above middle of veinlets, far from costae; indusia medium-sized, orbicular-reniform, brown, membranous, with few grayish white long acicular hairs. Spores bilateral, orbicular-reniform, perispores coriaceous, exospore regularly finely reticulate. 2n = 124.

On soil in open forests on hills, common; 400–2500 m. Fujian, Gansu, Guangxi, Guizhou, Henan, Hubei, Hunan, N Jiangsu, Jiangxi, Shaanxi, Shandong, Sichuan, Yunnan, Zhejiang [Japan, S Korea, Nepal].

Parathelypteris nipponica is similar to P. novoboracensis (Linnaeus) Ching in outline, but the latter plant, which grows along the Atlantic coast, differs in segments acute at apices and indusia glabrous at the back.


秦岭金星蕨 qin ling jin xing jue

Plants 45–60 cm tall. Rhizomes ascending. Fronds subclustered; stipes 10–20 cm, bases dark brown, with sparse brown broadly ovate scales, distally stramineous, glabrous; laminae oblong-lanceolate, 35–45 × 8–11 cm, gradually tapering to bases, pinnate-pinnatifid, acuminate and pinnatifid at apices; pinnae ca. 25 pairs, proximally gradually shortened into small auricles, lowest ones tuberculaten; middle pinnae alternate, spreading, sessile, lanceolate, 4–6 × ca. 1 cm, bases symmetrical and slightly broader, subtruncate, pinnatifid nearly to costae, apices long acuminate; segments ca. 18 pairs, spreading, oblong-lanceolate, 4–6 × ca. 2 mm, entire, obtuse at apices. Veinlets evident, simple, 5 or 6 pairs per segment, proximal pair arising from bases of costule. Laminae thickly herbaceous, grass-green when dry, abaxially with orange-yellow spherical glands, costae, costules, and margins with dense grayish white spreading fine acicular hairs, adaxially along grooves and veins with appressed short setae, along rachises with sparse long hairs. Sori orbicular, 3–5 pairs per segment, dorsifixed near ends of veinlets and close to margins; indusia medium-sized, orbicular-reniform, brown, membranous, with more setae, persistent. Spores bilateral, orbicular-reniform, perispores coriaceous and obviously finely reticulate on surfaces, exospore finely reticulate.

● Pinus armandii forests, common; ca. 1800 m. Gansu, Shaanxi.

Parathelypteris qinlingensis differs from P. nipponica in having rhizomes ascending, fronds subclustered, pinnae with more orange-yellow spherical glands, fine acicular long hairs abaxially, and indusia densely covered with setae.


狭脚金星蕨 xia jiao jin xing jue

Dryopteris nipponica (Franchet & Savatier) C. Christensen var. borealis H. Hara, Bot. Mag. (Tokyo) 48: 695. 1934; Parathelypteris nipponica (Franchet & Savatier) Ching var. borealis (H. Hara) Nakaike; Thelypteris nipponica (Franchet & Savatier) Ching var. borealis (H. Hara) H. Hara.
Plants 45–65 cm tall. Rhizomes long creeping, with dense rusty yellow hairs. Fronds approximate; stipes ca. 13 cm, stramineous, glabrous, bases with sparingly brown ovate scales; laminae 25–50 × 5–11 cm; pinnae alternate, flatly spreading, sessile, proximal 7 or 8 pairs abruptly tapering into auricles, lowest ones tuberculate; middle pinnae lanceolate, 3–6 × 0.6–0.9 cm, bases slightly broadened, symmetrical, subtruncate, pinnatifid nearly to costae, apices acuminate; segments 12–18 pairs, oblong, 3–4.5 × 1.5–2 mm, entire, obtuse at apices. Veinlets evident, simple, 4 or 5 pairs per segment, proximal pairs arising from above bases of costules. Laminae herbaceous, yellowish green when dry, with dense orange-yellow spherical glands abaxially, with sparse grayish white fine acicular hairs along costae, costules, and margins, adaxially along grooves of costae with short hairs, elsewhere glabrous. Sori orbicular, dorsifixed near ends of veinlets and close to margins, 1–4 pairs per segment; indusia small, orbicular-reniform, brown, membranous, subglabrous. Spores bilateral, orbicular-reniform, perispermes few corrugate and finely reticulate on corrugations.

Valley thickets, wet shaded places in forests, common; 400–1900 m. N Anhui, N Fujian, Guangxi, Guizhou, Hunan, Jiangxi, Shaanxi, Sichuan [Japan].

*Parathelypteris borealis* is very similar to *P. nipponica* in laminar outline but differs by laminae with dense orange yellow spherical glands abaxially and indusia subglabrous. It is also similar to *P. qinlingensis*, but the latter has rhizomes ascending, costae with denser long acicular hairs abaxially, and indusia with more setae.


马蹄金星蕨  ma ti jin xing jue


Plants 7–20 cm tall. Rhizomes long creeping, branching mixed and becoming felt like, with sparse dark brown lanceolate small scales. Fronds approximate; stipes 3–5(–13) cm, slender, dark stramineous, subglabrous; laminae lanceolate, 4–7 × ca. 1.5 cm, not tapering to bases, bipinnatifidpartite, acuminata and pinnatifid at apices; pinnae 7–10 pairs, alternate, spreading, stalks short, proximal pair of similar shape as distal ones, 7–10 × 6–7 mm, subtruncate at bases, pinnatifid nearly to costae, obtuse at apices; segments 2 or 3 pairs, oblong, ca. 3 × ca. 1.5 mm, proximal pair usually irregularly bilobate. Veinlets evident, simple, ca. 3 pairs per segment. Laminae herbaceous, dark green when dry, subglabrous abaxially, adaxially with sparse appressed short hairs along grooves on costae. Sori orbicular or oblong, medium-sized, 2–4 pairs per segment, dorsifixed slightly above middle of veinlets; indusia large, orbicular-reniform, brown, thickly membranous, occasionally with few grayish white setae, persistent.

On rocks in forests. Along the coast, offshore islands of Fujian, Taiwan [Japan, Korea].


矮小金星蕨  ai xiao jin xing jue


Plants 10–18 cm tall. Rhizomes long creeping, apices including bases of stipes with reddish brown narrowly lanceolate small scales. Fronds approximate; stipes 3–10 cm, dark stramineous, with grayish white fine acicular hairs; laminae lanceolate, 5–8 × 2–3.5 cm, tapering to bases, pinnate-pinnatifid, acuminate and pinnatifid at apices; pinnae 6–8 pairs, alternate, subspreading, lanceolate, bases symmetrical and tapering, rounded-truncate, pinnatifid nearly to costae, apices obtuse or acute; segments 3–5 pairs, obliquely spreading, proximal pair oblong, 2–3 × 1.5–2 mm, entire, rounded at apices; distal segments gradually shortened. Veinlets visible abaxially, simple, 3 or 4 pairs per segment, proximal pair arising above bases of costules. Laminae thickly leathery, dark green when dry, with orange-yellow spherical glands abaxially, costae and costules with sparse glaucous acicular long hairs, adaxially along costal grooves with acicular hairs. Sori small, orbicular, 1–6 pairs per segment, dorsifixed near ends of veinlets, close to margins; indusia horseshoe-shaped, medium-sized, brown, thickly membranous, with more fine and long setae, persistent. Spores bilateral, orbicular-reniform, perispermes corrugate, finely reticulate on corrugations.

On rocks in forests; 1000–1400 m. Taiwan [Japan, Korea, Philippines].


有齿金星蕨  you chi jin xing jue


Plants ca. 50 cm tall. Rhizomes long creeping, glabrous, apices with sparse dark brown lanceolate scales. Fronds approximate or remote; stipes ca. 25 cm, dark stramineous, subglabrous; laminae broadly lanceolate, ca. 25 × 13 cm, not tapering to bases, pinnate-pinnatifid, acuminate and pinnatifid at apices; pinnae ca. 20 pairs, spreading, alternate or subopposite on proximal ones, subsessile, lanceolate, 5–7 × ca. 1.5 cm, bases symmetrical, subtruncate, apices acuminate; proximal pinnae slightly tapering to bases, pinnatifid nearly to costae; segments ca. 18 pairs, spreading, lanceolate, ca. 7 × 2 mm, acute at apices; segments on fertile laminae crenate along margins; sterile ones sharply lobate along margins. Veinlets evident, simple, 6 or 7 pairs per segment, proximal pair arising from bases of costules, with sparse spherical glands abaxially, glabrous, adaxial sides with dense short hairs along costal grooves and on costae. Sori medium-sized, orbicular, 5 or 6 pairs per segment, dorsifixed near ends of veinlets, close to margins; indusia small, orbicular-reniform, brown, membranous, glabrous or occasionally

狭叶金星蕨 xia ye jin xing jue


Plants 25–35 cm tall. Rhizomes long creeping, apices including stipe bases with sparse dark brown lanceolate thick scales. Fronds approximate; stipes 10–15 cm, stramineous, subglabrous, distal parts and rachises more grayish white pubescent; laminae lanceolate, 15–20 × 3–4 cm, slightly tapering to bases, pinnate-pinnatifid or subbipinnate, acuminate and pinnatifid at apices; pinnate 10–15 pairs, alternate, spreading, sessile or very shortly stalked, proximal pair of similar shape but slightly shorter than distal ones; middle pinnae lanceolate, 2–3 × ca. 1 cm, bases ± symmetrical, truncate, pinnatifid nearly to costae or subpinnate, apices obtuse or acute; segments or pinnales 6–20 pairs, proximal 2 or 3 pairs usually free, proximal pair of pinnae larger, oblong, 4–5 × ca. 2 mm, bases cuneate, slightly adnate to costae, margins entire or thickly serrate, apices obtuse; distal pairs gradually reduced. Veinlets evident abaxially, simple, 3 or 4 pairs per segment. Laminae herbaceous, when dry dark green, with orange-yellow spherical glands abaxially, with few acicular hairs along costae, veins occasionally with few short acicular hairs, rachises ± grayish white pubescent. Sori small, orbicular, 4 or 5 pairs per segment, dorsifixed near ends of lateral veins, close to margins; indusium medium-sized, orbicular-reniform, brown, thickly membranous, with sparse grayish white setae, persistent. Spores bilateral, orbicular-reniform, perispores corrugate and regularly finely reticulate. 2n = 144.

Open forests, beneath Phyllostachys pubescens; sea level to 1500 m. Anhui, Chongqing, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [N India, Japan, S Korea, Nepal, Vietnam].

1a. Pinnae abaxially subglabrous, except for sparse grayish white acicular hairs along costae, adaxially with short acicular hairs along costae, occasionally with few appressed short acicular hairs along veins ...... 10a. var. glanduligera

1b. Pinnae abaxially more densely pubescent, along costae with fine acicular hairs, adaxially with sparse appressed fine acicular hairs along veins and in intercostal areas except for acicular hairs along costal grooves ...... 10b. var. puberula

10a. Parathelypteris glanduligera var. glanduligera 金星蕨(原变种) jin xing jue (yuan bian zhong)

Aspidium glanduligerum Kunze, Anal. Pteridogr. 44. 1837; A. gracilescens Blume var. glanduligerum (Kunze) Franчет & Savatier; Christella glanduligera (Kunze) H. Léveillé; Dryopteris glanduligera (Kunze) Christ; D. gracilescens (Blume) Kunze var. glanduligera (Kunze) C. Christensen; D. repentina C. B. Clarke ex Christ; Lastrea glanduligera (Kunze) T. Moore; L. gracilescens Hooker var. glanduligera (Kunze) Beddome; Nephrodium glanduligera (Kunze) Makino; N. gracilescens (Blume) Hooker var. glanduligera (Kunze) Baker; Thelypteris glanduligera (Kunze) Ching.

Pinnae abaxially subglabrous, except for sparse grayish white acicular hairs along costae and main veins, adaxially with short acicular hairs along costae, occasionally with few appressed short acicular hairs along veins.

Forests; sea level to 1500 m. Anhui, Chongqing, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [N India, Japan, S Korea, Vietnam].


微毛金星蕨 wei mao jin xing jue


Pinnae abaxially densely pubescent, along costae with
finer acicular hairs, adaxially also with sparse oppressed fine acicular hairs along veins and in intercostal areas, acicular hairs along costal grooves.

- Wet shaded places beneath *Phyllostachys pubescens*; 200–1000 m. Anhui, Jiangsu, Jiangxi.


Plants 2.6–3 m tall. Rhizomes strong, woody and ascending. Fronds approximate; stipes nearly to 1 m, thick, ca. 1 cm in diam., bases with thick lanceolate scales, distally with sparse short setae, dark stramineous; laminae large, oblong-lanceolate, 160–200 × 50–60 cm, bases nearly tapering or sometimes proximal pair of pinnae slightly shortened, pinnate-pinnatifid, acuminately rounded, and pinnatifid at apices; pinnae mostly subopposite, spreading, sessile; middle pinnae linear-lanceolate, 25–30 × 2–2.5 cm, bases symmetrical, truncate, pinnatifid and reaching both narrow wings of costae, apices caudate-acuminate; segments 60–70 pairs, flatly spreading, pectinately arranged, linear, 8–10 × 2.2–2.5 mm, entire, rounded or acute at apices. Veins evident, lateral veins simple, 12–14 pairs per segment, proximal pair arising from base of costules, all segments separated from each other and with grayish white acicular hairs. Sori orbicular-reniform, perispores orbicular, dorsofixed at midveinlets between costules and margins, 2–5 pairs per segment; indusia orbicular-reniform, brown, thickly membranous and separated from each other with white acicular hairs.

- Wet places in dense valley forests, forests at foot of mountains; 300–500 m. N Fujian, Guangdong, S Jiangxi.

*Parathelypteris chingii* is similar to *P. japonica* but differs by plants shorter and smaller, stipes with spreading acicular hairs at bases, pinnae with spreading fine and long acicular hairs abaxially, and indusia separated from each other.

1a. Plants 35–60 cm tall; pinnae sessile, abaxially along costae and veins with grayish white acicular hairs, and adaxially along costal grooves with appressed short setae and multicellular acicular hairs, rachises with denser acicular hairs................................. 12a. var. *chingii*

1b. Plants to 75 cm tall; proximal pinnae stalked, along costae and veins with dense short hairs except long acicular hairs abaxially, rachises with dense setae adaxially, with sparse grayish white fine and long acicular hairs abaxially................................. 12b. var. *major*

12a. *Parathelypteris chingii* var. *chingii*

秦氏金星蕨（原变种）*qin shi jin xing jue* (yuan bian zhong)

Plants 35–60 cm tall. Pinnae sessile, abaxially along costae and veins with grayish white acicular hairs, adaxially along costal grooves with appressed short setae and multicellular acicular hairs.

- Wet places in dense valley forests; 300–500 m. N Fujian, S Jiangxi.

12b. *Parathelypteris chingii* var. *major*

大羽金星蕨 *da yu jin xing jue*


Plants to 75 cm tall. Proximal pinnae stalked, along costae and veins with dense short hairs except for long acicular hairs abaxially; rachises with dense setae adaxially, with sparse grayish white fine and long acicular hairs abaxially.

- Wet shaded places in forests at foot of mountains. Guangdong.

长毛金星蕨 chang mao jin xing jue


Plants to 70 cm tall. Rhizomes thick and erect, ± trunklike. Fronds clustered; stipes ca. 30 cm, with sparse scales at bases and with dense grayish white multicellular acicular hairs, distally castaneous-brown and subglabrous; laminae oblong-lanceolate, ca. 40 × 15 cm, slightly tapering to bases, pinnate-pinnatifid, acuminate and pinnatifid at apices; pinnae ca. 20 pairs, alternate, sessile, proximal ones somewhat shortened, reflexed, lanceolate, ca. 10 × 2–2.5 cm, bases truncate, symmetrical, pinnatifid nearly to costae, apices long acuminate; segments 20–40 pairs, spreading, segments below middle narrowly rectangular, ca. 1 × 0.3 cm, shallowly undulate or usually sparsely bluntly serrate along margins, slightly bent distally, rounded at apices. Veins evident on both sides, lateral veins simple, 6–8 pairs per segment, proximal pair arising from base of costules. Laminae herbaceous, dark green when dry, with dense reddish purple spherical glands abaxially, costae and veins with dense grayish white multicellular acicular hairs; adaxially spreading appressed pubescent throughout; rachises dark stramineous, pubescent adaxially, glabrous abaxially. Sori orbicular, dorsifixed at middle of lateral veins, 3–6 pairs per segment; indusia large, orbicular-reniform, thickly membranous, brown, with spreading grayish white long acicular hairs throughout, persistent.

Evergreen forests; ca. 1500 m. S Guangxi [N Vietnam].


毛脚金星蕨 mao jiao jin xing jue


Plants 35–60 cm tall. Rhizomes erect, strong, cylindric. Fronds clustered; stipes 10–20–(30) cm, proximal part dark brown, bases with dense grayish brown multicellular spreading acicular long hairs (when dry easily fallen) and few dark brown lanceolate scales, distally dark stramineous and subglabrous; laminae narrowly oblong, 25–30 × 9–14 cm, slightly tapering to bases, pinnate-pinnatifid, acuminate and pinnatifid at apices; pinnae 20–25 pairs, alternate, spreading, proximal 3 or 4 pairs shortened; middle pinnae lanceolate, 5–8 × 1–1.5 cm, bases truncate, symmetrical, pinnatifid nearly to costae, apices caudate-acuminate; segments 15–18 pairs, spreading, rectangular, 4.5–6.5 × 2–3 mm, entire or slightly undulate at margins, rounded at apices. Veins visible on both sides, lateral veins simple, 5–8 pairs per segment, proximal pair arising from bases of or slightly above costules. Laminae herbaceous, dark green when dry, abaxially with denser reddish purple spherical glands and costae and veins with denser multicellular acicular hairs, adaxially spreading appressed pubescent throughout; rachises stramineous and sparsely pubescent on both sides. Sori orbicular, dorsifixed at middle of lateral veins, 1–5 pairs per segment; indusia large, orbicular-reniform, thickly membranous, brown, glabrous or occasionally sparsely shortly setaceous.

Seasonal rain forests or mixed forests on mountains; 1400–1600 m. SE Yunnan [N India, Myanmar].


尾羽金星蕨 wei yu jin xing jue

Plants 50–80 cm tall. Rhizomes erect, thick and short. Fronds clustered; stipes 20–40 cm, bases nearly black and with grayish brown, spreading multicellular acicular hairs and few brown lanceolate scales, distally castaneous-brown, subglabrous or grooves with brownish acicular hairs; laminae oblong-lanceolate, 30–40 × 10–20 cm, slightly tapering to bases, pinnate-pinnatifid, acuminate and pinnatifid at apices; pinnae 20–25 pairs, alternate, spreading, sessile, proximal ones shortened, reflexed; largest pinn pair lanceolate, 4.5–9 × 1.2–2 cm, bases slightly tapering, rounded-truncate, symmetrical, pinnatifid and reaching narrow wing on both sides of costae, apices caudate or acuminate; segments 20–28 pairs, spreading, linear-lanceolate to rectangular, 5–9 × 2.5–3 mm, undulate-crenate or thickly serrate at margins, rounded or rounded-truncate at apices. Veins evident abaxially, lateral veins simple, 6–9 pairs per segment, proximal pair arising from base of or slightly above costules. Laminae papery or thickly herbaceous, when dry dark green, abaxially with reddish purple spherical glands, usually glabrous or along rachises, costae, and veins sparsely grayish brown pubescent; adaxially with appressed reddish brown hairs, rachises and costal grooves with grayish brown acicular hairs. Sori orbicular, medium-sized, dorsifixed at middle of veinlets, 5–7 pairs per segment; indusia large, orbicular-reniform, brown, thickly membranous, glabrous or occasionally shortly setaceous.

- Mossy forests or bamboo forests in subalpine areas on mountains; 1700–1900 m. Guangxi, S Yunnan, and E China (exact locality unknown).


毛盖金星蕨 mao gai jin xing jue

Plants to 50 cm tall. Rhizomes erect, short. Fronds clustered; stipes 18–20 cm, with acicular hairs and dark brown linear-lanceolate scales, distally castaneous-red and including rachises and costae with dense short acicular hairs; laminae 26–30 × ca. 6 cm, not tapering to bases, apices acuminate and pinnatifid; middle pinnae narrowly lanceolate, 5–6 × ca. 1 cm, bases slightly tapering and truncate, symmetrical, slightly bent distally, pinnatifid and reaching both narrow wings, apices acuminate; segments ca. 16 pairs, oblong-triangular, 4–4.5 × ca. 3 mm, margins entire and usually recurved when dry, slightly tapering to apices, apices obtuse. Veins evident, lateral veins simple, ca. 5 pairs per segment, proximal pair arising from
slightly above base of costules. Laminae thickly herbaceous, when dry brownish green, abaxially with sparse reddish purple spherical glands, with dense short acicular hairs on both surfaces. Sori orbicular, dorsifixed at middle of lateral veins; indusia medium-sized, orbicular-reniform, close to each other, brown, thickly membranous, with dense short setae, persistent.

- Wet places in thickets, common. W Guangdong (Dang Shan, Huaiji).


shanensis, p. 321].

草山金星蕨 cao shan jin xing jue

Plants ca. 38 cm tall. Rhizomes erect, black, short. Fronds clustered; stipes 14–18 cm, bases dark brown, with dense spreading acicular long hairs and few lanceolate scales, distally castaneous red and to rachises with dense uncellular short acicular hairs; laminae 20–22 × ca. 9 cm, nearly tapering to bases, pinnate-pinnatifid, apices acuminate and pinnatifid; pinnae 11–15 pairs, alternate (proximal ones subopposite), oblique distally, shortly stalked, proximal pair shortened or slightly shortened; middle ones lanceolate, ca. 6 × 1 cm, bases rounded-truncate, symmetrical, pinnatifid nearly to costae, apices acuminate; segments ca. 18 pairs, ones below middle oblong, ca. 5 × 2.5 mm, entire along margins, rounded at apices. Veins evident, lateral veins simple, ca. 6 pairs per segment, proximal pair arising from near base of costules. Laminae herbaceous, dark brown when dry, abaxially with spreading short acicular hairs throughout and including veins with reddish purple spherical glands, axially with spreading hairs through-out. Sori orbicular, dorsifixed slightly above bases of lateral veins; indusia medium-sized, orbicular-reniform, brown, thinly herbaceous, separated from each other, sparsely pubescent, persistent.

- Wet soil of valley forests. Taiwan (Caoshan, Taibei).

On one page of the protologue (appendix, p. 321), the name is cited as "Cyclosorus” cao-shanensis, but this is obviously a typographi-cal error. It appears under the generic heading Parathelypteris with six other species of Parathelypteris, whereas numerous species of Cyclosorus appear later (pp. 331–350); it is not included in the index under Cyclosorus (p. 364); and the name appears as P. cao-shanensis in the synopsis (p. ii), key (p. 32), main text (p. 50), and index (p. 377).


中华金星蕨 zhong hua jin xing jue

Plants 57–80 cm tall. Rhizomes short and decumbent or ascending. Fronds approximate; stipes 27–40 cm, bases nearly black, with sparse lanceolate scales, distally castaneous-brown or reddish brown, glabrous, polished; laminae lanceolate, 30–40 × 8–12 cm, not tapering to bases, pinnate-pinnatifid, apices acuminate and pinnatifid; pinnae ca. 18 pairs, opposite or alternate distally, obliquely spreading, sessile, proximal pair not shortened; middle ones narrowly lanceolate, 5–7 × 0.8–1.2 cm, bases truncate, symmetrical, pinnatifid and reaching both narrow wings on costae, apices acuminate; segments 18–24 pairs, spreading, oblone or triangular-oblong, 3.5 × 2–3 mm, entire along margins, obtuse at apices. Veins evident, lateral veins simple, 4 or 5 (or 6) pairs per segment, proximal pair arising from slightly above base of costules. Laminae herbaceous, brownish green when dry, usually glabrous except for reddish orange spherical glands; adaxially pubescent along costae. Sori orbicular, dorsifixed at middle of lateral veins, ca. 3 pairs per segment; indusia large, orbicular-reniform, brown, membranous, nearly touching one another, usually glabrous, persistent.

- Wet shaded places in valley forests; 700–1000 m. S Anhui, N Fujian, Guangdong, S Guangxi, Guizhou, W Hunan, Jiangxi, S Sichuan, Zhejiang.

18a. Parathelypteris chinensis var. chinensis

中华金星蕨原变种 zhong hua jin xing jue (yuan bian zhong)

Theelypteris chinensis Chang, Bull. Fan Mem. Inst. Biol., Bot. 6: 311. 1936; Aspidium parathelypteris Christ; Dryopteris japonica (Baker) C. Christensen var. elongata Rosenstock; D. parathelypteris (Christ) C. Christensen; T. parathelypteris (Christ) Ching.

Laminae glabrous except for reddish orange glands abaxially; sori nearly touching each other, indusia glabrous ............... 18a. var. chinensis

18b. Parathelypteris chinensis var. trichocarpa

毛果金星蕨 mao guo jin xing jue

Laminae with sparse glands abaxially on costae, costae, veins, and intercostal areas with sparse short acicular hairs; sori ± separated from each other; indusia with sparse short hairs ..................... 18b. var. trichocarpa


光脚金星蕨 guang jiao jin xing jue

Plants 55–70 cm tall. Rhizomes short, decumbent or ascending. Fronds approximate or subclustering; stipes 25–35 cm, bases nearly black, with sparse reddish brown lanceolate scales, distally brown-castaneous or castaneous-brown or wholly stramineous, glabrous; laminae ovate-oblong, 30–35 × 17–20 cm, not tapering at bases, pinnate-pinnatifid, apices acuminate and pinnatifid; pinnae 15–20 pairs, spreading, proximal 3 or 4 pairs of pinnae longer, opposite or subopposite, sessile; middle pinnae lanceolate, 8–10 × 1.3–1.6 cm, bases subtruncate, symmetrical, pinnatifid and reaching both narrow wings on costae,
apices acuminate; segments 25–30 pairs, lanceolate and slightly falcate, 5–7 × ca. 2.6 mm, entire, apices obtuse or acute. Veins evident, lateral veins simple, 8 or 9(or 10) pairs per segment, proximal pair arising from near base of costules. Laminae herbaceous, dark green when dry, abaxially along costae, costae (sometimes including lateral veins) and margins with grayish white sparse pubescence and more reddish brown globose large glands, adaxially along costal grooves with dense acicular hairs, rachises with appressed short acicular hairs. Sori orbicular, dorsiixed slightly above middle of lateral veins, 3 or 4 pairs per segment; indusia large, orbicular-reniform, brownish, membranous, grayish white pubescent or glabrous, persistent. 2n = 124.


1a. Stipes and rachises nearly black at bases, distally castaneous-brown; indusia somewhat glaucous, pubescent ............... 19a. var. japonica
1b. Stipes and rachises stramineous, pinnae abaxially and indusia glabrous ... 19b. var. glabrata

19a. Parathelypteris japonica var. japonica

19b. Parathelypteris japonica var. glabrata


Plants 30–35 cm tall. Rhizomes short and erect, black. Fronds clustered; stipes 12–14 cm, slender, bases nearly black, mixed with grayish white setae and few spreading multicellular long hairs, distally castaneous brown and with grayish white setae; laminae oblong, 17–22 × 9–12 cm, not tapering at bases, pinnate-pinnatifid, apices acuminate and pinnatifid; pinnae 10–12 pairs, alternate, sessile, proximal pinnae not shortened, 5–6.5 × 1.2–1.6 cm, bases slightly tapering, truncate, symmetrical, pinnatifid and reaching broad wing on both sides of costae, apices acuminate; pinnae 5–8 pairs, approximate, rectangular, 5–7 × ca. 5 mm, apices rounded or rounded-truncate and with 2–4 angles. Veinlets evident, lateral veins simple, 3 or 4 pairs per segment, proximal pair arising from above base of costules. Laminae herbaceous, when dry deep green, abaxially with sparse short setae along costae, adaxially with sparse appressed short hairs, hairs along costal grooves dense; rachises stramineous, with dense short setae. Sori orbicular, 1 or 2 per segment, dorsiixed at slightly high places at middle of lateral veins, in one row on each side of costules; indusia medium-sized, orbicular-reniform, brown, thickly membranous, slightly pubescent, persistent.

- Wet soil at streamsides in forests; ca. 800 m. N Fujian.

Parathelypteris pauciloba is similar to P. angulariloba, but the latter differs in having rhizomes short and erect, stipes throughout with grayish white short setae and mixed few spreading multicellular long acicular hairs, costae with sparse unicellular short setae abaxially, and indusia slightly pubescent.

22. Parathelypteris angulariloba (Ching) Ching, Acta Phyto-
Plants 30–60 cm tall. Rhizomes short, decumbent or ascending, nearly black. Fronds subclustering; stipes 10–30 cm, bases nearly black, with dense spreading multicellular acicular hairs, distally castaneous-brown or castaneous-brown, subglaucous; laminae narrowly oblong, 17–30 × 6–12 cm, bases not tapering, pinnate-pinnatifid, adaxially acuminate and pinnatifid; pinnae ca. 20 pairs, alternate, proximal pair not reduced, ± reflexed; middle pinnae lanceolate or linear-lanceolate, 5–6 × 0.7–1.5 cm, bases truncate, ± symmetrical, sessile, pinnatifid and reaching 1/3–1/2, apices acuminate and pinnatifid or sometimes entire; segments 8–12 pairs, rectangular or subsquare, 3–5 × ca. 3.5 mm, entire, apices rounded or rounded-truncate and with 2–4 blunt angles. Veins evident, lateral veins simple, 2 or 3(or 4) pairs per segment, proximal pair arising from above base of costules. Laminae thickly herbaceous, greenish when dry, abaxially along costae and main veins with multicellular short acicular hairs, sometimes with mixed orange capitate glands; adaxially along costal grooves with acicular hairs, elsewhere glabrous. Sori orbicular, sometimes dorsifixed at middle of lateral veins, 1 or 2 pairs per segment, indusia medium-sized, orbicular-reniform, brown, thickly membranous, with dense grayish white short setae, persistent.

Streamsides in valley forests, shaded wet places in thickets; 400–1100 m. N and SE Fujian, N and SE Guangdong, E Guangxi, Taiwan [Japan].


Plants ca. 60 cm tall. Rhizomes short and decumbent. Fronds subclustered; stipes ca. 30 cm, proximal part black, polished, with denser grayish white multicellular long acicular hairs, distally castaneous-brown, sparsely pubescent; laminae oblong, ca. 30 × 20–40 cm, bases not tapering, pinnate-pinnatifid, adaxially acuminate and pinnatifid; pinnae ca. 15 pairs, spreading, alternate, sessile, proximal pair not shortened; middle pinnae lanceolate, 10–12 × ca. 2 cm, bases not tapering, truncate, symmetrical, pinnatifid and reaching narrow wings on both sides of costae, apices acuminate; segments ca. 24 pairs, linear-lanceolate, slightly falcate, slightly tapering to apices, rounded-truncate, entire. Veins evident, lateral veins simple, 6 or 7 pairs per segment, proximal pair arising above base of costules. Laminae herbaceous, when dry grayish green, abaxially with dense multicellular barblike long hairs, adaxially along costal grooves with dense long acicular hairs, main veins slightly setaceous or subglaucous, rachises with dense long acicular hairs adaxially. Sori orbicular, dorsifixed at middle of lateral veins, 5 or 6 pairs per segment; indusia smaller, orbicular-reniform, brown, membranous, separated from each other, densely pubescent, persistent.

Shaded wet places in valley forests. S Guangxi, S Yunnan [border of Vietnam].


凸轴蕨属 tu zhou jue shu

Lin Youxing (林尤兴); Kunio Iwatsuki


Plants small to medium-sized, terrestrial. Rhizomes short, decumbent or erect, rarely long creeping, covered with brown lanceolate scales and glaucous short hairs or subglaucous. Fronds approximate or clustered; stipes ± brown at bases, distally stramineous, glabrous or sparsely hairy; laminae oblong, lanceolate, or ovate-triangular, pinnate-pinnatifid, rarely tripinnate, if latter then pinnules separated from each other, never connected with narrow wing along costae, apices acuminate and pinnatifid. Laminae herbaceous or thinly herbaceous, when dry usually green, both surfaces ± with grayish white unicellular (rarely multicellular) acicular hairs, hairs denser along rachises and costae, pinnae usually glandless abaxially, rarely orange-red spherical glandular, costae rounded and raised adaxially, never grooved. Veinlets pinnate, simple or forked, oblique distally, not reaching
margins. Sori small, orbicular, attached above middle of veinlets; indusia medium-sized, orbicular-reniform, each attached at a sinus, membranous, usually green, when dry grayish yellow or brownish, persistent. Spores bilateral, perispores corrugate, usually foveolate; exospore with finely reticulate surfaces. \( x = 35 \).

About 12 species: S Asia, S China to Japan, Madagascar, Malesia; 11 species (five endemic) in China.

The following taxon is excluded from the present treatment, pending further research: *Metathelypteris glandulosa* H. G. Zhou & H. Li (Acta Bot. Yunnan. 14: 34. 1992), described from Guangxi.

1a. Pinnae with orange-red spherical glands or eglandular abaxially, costae with grayish white multicellular acicular hairs abaxially.

2a. Pinnae glandular abaxially, abaxially with unicellular short acicular hairs along lateral veins and intercostal areas ........................................................................................................................................................................... 10. *M. glandulifera*

2b. Pinnae without glands, with grayish white multicellular spreading long acicular hairs on both surfaces .......... 11. *M. flaccida*

1b. Pinnae without orange-red spherical glands abaxially, costae with grayish white unicellular acicular hairs or subglabrous abaxially.

3a. Laminae ovate-triangular.

4a. Laminae bipinnatifid, segments entire ................................................................. 6. *M. deltoideofrons*

4b. Laminae pinnate-pinnatifid or 3-pinnate to 3-pinnate-pinnatifid.

5a. Laminae oblong, except for costae long villous adaxially, elsewhere glabrous; indusia membranous, usually green, when dry grayish yellow or brownish, glabrous abaxially, or sometimes with sparse acicular hairs ................................................................. 9. *M. wayshanica*

5b. Laminae ovate-triangular, hairy on both surfaces; also hairy at indusia.

6a. Proximal pinnae sessile or with 0.5–1 mm stalk, pinnules rounded-obtuse or acute at apices, sessile ................................................................. 7. *M. hattorii*

6b. Proximal pinnae with 3.5–5 mm stalk, pinnules long acuminate-caudate at apices, stalk 4–7 mm ................................................................................................................ 8. *M. petiolulata*

3b. Laminae oblong or lanceolate.

7a. Laminae thick, papyraceous or thinly herbaceous; plants taller and larger, usually 75–95 cm tall or more; pinnae glabrous abaxially, or costae and costules occasionally with sparse acicular short hairs .......... 1. *M. singalanensis*

7b. Laminae thinner, herbaceous or thinly herbaceous; plants smaller and shorter, no more than 65 cm tall; pinnae ± with short acicular hairs or glabrous abaxially.

8a. Pinnae glabrous abaxially, or at most with hairs along costae, costae occasionally with very sparse acicular hairs.

9a. Proximal pinnae usually not shortened, also not tapering to bases; laminae adaxially with dense grayish white acicular hairs along rachises and costae; veinlets usually simple, occasionally forked ................................................................................................................ 2. *M. gracilescens*

9b. Laminae with proximal 1 or 2 pairs of pinnae ± shortened, pinna bases clearly tapering; laminae adaxially with grayish white short acicular hairs along rachises and costae; veinlets on pinnules of proximal pinnae usually forked, simple distally .................................................. 3. *M. adscendens*

8b. Pinnae abaxially at least with denser short acicular hairs along costae.

10a. Pinnae arrangement sparser, proximal ones 2–4 cm from each other, bases clearly tapering; segments entire or usually with densely crenate sinuses, or pinnatifid ........................................................................................................ 4. *M. laxa*

10b. Pinnae arrangement denser, proximal ones 1–2 cm from each other, bases nearly tapering, segments usually entire, at most shallowly undulate ................................................ 5. *M. uraiensis*


鲜绿凸轴蕨 xian lu tu zhou jue

*Nephrodium singulanense* Baker, J. Bot. 18: 212. 1880; *Dryopteris media* Alderwerelt; *D. singulanensis* (Baker) C. Christensen; *Lastrea singulanensis* (Baker) Beddome; *Thelypteris singulanensis* (Baker) Ching.

Plants 75–95 cm tall. Rhizomes thick and short, erect, apices including stipe bases with dense scales; scales brown, linear-lanceolate, caudate at apices. Fronds clustered; stipes 30–50 cm, stramineous, glabrous above bases, polished; laminae lanceolate to broadly lanceolate, 30–70 × 20–30 cm, bases ± tapering, rounded-truncate, pinnate-pinnatifid, apices acuminate and pinnatifid; pinnae 15–25 pairs, spreading or oblique distally, sessile, proximal pair usually slightly shortened, distal ones linear-lanceolate, sometimes falcate, 12–18 × 2–3.5 cm, bases subtruncate, pinnatifid nearly to costae, apices caudate-acuminate; segments 20–30 pairs, basiscopic ones on costae longer than acroscopic ones, oblong, 8–15 × 3–5 mm, entire or serrate along margins, apices blunt-pointed. Veinlets evident, simple or forked on proximal segments, 6–10(–12) pairs, not reaching margins. Laminae papyraceous, when dry green or yellowish green, glabrous abaxially, or sometimes with sparse short acicular hairs along costae and costules, adaxially with grayish white short acicular hairs along rachises and costae. Sori small, orbicular, attached on ends of lateral veins or middle of acroscopic vein on forked lateral veins; indusia small, orbicular-reniform, membranous, when dry brownish yellow, sometimes siniuate along margins, glabrous or sparsely capitate shortly hairy. \( 2n = 144 \).

Aspidium gracilescens Blume, Enum. Pl. Javae 2: 155. 1828; *Dryopteris arisanensis* Rosenstock; *D. gracilescens* (Blume) Kunze; *D. sublaxa* Hayata; *Lastrea gracilescens* (Blume) T. Moore (1858), not Hooker (1857); *Nephrodium gracilescens* (Blume) Hooker; *Thelypteris gracilescens* (Blume) Ching.

Plants 25–40 cm tall. Rhizomes short, decumbent or ascending, apices including stipe bases covered with reddish brown lanceolate small scales. Fronds subclustered; stipes 15–30 cm, stramineous or tan, glabrous or with sparse short hairs; laminae narrowly oblong, 20–30 × 6.5–10 cm, pinnate-pinnatifid, apices acuminate and pinnatifid; pinnae 15–18 pairs, subopposite or alternate distally, spreading, proximal 1 or 2 pairs not shortened, tapering to bases, reflexed proximally, sessile; middle ones linear-lanceolate, 4–6.5 × 1–1.4 cm, bases tapering, subtruncate, pinnatifid and reaching narrow wings on both sides of costae, apices acuminate; segments 12–15 pairs, oblique distally, oblong, 4–6 × 2–4 mm, entire or slightly undulate-crenate distally, apices rounded-obtuse. Veinlets evident abaxially, simple, occasionally forked, 5 or 6 pairs per segment, proximal pair arising from above base of costules. Laminae herbaceous, yellowish green when dry, abaxially glabrous or costae adaxially with sparse short hairs, adaxially with dense grayish white short acicular hairs, also veins with sparse similar hairs adaxially. Sori small, orbicular-reniform, membranous, brownish, glabrous, persistent or sometimes deciduous.

On soil in dense forests on mountains; 1000–2500 m. Taiwan, Yunnan [Indonesia, S Japan, Malaysia, Philippines; Pacific islands (Polynesia)].


微毛凸轴蕨 wei mao tu zhou jue


Plants 25–50 cm tall. Rhizomes short, decumbent, with sparse short hairs and brown ovate-lanceolate scales. Fronds clustered or approximate; stipes 10–25 cm, stramineous, glabrous above bases; laminae 15–25 × 8–12 cm, ± tapering to bases, pinnate-pinnatifid, apices long acuminate and pinnatifid; pinnae 10–15 pairs, alternate, sessile, proximal 1 or 2 pairs ± shortened, bases slightly tapering; middle ones narrowly lanceolate, 4–6 × 1.5 cm, pinnatifid and reaching narrow wings on both sides of costae, long acuminate at apices, sometimes slightly cuneate; segments 10–14 pairs, spreading, approximate, oblong-lanceolate, 4–6 × ca. 2.5 mm, entire or densely serrate in sinus along margins on proximal segments, rounded-obtuse at apices. Veins visible, veinlets usually forked on proximal segments, distal ones simple, 3–5 pairs per segment, proximal pair arising from slightly higher above base of costules, not reaching margins. Laminae herbaceous, when dry green, glabrous on both surfaces, only occasionally with sparse short hairs along both sides of costae. Sori small, orbicular, 2–4(or 5) pairs per segment, attached near ends of lateral veins, close to margins; indusia small, orbicular-reniform, membranous, green, or brownish when dry, glabrous or occasionally with several short hairs, usually deciduous when mature.

- Valley forests; 200–700(–71800) m. Fujian, Guangdong, Guangxi, Taiwan.


疏羽凸轴蕨 shu yu tu zhou jue

Aspidium laxum Franchet & Savatier, Enum. Pl. Jap. 2: 237. 1876; Dryopteris laxa (Franchet & Savatier) C. Christensen; *D. macarthyi* (Baker) C. Christensen; *Lastrea laxa* (Franchet & Savatier) Copeland; *Nephrodium laxum* (Franchet & Savatier) Diels; *N. macarthyi* Baker; *Thelypteris laxa* (Franchet & Savatier) Ching.

Plants 30–60 cm tall. Rhizomes long, decumbent or ascending, with sparse grayish white short hairs and reddish brown lanceolate scales, similar indument on stipe bases. Fronds approximate; stipes 10–35 cm, stramineous, above bases subglabrous; laminae narrowly oblong, 15–35 × 10–18 cm, bases nearly tapering, pinnate-pinnatifid, apices acuminate and pinnatifid; pinnae 8–18 pairs, subopposite, linear-lanceolate, 5–9 × 1–2 cm, bases truncate, ± symmetrical, sessile, pinnatifid and reaching narrow wings on both sides of costae; segments oblong-lanceolate, middle ones 4–8 × 2–3 mm, entire or densely crenate-sinuate, or parted into small segments, obtuse-pointed or acute at apices. Veins visible, veinlets forked on segments on proximal pinnae, others simple, 5–7 pairs per segment, proximal pair arising above base of costules, not reaching margins. Laminae herbaceous, green when dry, abaxially with spreading hairs throughout, adaxially with acicular hairs along rachises, costae, and veins. Sori small, orbicular, 4–6 pairs per segment, attached on ends of veinlets or acrosopic vein on forked veinlets, close to margins; indusia small, orbicular-reniform, membranous, green, when dry grayish yellow, sparsely pubescent.

Forests on mountains, dense valley forests; near sea level to 800 m. Anhui, Chongqing, Fujian, Guangdong, Guangxi, Hainan, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [Japan, S Korea].


乌来凸轴蕨 wu lai tu zhou jue

Plants 30–40 cm tall. Rhizomes short, decumbent or ascending, apices including stipe bases with sparse deep brown small scales and grayish white short acicular hairs. Fronds subclustered; stipes 14–20 cm, stramineous, glaucous, shortly hairy; laminae oblong-lanceolate, 16–22 × 8–15 cm, not tapering to bases, pinnate-pinnatifid, apices long acuminate and pinnatifid; pinnae 12–15 pairs, opposite or distal ones alternate, sessile,
The proximal pair usually slightly shortened, bases slightly tapering, reflexed, above several pairs linear-lanceolate, 4–8 × 1.2–1.7 cm, bases tapering, rounded-truncate, symmetrical, pinnatifid and reaching narrow wings on both sides of costae, apices caudate-acuminate; segments 14–20 pairs, spreading, approximate, oblance-lanceolate, 4–7 × 2–3 mm, entire or sometimes undulate along margins, rounded-obtuse at apices. Veins evident abaxially, veinlets usually forked, or distal ones simple, 5–7 pairs per segment, proximal pair arising from above base of costules. Laminae thinly herbaceous, when dry yellowish green, abaxially with grayish white short hairs, hairs along rachises and costae denser, adaxially densely covered with grayish yellow acicular hairs along rachises and costae. Sori small, orbicular, 2–4 pairs per segment, attached near ends of lateral veins, close to margins; indusia small, orbicular-reniform, membranous, green, when dry brownish, sometimes lacerate along margins and acicular hairy, persistent. 2n = 124.

Streamsides in valley forests, broad-leaved forests on slopes; 400–1700 m. N Guangdong, Taiwan, SE Xizang, W Yunnan [Japan, Philippines].

1a. Proximal pair of pinnae slightly shortened, bases slightly tapering, lateral veins forked on proximal pinnae, intercostal areas abaxially with short hairs ........................................ 5a. var. uraiensis

1b. Proximal pair of pinnae of similar shape and size as distal ones, lateral veins simple, occasionally forked, pinnae abaxially, except for grayish white short acicular hairs along rachises and costae, glabrous ........................................ 5b. var. tibetica

5a. Metathelypteris uraiensis var. uraiensis

三角叶凸轴蕨 5a. var. uraiensis

5b. Metathelypteris tibetica var. tibetica

林下凸轴蕨 5b. var. tibetica


三棱叶凸轴蕨 san jiao ye tu zhou jue

Plants 23–55 cm tall. Rhizomes short, ascending, including stipe bases with grayish white acicular hairs and few brown linear-lanceolate small scales. Fronds approximate; stipes 10–30 cm, stramineous, subglabrous above bases; laminae ovate-triangular, 13–30 × 10–16 cm, broadest at bases, pinnate-pinnatifid, long acuminate and pinnatifid at apices; pinnae 10–14 pairs, spreading, proximal ones subopposite, distal ones alternate, proximal pinnae largest, bent distally, linear-lanceolate, 5–9.5 × 1.2–2.2 cm, bases truncate, sessile, pinnatifid and reaching narrow wings on both sides of costae, apices long acuminate; segments 12–20 pairs, 5–10 × 2–3 mm, entire, obtuse-pointed at apices. Veins evident abaxially, lateral veins simple or forked. 5 or 6 pairs per segment, not reaching margins. Laminae thinly herbaceous, when dry yellowish green, with grayish white short acicular hairs on both surfaces, hairs along rachises and costae densely covered with grayish white acicular hairs, persistent.

● Rock crevices at streamsides, streamsides in bamboo forests; 600–2200 m. Hunan, Yunnan.

The FRPS account of Metathelypteris misidentified material of *M. deltoideofrons* as *M. decipiens* (C. B. Clarke) Ching. Here, we follow Fraser-Jenkins (Taxon. Revis. Indian Subcontinental Pteridophytes, 592. 2008) and treat the latter as a synonym of species no. 11, *M. flaccida*.


下凸轴蕨 lin xia tu zhou jue

Dryopteris hattorii H. Itô, Bot. Mag. (Tokyo) 99: 359. 1935 [*“hattorii”*]; D. laxa (Franchet & Savatier) C. Christensen var. dilatata Koidzumi; Lastrea hattorii (H. Itô) Tagawa; L. laxa (Franchet & Savatier) Copeland var. dilatata (Koidzumi) Honda; Thelypteris hattorii (H. Itô) Tagawa; T. nemoralis Ching.

Plants 30–60 cm tall. Rhizomes short, decumbent, apices including stipe bases densely covered with reddish brown lanceolate scales and grayish white setae. Fronds approximate; stipes 15–30 cm, bases dark brown, stramineous above bases, subglabrous; laminae ovate-triangular, 15–35 × 14–26 cm, broadest at bases, bases rounded-truncate, 3-pinnate-pinnatifid, apices acuminate and pinnatifid; pinnae 12–16 pairs, proximal ones subopposite, distal ones alternate, sessile, or proximal pinnae sometimes with 0.5–1 mm stalks; proximal pair not shortened, of similar shape and size as distal ones, lanceolate, 10–15 × 2.5–3.5 cm, pinnae not tapering to base except for proximal 2 pairs, rounded-truncate at bases, pinnate-pinnatifid, acuminate at apices; pinnales ca. 16 pairs, subopposite, pinnae distal to middle ones connected to each other by narrow wings, proximal ones oblance-lanceolate, 2.5–3 × ca. 1 cm, bases decurrent, sessile, separated from each other, pinnatifid to ca. 2/3, apices rounded-obtuse or acute; segments oblance, 3.5–4 × ca. 2.4 mm, entire, rounded-obtuse at apices. Veins not evident.
lateral veins simple or forked, 2 or 3 pairs per segment, not reaching margins. Laminae herbaceous, when dry green, densely grayish white pubescent on both surfaces. Sori small, orbicular, usually 1 per segment, attached near ends of acroscopic veinlets on bases and close to margins; indusia small, orbicular-reniform, membranous, when dry grayish brown, sparsely pubescent, persistent.

Valley forests; 100–1700 m. S Anhui, N Fujian, N Guangxi, Hunan, Jiangxi, SW Sichuan, Zhejiang [Japan].


有柄凸轴蕨 you bing tu zhou jue

Plants 55–65 cm tall. Rhizomes short and decumbent. Fronds subclustered; stipes 23–30 cm, dark brown, with dense white acicular hairs, distally stramineous, subglabrous, polished. Laminae ovate-triangular, 30–40 cm, broadest at bases and similar in size as length, bases broadly cordate, 3-pinnate to 4-pinnatifid, apices acuminate and pinnatifid; pinnae 10–12 pairs, ascending, proximal ones opposite or subopposite, stalk 3.5–5 cm, distal ones alternate, sessile; proximal pair largest, triangular-lanceolate, 17–22 × 10–12 cm, bases subtruncate, 2-pinnate to 2-pinnate-pinnatifid, apices caudate-acuminate; pinnae 10–15 pairs, alternate or subopposite, approximate, short stalks of proximal several pairs 4–7 mm, distal ones sessile, basiscopic pinnules of costae longer than acroscopic ones, but proximal pair of pinnules slightly shortened sometimes, above ones lanceolate, 6–7 × ca. 2.5 cm, bases broadly cuneate, pinnatifid, apices caudate-acuminate; pinnae of 2-pinnate laminae ca. 10 pairs, proximal 2 or 3 pairs slightly shortened, narrowly oblong, 6–15 × 3–4 mm, bases adnate to costules, decurrent, connected to each other by narrow wings, margins crenate, apices acuminate and pinnatifid; pinnae 10–14 pairs, spreading, proximal pair of pinnules slightly short-stalked, pinnatifid; pinnules ca. 14 pairs, basiscopic ones on costae longer than acroscopic ones, lanceolate, ca. 2 × 0.5 cm, bases connected by narrow wings, pinnatifid, apices obtuse-pointed; acroscopic segments ca. 1.2 × 0.3 cm, pinnatilobate. Laminae thinly herbaceous, when dry brownish, except costae villous adaxially, elsewhere glabrous. Sori small, 4 or 5 pairs per pinnule; indusia small, orbicular-reniform, brown, glabrous, deciduous.

● Shaded places among rocks. Fujian, Zhejiang.


薄叶凸轴蕨 bo ye tu zhou jue

Plants to 40 cm tall. Rhizomes long creeping, apices including stipe bases with deep brown linear-lanceolate scales and grayish white acicular hairs. Fronds approximate; stipes 20–30 cm, stramineous, above bases with similar hairs but sparsely so and with few scales; laminae oblong-lanceolate, ca. 30 × 14–16 cm, nearly tapering to bases, pinnate-pinnatifid, apices acuminate and pinnatifid; pinnae 10–14 pairs, spreading, subopposite, sessile, lanceolate, 7–8 × 1–1.5 cm, bases slightly tapering, rounded-truncate, pinnatifid nearly to costae, apices long acuminate; segments ca. 17 pairs, spreading, lanceolate, sometimes falcate, 1–1.2 × ca. 0.3 cm, bases decurrent, connected to each other by narrow wings, margins crenate, apices rounded-obtuse or acute. Veins not evident, lateral veins forked, 8–10 pairs per segment, proximal pair arising above bases of costae and not reaching margins. Laminae herbaceous, when dry dark green, abaxially covered with grayish white multicellular acicular hairs along rachises, costae, and costules, lateral veins and intercostal areas covered with short unicellular acicular hairs, mixed with small orange-red globose glands, adaxially densely grayish white acicular hairy along rachises and costae, hairs along veins sparse. Sori small, orbicular, 6 or 7 pairs per segment, attached near ends of acroscopic vein of forked lateral veins; sporangia each with 4 or 5 globose small glands along both sides of annuli; indusia orbicular-reniform, greenish, when dry grayish brown, membranous, subentire, not easily seen when mature.

● Dense forests. N Guangxi.

The lamina outline of Metathelypteris glandulifera is extremely similar to that of M. flaccida, but the pinnae are covered with orange-red globose glands abaxially; the sporangia also have a few similar glands along both sides of the annuli, and the pinnae are covered with unicellular short acicular hairs along veinlets and intercostal areas.


Aspidium flaccidum (Blume), Enum. Pl. Javae 2: 161. 1828; Dryopteris flaccida (Blume) Kunze; D. gracilescens (Blume) Kunze var. decipiens (C. B. Clarke) Alderwerelt; Lastrea flacida (Blume) T. Moore; L. gracilescens Hooker var. decipiens (C. B. Clarke) Beddome; Metathelypteris decipiens (C. B. Clarke) Ching; Nephrodium flaccidum (Blume) Hooker; N. gracilescens (Blume) Hooker var. decipiens (C. B. Clarke);

---

1a. Rachises and costae covered with scales abaxially; scales inflated or incrassate at bases, leaving rough marks after falling.
   2a. Plants 1–1.4 m tall; costae and costules with scales incrassate and not inflated at bases
   3. M. setigera
   2b. Plants 3–4 m tall, costae and costules covered with inflated bases of scales abaxially.
   3a. Scales on rachises denser, scales on costae entire
   1. M. ornata
   3b. Scales on rachises sparse, scales on costae with dense acicular hairs along margins
   2. M. polypodioides

1b. Rachises and costae without scales abaxially, or with grayish white hairs, or glabrous.
   4a. Pinnae glabrous or with unicellular acicular hairs.
   5a. Laminae herbaceous, when dry yellowish green; pinnules oblique distally and intersecting with costae at sharp angle; pinnules glabrous abaxially, at most with sparse acicular hairs along costae
   4. M. oligophlebia
   5b. Laminae thinly herbaceous, grass-green or dark green when dry; pinnules spreading and intersecting with costae at right angle; pinnules with more spreading acicular hairs abaxially
   5. M. viridifrons
   4b. Pinnae with spreading multicellular acicular hairs abaxially.
   6a. Laminae herbaceous, pinnules oblique distally and intersecting with costae at sharp angle; proximal pinnules with 2–2.5 cm stalks; hairs abaxially dense and elongate and 2.5–3 mm
   6. M. torresiana
   6b. Laminae thinly herbaceous, pinnules spreading and intersecting with costae at right angle; pinnules subsessile; hairs abaxially sparse and short and 1.5–2 mm
   7. M. contigua


---

Thelypteris decipiens (C. B. Clarke) Ching; T. flaccida (Blume) Ching.

Plants 40–60 cm tall. Rhizomes thick and short, erect, with deep brown linear-lanceolate scales. Fronds clustered; stipes 15–30 cm, bases dark brown, with similar scales and grayish white short acicular hairs, distally stramineous and sparsely shortly hairy; laminae oblong-lanceolate, 25–40 × 12–16 cm, nearly tapering to bases, 2-pinnate-pinnatifid, apices acutate and pinnatifid; pinnules 10–15 pairs, spreading, subopposite, sessile; proximal ones lanceolate, 7–9 × 2–2.5 cm, bases ± tapering, rounded-truncate, pinnate-pinnatifid, apices caudate-acuminate; pinnules 10–15 pairs, spreading, lanceolate, 1–1.5 × 0.3–0.5 cm, bases decurrent to form narrow wing along costae, pinnatifid to 1/2–2/3 distance to costae, apices rounded-obtuse; segments 5–7 pairs, triangular-lanceolate, 1–2 × ca. 1 mm, entire, obtuse-pointed at apices. Veins not evident, lateral veins simple or forked, 2 or 3 pairs per segment, proximal pair arising from base of costules, not reaching margins. Laminae thinly herbaceous, when dry yellowish green, with dense spreading multicellular acicular hairs on both surfaces. Sori small, orbicular, 1 per segment, attached above middle of acroscopic vein of forked lateral veins; indusia small, orbicular-reniform, membranous, greenish, when dry grayish brown, glabrous or occasionally with few acicular hairs along margins, persistent. 2n = 140.

Streamsides in forests; 700–1800 m. Guizhou, SW Yunnan [Bhutan, India, Indonesia, Malaysia, Nepal, Philippines, Sri Lanka, Thailand, N Vietnam].

---

Ferns S. India 56, t. 171. 1864, not Klotzsch (1847); Dryopteris ornata (Wallich ex J. Smith) C. Christensen; Lastea ornata (Wallich ex J. Smith) Copeland; Nephrodium ornatum (Wallich ex J. Smith) Christ; Thelypteris ornata (Wallich ex J. Smith) Ching.

Plants 3–4 m or more tall. Rhizomes erect, cylindric, with
Plants ca. 1.5 m tall. Rhizomes short, decumbent, thick, with ascending apex. Fronds tufted; stipes ca. 80 cm, pale, dull, basal half at least bearing copious slender scales and hairs; scales thin, pale, linear, bearing copious very slender unicellular hairs and sometimes a few of more than one cell, base of scales thick and dark, of larger ones flat, of smaller ones terete, leaving warts when scales fall; main rachises pale, hairy as stipe, with many small warts abaxially; laminae ca. 80 cm; basal 2 or 3 pairs of pinnae to 35 × 15 cm, upper ones gradually shortened; basal pinnules of lower pinnae somewhat shortened; pinna rachis hairy abaxially, with narrow pale scales abaxially; largest pinnules sessile, ca. 10 × 2.5 cm, acuminate at apices, almost at right angle to pinna rachis, segments all with broad bases connected by a very narrow wing along costae; costae densely hairy abaxially (sparingly hairy on costules), abaxially with very narrow pale scales, short capitate hairs also present; segments almost at right angles to costae, larger ones deeply lobed. Veinlets forked or shortly pinnate, laminae adaxially capitate hairs. Sori small, on acroscopic branch of a vein; indusium small, persistent, bearing many short capitate hairs; sporangia with 2 or 3 similar capitate hairs near annulus; spores not winged, surface apparently minutely and irregularly granular.

Plants 1–1.4 m tall. Rhizomes thick and ascending, with dense brownish linear-lanceolate scales; scales ca. 1 cm, thick, with sparse hairs along margins. Fronds clustered; stipes 50–60 cm or more, stramineous, bases with similar scales as rhizomes, distally sparse, scales inflated at bases, persistent, adaxial sides with short acicular hairs along costules and main veins, costae with sparse linear-lanceolate scales abaxially, scales inflated at bases, persistent, adaxial sides with short acicular hairs along costae. Sori small, orbicular, 1 pair per segment, attached near top of basal acroscopic veinlets; indusia not developed. 2n = 62.

Tropical rain forests. Taiwan [Indonesia, Malaysia].


針毛蕨 zhen mao jue

Plants 60–150 cm tall. Rhizomes short and ascending, including stipe bases with deep brown lanceolate marginally
sparsely hairy scales. Stipes 30–70 cm, stramineous, glabrous above bases; laminae triangular-ovate, similar in length to stipes, 30–45 cm wide at proximal part, not tapering at bases, 3-pinnatifid, acuminated and pinnatifid at apices; pinnae ca. 14 pairs, oblique distally, alternate, or proximal ones opposite, stalks to 2 cm or more, proximal pair larger, oblong-lanceolate, ca. 20 × 5 cm, slightly tapering to bases, acuminated and pinnatifid at apices; second pair and above pinnae gradually reduced distally, not tapering to bases, with stalks 1–1.5 cm, bipinnatifid; pinnules 15–20 pairs, 3.5–8 × 1–2.5 cm, lanceolate, bases rounded-truncate, symmetrical, sessile (proximal ones shortly stalked), ± decurrent (distal ones connected to each other by narrow wing), pinnatifid nearly to costules, apices acuminate; segments 10–15 pairs, spreading, 5–12 × 2–3.5 mm, bases connected to each other by narrow wings, margins entire or sharply lobate, apices obtuse or bluntly pointed. Veins evident abaxially, veinlets simple or forked on sharply lobate segments, 4–8 pairs per segment. Laminae herbaceous, when dry grass-green, glabrous on both surfaces, with orange-yellow transparent capitate glandular hairs abaxially, or along costules and near ends of costae with few unicellular acicular hairs, adaxially with greyish white short acicular hairs along costae and costules, usually with reddish purple spots on costae. Sori small, orbicular, 3–6 pairs per segment, attached near ends of costules; indusia small, orbicular-reniform, greyish green, glabrous, deciduous when mature or hidden in sori.

Streamsides in valleys, wet soil at forest margins. S Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Zhejiang [Japan, S Korea].

1a. Pinnae glabrous on both surfaces ...... 4a. var. oligophlebia  
1b. Pinnae along costae and costules all with greyish white unicellular acicular short hairs abaxially .................. 4b. var. elegans

4a. Macrothelypteris oligophlebia var. oligophlebia

針毛蕨 (原变种) zhen mao jue (yuan bian zhong)


Pinnae glabrous on both surfaces.

Streamsides in valleys, wet soil at forest margins; 400–800 m. S Anhui; N Guangxi, S Henan, Hunan, S Jiangsu, Jiangxi, Zhejiang [Japan].

5. Macrothelypteris viridifrons


Plants 60–110 cm tall. Rhizomes short and erect, with redish brown hairy lanceolate scales at apices. Fronds clustered; stipes 30–50 cm, stramineous, bases with greyish white short acicular hairs, distally glabrous; laminae similar in length to stipes or slightly longer; 20–50 cm wide, not tapering to bases, 3-pinnate-pinnatifid, acuminated and pinnatifid at apices; pinnae 10–12 pairs, alternate or subopposite, oblique distally, stalks 1.5–5 cm, proximal pair largest, oblong-lanceolate, 24–30 × ca. 10 cm, bases slightly tapering, rounded-truncate, apices acuminate; second pair of pinnae (distally all pinnae) of similar shape as proximal pair, but not tapering to bases, gradually reduced, shortly stalked, 2-pinnate-pinnatifid; pinnules of 1-pinnate parts of laminae 10–15 pairs, alternate, spreading, proximal pair slightly shortened, distal ones oblong-lanceolate, 5–6.5 × 2.5–3 cm, bases truncate, shortly stalked, pinnate-pinnatifid, apices acuminate; pinnules of 2-pinnate parts of lamina 10–15 pairs, lanceolate, 1–1.5 × 0.4–0.7 cm, bases rounded-truncate and decurrent, connected to each other on both sides by narrow wings, pinnate lobate or pinnatifid to 2/3 of distance to costules, obtuse or bluntly pointed at apices; segments elliptic, ca. 2.5 × 1.5 mm, entire or slightly undulate along margins, rounded at apices. Veins visible, veinlets simple, 2 or 3 pairs per segment. Laminae thickly herbaceous, when dry grass-green, with more spreading acicular hairs abaxially, adaxially with more short acicular hairs along costules; rachises stramineous, glabrous abaxially, polished. Sori small, orbicular, 1 or 2 per segment, attached near ends of proximal veinlets; indusia small, orbicular-reniform, green, membranous, with 1 or 2 villous-hairs and deciduous after maturity, 2n = 124.

Shaded wet places in forests in mountain valleys; ca. 800 m. Anhui, N Fujian, Guizhou (Nayong), Hunan, S Jiangsu, Jiangxi, Zhejiang [Japan, S Korea].


普通针毛蕨 pu tong zhen mao jue

*Polystichum torresianum* Gaudichaud, Voy. Uranie, Bot. 8:
333. 1828; *Aspidium mollissimum* Christ; *A. uliginosum* Kunze; *Dryopteris lasiocarpa* Hayata; *D. mollissima* (Christ) C. Christensen; *D. oligophlebia* (Baker) C. Christensen var. *lasiocarpa* (Hayata) Nakai; *D. tenericaulis* (Wallich ex Hooker) Ching; *D. uliginosa* (Kunze) C. Christensen; *Lastrea oligophlebia* (Baker) Copeland var. *lasiocarpa* (Hayata) H. Ilô ex M. Mizushima; *L. tenericaulis* (Wallich ex Hooker) T. Moore; *L. torresiana* (Gaudichaud) T. Moore; *Nephrodium oligophlebia* (Wallich ex Hooker) Hooker; *Polypodium tenericaule* Wallich ex Hooker; *P. trichododes* J. Smith; *Thelypteris oligophlebia* (Baker) Ching var. *lasiocarpa* (Hayata) H. Ilô; *T. torresiana* (Gaudichaud) Alston; *T. uliginosa* (Kunze) Ching.

Plants 60–150 cm tall. Rhizomes short, erect or ascending, with dense reddish brown hairy linear-lanceolate scales at apices. Fronds clustered; stipes ca. 50 cm, stramineous, distally glabrous; laminae ovate-lanceolate, similar in length as stipes, 15–30 cm proximally, not tapering to bases, 3-pinnate-pinnatifid, acuminate and pinnatifid at apices; pinnae ca. 15 pairs, opposite, distal ones alternate, spreading, subsessile; proximal pair of pinnules broadly lanceolate, 14–18 × 8–9 cm, bases slightly tapering, truncate, pinnate-pinnatifid, acumes acuminate; pinnules of 1-pinnate laminae 15–20 pairs, connected to each other, spreading, proximal ones opposite, distal ones alternate, oblong-lanceolate, 3–4 × ca. 1 cm, bases connected along both sides by narrow wings, partite, acuminate at apices; segments 12–15 pairs, approximate, or obliquely spreading, elliptic, 3.5–4.2 × ca. 2.2 mm, bases decurrent and connected to each other by narrow wings, margins sharply lobate into 3 or 4 crenations, apices rounded; second pair of pinnules of similar size as proximal pair, but not tapering at bases. Veins visible, veins 2- or 3-forked, occasionally simple, 3 or 4 pairs per segment. Laminae thinly herbaceous, green when dry, with sparse whitish multicellular spreading acicular hairs abaxially, adaxially with similar short acicular hairs but sparse, costae stramineous, glabrous or subglabrous abaxially, hairy adaxially. Sori small, orbicular, 3 or 4 pairs per segment, attached near ends on acroscopic veinlets forked; indusia small, not very prominent.

- Wet soil in forests in mountain valleys; 900–1100 m. S Yunnan, S Zhejiang.


卵果蕨属 *luan guo jue shu*

Lin Youxing (林尤兴); Alan R. Smith

*Polypodium* [par.] *Phegopteris* C. Presl, Tent. Pterid. 179. 1836.

Plants mid- and small-sized, terrestrial. Rhizome long creeping or short and erect, densely covered with brown scales and whitish acicular hairs. Fronds remote or clustered; stipe stramineous, shiny, slender, base scaly; scales brown, lanceolate and sparsely long hairy along margins; lamina bipinnatifid or pinnate-pinnatifid, ovate-triangular or narrowly lanceolate; pinnate connected to each other by a narrow wing along rachis, or proximal 1–3 pairs free, proximal pinnae not shortened or basal pair only slightly shortened, or proximal several pairs gradually reduced to auricles; veins pinnate, lateral veins simple or forked, veinlets reaching margins; lamina herbaceous or soft papery, with whitish acicular hairs on both surfaces, rachis, costae, and costules rounded and raised on both sides and similarly with dense acicular hairs, sometimes mixed with a few forked hairs, with more brownish hairs and lanceolate, ciliate scales abaxially. Sori orbicular to oblong, borne above middle of ultimate veins, exindusiate or indusia very small and vestigial; sporangia often with a few short acicular hairs or capitulate hairs near annulus. Spores bilateral, reniform, perispores winged, thin, and transparent, granular on surfaces. $x = 30$.

Four species: widely distributed throughout the N temperate zone, one species in SE Asia; three species (one endemic) in China.

*Phegopteris* is monophyletic and differs from *Pseudophegopteris* in its smaller stature, stramineous stipes, laminae usually triangular or...
narrowly lanceolate, proximal pinna bases decurrent and adnate to each other by a rachis wing, veinlets reaching margin, sparsely ciliate scales on abaxial side of rachises, and costae sparsely ciliate. Phegopteris is primarily N temperate and circumboreal, while Pseudophegopteris is tropical and subtropical and restricted to the Paleotropics.

The following taxa are excluded from the present treatment, pending further research: Phegopteris amaurophylla Christ (Bull. Herb. Boissier 7(1): 14. 1899), described from Yunnan, and *P. somae* (Hayata) Tagawa (Acta Phytotax. Geobot. 7: 75. 1938; Dryopteris somae Hayata, Icon. Pl. Formosan. 5: 287. 1915 [*"somai"*], described from Taiwan.

1a. Rhizome short, erect; lamina lanceolate, pinnae connected to each other by narrow wings; most pinnae below middle of blade gradually shortened, proximal pair of pinnae reduced to auricles.......................... 3. *P. decursive-pinnata*

1b. Rhizome long creeping; lamina ± triangular, proximal 1–3 pairs of pinnae free, not tapering proximally, or basal pair slightly shortened, distal pinnae connected to each other by narrow rachis wing.

2a. Lamina triangular, length and width subequal or length slightly longer than width, proximal pair of pinnae largest and often reflected downward ...................................................................................... 1. *P. connectilis*

2b. Lamina narrowly triangular, length almost 2 times width, proximal 1–3 pairs of pinnae free, proximal pair slightly shortened, spreading or slightly ascending ............................................................... 2. *P. tibetica*


卵果蕨 lu'an guo jue

Polypodium connectile Michaux, Fl. Bor.-Amer. 2: 271. 1803; *Aspidium phegopteris* (Linnaeus) Baumgarten; *Dryopteris phegopteris* (Linnaeus) C. Christensen; *Gymnocarpium phegopteris* (Linnaeus) Newman; *Nephrodium phegopteris* (Linnaeus) Prantl; *Phegopteris polypodioides* Fée; *P. vulgaris* Mettenius; *Polypodium phegopteris* Linnaeus; *Polystichum phegopteris* (Linnaeus) Roth; *Thelypteris phegopteris* (Linnaeus) Slos. 

Plants 25–40 cm tall. Rhizome long creeping, with bright brown, ovate-lanceolate thin scales at apex. Fronds remote; stipe dark brown at base, striamineous distally, 15–30 cm, sparsely scaly, nearly smooth; lamina bipinnatifid, deltoid, 13–20 × 10–18 cm, acuminate and pinnatifid at apex; pinnae ca. 10 pairs, usually opposite, spreading, lanceolate, 5–9 × 1–2 cm, basal pair largest, bases slightly or not tapering, free from second pair of pinnae, slightly deflexed, apices acumenitate; segments oblong, entire, undulate, or lobed along margins, rounded or obtuse at apices; distal pinnae gradually shortened, bases connected along rachises by triangular wings. Veins pinnate, lateral veins simple or occasionally forked. Fronds herbaceous, drying deep green, rachises raised abaxially, adaxially with grooves with dense acicular hairs, rachises and costae with acicular hairs on both sides and mixed with a few forked hairs, with sparse brownish narrowly lanceolate scales abaxially, scales sparsely long ciliate along margins, subglabrous between veins on both surfaces. Sori orbicular or nearly so, borne subterminally on ultimate veins and close to margins. Sporangia each occasionally with 1 or 2 hairs near annulus. 2n = 60, 90.

Forests, shrublands; 1200–3600 m. Guizhou, Heilongjiang, He-nan, Jilin, Liaoning, Shaanxi, Sichuan, Taiwan, Yunnan [widely distributed in temperate regions of the N Hemisphere, south to mountains of C Asia and the Himalaya].

Phegopteris connectilis is similar to *P. hexagonoptera* (Michaux) Fée, which occurs in North America only. In *P. connectilis*, the proximal pinnae taper to their bases, the proximal and subbasal pinnae are not connected by decurrent wings along the rachis, the laminae are thinly herbaceous and sparsely shortly hairy on both surfaces, and the lateral veins are mostly simple. *Phegopteris hexagonoptera* has the proximal pair of pinnae connected to the next pair by a wing along the rachis, shorter laminar hairs (less than 0.25 mm vs. mostly 0.3-0.5 mm or longer in *P. connectilis*), and ultimate veins forked or pinnate.


西藏卵果蕨 xi zàng lu'an guo jue

Plants ca. 45 cm tall. Rhizome not seen. Stipe dark brown at base, distally striamineous, 24–27 cm, with triangular-lanceolate scales, rounded abaxially, nearly smooth or with short hairs, grooved and with acicular hairs adaxially; lamina pinnate-pinnatifid, oblong, 18–20 × 10–14 cm, base not decurrent, apex acuminate and pinnatifid; pinnae 13–15 pairs, proximal 2 or 3 pairs free, spreading or slightly obliquely spreading, 5–7 × ca. 2 cm (basal one pair slightly shortened), oblong-lanceolate, slightly tapering to bases, ± adnate to rachis, pinnatifid; segments oblong, entire along margins (or occasionally undulate-crenate on long segments), sparsely ciliate, rounded-oblute at apices; pinnae above middle gradually shortened, linear-lanceolate, bases decurrent and connected to each other along rachis by narrow wings. Veins pinnate, lateral veins forked or simple and reaching margins. Fronds herbaceous, drying deep green, rachises raised abaxially, adaxially with grooves with dense acicular hairs, rachises and costae with acicular hairs on both sides and mixed with a few forked hairs, with sparse brownish narrowly lanceolate scales abaxially, scales sparsely long ciliate along margins, subglabrous between veins on both surfaces. Sori orbicular or nearly so, borne subterminally on ultimate veins and close to margins, exindusiate. Sporangia each occasionally with 1 or 2 hairs near annulus.

● Abies forests; ca. 3600 m. Xizang (Bomi).

*Phegopteris tibetica* is most similar to *P. connectilis*, but the laminar length is 2 times the width, proximal 2 or 3 pairs of pinnae usually not connected at bases by a rachis wing, basal pair of pinnae slightly shortened, and laminae glabrous between veins on both surfaces.


延羽卵果蕨 yán yǔ lu'an guo jue

Plants 30–60 cm tall. Rhizome short and erect, including base of stipe with reddish brown, ciliate, narrowly lanceolate scales. Fronds clustered; stipe stramineous, 10–25 cm; lamina lanceolate, 20–50 × 5–12 cm, gradually tapering to base, bipinnatifid or pinnate and toothed along margins, acuminate and pinnatifid at apex; pinnae 20–30 pairs, alternate, obliquely spreading, middle ones largest, narrowly lanceolate, 2.5–6 × ca. 1 cm, broad and decurrent at bases, connected by orbicular auricles or triangular wings between pinnae, pinnatifid to 1/3–1/2 of distance to costules, acuminate at apices; segments obliquely spreading, ovate-triangular, entire, obtuse at apices; pinnae gradually shortened to both ends, basal one pair of pinnae often shortened into small auricles. Veins pinnate, lateral veins simple and reaching margins. Fronds herbaceous, along rachis, costae, and veins with whitish unicellular acicular short hairs on both sides, abaxial side with forked and stellate hairs, abaxial side of rachises and costae with sparse brownish, hairlike or lanceolate, ciliate scales. Sori suborbicular, borne at or near ends of ultimate veins, 2 or 3 per segment, sometimes with tufts of stalked forked hairs in center when young. Sporangia each sometimes with 1 or 2 short hairs near annulus. 2n = 60, 90, 120.

Along rivers on fluvial plains, lower montane regions of hills, forests by roadsides; sea level to 2000 m. Anhui, Chongqing, Fujian, Gansu, Guangdong, Guangxi, Henan, Hunan, Jiangsu, Jiangxi, S Shaanxi, Sichuan, Taiwan, Yunnan, Zhejiang [Japan, S Korea, N Vietnam].

_Phegopteris decursive-pinnata_ is very different from other species of the genus in having short, erect rhizomes and narrowly lanceolate laminae, but it can spread by long-creeping rhizomes. Because of these characters, Iwatsuki removed it from _Thelypteris_ sect. _Phegopteris_ and treated it and some species that we place in _Pseudophegopteris_, as well as other species, in _T_. sect. _Lastrea_ (Bory) Alston. Three ploidal levels are known, but these numbers do not clearly correlate with differing morphologies.


_bian guo jue shu_.

Lin Youxing (林尤兴); Kunio Iwatsuki

Plants medium-sized, terrestrial. Rhizomes erect, including stipe bases with scales and short rough hairs; scales reddish brown, ovate-lanceolate, ciliate and densely shortly hairy. Fronds clustered; stipes greenish, with dense divided grayish white transparent acicular fine long hairs; laminae broadly lanceolate, not tapering at bases, pinnate-pinnatifid, acuminate and pinnatifid at apices; pinnae large, but proximal pair of pinnae not shortened, lanceolate, pinnatifid; segments with semitransparent membranous narrow edge and undulate along margins, when dry usually reflexed and not easily seen; costae grooved adaxially, abaxially rounded; veins free, veinlets on segments simple (occasionally forked at middle), slightly inflated at ends and not reaching margins; vein type similar to _Pseudocyclosorus_., i.e., acroscopic veinlet of basal pair of veins reaching excartilaginous sinuses, basiscopic veinlet reaching margins above sinus. Laminae herbaceous, along rachises and costae setaceous and mixed with short rough hairs. Sori oblong, attached below ends of veinlets and close to margins, exindusiate. Sporangia glabrous or usually with only one short acicular hair near annulus. Spores echinate.

- One species: China.

_Craspedosorus_ is clearly closely related to _Leptogramma_. They both are very similar in laminar outline, segment shape, venation, and sori, but _Craspedosorus_ is larger, with more pinnae that are free from rachises (except for distal ones) and pinnatifid nearly to costae; veinlets not reaching margins, segments slightly undulate along margins and with translucent membranous narrow edges (usually reflexed when dry and not easily seen); sori short and thick, oblong, attached near ends of veinlets and closer to margins; and sporangia glabrous or each with one short acicular hair. In the opinion of _Thelypteridaceae_ co-author Alan R. Smith, these diagnostic characters are not enough to separate _Craspedosorus_ from _Leptogramma_.


_bian guo jue_

Lin Youxing (林尤兴); Kunio Iwatsuki

Plants to 1.1 m tall. Stipes ca. 40 cm, glabrous above bases; laminae broadly lanceolate, ca. 65 × 22 cm, not tapering at bases, pinnate-pinnatifid; pinnae ca. 25 pairs, sessile, alternate, middle ones lanceolate, ca. 14 × 2.5 cm, bases truncate on acroscopic sides and parallel with costae, basal sides obliquely truncate, pinnatifid to above 2/3 of distance to costule, apices acuminate; segments ca. 20 pairs, middle ones oblong-lanceolate, ca. 1 cm (proximal 3 or 4 pairs slightly shorter), ca. 5 mm wide, with translucent membranous narrow edge along margins and slightly undulate, usually reflexed when dry, obtuse or bluntly pointed at apices. Veinlets in segments 5–9 pairs, simple or occasionally forked at middle, slightly thickened at end and not reaching margins. Laminae herbaceous, green when dry, abaxially glabrous, adaxially with long setae and mixed short rough hairs on rachises and costae. Sori oblong, attached slightly below end of veinlets and close to margins, costules with broad sterile space on both sides; sporangia each usually with one short acicular hair near annulus.

- Shaded thickets; 1400–1500 m. NE Yunnan.


_zi bing jue shu_.

Lin Youxing (林尤兴); Alan R. Smith

Plants medium-sized, terrestrial. Rhizome short and erect, long creeping to ascending, apex with brown lanceolate scales.
Fronds clustered, sparse or remote; stipe castaneous or red-brown, less often stramineous or tan, shiny, base sometimes with whitish acicular hairs, sometimes mixed with stellate hairs, distally often glabrescent and smooth; lamina pinnate-pinnatifid to bipinnate-pinnatifid, lanceolate, oblong-lanceolate, oblong, or ovate, tapering or not to base, acuminate and pinnatifid at apex; pinnae usually opposite or subopposite, spreading or obliquely spreading, pinnae below middle not adnate to rachis, sessile or shortly stalked, lanceolate or triangular-lanceolate, bases often broadened, truncate, symmetrical or not, sometimes hastate, apices acuminate; basiscopic segments sometimes longer than acroscopic segments, and basal segments on both sides sometimes prolonged; costae raised on both sides, usually same color as stipes and rachises or lighter colored, abaxially glabrous or with whitish acicular hairs, hairy adaxially; veins free, lateral veins simple or forked, each with a clavate hyathode at end and not reaching margin. Sori oblong, ovate, or suborbicular, borne at middle or above middle, exindusiate. Sporangia glabrous or with short hairs just below annulus. Spores bilateral, orbicular-reniform, perispores thin and transparent, reticulate or foveolate on surfaces, exospore smooth. $x = 31$.

About 25 species: tropical and subtropical Asia, east to the Pacific islands, to the west reaching to W Africa; 12 species (four endemic) in China.

Citations of Pseudophegopteris paludosa (Blume) Ching from China (Ching, Acta Phytotax. Sin. 8: 315. 1963; Tsai & Shieh, Fl. Taiwan, ed. 2, 1: 401. 1994), a species known with certainty only from Malesia (Holttum, Blumea 17: 91. 1969; Fl. Males., Ser. 2, 1: 347. 1981), perhaps apply to specimens of P. pyrrhorhachis or P. hirtirachis, which are two closely related and similar species.

1a. Stipes stramineous, bases including abaxial sides of rachises and costae with whitish acicular hairs mixed with irregularly forked or stellate hairs.

2a. Stipes same size or slightly shorter than laminae, 15–30 cm; pinnae with sparse acicular hairs adaxially ............. 1. P. levingei

2b. Stipes equal to 1/4 of laminae in length, 8–10 cm; pinnae except costae with sparse acicular hairs adaxially, otherwise glabrous ........................................................................................................ 2. P. brevipes

1b. Stipes red-castaneous or castaneous, or if stramineous or brown-stramineous then bases of stipe, abaxial sides of rachis, and costae never with mixed acicular hairs.

3a. Basal pair of pinnules or segments on proximal pinnae, particularly basiscopic one, clearly longer than adjacent one and also lobed or incised; pinna base asymmetrically hastate.

4a. Laminae not tapering to base, i.e., proximal 1 or 2 pairs of pinnae largest; pinnae all sessile ............... 3. P. yigongensis

4b. Laminae ± tapering to base, i.e., proximal 1 or 2 pairs of pinnae smaller than distal ones.

5a. Pinnae below middle shortly stalked ................................................................. 4. P. tibetana

5b. Pinnae all sessile.

6a. Rhizome long creeping; stipes nearly same length as or slightly shorter than laminae; laminae papery, drying brownish green, glabrous on both surfaces .......................................................... 5. P. aurita

6b. Rhizome shortly creeping to ascending; stipes much shorter than laminae; laminae thinly herbaceous, drying yellowish green, with fine acicular hairs on both surfaces ........................................ 6. P. subaurita

3b. Basal pair of pinnules or segments on proximal pinnae same shape and size as distal pinnules/segments on same pinna, or at most slightly inflated; pinnae symmetrically hastate at base, or seemingly not hastate.

7a. Stipules stramineous, occasionally tan; plants 90–120 cm tall; laminae 60–80 × 20–30 cm; segments toothed along margins ........................................................ 12. P. microstegia

7b. Stipules red-castaneous, castaneous-brown, or reddish brown, never stramineous or brown-stramineous; segments entire along margins.

8a. Laminae less than 20 cm wide, pinnate-pinnatifid.

9a. Sori near end of acroscopic veinlet of a forked pair and closer to margin; sporangia lacking hairs; pinnae subglabrous on abaxial surfaces between veins .................................................. 10. P. zayuensis

9b. Sori at middle of ultimate veins, between costae and segment margins; sporangia with 1 or 2 seta(e) below annulus; pinnae with sparse fine acicular hairs on abaxial surfaces between veins .......................................................... 11. P. rectangularis

8b. Laminae wider than 20 cm, pinnate-pinnatisect with pinnules often toothed or lobed, or 2-pinnate-pinnatifid.

10a. Laminae broadly ovate, proximal pair of pinnae largest, 30–45 × 13–20 cm, pinnules pinnatifid nearly to costules ........................................................................................................ 9. P. yunkweiensis

10b. Laminae oblong or oblong-lanceolate, proximal pair of pinnae same size as ones above or slightly shorter, 10–20 × 2.5–7 cm, pinnae pinnatifid to 1/2 of distance to costule.

11a. Rhizome long creeping; laminae with sparse acicular short hairs or sometimes glabrous on abaxial surfaces; sporangia glabrous .......................................................... 7. P. pyrrhorhachis

11b. Rhizome short, ascending; laminae with dense acicular short hairs on abaxial surfaces; sporangia each with 2 or more hairs .............................................................................. 8. P. hirtirachis


星毛紫柄蕨 xing mao zi bing jue
Plants 60–80 cm tall. Rhizome long creeping, with reddish brown, broadly lanceolate scales and whitish acicular hairs. Fronds remote; stipe stramineous, 15–30 cm, with sparse similar scales on proximal parts and denser whitish acicular hairs and few irregularly forked stellate hairs; lamina pinnate-pinnatisect, lanceolate or oblong-lanceolate, 35–60 × 5–15 cm, slightly tapering at base, acuminate and pinnatifid at apex; pinnae to ca. 20 pairs, opposite, sessile, pinnae above middle approximate, proximal 2 or 3 pairs remote from each other, gradually shortened downward, basal pair of pinnas smallest, 2–5 cm, others 3–8(–11) × 1.5–2.5 cm, lanceolate, bases truncate, ± symmetrical, pinnatisect nearly to costae, apices acuminate; segments 8–15 pairs per pinna, opposite, obliquely spreading, approximate, oblong, 1–1.3 × 0.3–0.5 cm, slightly broader at base, connected to each other by a narrow wing, entire, crenate, or occasionally lobed along margins of larger segments, obtuse at apices. Veins visible on both sides, lateral veins simple or forked, 5–7 per segment, basal pair arising from above bases of main veins. Laminae herbaceous, drying dark green, abaxial surfaces with dense whitish acicular hairs and a few stellate scales; scales ovate-lanceolate, thinly membranous, apices hairy on back and margins. Fronds remote; stipe stramineous, 15–30 cm, bases villosus, dark brown lanceolate scales. Fronds remote; stipe blackish brown at base, shortly stalked, proximal 1 or 2 pairs of pinnae obliquely tri-apsic and pinnatifid at apex; segments to ca. 12 pairs, approximate, spreading, oblong, 8–9 × 4.5 mm, hairy along margins, obtuse at apices. Veins slender, visible adaxially, lateral veins forked, 4 or 5 pairs per segment, basal pair arising from above bases of costae. Laminae thinly herbaceous, drying deep green or dark brown-green, with sparse whitish hairs, hairs denser along costae and veins and mixed with a few irregularly forked stellate hairs, adaxial surfaces with sparse acicular hairs along costae, rachises stramineous, sparsely hairy. Sori oblong, 2–4 pairs per segment, borne near ends of forked veinlets and close to margins. Sporangia each with hairs below annulus.

- In rock crevices in valleys; ca. 2300 m. SE Xizang (Zayü).

### 3. Pseudophegopteris yigongensis

**Ching, Fl. Xizang. 1: 165. 1983.**

易贡紫柄蕨 yi gong zi bing jue

Plants 60–75 cm tall. Rhizome long creeping, with lanceolate hairy scales. Fronds remote; stipe blackish brown at base, brown-stramineous and shiny distally, 30–40 cm, bases villous, distally glabrous; lamina narrowly oblong or narrowly lanceolate, 25–35 × 6–10 cm, base not tapering, pinnate-pinnatifid (basal pinnules on proximal pair of pinnae often pinnate), apex pinnatifid and acuminate; pinnae 9–12 pairs, opposite, spreading, distal pinnae decurrent and connected, middle pinnae ± decurrent and adnate to rachis but not connected to each other, proximal 1 or 2 pairs of pinnae largest, sessile and not decurrent, 7–9 × ca. 4.5 cm, bases asymmetrical, pinnatifid, apices long acuminate; basiscopic pinna segments longer than acrosopic ones, particularly basal basiscopic one, to 3–4 cm, pinnatifid, other segments entire. Veins visible on both sides, lateral veins simple or forked, 4–6 pairs per segment. Laminae thinly herbaceous, drying yellowish green, abaxially villous along veins, subglabrous adaxially, rachises stramineous and sparsely villous. Sori oblong, borne at middle or above middle of ultimate veinlets, 2–4 pairs per segment. Sporangia each with 2–4 acicular hairs below annulus.

- Dense forests; ca. 2500 m. SE Xizang (Bomi, Yigong).

*Pseudophegopteris yigongensis* is somewhat similar to *P. levingei*, differing in the fewer lateral pinnae, proximal two pairs much larger than distal ones, and laminae sparingly villous abaxially.

### 4. Pseudophegopteris tibetana

**Ching & S. K. Wu, Fl. Xizang. 1: 164. 1983.**

西藏紫柄蕨 xi zang zi bing jue

Plants 85–90 cm tall. Rhizome long creeping, with sparse dark brown lanceolate scales. Fronds remote; stipe red-castaneous at base, shiny, 15–40 cm, base with a few scales and acicular hairs; lamina lanceolate, (15–)45–50 × (4–)12–16 cm, slightly tapering proximally, pinnate-pinnatifid (pinnules on proximal pair of pinnae often lobed), pinnatifid and long acuminate at apex; pinnae 4–17 pairs, ± opposite or subopposite, pinnae above middle ± adnate to rachis, pinnae below middle shortly stalked, proximal 1 or 2 pairs of pinnae obliquely triangular, (2–)7–7.5 × 1.5–3 cm, bases asymmetrical, pinnatifid, apices acuminate; basiscopic segments largest, oblong-lanceolate, ca. 2 × 0.4–1 cm, pinnatifid, other segments entire; dis-
tal pinnae lanceolate, to 8 × 2–2.2 cm, symmetrical, pinnatifid to 1/2 distance to costae or less, acuminate at apices; segments oblong, entire. Veins visible abaxially, lateral veins forked or simple, 2–6 pairs per segment, basal pair arising from bases of costae. Fronds papery, drying yellowish green, abaxial surfaces with sparse hairs along veins and margins, rachises stramineous to brown, sparsely villous, hairs denser adaxially. Sori oblong, borne above middle of ultimate veinlets, 2–4 pairs per segment. Sporangia each with a seta below annulus.

- Dense forests; ca. 2100 m. SE Xizang.

The distinctness of *Pseudophegopteris tibetana* relative to *P. aurita* and *P. yigongensis* needs more study.


**Erb shu zhuang zi bing jue**

Gymnogramma aurita Hooker, Icon. Pl. 10: t. 974. 1854; Aspidium auritum (Hooker) Christ; Dryopteris aurita (Hooker) C. Christensen; Grammitis aurita (Hooker) T. Moore; Leptogramma aurita (Hooker) Beddome; Nephrodium auritum (Hooker) Handel-Mazzetti; Phegopteris aurita (Hooker) J. Smith; Polypodium auritum (Hooker) E. J. Lowe; Thelypteris aurita (Hooker) Ching.

Plants 40–100 cm tall. Rhizome long creeping, with scales at apex; scales brown, narrowly lanceolate, 3–4 mm, ciliate along margins. Fronds remote; stipe red-castaneous or brownish at least toward base, shiny, 20–60 cm; lamina ovate-lanceolate, 20–70 × 15–30 cm, slightly tapering to base, pinnate-pinnatifid, pinnatifid and acuminate at apex; pinnae 10–18 pairs, opposite, spreading, sessile, proximal 1 or 2 pairs of pinnae slightly shortened, lanceolate, distal pinnae 7–15 × 2–4 cm, bases hastate, asymmetrical, pinnatifid near to costae, apices acuminate, pinnae above middle ± symmetrical at base and adnate to rachis; segments (10–)15–20 pairs, spreading, basiscopic segments of pinnae longer than acrosopic ones, basal pair largest, particularly basiscopic one more oblique, lanceolate, 2.5–4 × 0.7–1 cm, margins pinnately lobed or crenate, acrosopic acuminate, acrosopic ones shorter, parallel to rachis, oblong, 1–2 cm, entire or shallowly undulate, obtuse at apices. Veins visible abaxially, lateral veins forked or simple, 5–7 pairs per segment, basal pair arising from bases of costules. Laminae thickly herbaceous, drying brown-green, with short hairs along both sides of costae or only adaxially, laminae otherwise glabrous, rachises smooth abaxially, with dense short hairs adaxially. Sori oblong or sometimes ovate-orbicular, borne above middle of ultimate veinlets, far from costules, 2–5 pairs per segment. Sporangia each with hairs below annulus. \(2n = 62, 124\).


A widespread species, *Pseudophegopteris aurita* varies considerably in frond size, and hence in laminar dissection, over its range. Specimens outside of China tend to be considerably larger.


**Guang zhoo zi bing jue**


Plants 50–120 cm tall. Rhizome shorty creeping to ascending, apex and stipe base with dense brown-lanceolate hairy scales. Fronds clustered or slightly spaced; stipe red-castaneous at least at base, 10–35 cm, abaxially sparsely hairy, adaxially with dense hairs along groove; lamina oblong-lanceolate, 40–50(–100) × 15–30 cm, tapering at base, pinnate-pinnatifid, pinnatifid and long acuminate at apex; pinnae 15–20 pairs, opposite, obliquely spreading, sessile, basal pair of pinnae smallest, narrowly triangular, 2–6 × 3–6 cm, more distal pinnae gradually longer, second pair 8–15 × ca. 2 cm (excluding basalmost segments), triangular-lanceolate, bases abruptly widened to 7 cm, asymmetrically hasteate, pinnatifid nearly to costules, apices acuminate; segments 15–25 pairs per pinna, opposite, obliquely spreading, basal pair clearly longer than distal pairs, particularly basiscopic one pinnatifid and more oblique, lanceolate, to ca. 4 × 1.2 cm, tapering to an acute apex, acrosopic one parallel to rachis, to 4 cm, more distal segments to 3 × 0.8 cm, oblong, margins crenate to lobed, distal segments entire, obtuse or subacute at apices. Veins visible abaxially, lateral veins simple or forked on proximal larger segments, basal pair arising from bases of costae. Fronds herbaceous, drying yellowish green, with fine acicular hairs on both surfaces, hairs along costae and veins denser abaxially. Sori subterminal to oblong, borne at middle or above middle (closer to margin) of ultimate veins. Sporangia each often with 1 or 2 short hairs below annulus. \(2n = 62\).

Forests beside streams, open areas in thickets; 200–1000 m. N and S Taiwan [Japan (Ryukyu Islands)].

*Pseudophegopteris subaurita* is closely related to *P. pyrrhorhachis* and to *P. aurita* but is seemingly absent from mainland China.


**Zi bing jue**

Plants 80–100 cm tall. Rhizome long creeping, scaly at apex. Fronds approximate or sparse; stipe red-castaneous, shiny, 20–40 cm, base with short hairs and few lanceolate scales, distally glabrous; lamina oblong-lanceolate, 60–70 × 20–35 cm, somewhat tapered to base, pinnate-pinnatifid, acuminate at apex; pinnae 15–20 pairs, opposite, sessile, proximal pinnae narrowly lanceolate, middle pinnae larger, 13–20 × 2.5–5 cm, bases slightly broadened, rounded-truncate, proximal 1–3 pairs sometimes slightly shortened, pinnatifid, shortly acuminate at apices; pinnules 15–25 pairs, opposite, spreading, lanceolate and slightly falcate, 1.5–2.5 × 0.5–0.8 cm, bases slightly broadened and adnate to costae, connected to each other by a narrow wing, lobed to 1/2 distance to costae, apices slightly acuminate; segments triangular-oblong, acuminate and entire at apices. Veins hidden, pinnate on segments, 2–4 pairs per segment, basal pair arising from above base of costules. Fronds herbaceous, drying dark brown-green, abaxial surfaces with sparse short acicular hairs, hairs along costae, costules, and...

Plants to 1 m. Rhizomes ascending, stipe base with brown lanceolate scales. Fronds somewhat clustered; stipe red-castaneous, shiny, 20–55 cm, base with scales and whitish hairs; lamina oblong, mostly 50–80 × 15–35 cm, slightly tapering at base, 2-pinnate-pinnatifid, acuminate and pinnatifid at apex; pinnae opposite to subopposite, sessile, lanceolate, middle pinnae largest, 9–20 cm or more, mostly 2–6 cm wide, slightly asymmetrical, acute at apices, proximal 1 or 2 pairs shortened, proximal pair 3–10 cm, pinnatifid or pinnatisect; pinnules 12–20 pairs per pinna, opposite, spreading, basiscopic ones on proximal pinnae slightly longer than acrosopic ones, 0.8–3.5 × 0.5–0.8 cm, bases broadened and adnate to costae, connected to each other by narrow wings, apices shortly acuminate to obtuse, basal pair of pinnules same size or slightly longer, toothed to pinnatifid to 1/2 distance to costules; segments triangular-oblong, entire to dentate, obtuse to acute at apices. Veins visible on both sides, lateral veins simple or forked, mostly 4–15 or more pairs per pinnule, basal pair arising above bases of costules. Laminae herbaceous, drying deep green or brownish green, abaxial surfaces with dense short whitish hairs along costa, veins, and between veins, adaxially with appressed thick short hairs along rachises, costae, and costules, rachises castaneous or red-castaneous and with sparse to dense, short, spreading hairs abaxially. Sori suborbicular to oblong, near ends of ultimate veinlets. Sporangia glabrous between hairs.

**Polypodium pyrrhorhachis** Kunze, Linnaea 24: 257. 1851; *Dryopteris laterepens* (E. W. Trotter ex Hope) C. Christensen; *Lastrea pyrrhorhachis* (Kunze) Copeland; *Macrothelypteris pyrrhorhachis* (Kunze) Pichi Sermolli; *Nephrodium brunneum* Handel-Mazzetti; *N. distans* Diels (1889), not Hooker (1862); *Phegopteris brunnea* Wallich ex J. Smith; *P. distans* Mettenius; *P. pyrrhorhachis* (Kunze) Tagawa; *Polypodium distans* D. Don (1825), not Kaulfuss (1824); *P. distans* var. *adnatum* C. B. Clarke; *P. laterepens* E. W. Trotter ex Hope; *Thelypteris brunnea* (Handel-Mazzetti) Ching; *T. pyrrhorhachis* (Kunze) B. K. Nayar & S. Kaur

Laminae abaxially with dense short acicular hairs along costa, costules, and veins, often hairy between veins.

Forests beside streams; 800–1000 m. Chongqing, Fujian, S Guangxi, Guangdong, Guangxi, Guizhou, Hunan, Hubei, Henan, Jiangxi, Sichuan, Taiwan, Yunnan [Bhutan, N India, Myanmar, Nepal, Sri Lanka, Vietnam].

“*Polypodium brunneum*” (Wallich, Numer. List, no. 333. 1829) belongs here but is a nomen nudum and was not therefore validly published (Melbourne Code, Art. 38.1(a)).


紫柄蕨

**Polypodium pyrrhorhachis** Kunze, Linnaea 24: 257. 1851; *Dryopteris laterepens* (E. W. Trotter ex Hope) C. Christensen; *Lastrea pyrrhorhachis* (Kunze) Copeland; *Macrothelypteris pyrrhorhachis* (Kunze) Pichi Sermolli; *Nephrodium brunneum* Handel-Mazzetti; *N. distans* Diels (1889), not Hooker (1862); *Phegopteris brunnea* Wallich ex J. Smith; *P. distans* Mettenius; *P. pyrrhorhachis* (Kunze) Tagawa; *Polypodium distans* D. Don (1825), not Kaulfuss (1824); *P. distans* var. *adnatum* C. B. Clarke; *P. laterepens* E. W. Trotter ex Hope; *Thelypteris brunnea* (Handel-Mazzetti) Ching; *T. pyrrhorhachis* (Kunze) B. K. Nayar & S. Kaur

Laminae abaxially with dense short acicular hairs along costa, costules, and veins, often hairy between veins.

Forests beside streams; 800–1000 m. Chongqing, Fujian, S Guangxi, Guangdong, Guangxi, Guizhou, Hunan, Hubei, Henan, Jiangxi, Sichuan, Taiwan, Yunnan [Bhutan, N India, Myanmar, Nepal, Sri Lanka, Vietnam].


Plants to 1.5 m tall. Rhizome stout, short and ascending, stipe base with brown lanceolate scales. Fronds somewhat clustered; stipe red-castaneous, shiny, 40–55 cm, base with dense brown, ovate-lanceolate, hairy scales, distally glabrous; lamina ovate, ca. 100 × 40–60 cm, not tapering to base, 2-
Pinnate-pinnatifid, apex acuminate and pinnatifid; pinnae 10 or more pairs, opposite, or distal ones subopposite and more oblique, sessile or proximal ones shortly stalked, proximal pair largest, 30–45 × 13–20 cm, oblong-lanceolate, bases symmetrical or basal several pinnae shortened acroscopically, pinnate-pinnatifid, acuminate at apices, basiscopic pinnae not elongate relative to more distal pinnae; pinnules 15–25 pairs per pinnae, 2.5–3 cm apart, alternate, spreading, mostly free from each other, sessile or narrowly adnate to costae, distalmost ones connected by a narrow wing, lanceolate, 6–13 × 1.4–2.4 cm, truncate at bases, pinnatifid 3/4–4/5 distance to costules, acute at apices; segments 15–20 pairs, falcate-lanceolate, margins crenate or entire distally, apices acute or obtuse; veins visible on both sides, especially adaxially, lateral veins forked, 4–7 pairs per segment. Laminae herbaceous, drying dark green, rachises and costae reddish, costules stramineous, abaxially with sparse acicular hairs or glabrescent along rachises, costae, and costules, with denser acicular hairs adaxially along costae and costules, glabrous on both surfaces on and between veins. Sori suborbicular or slightly oblong, borne at middle of lateral veins between costae and margins, 3–6 pairs per segment. Sporangia glabrous.

Forests beside streams. N Guizhou (Zunyi), SE Yunnan (Mengzi) [N Vietnam].


察隅紫柄蕨 cha yu zi bing jue

Plants ca. 85 cm tall. Rhizome not seen. Stipe reddish brown, shiny, ca. 30 cm, scaly at base; scales reddish brown, linear-lanceolate, glabrous, or occasionally with a few long hairs dorsally, including rachises with sparse whitish acicular hairs; lamina to ca. 55 × 16 cm, slightly tapering at base, pinnate-pinnatifid, shortly acuminate and pinnatifid at apex; pinnae ca. 25 pairs, opposite or subopposite, proximal 1 or 2 pairs sessile, spreading, proximal pair shortest, ca. 5 cm, middle pinnae ca. 8 × 1.5–2 cm, linear-lanceolate, truncate and symmetrical at bases, pinnatifid to 3/4 of distance to costae, acute at apices; segments ca. 20 pairs per pinna, rectangular, 7–8 × 4–5 mm, entire. Veins visible abaxially, 4 or 5 pairs per segment, basal pair arising from above base of costules. Laminae thinly papery, drying green, subglabrous on both surfaces between veins, costae at bases red-castaneous abaxially, distally stramineous, shiny, with sparse acicular hairs. Sori orbicular, borne near tips of acroscopic vein of forked lateral vein pair and close to margin. Sporangia glabrous.

- Broad-leaved forests; ca. 2100 m. S Xizang.

This species is known only from the type.

Pseudophegopteris zayuensis is closely related to *P. tibetana*, differing primarily by the basiscopic basal pinnule on proximal pinnae not being strongly elongate and the glabrous sporangia. More collections are needed to evaluate the importance of these differences.


对生紫柄蕨 dui sheng zi bing jue

Plants 40–70 cm tall. Rhizome short, suberect. Fronds clustered; stipe red-castaneous, shiny throughout, 10–30 cm, with short spreading acicular hairs, base with narrowly lanceolate, brownish, sparsely hairy, thin scales; lamina narrowly oblong-lanceolate, 30–50 × 7–12 cm, slightly tapering and with pinnae more spaced proximally, pinnate-pinnatifid; pinnae ca. 20 pairs, opposite to subopposite, spreading, sessile and distal ones becoming narrowly adnate to rachis, proximal 1–3 pairs slightly shortened, to 3 cm, basal segments of proximal pinnae not significantly elongate or lobed, distal pinnae lanceolate, 4–7 × 0.8–1.8 cm, pinnately lobed to 3/4 of distance to costae, acuminate at apices; segments 12–20 pairs per pinna, obliquely spreading, oblong-triangual, entire along margins, obtuse at apices. Veins visible, lateral veins simple or occasionally forked, 3–5 pairs per segment, basal pair arising from above base of costules, acroscopic one of a pair running toward sinus but not reaching margin. Laminae herbaceous, drying greenish, adaxial surfaces nearly smooth except for hairs along costae, abaxial surfaces with sparse to many acicular hairs to 0.5 mm, hairs along costae denser, also sometimes with a few capitulate short hairs between veins, rachises red-castaneous and with denser acicular hairs. Sori suborbicular, borne at middle or near tips of lateral veins, 2–4 pairs per segment. Sporangia each usually with 1 or 2 acicular hairs below annulus. 2n = 124.

Forests beside streams; 1000–1500 m. N Guangxi, SE Xizang, SE and W Yunnan [Bhutan, NE India, Indonesia, Malaysia, Nepal].

*Dryopteris oppositipinna* Alderwerelt (Bull. Jard. Bot. Buitenzorg, sér. 2, 16: 24. 1914) is invalid (Melbourne Code, Art. 36.1(c)).


禾杆紫柄蕨 he gan zi bing jue


Plants 90–120 cm tall. Rhizome long creeping, with sparse, appressed, brownish, broadly lanceolate scales. Fronds remote; stipe stramineous, occasionally brown-stramineous, 30–40 cm, base with sparse brownish lanceolate scales, distally glabrous; lamina 60–80 × 20–30 cm, tapering proximally, pinnate-pinnatifid, pinnatifid and acuminate at apex; pinnae 20–25 pairs, subopposite, obliquely spreading or spreading, sessile, proximal pinnae linear-lanceolate, 10–15 × 2–3 cm, bases truncate, apices acute, proximal 2 or 3 pairs sometimes slightly shortened, 7–10 cm, pinnatifid nearly to costae; segments ca. 25 pairs per pinna, opposite, spreading, basal pair of segments same shape and size as more distal ones, oblong, 1–1.5 × ca. 0.5 cm, coarsely dentate or entire along margins, sparsely ciliate,
obtuse or truncate at apices. Veins visible abaxially, lateral veins forked, 6 or 7 pairs per segment, basal pair arising from above base of costules. Laminae thinly herbaceous, drying greenish, both surfaces with short hairs along costae and veins, hairs denser adaxially, rachises stramineous, adaxially densely hirsute along groove. Sori orbicular to slightly oblong, borne at middle of acrosopic vein of lateral vein pair. Sporangia glabrous.


Hook-sori fern

Lin Youxing (林尤兴); Kunio Iwatsuki

Plants medium-sized, terrestrial. Rhizomes short and strong, erect or long creeping, with grayish white unicellular short acicular hairs and few thick scales; scales brown, broadly lanceolate and with acicular and hooked hairs or along margins. Fronds clustered or opposite, lanceolate, proximal several pairs sometimes shortened into auricles, sessile or occasionally shortly stalked, middle pinnae pinnatifid; segments large, lanceolate or suboblong, entire, rounded-obtuse or obtusely pointed at apices. Veins pinnate, free, lateral ones simple, reaching margins above sinuses. Laminae herbaceous or papery, when dry brownish green or nearly brown, both surfaces ± with grayish white unicellular short acicular hairs and few hooked hairs along margins of acrosopic vein of lateral vein pair. Sporangia glabrous.


钩毛蕨属 gou mao jue shu

About ten species: mainly in mountains of subtropical regions; nine species (seven endemic) in China.

1a. Laminae clearly tapering to bases, i.e., proximal 1 to several pairs of pinnae shortened, proximal one auriculate.

2a. Proximal 2–5 pairs of pinnae gradually shortened, proximal 1 or 2 pairs of pinnae auriculate, less than 1 cm.

3a. Plants to more than 100 cm tall; rhizomes short and erect; adaxially with sparse appressed short hairs on intercostal areas, rachises with thick and long acicular hairs and with remaining marks after hairs fallen; sporangia each with 1 or 2 setae near top of annulus ................................................................. 1. **C. auriculata**

3b. Plants 60–70 cm tall; rhizomes long creeping; adaxially subglabrous on intercostal area, hairs on both sides of rachises leaving tubercular marks after fallen; sporangia glabrous ........................................ 2. **C. omeiensis**

2b. Proximal 1–3 pairs of pinnae gradually shortened or abruptly shortened, proximal pair of pinnae not auriculate, 2–4 cm.

4a. Proximal pair of pinnae abruptly shortened; adaxially subglabrous on intercostal areas; sori dorsifixed at middle of veinlets, located between costae and margins and not confluent when mature .................................................. 3. **C. leveillei**

4b. Proximal 2 or 3 pairs of pinnae gradually shortened; adaxially with sparse appressed short acicular hairs; sori dorsifixed near bases of veinlets and close to costules, ± confluent when mature ............................. 4. **C. costularisora**

1b. Laminae not tapering to bases, i.e., proximal pair of pinnae similar in size to distal ones.

5a. Smaller aerophores not clearly present at bases of pinnae on rachises.

6a. Rhizomes long creeping or ascending; pinnae with sparse short acicular hairs abaxially, adaxially with dense short acicular hairs along costae; sori dorsifixed below middle of veinlets and slightly close to costules ................................................................. 8. **C. flexilis**

6b. Rhizomes short and erect; pinnae with dense short acicular hairs abaxially, adaxially with dense short acicular hairs along costae and mixed with few long acicular hairs; sori dorsifixed above middle of veinlets and far from costules ........................................................................................................... 9. **C. tibetica**

5b. Aerophores linear-lanceolate to triangular-lanceolate at bases of pinnae on rachises.

7a. Pinnae of middle clearly shortly stalked; sori dorsifixed at middle or above middle and far from costules ...................................................................................................................... 5. **C. maguanensis**

7b. Pinnae not stalked; sori dorsifixed below middle of veinlets and slightly close to costules.

8a. Rhizomes short and erect; laminae papery; sporangia usually glabrous; plants 1.3–2.2 m tall .... 6. **C. neoauriculata**

8b. Rhizomes long creeping; laminae herbaceous; sporangia each with 1 or 2 short setae; plants less than 1 m tall .................................................................................................................................................. 7. **C. chuni**


耳羽钩毛蕨 er yu gou mao jue

---

**Pseudopogonitis microstegia** is very similar to **P. pyrrhorhachis** (and treated as a synonym of that by Holtum, 1969), differing mainly in the stramineous stipes and rachises and laminae abaxially glabrous except on rachises and costae. The purported differences need further study.

---

**THELYPTERIDACEAE**

Evergreen broad-leaved forests; 2300–2400 m. Chongqing (Nanchuan), C Sichuan, S and SE Xizang, NW and SE Yunnan [NE India].

**Pseudopogonitis microstegia** is very similar to **P. pyrrhorhachis** (and treated as a synonym of that by Holtum, 1969), differing mainly in the stramineous stipes and rachises and laminae abaxially glabrous except on rachises and costae. The purported differences need further study.

---

**THELYPTERIDACEAE**

Evergreen broad-leaved forests; 2300–2400 m. Chongqing (Nanchuan), C Sichuan, S and SE Xizang, NW and SE Yunnan [NE India].

**Pseudopogonitis microstegia** is very similar to **P. pyrrhorhachis** (and treated as a synonym of that by Holtum, 1969), differing mainly in the stramineous stipes and rachises and laminae abaxially glabrous except on rachises and costae. The purported differences need further study.
naeus) Kunz (1891); *D. himalayensis* C. Christensen; *D. squamistipes* (C. B. Clarke) C. Christensen; *Glaphyroptheris simulans* (Ching) H. Itô; *Lastrea himalayensis* (C. Christensen) Copeland; *L. simulans* (Ching) Copeland; *Polypodium appendiculatum* Hoffmann var. *squamistipes* C. B. Clarke; *P. auriculatum* (J. Smith) Wallich ex Hooker (1863), not Linnaeus (1753); *P. subvillosum* T. Moore; *Thelypteris auriculata* (J. Smith) K. Iwatsuki; *T. simulans* Ching; *T. squamistipes* (C. B. Clarke) Ching; *T. subvillosa* (T. Moore) Ching.

Plants to more than 1 m tall. Rhizomes short and erect, black, with scales or glabrous when old. Fronds clustered; stipes strong, 10–20(–30) cm, bases black, with grayish white acicular hairs and scales; scales dark brown, oblong-triangular, both surfaces and margins setaceous, distally deep stramineous and to rachises with similar hairs; laminae oblong-lanceolate, 60–(90–)130 × 20–30 cm, gradually tapering to bases, pinnate-pinnatifid, acuminate and pinnatifid at apices; pinnae 30–50 pairs, opposite or distal ones sometimes alternate, spreading, sessile, proximal 3–5 pairs of pinnae gradually shortened, proximal ones auriculate, only ca. 1 cm; middle pinnae linear-lanceolate, 12–20 × 1.5–2.5 cm, bases not tapering, rounded-truncate, pinnatifid to 3/4–4/5 of distance to costae, apices acuminated; segments 20–30 pairs, oblong, 5–10 × 4–6.5 mm, margins entire and sparsely acicular hairy, apices rounded-obtuse. Veinlets visible, simple, 10–12 pairs per segment, proximal pair arising from bases of costules. Laminae herbaceous or subpapery, when dry brownish green, abaxially with dense hooked long hairs, and with similar hairs along costales; rachises with dense thick long hairs, pinnae along grooves and mixed hooked thick long hairs, with similar hairs along costules; rachises with denser thick long hairs, pinnae with brown aerophores at bases abaxially. Sori small, orbicular, dorsifixed below middle of veinlets and close to costes, 10 or 11 pairs per segment; sporangia glabrous.

- Grassly slopes, stream-sides in forests; 900–1700 m. Sichuan, Yunnan.


*Cyclogramma leveillei* is similar to *C. omeiensis*, both have been treated as one species in the past. However, the former species differs in having only the proximal pair of pinnae shortened, 2–4 cm, never auriculate, adaxial sides with only short acicular hairs along costae, abaxial sides with spreading acicular hairs, and everywhere without hooked hairs; and the sporangia each with 2 or 3 setae near top. We conclude that it is appropriate to treat the two as distinct species.

马关钩毛蕨 ma guan gou mao jue

Plants ca. 65 cm tall. Rhizomes short and thick, decumbent or ascending, including stipe bases with sparse brown ovate-triangular hairy scales and grayish white dense short hairs. Fronds approximate; stipes 25–28 cm, bases blackish brown, distally stramineous, polished and sparsely grayish white shortly hairy; laminae oblong-lanceolate, 35–40 × 10–16 cm, tapering to bases, pinnate-pinnatifid, acuminate and pinnatifid at apices; pinnae 14–20 pairs, alternate or proximal ones subopposite, proximal 2 or 3 pairs of pinnae gradually shortened and reflexed, proximal pair shortest, but similarly shaped, ca. 2 cm; middle pinnae linear-lanceolate, 6.5–9.5 × 1.5–2 cm, bases not tapering, rounded-truncate, pinnatifid to 4/5 of distance to costae, apices caudate or entire; segments ca. 14 pairs, oblong, 6–8 × 3–3.5 mm, entire along margins and ± recurved proximally, rounded at apices. Veins evident, veinlets simple, ca. 8 pairs per segment, proximal pair arising from base of costules and all reaching margins above sinus. Laminae herbaceous, glabrous or brownish green, abaxially including costae and costules with dense short acicular hairs, adaxially with dense short hairs along costal grooves and with sparse long acicular hairs along costules, with sparse appressed short hairs on intercostal areas, rachises with dense short acicular hairs, distally dark stramineous, distally with grayish white hooked long hairs, rachises similarly hairy; laminae narrowly oblong, 60–100 cm or more, 25–40 cm wide, bases not tapering, pinnate-pinnatifid, apices acuminate and pinnatifid; pinnae 25–30 pairs, distal ones alternate, proximal ones subopposite, spreading, linear-lanceolate, 15–20 × 3–3.5 cm, broadly cuneate at bases, pinnatifid nearly to costae, caudate-acuminate at apices; segments ca. 23 pairs, spreading, middle ones oblong-lanceolate, 11–14 cm (proximal 1 or 2 pairs slightly shortened), 5–6 mm wide, entire, rounded-obtuse at apices. Veinlets evident abaxially, simple, 10–15 pairs per segment, proximal pair arising from slightly higher above base of costules and all reaching margins above sinuses. Laminae papery, brownish green when dry, subglabrous on both surfaces or with sparse short acicular hairs abaxially, rachises grooved adaxially, with dense hooked long hairs on both sides, abaxially with occasional small brown lanceolate scales, pinna bases abaxially with brown linear-lanceolate aerophores. Sori orbicular, smaller, attached below middle of veinlets and close to costules, 7–12 pairs per segment; sporangia glabrous.

- Shaded wet places in forests; ca. 1000 m. SE Yunnan.


滇东钩毛蕨 dian dong gou mao jue


Plants 1.3–2.2 m tall. Rhizomes thick and short, erect. Fronds clustered; stipes 70–120 cm, bases brown, with deep brown triangular-lanceolate shortly hairy scales and glaucous short acicular hairs, distally dark stramineous, distally with grayish white hooked long hairs, rachises similarly hairy; laminae narrowly oblong, 60–100 cm or more, 25–40 cm wide, bases not tapering, pinnate-pinnatifid, apices acuminate and pinnatifid; pinnae 25–30 pairs, distal ones alternate, proximal ones subopposite, spreading, linear-lanceolate, 15–20 × 3–3.5 cm, broadly cuneate at bases, pinnatifid nearly to costae, caudate-acuminate at apices; segments ca. 23 pairs, spreading, middle ones oblong-lanceolate, 11–14 cm (proximal 1 or 2 pairs slightly shortened), 5–6 mm wide, entire, rounded-obtuse at apices. Veinlets evident abaxially, simple, 10–15 pairs per segment, proximal pair arising from slightly higher above base of costules and all reaching margins above sinuses. Laminae papery, brownish green when dry, subglabrous on both surfaces or with sparse short acicular hairs abaxially, rachises grooved adaxially, with dense hooked long hairs on both sides, abaxially with occasional small brown lanceolate scales, pinna bases abaxially with brown linear-lanceolate aerophores. Sori orbicular, smaller, attached below middle of veinlets and close to costules, 7–12 pairs per segment; sporangia glabrous.

- Open forests on mountain slopes; ca. 1800 m. Yunnan.


焕镛钩毛蕨 huan yong gou mao jue


Plants 70–105 cm tall. Rhizomes strong, long creeping, nearly black, including stipe bases with brown triangular-lanceolate scales and grayish white short hairs. Fronds subapproximate; stipes 30–50 cm, bases dark brown, distally stramineous, subglabrous; laminae oblong-lanceolate, 40–55 × 20–25 cm, pinnae not deflexed at bases, pinnate-pinnatifid, acuminate and pinnatifid at apices; pinnae 12–18 pairs, alternate, obliquely spreading, or proximal ones opposite, spreading, sessile, linear-lanceolate, 10–15 × 2–3 cm, bases slightly tapering, rounded-truncate, pinnatifid to 3/4 of distance to costae, apices shortly caudate-acuminate; segments 16–20 pairs, oblong-lanceolate, 8–12 × 4–7 mm, entire, rounded-obtuse at apices. Veins not evident, veinlets simple, 10–11 pairs per segment, proximal pair arising from slightly higher above base of costules, or basiscopic veinlets arising from base of costules and all reaching margins above sinuses. Laminae thinly herbaceous, when dry
brownish green, abaxially with acicular short hairs along costae and costules, adaxially with short hairs along costal grooves, rachises with dense hooked hairs, pinna bases abaxially with deep brown, linear-lanceolate or linear-bent aero phores. Sori small, orbicular, attached below middle of veinlets and slightly close to costules, 7–10 pairs per segment; sporangia each with 1 or 2 short setae near top of annuli.

- On rocks in forests in mountain valleys. SW Guangdong (Xinyi).


Plants medium-sized, terrestrial. Rhizomes short and erect, including stipe bases with sparse scales and short hairs. Fronds clustered; stipes ca. 30 cm, dark brown proximally, distally to rachises brownish stramineous, shortly hairy distally; laminae lanceolate, ca. 45 × 18 cm, nearly tapering to bases, pinnate-pinnatifid, acuminate and pinnatifid at apices; pinnae ca. 20 pairs, above middle alternate, spreading or proximal ones subopposite, reflexed, sessile, linear-lanceolate, 8–9.5 × 1.4–1.7 cm, nearly flat-truncate and slightly narrowed at base, pinnatifid nearly to costae, acuminate or caudate at apices; segments ca. 20 pairs, oblong, entire along margins. Veins evident abaxially, veinlets simple, 8 or 9 pairs per segment, proximal pair arising from base of costules and all reaching margins above sinuses. Laminae papery, when dry dark green, abaxially with glaucous short hairs, hairs along costae and costules dense and mixed with few acicular long hairs, adaxially with dense short acicular hairs along costal grooves, rachises with dense short acicular hairs on both sides, abaxial sides mixed with few thick and long acicular hairs and with smaller brownish tuberculate aerophores. Sori small, orbicular, attached below middle of veinlets and slightly closer to costules, 4–6 pairs per segment; sporangia each with 1 or 2 (or 3) short setae near tops.

- Forests on limestone; 300–1400 m. Guizhou, Sichuan.

“Leptogramma intermedia” (Ching in C. F. Zhang, Fl. Zhejiang 1: 154. 1993) was not validly published because no Latin description or diagnosis, or reference to such, was provided (Melbourne Code, Art. 39.1). It does not appear to represent a distinct species.

1a. Proximal pair of pinnae longer than distal ones, hence laminae hastate ........................................................ 1. L. tottoides

1b. Proximal pair of pinnae similar length as distal ones or slightly shorter, laminae not hastate.

2a. Proximal free pinnae with short stalks.


3a. Laminae not tapering to bases; free pinnae 5 pairs; sporangia each with 3 or 4 setae near top  2. L. scallanii
3b. Laminae slightly tapering to bases; free pinnae 9 pairs; sporangia each with 1 or 2 setae near top  3. L. pozoi

2b. All pinnae sessile.

4a. Stipes dark brown; laminae somewhat leathery and brown when dry; free pinnae 7–9 pairs  4. L. huishuiensis

4b. Stipes stramineous or deep stramineous; laminae herbaceous and greenish to deep green when dry (rarely dark brown); free pinnae 1–7 pairs.

5a. Laminae dark brown when dry; pinnae without hairs on intercostal areas  5. L. yahanensis

5b. Laminae greenish to deep green when dry, with hairs on intercostal areas.

6a. Rhizomes ascending; laminae yellowish green when dry  6. L. jinfoshanensis

6b. Rhizomes erect; laminae greenish to deep green when dry.

7a. Laminae greenish when dry; sporangia subglabrous near tops  7. L. centrochinensis

7b. Laminae deep green when dry; sporangia each with 2–4 setae near top.

8a. Pinnae with sparse acicular hairs adaxially, abaxially pubescent throughout  8. L. himalica

8b. Pinnae with dense acicular hairs on both surfaces  9. L. sinica

Leptogramma tottoides (H. Itô) C. M. Kuo; Leptogramma caudata Ching; L. totta (Schlechtendahl) J. Smith var. tottoides (H. Itô) H. Itô; Stegnoogramma tottoides (H. Itô) K. Iwatsuki; Thelypteris caudata (Ching) C. F. Reed.

Plants 17–32 cm tall. Rhizomes short and erect, including stipe bases with sparse reddish brown broadly lanceolate scales and grayish white acicular hairs. Fronds clustered; stipes 10–17 cm, slender, dark stramineous, throughout with sparse unicellular acicular long hairs; lamina 1-pinnate, hastate-lanceolate, 14–20 × 4–6 cm, bases hastate and broadest, apices acuminate; pinnae 16–20 pairs, subopposite and spreading, sub-sessile, proximal 2 or 3 pairs free, distal ones adnate to rachises, proximal pair largest, spreading, oblong-lanceolate, 2–3 × ca. 1 cm, truncate and symmetrical at bases, pinnatifid to 1/2 distance to costae, obtuse or shortly acute at apices; segments 4–6 pairs, ovate-orbicular, entire; second pair of pinnae abruptly shortened, 1.5–2 cm, of similar shape as proximal pair, middle pairs of pinnae of similar size and shape, bases adnate to rachises but free from each other, distal pinnae slightly shorter than middle ones, bases connected to each other by broad wings, entire or crenate proximally. Veinlets evident, 3 or 4 pairs per segment, simple, proximal pair arising from far above base of costules and acroscopic one reaching sinus or margins of sinus, basiscopic one reaching margin far above sinus. Laminae thinly herbaceous, dark brown when dry, pinnae throughout with acicular hairs adaxially, abaxially including rachises with spreading grayish white acicular fine hairs, veins sparsely puberulent. Sori linear, usually attached on proximal half on proximal pair of veinlets; sporangia each with 3 or 4 setae near top.

- On rocks in forests; 800–2500 m. Fujian, Guizhou, Jiangxi, Taiwan, Zhejiang.


Asplenium scallanii Christ, Boll. Soc. Bot. Ital. 1901: 296, 1901; Dryopteris scallanii (Christ) C. Christensen; Segnoogramma scallanii (Christ) K. Iwatsuki.

Plants 20–30 cm tall. Rhizomes short and erect, including proximal parts of stipes with sparse reddish brown lanceolate, hairy scales and dense acicular hairs. Fronds clustered; stipes 5–10 cm, dark stramineous, with dense acicular long hairs distally; laminae 1-pinnate, oblong, 14–20 × 5–7 cm, bases not tapering, apices acuminate and pinnatifid; pinnae 10–14 pairs, alternate, proximal 3–5 pairs shortly stalked, similar in size to distal ones; middle pinnae lanceolate, 2.5–4 × 0.7–1 cm, bases subtruncate, symmetrical, pinnatifid to 1/3–1/2 of distance to costae, apices acuminate or shortly acuminate; segments ca. 10 pairs, ovate-orbicular, entire, separated from each other by oblong-lanceolate or elliptical sinuses. Veins evident, 4 or 5 pairs of veinlets per segment, proximal pair arising from above base of costules, acroscopic veinlet reaching sinuses. Laminae papery, when dry brownish green, adaxially with 1 or 2 acicular hairs along costae and veinlets, abaxially with sparse acicular thick hairs along costae and costules. Sori oblong or linear, attached on abaxial sides along veinlets, 1 or 2 pairs per segment. Sporangia each with 2 or 3 setae near top.

Wet places in forests, on rocks in ravines; 400–1400 m. Fujian, Guangdong, Guangxi, Guizhou, Hunan, Jiangxi, Sichuan, Yunnan, Zhejiang [N Vietnam].


Hemionitis pozoi Lagasca, Nov. Gen. Pl. 33. 1816; Cyclosorus pozoi (Lagasca) C. M. Kuo; Gymnogramma totta Schlechtendahl; G. totta var. mollissima Kunze; Lastreopsis fruticosa (Desvaux) Ching; Leptogramma africana (Desvaux) Nakai ex Mori; L. mollissima (Kunze) Ching; L. pozoi subsp. mollissima (Kunze) Nakaika; L. totta (Schlechtendahl) J. Smith; Polypodium africanum Desvaux; P. totta Willdenow (1810), not Thunberg (1800); Segnoogramma mollissima (Kunze) Fraser-Jenkins; S. pozoi (Lagasca) K. Iwatsuki; Thelypteris mollissima (Kunze) Thapa; T. pozoi (Lagasca) C. V. Morton.

Plants 35–45 cm tall. Rhizomes short and erect, with brown lanceolate hairy scales. Fronds clustered; stipes ca. 13 cm, stramineous, bases with brown scales, distally with grayish white acicular hairs; laminae lanceolate, 20–28 × 10–13 cm, slightly tapering proximally, pinnate-pinnatifid, pinnate-acuminate at apices; lateral free pinnae 9 pairs, proximal pinnae acicular
shortly stalked, proximal pair of similar shape and size and reflexed; middle pinnae lanceolate, ca. 6 × 1.5 cm, bases truncate, pinnatifid to 1/2 of distance to costa, apices long caudate; segments rectangular, entire, obtuse-rounded at apices. Veinlets evident, simple, basiscopic vein of proximal pair arising from costa, acroscopic vein arising from base of costules and reaching margin. Laminae herbaceous, deep green when dry, costa and veins with acicular hairs, also with acicular short hairs on intercostal areas of both surfaces. Sori narrowly ovate, attached on middle or proximal parts of veinlets and slightly closer to bases. Sporangia each with 1 or 2 setae near annuli. 2n = 144.

Lower mountain areas; 300–600 m. SE Taiwan (Lan Yu) [S India, Indonesia, Japan, Sri Lanka; Africa].

Fraser-Jenkins (Taxon. Revis. Indian Subcontinental Pteridophytes, 195. 2008) believes *Thelypteris mollissima* is a strictly Asian taxon that should be separated from the Macronesian and African *T. pozo*. This is not accepted here.


惠水茯蕨 *hui shui fu jue*

Plants to 33 cm tall. Rhizomes not seen. Stipes 10–13 cm, dark brown, bases with sparse brown lanceolate scales, distally with dense grayish white acicular long hairs; laminae lanceolate, 12–25 × 5–10 cm, slightly tapering to bases, pinnate-pinnatifid-acuminate at apices; lateral free pinnae 7–9 pairs, sessile, distal pinnae adnate to rachises, proximal pair of similar shape and size as distal ones; middle pinnae lanceolate, ca. 5 cm, truncate at bases, pinnatifid to 1/2 of distance to costa, acuminate at apices; segments ca. 12 pairs per pinna, oblong, entire, separated from each other by obtriangular sinuses, obtuse at apices. Laminae somewhat leathery, when dry dark brown, rachises, costa, and veinlets with dense acicular hairs abaxially, adaxial sides with short setae, abaxially with sparse short setae on intercostal areas. Sori narrowly ovate, attached on middle to proximal parts along veinlets. Sporangia each with more than 3 setae near top.

- Guizhou (Huishui).


惠安茯蕨 *ya an fu jue*

Plants to 18 cm tall. Rhizomes short and erect, including stipe bases with sparse reddish brown lanceolate, hairy scales and acicular hairs. Stipes 5–6 cm, throughout with acicular hairs; laminae broadly lanceolate, 10–12 × ca. 4 cm, not tapering to bases, 1-pinnate, acuminate at apices; pinnae ca. 10 pairs, alternate except for proximal pair, others adnate to rachises; middle pinnae lanceolate and slightly falcate, 2.5 × 0.7–0.8 cm, undulate or crenate, shortly acuminate at apices. Veins evident, veinlets 2 pairs per group, proximal pair arising from far above base of costules, acroscopic veinlet reaching sinus. Laminae herbaceous, when dry dark brown, adaxially subglabrous except with sparse, short hairs along costa, abaxially with spreading acicular long hairs along costa and costules. Sori linear, attached on middle on acroscopic veinlet of each group. Sporangia each with 2 or 3 setae near top.

- On rocks in forests; ca. 1000 m. SW Sichuan (Ya’an).


金佛山茯蕨 *jin fo shan fu jue*

Plants 30–35 cm tall. Rhizomes ascending. Fronds clustered; stipes ca. 22 cm, stramineous, with dense grayish white lanceolate acicular hairs; laminae lanceolate, ca. 30 × 8–18 cm, 1-pinnate, pinnatifid-acuminate at apices; free-pinnae 3–7 pairs, sessile, truncate, proximal pair of similar shape and size as distal ones, bases slightly tapering, apices caudate; middle pinnae lanceolate, 7–8 × ca. 1.5 cm, truncate at bases, pinnatifid to 1/2–2/3 of distance to costa, long caudate at apices; segments rectangular, with acicular hairs on intercostal areas of both surfaces, with dense acicular setae along rachises and veins, entire, rounded at apices. Veins evident, veinlets reaching margins above sinuses, 4 or 5 pairs per segment. Laminae herbaceous, when dry yellowish green, all with acicular hairs on both surfaces. Sori ovate, attached near bases of veinlets. Sporangia each with 2–4 acicular hairs near top.

- On wet rocks in broad-leaved forests; ca. 1800 m. Chongqing (Nanchuan).


华中茯蕨 *hua zhong fu jue*

Plants 30–35 cm tall. Rhizomes short and erect, including stipe bases with sparse broadly lanceolate hairy scales and acicular short hairs. Fronds clustered; stipes 8–14 cm, deep stramineous, above bases with dense short hairs and mixed with few acicular long hairs; laminae lanceolate, 18–24 × ca. 6 cm, 1-pinnate, acuminate at apices; pinnae 14–16 pairs, alternate, spreading, sessile, proximal pair not shortened and of similar shape and size as distal ones, proximal 2 pairs free, distal ones adnate to rachises; middle ones broadly lanceolate, 3–3.5 × ca. 1 cm, bases truncate, symmetrical (proximal pair of pinnae slightly broad and basal basiscopic one cuneate), pinnatifid to 1/2 of distance to costa, apices shortly acuminate; segments 7 or 8 pairs, broadly ovate, entire, separated by obtriangular sinuses. Veins evident, (3 or)4 pairs of veinlets per segment, proximal pair (basiscopic veinlet) arising from bases of costa and all reaching margins above sinuses. Laminae herbaceous, when dry greenish, adaxially throughout with appressed acicular hairs, abaxially pubescent along costa and costules and with acicular short hairs along rachises. Sori orbicular or oblong, attached on middle of veinlets. Sporangia subglabrous.

- Wet places in open forests. W Hubei.

8. **Leptogramma himalaica** Ching, Sinensia 7: 100. 1936.

喜马拉雅茯蕨 *xi ma la ya fu jue*

*Leptogramma yunnanensis* Ching; *Stegnogramma himalaica* (Ching) K. Iwatsuki, *Thelypteris himalaica* (Ching) C. F. Reed.
Plants 30–35 cm tall. Rhizomes short and erect. Fronds clustered; stipes to 20 cm, grayish stramineous proximally, densely pubescent and with 1 or 2 reddish brown lanceolate hairy scales, distally stramineous, polished and subglabrous; laminae lanceolate, 22.26 × 6.5–8 cm, not tapering to bases, 1-pinnate, acuminated at apices; pinnae 12–16 pairs, opposite, distal ones alternate, sessile, proximal 0–3 pairs free, distal ones ± adnate to rachises; middle pinnae lanceolate, 3.35 × ca. 1 cm, bases truncate, symmetrical, pinnatifid to 0.3 of distance to costae, apices shortly pointed or acute; segments 6–8 pairs, ovate, separated by obtriangular sinuses. Veins evident, 3 pairs per segment, proximal pair arising above base of costules and all reaching sinuses. Laminae herbaceous, when dry dark green, pinnae with sparse acicular hairs adaxially, abaxially pubescent throughout. Sori linear, attached on middle of veinlets. Sporangia each with 3 or 4 setae near top.

Shaded places by rocks or slopes; 2100–2500 m. Xizang, NW Yunnan [N India].


方杆蕨属 fang gan jue shu

Lin Youxing (林尤兴); Kunio Iwatsuki

Plants medium-sized to large, terrestrial, ± with acicular hairs. Rhizomes short and thick, decumbent or ascending, sessile, with sparse scales. Fronds clustered or approximate; stipes strong, with sparse brown lanceolate scales at bases; laminae elliptic, not tapering to bases, pinnate-pinnatifid; pinnae large, linear-lanceolate, sessile, free, opposite or subopposite, pinnatifid nearly to costae; rachises rectangular abaxially, flat, glabrous or with sparse short hairs, when dry reddish, costae grooved adaxially and densely hairy abaxially; segments large, falcate-lanceolate. Veins free, pinnate on segments, veinlets simple, prominent and reaching margins, proximal pair only reaching nearby line of transparent membrane below sinuses or to margins above sinuses. Laminae herbaceous, papery or leathery, when dry yellowish green, rachises and costae ± with grayish white long hairs on both sides, not glandular. Sori orbicular, attached at bases of veinlets, in a row on each side close to costules, usually confluent into a line when mature, indusiate or indusiate. Sporangia usually with acicular hairs near tops. Spores elliptic, bilateral, irregularly echinate or small tuberculate on surfaces. $x = 12(36)$.

Twelve species: Bhutan, China, N India, S Japan, N Myanmar, Nepal, Philippines, N Vietnam; 11 species (ten endemic) in China.

1a. Sori exindusiate.

2a. Sporangia glabrous ......................................................................................................................... 1. G. erubescens

2b. Sporangia bearing hairs .................................................................................................................. 2. G. sichuanensis

1b. Sori indusiate.

3a. Sori obviously indusiate.

4a. Indusia glabrous ................................................................................................................................. 8. G. jinfolushanensis

4b. Indusia with acicular hairs.

5a. Rachises, costae, veins, and intercostal areas all glabrous abaxially ............................................. 9. G. glabrata

5b. Rachises, costae, veins, and intercostal areas abaxially all with dense acicular hairs.

6a. Laminae glabrous adaxially on intercostal area, sporangia glabrous .................................................. 10. G. villosa

6b. Laminae adaxially with short setae on intercostal area, sporangia bearing dense acicular hairs .................................................. 11. G. rafostarminca

3b. Sori with small scale-shaped indusia, usually obscured by mature sporangia and not easily seen.

7a. Sporangia glabrous.

8a. Plants over 1 m tall; proximal pair of veins from adjacent segments reaching bottom of sinuses .......... 3. G. mollis

8b. Plants normally 50–60 cm tall; proximal pair of lateral veins on segments reaching margins above sinuses ......................................................................................................................... 4. G. emeiensis

7b. Sporangia bearing hairs.

9a. Proximal pair of veinlets on segments reaching both sides of bottom of sinuses; rachises, veins, and intercostal areas glabrous ......................................................................................................................... 5. G. eriocarpa
9b. Proximal pair of veinlets on segments reaching margins above sinuses; rachises, veins, and intercostal areas ± with short setae or acicular hairs.

10a. Rachises, costae, and veins all with dense long acicular hairs, laminae only with short setae abaxially, glabrous on intercostal areas; Sichuan .............................................................. 6. G. splendens

10b. Rachises with sparse short setae abaxially, costae and veins with sparse long setae, laminae with sparse setae on veins and intercostal areas; Yunnan .......................................................... 7. G. pallida


Plants 2–3 m tall or more. Rhizomes stout, decumbent, woody and glabrous. Fronds clustered; stipes 1–2 m, thicker than 1 cm, ribbed, throughout glabrous, stramineous and often reddish; laminae 100–200 × 25–50 cm, not tapering to bases, pinnate-pinnatifid or subpinnate, acuminata and pinnatifid at apices; pinnae 40–50 pairs per frond, opposite, sessile, proximal several pairs strongly oblique distally, bases tapering; middle pinnae spreading, linear, (10–)20–30 or more × (1.5–)2.5–4 cm, bases truncate and close to costae, pinnatifid nearly to both lateral narrow wings of costae, apices acuminate; segments many (ca. 50 pairs), pectinately arranged, spreading, linear-lanceolate, slightly falcate, 1.4–2 × ca. 0.4 cm, slightly broadened to bases, entire, separated by narrow sinuses, pointed at apices. Veins evident, costae grooved adaxially, pubescent, abaxially rounded and raised, glabrous or sometimes sparsely hairy, veinlets 12–23 pairs per segment, simple, proximal pair arising from base of costules and reaching both sides of rounded sinuses. Laminae papery, when dry greenish or yellowish green, pinnate glabrous adaxially, with 1 or 2 acicular hairs along margins, or sparsely hairy abaxially; rachises rectangulata abaxially, flat, stramineous or reddish, with grayish white acicular hairs when young and then deciduous. Soror orbiculata, 10–15 pairs per segment, attached at bases of veinlets, close to both sides of costules and in 1 row on each side, confluent into lines when mature, exindusiate. Sporangia glabrous.

Forests in ravines of low mountains; 800–2000 m. Guizhou, Sichuan, Taiwan, Yunnan [Bhutan, N India, S Japan, Kashmir, N Myanmar, Nepal, Pakistan, Philippines, N Vietnam].

“Glaphyropteridopsis erubescens var. mollis” (Ching, Vasc. Pl. Hengduan Mount. 1: 97. 1993) was not validly published because no Latin description or diagnosis, to reference such, was provided and no type was indicated (Melbourne Code, Art. 39.1 and 40.1). The name “Christella erubescens” (H. Léveillé, Fl. Kouy-Tchéou, 474–476. 1915) belongs here but is a nomen nudum and was not therefore validly published (Art. 38.1(a)).

Thelypteris ×erubesquirolica W. C. Shieh & J. L. Tsai (J. Sci. Engin. 24: 7. 1987), described from Taiwan (Nantou), appears to be a presumed hybrid between Glaphyropteridopsis erubescens and Pseudo-cyclosorus esquirolii.
costae, veins, and intercostal areas, adaxially with dense short setae only along costae and elsewhere glabrous. Sori orbicular and attached at bases of veinlets and close to costules; indusia small, bearing hairs. Sporangia glabrous.

- Broad-leaved forests; 800–900 m. Sichuan (Emei Shan).


峨眉方杆蕨 e mei fang gan jue

Plants ca. 80 cm tall. Rhizomes not seen. Stipes ca. 40 cm, stramineous, glabrous; laminae lanceolate, ca. 70 × 20–25 cm, pinnate-pinnatifid, pinnatifid-acuminate at apices; lateral free pinnae ca. 25 pairs, obliquely spreading, proximal ones subopposite, distal ones alternate, sub sessile; middle pinnae lanceolate, ca. 13 × 1.7 cm, truncate at bases, pinnatifid, pinnatifid-acuminate at apices; segments ca. 30 pairs, ca. 3 mm wide, entire, obtuse-pointed at apices; proximal pair (particularly acrosopic one) extremely elongated. Veins visible on both sides, adaxially impressed, costules raised abaxially, veinlets 12 pairs per pinna, proximal pair arising from closely above base of costules and all reaching margins above sinuses. Laminae dark green or green when dry, papery, rachises, costae, veins, and abaxial sides of intercostal areas all with dense acicular hairs, adaxially with dense short hairs along grooves of costae, veins, intercostal areas, and margins with short setae. Sori orbicular and attached on proximal parts of veinlets, close to costules, indusiate and hairy. Sporangia hairy.

- Mixed forests at road sides, rock crevices by streams; 1800–1900 m. Sichuan (Emei Shan).


毛囊方杆蕨 mao nang fang gan jue

Plants to 1.2 m tall. Rhizomes strong and decumbent, subwoody and glabrous. Fronds subapproximate; stipes ca. 50 cm, stramineous, glabrous; laminae narrowly oblong, ca. 70 × 27 cm, not tapering to bases, pinnate-pinnatifid and reaching both lateral narrow wings of costae, acuminate and pinnatifid at apices; pinnae 25–30 pairs, opposite or subopposite, sessile, spreading, proximal several pairs not shortened, reflexed, bases tapering; middle pinnae linear-lanceolate, ca. 17 × 2 cm, bases truncate and to 3 cm wide, symmetrical, pinnatifid to both lateral narrow wings of costae, apices long acuminate; segments 25–30 pairs, spreading, lanceolate, ca. 9 mm (proximal pair to 1.5 cm), ca. 3 mm wide, gradually broadened to bases, entire, acute at apices. Veins evident, 11 or 12 pairs of veinlets per segment, proximal pair arising from base of costules and all reaching both sides near sinuses. Laminae papery, greenish or dark green when dry, rachises adaxially with hairs, costae, veins, and abaxial surfaces of intercostal areas all glabrous. Sori orbicular, 6–9 pairs per segment, attached at bases of veinlets and in rows close to costules; indusia small and hairy. Sporangia each with 1 or 2 acicular hairs near top.

- Forests in ravines; 700–1500 m. Chongqing (Nanchuan).


大叶方杆蕨 da ye fang gan jue

Plants ca. 1.2 m tall. Rhizomes strong, decumbent, subwoody and glabrous. Fronds subapproximate; stipes ca. 50 cm, deeply grooved, glabrous, stramineous; laminae narrowly oblong, ca. 80 × 28 cm, not tapering to bases, pinnate-pinnatifid nearly to costae, acuminate and pinnatifid at apices; pinnae ca. 30 pairs or more, opposite or subopposite, sessile, proximal several pairs not shortened; middle pinnae linear-lanceolate, ca. 21 × 2.5 cm, (ca. 3.5 cm wide at bases), bases symmetrical, acrosopic sides truncate and close to rachises, basiscopic sides rounded, pinnatifid nearly to costae, apices long acuminate; segments 35–40 pairs, spreading, lanceolate and slightly falcate, ca. 1.2 × 0.4 cm (proximal pair 1.6–2 cm), gradually broadened to bases and gradually tapering and pointed at apices and entire, separated by obtriangular sinuses. Veins visible, ca. 14 pairs per segment, simple, proximal pair arising from base of costules and reaching margins above sinuses. Laminae thinly herbaceous, green when dry, pinnae adaxially with short setae along costae, abaxially with dense grayish white acicular hairs along rachises, costae, and veins; rachises stramineous, rectangular. Sori orbicular, 10–12 pairs per segment, attached at bases of veinlets, in one row on each side of costules; indusia scalelike, small, hairy. Sporangia hairy near tops.

- On rocks in forests; ca. 600 m. Sichuan (Emei Shan).


灰白方杆蕨 hui bai fang gan jue

Plants ca. 82 cm tall. Rhizomes decumbent, woody, with 1 or 2 brown broadly lanceolate thick scales. Fronds sparse; stipes ca. 28 cm, stramineous, grooved adaxially, glabrous throughout; laminae oblong, ca. 56 × 22 cm, slightly tapering to bases, pinnate-pinnatifid, acuminate and pinnatifid at apices; pinnae ca. 26 pairs, sessile, opposite, distal ones alternate, spreading, close, without interval, proximal pair slightly shortened and slightly reflexed, ca. 10 cm, tapering to bases; second pair of pinnae falcate-lanceolate, ca. 12 × 2.4 cm, bases truncate and close to rachises, pinnatifid nearly to costae, apices acuminate; segments ca. 28 pairs, spreading, separated by narrow interval, falcate-lanceolate, ca. 1.3 cm (basal acrosopic one longer), ca. 0.3 cm wide, entire, pointed at apices. Veins fine, not evident, veinlets 10–12 pairs per segment, proximal pair reaching margins above sinuses. Laminae papery when dry, greenish, adaxially with dense setae along grooves of rachises, veins and intercostal areas with sparse hairs, abaxially with dense long setae along costae and veins, occasionally sparsely hairy on intercostal areas. Sori orbicular, 4 or 5 pairs per segment, attached at bases of veinlets and in one row on each side of costules; indusia small and hairy. Sporangia each with 1 or 2 acicular hairs near tops.

- Shaded wet places in mixed forests on limestone mountains; ca. 1500 m. NE Yunnan.


金佛山方杆蕨 jin fo shan fang gan jue

Plants ca. 1.5 m tall. Rhizomes decumbent. Fronds ap-
Plants medium-sized. Rhizomes creeping, decumbent or erect, bases with sparse lanceolate brown scales. Fronds remote, 60–80 cm tall. Fronds approximate; stipes 20–40 cm, pinnate-pinnatifid, acuminate at apices; pinnate 2 pairs, sessile, pinnate below middle opposite, spreading, distal ones alternate, obliquely spreading, proximal 2 pairs not shortened, reflexed, of similar size as distal ones, but cuneate at bases; distal pinnate lanceolate, ca. 10 × 1.6 cm, bases widest, rounded-cuneate, pinnatifid nearly to costae, apices acuminately rounded-cuneate, pinnatifid nearly to costae; segments ca. 23 pairs, falcate-lanceolate, ca. 7 mm (basal acroscopic one ca. 1 cm), ca. 2.5 mm wide, pointed at apices. Veins not evident, veinlets ca. 9 pairs per segment, basal acroscopic veinlet reaching bottom of sinuses, basiscopic one reaching margins above sinuses. Laminae papyry, grayish green when dry, abaxially with dense grayish white acicular hairs along costae, veins, and intercostal areas, adaxially densely hairy along costae, glabrous on intercostal areas. Sori orbicular, 5–7 pairs per segment, attached near bases of veinlets and in one row on each side of costules; indusia bearing long hairs. Sporangia glabrous.


粉红方杆蕨 fen hong fang gan jue


Plants 50–100 cm tall. Rhizomes creeping, glabrous. Fronds approximate; stipes 20–40 cm, stramineous, glabrous and usually reddish; laminae oblong-lanceolate, 40–50 × 18–25 cm, not tapering to bases, pinnate-pinnatifid nearly to costae, acuminate and pinnatifid at apices; pinnate 20–28 pairs, opposite or distally subalternate, sessile, spreading or slightly obliquely bent distally, linear-lanceolate, long acuminate at apices; proximal 1 or 2 pairs slightly shortened and reflexed, bases tapering; middle pinnate 10–16 × 1.2–2 cm, wider at bases and sub-truncate, pinnatifid nearly to costae; segments 30–35 pairs, spreading, linear-falcate, 6–10 × 2–2.5 mm; proximal pair longer, entire, obtuse-pointed or acute at apices. Veins evident, veinlets 8–10 pairs per segment, proximal pair arising from base of costules and reaching margins above sinuses. Laminae papyry, when dry yellow-green, abaxially with dense long acicular hairs along rachises, costae, veins, and intercostal areas, adaxially only with short setae. Sori orbicular, 3–5 pairs per segment, attached at bases of veinlets and in one row on each side of costules; indusia bearing acicular hairs. Sporangia bearing acicular hairs.


假毛蕨属 jia mao jue shu


Plants 60–85 cm tall. Rhizomes creeping, decumbent or erect, bases with sparse lanceolate brown scales. Stipes 20–40 cm, pinnate-pinnatifid, acuminate at apices; pinnate 2 pairs, sessile, pinnate below middle opposite, spreading, distal ones alternate, obliquely spreading, proximal 2 pairs not shortened, reflexed, of similar size as distal ones, but cuneate at bases; distal pinnate lanceolate, ca. 10 × 1.6 cm, bases widest, rounded-cuneate, pinnatifid nearly to costae, apices acuminately rounded-cuneate, pinnatifid nearly to costae; segments ca. 25 pairs, falcate-lanceolate, ca. 7 mm (basal acroscopic one ca. 1 cm), ca. 2.5 mm wide, pointed at apices. Veins not evident, veinlets ca. 9 pairs per segment, basal acroscopic veinlet reaching bottom of sinuses, basiscopic one reaching margins above sinuses. Laminae papyry, grayish green when dry, abaxially with dense grayish white acicular hairs along costae, veins, and intercostal areas, adaxially densely hairy along costae, glabrous on intercostal areas. Sori orbicular, 5–7 pairs per segment, attached near bases of veinlets and in one row on each side of costules; indusia bearing long hairs. Sporangia glabrous.


假毛蕨属 jia mao jue shu

Aspidium rufostramineum (Christ) Ching.

Plants 50–100 cm tall. Rhizomes creeping, decumbent or erect, bases with sparse lanceolate brown scales. Fronds remote,
approximate or clustered; stipes usually with sparse short hairs, stramineous; laminae pinnate-pinnatifid, proximal pinnae gradually shortened into auricle, hastate or abruptly contracted into tubercule, pinnae attached to rachises and at base abaxially each usually with a dark brown tuberculate aerophore. Veinlets free, costules raised on both sides, proximal pair on adjacent segments sometimes reaching cartilaginous sinuses, rarely connivent, but usually acroscopic veinlet reaching sinus and basiscopic one reaching margin above sinus. Laminae usually deep green when dry, usually papery, sometimes herbaceous or leathery, laminae adaxially with dense appressed setae along costal grooves, sparsely setaceous also along veins, abaxially mostly with acicular hairs on intercostal areas, rarely glabrous. Sori orbicular, usually attached at middle of veinlets, sometimes at distal or proximal parts; indusia orbicular-reniform, thick, usually brown, persistent, with fine hairs or glabrous, sometimes glandular. Spores normally monolete, rarely trilete, exospore echinate, perispore cristate. x = 35, 36.

About 50 species: tropical and subtropical regions; 38 species (31 endemic) in China.

*Pseudocyclosorus tibeticus* Ching & Y. X. Lin (Acta Phytotax. Sin. 22: 201. 1984) was described from Xizang (Mêdog) but is excluded from the present treatment, pending further studies. It is similar to *P. tylodes*.

1a. Proximal pinnae not gradually reduced, not tuberculate.
2a. Spores monolete.
   3a. Laminae abaxially glabrous on intercostal areas ................................................................. 35. *P. latilobus*
   3b. Laminae abaxially with fine and long acicular hairs on intercostal areas ........................ 36. *P. guangxianensis*
2b. Spores trilete.
   4a. Proximal pair of veinlets on segments reaching bottom of sinus ........................................ 37. *P. ciliatus*
   4b. Proximal acroscopic veinlet on segment reaching bottom of sinus, others reaching margin above sinus ................................................................. 38. *P. caudipinnus*
1b. Proximal pinnae abruptly reduced into aerophores or auricles or hastate.
5a. Proximal pinnae abruptly reduced to brown aerophores.
6a. Basal acroscopic veinlet on segments of middle pinnae reaching bottom of sinus, basiscopic one reaching margin above sinus.
   7a. Plants over 100 cm tall; laminae abaxially with acicular fine hairs on intercostal areas; indusia hairy ......................................................................................................................................... 4. *P. xinpingensis*
   7b. Plants only 25–58 cm tall; laminae abaxially lacking hairs on intercostal areas; indusia glabrous .... 5. *P. torrentis*
6b. Proximal pair of veinlets on segments of middle pinnae reaching bottom of sinus.
   8a. Sori attached on distal parts of veinlets and close to margins ........................................ 3. *P. cavaleriei*
   8b. Sori attached on proximal parts of veinlets and close to costules.
      9a. Plants small; lateral pinnae ca. 13 × 1–1.4 cm, segments ca. 2 mm wide .............................. 1. *P. tylodes*
      9b. Plants large; lateral pinnae length and width over 15 cm and 2 cm respectively, segments ca. 4 mm wide ................................................................................................................................. 2. *P. tuberculifer*
5b. Proximal pinnae gradually reduced into auricles or hastate.
10a. Rachises, costae, and veins with only fine hairs abaxially, at most with 1 or 2 acicular hairs at apices.
   11a. Pinnae obliquely spreading.
      12a. Plants ca. 1.2 m tall; fronds ca. 100 × 30 cm; middle pinnae ca. 25 × 3 cm; segments over 35 pairs, more than 1.2 cm ................................................................. 33. *P. obliquus*
      12b. Plants 90–110 cm tall; fronds 70–85 × ca. 20 cm; middle pinnae 10–15 × 1.2–2 cm; segments fewer than 30 pairs, length less than 9 mm ........................................ 34. *P. subochthodes*
   11b. Pinnae spreading.
      13a. Indusia with fine hairs ........................................................................................................ 32. *P. damingshanensis*
      13b. Indusia glabrous.
         14a. Sori attached on middle of veinlets ............................................................................... 29. *P. tsoi*
         14b. Sori attached above middle of veinlets.
            15a. Veins simple, not forked and glandular abaxially ................................................... 30. *P. emeiensis*
            15b. Veins forked, without glands abaxially ................................................................. 31. *P. fucatoventulosus*
10b. Rachises ± with long acicular hairs abaxially, costae and veins usually with acicular hairs abaxially, sometimes glabrous.
   16a. Indusia glabrous.
    17a. Pinnae linear and oblique distally.
       18a. Pinnae extremely oblique distally, basal acroscopic segments clearly elongated;
          indusia glandular ........................................................................................................ 19. *P. falcilobus*
       18b. Pinnae slightly oblique distally, basal acroscopic segments not clearly elongated;
          indusia without glands ................................................................................................... 20. *P. lushanensis*
17b. Pinnae not linear, spreading, at least proximal pinnae spreading.
   19a. Costae and veins not glandular abaxially.
      20a. Laminae abaxially with fine hairs on intercostal areas
         .................................................. 26. *P. stramineus*
      20b. Laminae abaxially glabrous on intercostal areas.
         21a. Basal segments on proximal pinnae entire along margins
            ......................... 27. *P. duclouxii*
         21b. Basal segments on proximal several pairs of pinnae lobed along
            margins .......................................................... 28. *P. jijiangensis*
   19b. Costae and veins glandular abaxially.
      22a. Laminae abaxially hairy on intercostal areas.
      23a. Plants to 140 cm tall; laminae ca. 100 cm, pinnae ca. 17 × 2–2.5 cm;
            segments separated from each other by broad intervals, abaxially
            with sparse short hairs along costae and veins
            ............................................... 24. *P. qingchengensis*
      23b. Plants ca. 90 cm tall; laminae ca. 50 cm; pinnae 9–13 × ca. 1.5 cm;
            segments separated from each other by narrow intervals, abaxially
            with mixed sparse setae and fine hairs along costae and veins
            ...................... 25. *P. angustipinnus*
      22b. Laminae abaxially glabrous on intercostal areas.
      24a. Sori attached above middle of veinlets and close to margins
         .......... 23. *P. submarginalis*
      24b. Sori attached on middle of veinlets.
         25a. Pinnae lanceolate, basal acroscopic veinlet reaching bottom
            of sinus, basiscopic one reaching margin above sinus
            ........................................ 21. *P. esquirolii*
         25b. Pinnae linear-lanceolate, basal pair of veinlets all reaching
            bottom of sinus .......................................................... 22. *P. linearis*
   16b. Indusia with hairs.
      26a. Pinnae extremely oblique distally, basal basiscopic segments clearly contracted or not
           contracted.
      27a. Pinna bases contracted basiscopically.
         28a. Plants 40–110 cm tall; pinnae 1.4–1.5 cm wide in middle, costae slightly
            grooved adaxially and with appressed acicular hairs, not shiny
            ................. 6. *P. subfalcilobus*
         28b. Plants 25–40 cm tall; pinnae 9–10 mm wide in middle, costae
            rounded and raised adaxially, subglabrous and shiny
            ........................................ 7. *P. pseudofalcilobus*
      27b. Pinna bases not contracted.
         29a. Rachises, costae, and veins with mixed sparse long acicular hairs and
            short fine hairs abaxially, and glabrous on intercostal areas abaxially
            ................................. 8. *P. dehuaensis*
         29b. Rachises, costae, and veins with dense long acicular hairs abaxially
            only and hairy on intercostal area ........................................ 9. *P. guangxiensis*
   26b. Pinnae spreading or slightly obliquely spreading, proximal pair of segments or
        acroscopic one clearly elongated.
      30a. Sori attached below middle of veinlets and close to costules.
         31a. Fronds dimorphic; pinna bases with segments not clearly elongate,
            acroscopic veinlet of pinna basal pair reaching bottom of sinus
            ........................................ 10. *P. shuangbaiensis*
         31b. Fronds monomorphic; pinna bases with segments clearly elongate,
            proximal veinlets of segments all reaching bottom of sinuses
            ........................................ 11. *P. dulongjiangensis*
      30b. Sori attached on middle of veinlets.
         32a. Laminae abaxially with fine setae on intercostal areas
            ........................................ 12. *P. canus*
         32b. Laminae abaxially lacking fine setae on intercostal areas.
         33a. Indusia with only few fine hairs.
            34a. Proximal 7–9 pairs of pinnae abruptly reduced into linear
                auricles, proximal ones tuberculate; laminae abaxially glabrous
                on intercostal areas ........................................ 18. *P. paraochthodes*
            34b. Proximal 3 pairs of pinnae abruptly reduced and hastate.
            35a. Pinnae (particularly acroscopic ones) obviously
                broadened at their bases, margins pinnatifid; segments
                11–14 × 5–6 mm; laminae herbaceous; sori attached
                above middle of veinlets ........................................ 16. *P. gongshanensis*
            35b. Pinnae narrowed at their bases; segments ca. 9 × 3 mm;
                laminae papery; sori attached on middle of veinlets ........ 17. *P. pseudorepens*
      33b. Indusia with dense hairs.
         36a. Proximal pinnae mostly reduced and hastate or auriculate
            .................. 15. *P. zauensis*
         36b. Proximal 2 or 3 pairs of pinnae reduced and hastate.

假毛蕨 jia mao jue

Aspidium tylodes Kunze, Linnaea 24: 281. 1851 [“xylodes”]; Cyclosorus tylodes (Kunze) Panigrahi; Dryopteris ochthodes (Kunze) C. Christensen var. tylodes (Kunze) C. Christensen; D. tylodes (Kunze) Christ; Lastrea ochthodes (Kunze) T. Moore var. tyloides (Kunze) Beddome; L. tylodes (Kunze) T. Moore [“xylodes”]; Nephrodium proximum (Willdenow) Desvaux var. tylodes (Kunze) Baker; N. tylodes (Kunze) Baker; Thelypteris tylodes (Kunze) Ching.

Plants to 1.2 m tall. Rhizomes erect, apices and bases of stipes with sparse brown lanceolate scales. Fronds clustered; stipes 25–40 cm, grayish brown at bases, distally deep stramineous and glabrous; laminae oblong-lanceolate, 45–80 × ca. 24 cm, slightly tapering to bases, pinnate-pinnatifid, acuminate-pinnatifid at apices; proximal 5–10 pairs of pinnae abruptly reduced into tuberculate aeroophores; normal pinnae ca. 34 pairs, alternate, oblique distally, sessile; middle pinnae lanceolate, ca. 13 × 1.2–1.4 cm, long acuminate at apices, proximal pinnae tapering to bases, pinnae above middle slightly tapering to bases and broadly cuneate, pinnatifid; segments 40–45 pairs, obliquely spreading, ca. 5 × 1.5–2 mm, entire, pointed or obtuse-pointed at apices. Veins evident on both sides, 9 or 10 pairs per segment, proximal pair arising from base of costules and all reaching sinuses. Laminae firmly papery when dry, brownish, costae with acicular hairs, elsewhere glabrous. Sori orbicular, attached below middle of veinlet and close to costules; indusia orbicular-reniform, thick, glabrous, persistent.

Forests by streams or on rocks; 800–4300 m. Guangdong, Guangxi, Yunnan [Indonesia, Myanmar, N Philippines, Sri Lanka, N Thailand, Vietnam].

In Kunze’s protologue, the epithet “xylodes” is considered to be a misprint; it was printed as “tylodes” on pages 244 and 283. For further discussion on the spelling, see Holtum and Grimes (Kew Bull. 34: 504–1980).

The name Nephrodium proximum (Willdenow) Desvaux has been misapplied to material of this taxon by Dunn and Tutcher (Bull. Misc. Inform. Kew, Addit. Ser. 10: 348. 1920).

The present authors have not seen a complete specimen of Pseudocyclosorus cavaleriei. The type of P. cavaleriei was collected by Cavalerie on 5 August 1903, from Guiyang Ging-yan (Tsin Gai), Guizhou province, no. 1244 (E). It has the middle part of the lamina and seven pairs of pinnae. Cymn examined the specimen and identified it as Dryopteris tylodes in 1931. The species was included within Thelypteris esquiroli (Christ) Ching by Holtum in 1936 and later in P. esquiroli (species no. 21 in this account) (Holtum & Grimes, Kew Bull. 34: 514–515. 1980).

The subrectangular rachises, opposite pinnae, and proximal pair of veinlets reaching bottom of sinuses suggest that the species should not be included in Pseudocyclosorus esquiroli, but is instead closer to P. tylodes. However, the sori attached on distal parts of veinlets and close to margins are different from those of specimens of P. tylodes. So, it is here treated as an independent species, and we hope that more specimens of this species will be collected for study.


瘤羽假毛蕨 liu yu jia mao jue


Plants more than 2 m tall. Rhizomes erect, firm, apices with dense brownish lanceolate scales. Fronds clustered; stipes 100–130 cm, brownish, sparsely scaly, distally glabrous; laminae broadly oblong-lanceolate, ca. 100 × 45 cm, tapering to bases, pinnate-pinnatifid, acuminate at apices; proximal to 15 pairs of pinnae abruptly reduced into brown aeroophores, middle normal pinnae 28–30 pairs, proximal ones opposite or subopposite, spreading, distally alternate, obliquely spreading, sessile; middle pinnae linear-lanceolate, 20–30 × 2.2–3 cm, linear-acuminate at apices; proximal pinnae slightly tapering, cuneate, distal pinnae slightly broadened to bases, rounded-cuneate, pinnatifid and reaching broad wings on both sides; segments 35–45 pairs, oblique distally, slightly bent, subfalcate, 8–14 × ca. 4 mm, entire, acute at apices. Veins evident, raised on both sides, veinlets 11–15 pairs per segment, proximal pair reaching bottom of sinuses. Laminae papyraceous when dry and brownish green, rachises and costae with sparse acicular hairs at apices abaxially, costae with dense appressed setae along grooves abaxially, elsewhere glabrous. Sori orbicular, attached below middle of veinlets and close to costules; indusia orbicular-reniform, thick, brown, glabrous, persistent.

Gravely soil by streams; 600–1900 m. Guangdong, Guangxi, Yunnan [Indonesia (Sikkim)].


青岩假毛蕨 qing yan jia mao jue


Rachises subrectangular; middle pinnae spreading, alternate, ca. 18 × 3 cm, pinnate-pinnatifid, pinnatifid-acuminate at apices; segments ca. 35 pairs, separated by broad sinuses, lanceolate, ca. 1 × 0.4 cm, acute at apices; proximal pair clearly elongated, to 1.5 cm, proximal pair on segments reaching bottom of sinuses. Sori orbicular, attached above middle of veinlets and close to margins, ca. 10 pairs per segment.

● Guizhou (Guiyang).

The present authors have not seen a complete specimen of Pseudocyclosorus cavaleriei. The type of P. cavaleriei was collected by Cavalerie on 5 August 1903, from Guiyang Ging-yan (Tsin Gai), Guizhou province, no. 1244 (E). It has the middle part of the lamina and seven pairs of pinnae. Cymn examined the specimen and identified it as Dryopteris tylodes in 1931. The species was included within Thelypteris esquiroli (Christ) Ching by Holtum in 1936 and later in P. esquiroli (species no. 21 in this account) (Holtum & Grimes, Kew Bull. 34: 514–515. 1980).

The subrectangular rachises, opposite pinnae, and proximal pair of veinlets reaching bottom of sinuses suggest that the species should not be included in Pseudocyclosorus esquiroli, but is instead closer to P. tylodes. However, the sori attached on distal parts of veinlets and close to margins are different from those of specimens of P. tylodes. So, it is here treated as an independent species, and we hope that more specimens of this species will be collected for study.


新平假毛蕨 xin ping jia mao jue

Plants to 110 cm tall. Rhizomes ascending, brown. Fronds...
clustered; stipules ca. 54 cm, deep stramineous, with fine hairs; lamina lanceolate, ca. 57 × 22 cm, slightly tapering to bases, pinnate-pinnatifid, acuminatae-pinnatifidae at apices; lateral pinnae ca. 25 pairs, alternate, spreading, shortly stalked, proximal 3 pairs of pinnae abruptly reduced into black aerophores; middle pinnae narrowly lanceolate, ca. 14 × 1.4 cm, slightly tapering to bases, acuminatae at apices; lowest several pinnae clearly shortened, pinnatifidae; segments ca. 24 pairs, ca. 9 × 5 mm, entire, acute at apices. Veins clearly raised on both sides, veinlets 9 pairs per segment, proximal pair arising from base of costules, basiscopic veinlet reaching margin of sinus, acrosopic one reaching bottom of sinus. Laminae green when dry, papery, rachises with sparse short setae abaxially, adaxially with dense short setae, costa adaxially with sparse short setae abaxially, veins with sparse short setae; midrib papery when dry, dark brown, membranous, hairy, persistent.

- Shade of mossy forests on mountain summits; ca. 2300 m. Yunnan (Xining).


急梳假毛蕨 ji shu jia mao jue

Plants 25–58 cm tall. Rhizomes erect. Fronds clustered; stipules ca. 13–23 cm, stramineous, bases with brown scales, distally with acicular hairs abaxially. Laminae oblanceolate, 10–15 × 7–10 cm, bases slightly tapering, proximal 2 or 3 pairs abruptly reduced to auricles, or tuberculate, pinnate-pinnatifid, apices pinnatifid-acuminatae; lateral normal pinnae ca. 10 pairs; middle pinnae lanceolate, 4–6 × ca. 0.5 cm, bases broadened due to one pair of segments elongated, pinnatifid, pinnatifid-acuminatae at apices; segments ca. 11 pairs, lanceolate, ca. 4 × 2.5 mm, entire, acute at apices. Laminae dark brown when dry, dry, papery; abaxial sides of rachises with sparse setae on distal half, adaxial sides densely setaceous along grooves, abaxial sides of costa and veins glabrous; adaxial sides of costules with appressed short setae, glabrous on both veines and intercostal areas, with few short setae along margins. Veins evident, raised on both sides, veinlets 4 or 5 pairs per segment, basal basiscopic veinlet arising from above base of costules and reaching margins above sinuses, acrosopic veinlet arising from base of costules and reaching bottom of sinuses. Sori orbicular-reniform, thickly membranous, brown, shortly hairy, persistent.

- Sandy湿 or sandy beaches by margins of evergreen broad-leaved forests on slopes; ca. 1300–1500 m. NW Yunnan (Gongshan: Dulongjiang Valley).


似镰羽假毛蕨 si lian yu jia mao jue

Plants 25–40 cm tall. Rhizomes creeping, firm. Fronds clustered; stipules 10–15 cm, stramineous, glabrous; laminae narrowly lanceolate, 20–35 × ca. 8 cm, proximal 1 or 2 pairs of pinnae abruptly reduced into auricles, pinnate-pinnatifid, pinnatifid-acuminatae at apices; normal free pinnae 10–15 pairs, subopposite, oblique distally; sessile; middle pinnae narrowly lanceolate, ca. 5 × 1 cm, tapering to bases, pinnatifid, pinnatifid-acuminatae at apices; segments ca. 12 pairs, ligulate, ca. 5 × 2 mm, acute at apices. Veins evident on both sides, veinlets 6–8 pairs per segment, basal acrosopic veinlet reaching bottom of sinus, basiscopic one reaching margin above sinus. Laminae somewhat leathery, deep green when dry; rachises and veins all with setae and short hairs abaxially, adaxial sides of costa subglabrous with dense appressed setae along grooves, elsewhere glabrous. Sori attached below middle of veinlets and close to costules, ca. 8 pairs per segment; indusia orbicular-reniform, brown, papery, persistent, densely finely hairy.

- Sandy beaches at margins of evergreen broad-leaved forests on slopes; ca. 1300 m. NW Yunnan (Gongshan: Dulongjiang).
raised on both sides, veinlets not evident, 8 or 9 pairs per segment and all arising above base of costules, basal acrosopic vein reaching bottom of sinus, basiscopic vein reaching margin above sinus. Laminae dark green when dry, papery, with dense appressed acicular hairs along rachises, abaxial sides of costae and veins with mixed spreading acicular hairs and short setae, adaxial sides of costae densely setaceous along grooves, veinlets sparsely setaceous, glabrous on intercostal areas of both sides. Sori orbicular, attached on middle of veinlets; indusia orbicular-reniform, brown, thick, with few fine long hairs, persistent.

- Streamside in forests; ca. 700 m. Fujian (Dehua).


广西假毛蕨   guang xi jia mao jue

Plants ca. 60 cm tall. Rhizomes not seen. Stipes ca. 8.5 cm, deep stramineous, bases sparsely scaly, distally densely acicular hairy; laminae narrowly lanceolate, ca. 50 × 10 cm, proximal 4 or 5 pairs of pinnae gradually reduced and hastate; middle normal pinnae ca. 25 pairs, alternate, extremely oblique distally, sessile, pinnate-pinnatifid; middle pinnae narrowly lanceolate, ca. 7 × 1 cm, pinnatifid nearly to costae; segments ca. 18 pairs, acrosopic one of basal pair of pinnae slightly elongated, ca. 6 mm, others ca. 4 × 2 mm, bent, entire, acuminate at apices. Costules raised on both sides, veinlets not evident, 5 or 6 pairs per segment. Laminae dark green when dry, papery; rachises, costae, and veinlets all with dense long acicular hairs abaxially, adaxially densely setaceous along costal grooves, costules occasionally with 1 or 2 setae, finely hairy on intercostal areas abaxially. Sori orbicular, attached on middle of veinlets; indusia orbicular-reniform, papery, brown, persistent, acicular hairy.

- On shaded rocks by streamsides; ca. 300 m. Guangxi (Fusui).


独龙江假毛蕨   du long jiang jia mao jue

Plants ca. 90 cm tall. Rhizomes creeping. Fronds remote; dimorphic; fertile stipes to 43 cm, stramineous, sparsely brown scaly and glabrous; laminae oblong-lanceolate, ca. 50 × 18 cm, proximal 1 or 2 pairs of pinnae slightly shortened, pinnate-pinnatifid, acuminate at apices; lateral pinnae ca. 20 pairs, spreading, alternate, subsessile; middle pinnae narrowly lanceolate, ca. 9 × 1.4 cm, not narrowed to bases, pinnatifid, pinnatifid and long caudate-acuminate at apices; segments ca. 25 pairs, lanceolate, slightly bent, ca. 4 × 3 mm, entire, obtuse-pointed at apices; sterile fronds smaller, proximal 4 pairs of pinnae abruptly reduced into auricles. Veins evident on both sides, 7 or 8 pairs of veinlets per segment, proximal pair arising from above base of costules, acrosopic veinlet reaching bottom of sinus, basiscopic one reaching margin above sinus. Laminae dark green when dry, papery; rachises and costae with dense acicular hairs on both sides, acicular hairy on veins and abaxial surface of intercostal areas, adaxially occasionally with 1 or 2 acicular hairs and glabrous on intercostal areas, shortly setaceous along margins. Sori orbicular and attached below middle of veinlets and close to costules, 7 or 8 pairs per segment; indusia brown, membranous and hairy, persistent.

- Evergreen broad-leaved forests; ca. 2100 m. Yunnan (Shuang-bai).


独龙江假毛蕨   du long jiang jia mao jue

Rhizomes creeping, dark brown and firm. Stipes ca. 8 cm, stramineous, sparsely scaly proximally. Laminae lanceolate, ca. 110 cm, pinnatifid-acuminate at apices; proximal 12 pairs reduced and hastate; middle normal pinnae ca. 23 pairs, spreading, alternate, sessile, ca. 15 × 2.6 cm, pinnatifid, acuminate at apices; segments more than 30 pairs, subrectangular, proximal pair of pinnae elongate, spreading, others slightly bent distally; proximal segments 1.2–1.5 × ca. 0.4 cm, entire, obtuse-pointed at apices. Costules raised on both sides, 8 or 9 pairs per segment, proximal pair reaching bottom of sinus. Laminae green when dry, thinly papery, abaxially with acicular hairs along rachises, costae, veins, and intercostal areas, adaxially with appressed setae along costal grooves, costules and veinlets sparsely hairy, setaceous along margins. Sori orbicular, attached below middle of veinlets and close to costules; indusia orbicular-reniform, persistent, glabrous and finely hairy.

- Margins of evergreen broad-leaved forests on mountain slopes; 1200–1500 m. NW Yunnan (Gongshan: Dulongjiang).


长根假毛蕨   chang gen jia mao jue

_Nephrodium canum_ Baker in Hooker & Baker, Syn. Fil. 267. 1867; _Cyclosorus canus_ (Baker) S. Lindsay; _Dryopteris cana_ (Baker) Kuntze; _D. repens_ C. Christensen; _N. repens_ C. Hope (1899), not Baillon (1874); _Pseudocyclosorus medogensis_ Ching & S. K. Wu; _P. repens_ (C. Christensen) Ching; _Thelypteris cana_ (Baker) Ching; _T. repens_ (C. Christensen) Ching.

Plants more than 1 m tall. Rhizomes suberect and subglabrous. Fronds clustered; stipes 15–20 cm, stramineous or brownish, with sparse brown scales and dense setae; laminae oblong-lanceolate, 40–80 × 13–25 cm, pinnatifid-acuminate at apices; proximal pairs of pinnae reduced and hastate or auriculate; normal pinnae 20–25 pairs, alternate, sessile, spreading, pinnate-pinnatifid; middle pinnae narrowly lanceolate, pinnatifid and long acuminate; proximal pair of segments slightly elongate, spreading, 7–14 × 1.6–2.4 cm, pinnatifid nearly to costae; segments 20–28 pairs, sublinatele, slightly bent, 7–12 × 2.5–4 mm, entire, acute. Veins raised on both sides, visible, 8–12 pairs of veinlets per segment, proximal pair arising from bases or above base of costules, acrosopic vein reaching bottom of sinus, basiscopic one reaching margin above sinus. Laminae thinly papery or herbaceous, dark green or greenish when dry; abaxial sides of rachises, costae, and veins all with acicular hairs, adaxially with dense appressed setae along grooves, sparsely setaceous along veins, shortly hairy on intercostal areas on both surfaces. Sori orbicular, attached on middle veinlets; indusia orbicular-reniform, brown, persistent, hairy.
THELYPTERIDACEAE


福贡假毛蕨 阜贡假毛蕨

Plants to 1.3 m tall. Rhizomes not seen. Stipes ca. 50 cm, dark brown, deep stramineous distally and glabrous; laminae broadly lanceolate, ca. 85 × 20 cm, abruptly tapering to bases; pinnatifid-acuminate at apices; proximal 2 pairs of pinnae reduced and hastate; middle normal pinnae ca. 30 pairs, alternate, spreading, sessile, pinnate-pinnatifid; middle pinnae lanceolate, 12–15 × ca. 1.5 cm, bases not narrowed, rounded-truncate, pinnatifid nearly to costae; apices long acuminate; segments ca. 25 pairs, lanceolate, ca. 7 × 3 mm, entire, acute at apices. Veins evident, costules raised on both sides, veinlets 8(9) pairs per segment, proximal pair arising from base of costules, acroscopic veinlet reaching bottom of sinus, basiscopic one reaching margin above sinus. Laminae dark green when dry, papery, abaxially along rachises, costae, veins, and intercostal areas all with long acicular hairs, adaxially along costal grooves with appressed setae, costae appressed shortly hairy, veinlets each with 1 or 2 setae, glabrous on intercostal areas. Sori orbicular, attached on middle of veinlets; indusia orbicular-reniform, thinly membranous, brown, densely shortly hairy, persistent.

Pseudocyclosorus fugongensis differs from P. canus mainly in intercostal areas glabrous adaxially and laminae with 2 pairs of reduced pinnae proximally.


泸水假毛蕨 相水假毛蕨

Plants to 70 cm tall. Rhizomes erect; stipes to 32 cm, stramineous; laminae ovate-lanceolate, ca. 38 × 18 cm, pinnatifid-acuminate at apices; proximal 3 pairs of pinnae reduced into auricles, one pair reduced and hastate; middle normal pinnae ca. 17 pairs, proximal ones subopposite, distal ones alternate, shortly stalked, except for proximal pair slightly reflexed, others ascending distally, pinnate-pinnatifid; pinnae lanceolate, bent or falcate distally; middle pinnae ca. 13 × 2 cm, pinnatifid; segments ca. 26 pairs per pinna, subrectangular, bent distally, ca. 6 × 3 mm, entire, acute at apices. Costules raised on both sides, ca. 10 pairs of veinlets per segment, clearly visible. Laminae dark green when dry, papery; rachises, costae, and costules all with dense acicular hairs and pubescence abaxially, adaxial side of costae with dense appressed setae along grooves, veinlets and along margins sparsely setaceous, costules shortly hairy adaxially, intercostal areas with dense acicular fine hairs abaxially. Sori orbicular, attached on middle of veinlets; indusia orbicular-reniform, brown, hairy and persistent.


察隅假毛蕨 查隅假毛蕨

Plants 1–1.5 m tall. Rhizomes short and decumbent, subglabrous. Fronds clustered; stipes 10–30 cm, stramineous, with sparse brown scales proximally, distally shortly setaceous and easily deciduous when brushed; laminae oblong-lanceolate, 90–120 × 20–30 cm, proximal pairs of pinnae reduced and hastate or auriculate, pinnatifid-acuminate at apices; middle normal pinnae ca. 22 pairs, spreading, alternate, linear-lanceolate, bases not tapering, truncate, sessile or extremely shortly stalked, pinnatifid nearly to costae, apices acuminate; segments ca. 30 pairs, obliquely spreading, sublignulate, 8–9 × ca. 3 mm, slightly bent, entire, obtuse-pointed at apices. Veins evident, costules evident and raised on both sides, 9 or 10 pairs of veinlets per segment, simple, proximal pair arising above base of costules, acroscopic veinlet reaching bottom of sinus, basiscopic one reaching margin above sinus. Laminae green or dark green when dry, papery; abaxially with dense acicular hairs along rachises, costae, veins, and on intercostal areas, densely setaceous along costal grooves adaxially, hairs sparser on veins. Sori orbicular, attached on middle of veinlets, ca. 9 pairs per segment; indusia orbicular-reniform, brown, with acicular hairs, persistent.


贡山假毛蕨 贡山假毛蕨

Plants to 1 m tall. Rhizomes not seen. Stipes ca. 23 cm, bases brownish, distally stramineous, glabrous; laminae broadly lanceolate, ca. 70 × 30 cm, proximal 3 pairs of pinnae reduced and hastate, pinnate-pinnatifid, pinnatifid-acuminate at apices; middle normal pinnae ca. 20 pairs, alternate, spreading, lanceolate, 15–17 × 2.5–3 cm, bases truncate, sessile, pinnatifid, apices acuminate; segments more than 25 pairs, broadly lignulate, 11–14 × 5–6 mm, rounded-obtuse at apices; proximal pair of segments (particularly acroscopic one) clearly elongated, slightly lobed along margins. Veins evident abaxially, raised on both sides, 10–12 pairs of veinlets per segment, acroscopic veinlet of basal pair reaching bottom of sinus, basiscopic one reaching margin above sinus. Laminae greenish when dry, herbaceous, abaxially with dense acicular hairs along rachises, costae, veins, and intercostal areas and mixed glands; adaxially densely setaceous along costal grooves, appressed shortly hairy on costules, glabrous on intercostal areas. Sori orbicular, attached above middle of veinlets, 7 or 8 pairs per segment; indusia orbicular-reniform, membranous, brown, with 1 or 2 short hairs, persistent.

Pseudocyclosorus gongshanensis is similar to P. pseudorepens but differs in the proximal pair of segments on each pinna much larger than more distal ones, lobed along margins, and the sori attached on middle of veinlets.

 Plants 90–110 cm tall. Rhizomes decumbent, woody. Fronds approximate; stipes ca. 40 cm, stramineous, subglabrous; laminae lanceolate, 40–70 × 15–20 cm, pinnate-pinnatifid, pinnatifid-acuminate at apices; proximal 3 pairs of pinnae reduced and hasteate; middle normal pinnae ca. 20 pairs, obliquely spreading, alternate, sessile, ca. 14 × 2 cm, slightly tapering to bases, pinnatifid nearly to costae, pinnatifid and long caduate at apices; segments ca. 25 pairs, sublanceolate, ca. 9 × 3 mm, entire, rounded-obtuse at apices. Veins visible, costules raised on both sides, 9–11 pairs of veinlets per segment, oblique distally, proximal pair arising above base of costules, acroscopic veinlet reaching bottom of sinus, basiscopic one reaching margin above sinus. Laminae dark green when dry, papery; abaxially with long acicular hairs along rachises, costae, veins, and on intercostal areas, adaxially with dense setae along costal grooves, costules finely hairy adaxially, on veinlets and along margins with 1 or 2 setae. Sori orbicular, attached on middle of veinlets; indusia orbicular-reniform, brown, occasionally finely hairy, persistent.

 - On rocks by streams; 2200–2500 m. Yunnan (Gongshan).


 武宁假毛蕨 wu ning jia mao jue

 Plants to 1.2 m tall. Rhizomes decumbent, brown. Fronds approximate; stipes ca. 8–10 cm, dark brown proximally, distally stramineous, glabrous; laminae oblong-lanceolate or broadly lanceolate, ca. 110 × 26–35 cm, abruptly narrowed at bases, pinnate-pinnatifid, pinnatifid-acuminate at apices; normal lateral pinnae 28–30 pairs, extremely shortly stalked, alternate, obliquely spreading, proximal 7–9 pairs abruptly reduced into small linear auricles, proximal one reduced, tabulate; middle pinnae linear-lanceolate, ca. 20 cm, broadly cuneate at bases, pinnatifid nearly to costae, long acuminate at apices; segments 22–25 pairs, falcate-lanceolate, obliquely distally, 5.7–× 2–2.5 mm, entire, acute at apices; basal acroscopic one particularly elongated to 1 cm. Veins visible adaxially, costules raised on both sides, veinlets extremely obliquely distally, 9 or 10 pairs per segment, proximal pair arising from base of costule, acroscopic veinlet reaching bottom sinus, basiscopic one reaching margin above sinus. Laminae dark green when dry, papery; abaxially with acicular setae along rachises, costae, and veins, glabrous on intercostal areas, adaxially with appressed setae along grooves of costae and veins, margins subglabrous. Sori orbicular, attached on middle of veinlets; indusia orbicular-reniform, thick, brown, glandular, persistent.

 - On rocky soil at watersides in valleys; 300–1100 m. Fujian, Guangdong, Guangxi, Hainan, S and SW Yunnan, Zhejiang [India, Japan, Laos, Myanmar, Thailand, Vietnam].


 镰片假毛蕨 lian pian jia mao jue

 Plants 40–50 cm tall. Rhizomes decumbent, with sparse scales. Fronds approximate; stipes 13–18 cm, bases sparsely brown scaly, distally glabrous, deeply stramineous; laminae lanceolate, 20–32 × 10–13 cm, tapering proximally, pinnate-pinnatifid, pinnatifid-acuminate at apices; proximal 2 pairs of pinnae reduced into auricles; middle normal pinnae 16–18 pairs, proximal ones subopposite, distal ones alternate, obliquely spreading, sessile, narrowly lanceolate, 6.7–7.5 × ca. 1.2 cm, bases not narrowed, truncate, pinnatifid nearly to costae, apices long acuminate; segments ca. 17 pairs, obliquely spreading, lanceolate, 4–5 × ca. 7 mm, entire, obtuse-pointed at apices. Veins evident, costules raised on both sides, ca. 6 pairs of veinlets per segment. Laminae dark green when dry, papery; abaxially with sparse setae and fine short hairs along rachises, costae, and veins, glabrous on intercostal areas, adaxially densely setaceous along costal grooves, hairs sparser along veins but mixed with few glands. Sori orbicular, attached on middle of veinlets; indusia orbicular-reniform, brown, glandular and with 1 or 2 fine hairs, persistent.

 - Streamsides in forests; ca. 600 m. Fujian, Jiangxi (Jinggangshan, Lushan).

西南假毛蕨  xi nian jia mao jue


Plants to 1.5 m tall. Rhizomes creeping. Fronds remote; stipes deep stramineous, glabrous above bases. Laminae broadly oblong-lanceolate, ca. 130 × 30 cm, tapering to bases, pinnate-pinnatifid, pinnatifid-acuminate at apices; pinnae proximal 9–11 pairs alternate, gradually reduced to triangular auricles, distal pairs alternate, sessile, spreading, lanceolate, 15–20 × 2–2.3 cm, bases rounded-truncate, symmetrical, pinnatifid nearly to costae, apices long caudate-acuminate; segments 30–35 pairs, spreading, lanceolate, 9–10 × 2.5–3 mm, entire, obtuse or acute at apices; proximal pair (particularly acroscopic one) clearly elongated. Veins visible, costae raised on both sides, 8–12 pairs of veinlets per segment, proximal pair arising from base of costules, acroscopic veinlet reaching bottom of sinus, basiscopic one reaching margin above sinus. Laminae dark green when dry, papery, glabrous on both surfaces of intercostal areas, abaxially acicular hairy along rachises and costae, adaxially densely appressed-setaceous along veins, with 1 or 2 setae on veins and margins. Sori orbicular, attached on middle of veinlets, 10–12 pairs per segment; indusia orbicular-reniform, thickly membranous, brown, glabrous, persistent.

On rocks by streams in valleys, in bamboo by streams; 400–2100 m. Fujian, Guangxi, Guizhou, Hunan, Jiangxi, Sichuan, Taiwan, Yunnan [N India, Myanmar, Nepal, Thailand].


*Thelypteris ×erubesquirolica* W. C. Shieh & J. L. Tsai (J. Sci. Engin. 24: 7. 1987), described from Taiwan (Nantou), appears to be a presumed hybrid between *Pseudocyclosorus esquirolii* and *Glaphyropteris dubrae*.


线羽假毛蕨  xian yu jia mao jue

Plants more than 1.6 m tall. Rhizomes not seen. Stipes ca. 30 cm, bases dark brown, distally stramineous, glabrous; laminae lanceolate, ca. 140 × 40 cm, pinnate-pinnatifid, pinnatifid-acuminate at apices; proximal 9 pairs of pinnae abruptly reduced into auricles, middle normal pinnae more than 30 pairs, alternate, obliquely spreading, sessile, linear-lanceolate, ca. 20 × 2.3 cm, not broadened at bases, pinnatifid, pinnatifid-acuminate at apices; segments ca. 40 pairs, ligulate, 9–11 × ca. 5 mm, acute at apices. Veins not evident, ca. 12 pairs of veinlets per segment, proximal pair reaching bottom of sinus. Laminae dark green when dry, herbaceous; abaxially setaceous along rachises, glabrous along costae, veines densely glandular, adaxially densely setaceous along costal grooves, with 1 or 2 setae on veinlets, with few fine hairs along costules. Sori orbicular, attached on middle of veinlets; indusia orbicular-reniform, brown, thick, persistent, glabrous.


边囊假毛蕨  bian nang jia mao jue

Plants to 75 cm tall. Rhizomes creeping, woody, firm. Fronds remote; stipes ca. 23 cm, deep stramineous, bases with sparse deep brown lanceolate scales, distally glabrous; laminae broadly lanceolate, ca. 50 × 25 cm, abruptly narrowed proximally, pinnate-pinnatifid, pinnatifid-acuminate at apices; proximal 3 pairs of pinnae reduced and hastate; middle normal pinnae ca. 21 pairs, alternate, spreading, sessile, 12–14 × 1.5–1.7 cm, bases nearly tapering, truncate, pinnatifid nearly to costae, apices pinnatifid and long acuminate; segments ca. 22 pairs, obliquely spreading, lanceolate, ca. 7 × 4 mm, entire, rounded-obtuse at apices. Veins raised on both sides, 7–9 pairs of veinlets per segment, proximal pair arising above base of costules, acroscopic veinlet reaching bottom of sinus, basiscopic one reaching margin above sinus. Laminae greenish when dry, thinly papery; abaxially sparsely long acicular hairy along rachises, glabrous along costae, sparingly finely hairy and glandular along veins, adaxially with dense appressed setae along costal grooves, sparsely setaceous along veinlets. Sori orbicular, attached above middle of veinlets or closer to margins; indusia orbicular-reniform, brown, glabrous, persistent.

● Sichuan.

*Pseudocyclosorus submarginalis* is similar to *P. esquirolii* but differs in the plants smaller, laminae ca. 50 cm, proximal pair of veinlets on segment arising above base of costules, and sori attached above middle of veinlets and close to margins.


青城假毛蕨  qing cheng jia mao jue

Plants to 1.4 m tall. Rhizomes creeping, woody, firm, dark brown, sparsely scaly; scales lanceolate, deep brown, fragile and easily deciduous. Fronds remote; stipes 32–37 cm, bases dark brown, distally stramineous, glabrous; laminae lanceolate, ca. 100 × 30 cm, abruptly narrowed at bases, pinnate-pinnatifid, pinnatifid-acuminate at apices; proximal 3–6 pairs of pinnae reduced and hastate; middle normal pinnae ca. 30 pairs, proximal ones subopposite, distal ones alternate, sessile, narrowly lanceolate, 12–19 × ca. 2.5 cm, truncate at bases, pinnatifid, pinnatifid-acuminate at apices; segments ca. 37 pairs, 8–10 × ca. 3 mm, entire, obtuse-pointed at apices. Veins evident, costules raised on both sides, ca. 12 pairs of veinlets per segment, proximal pair arising above base of costules, acroscopic veinlet reaching bottom of sinus, basiscopic one reaching margin above sinus. Laminae dark green when dry, papery; abaxially with long acicular hairs along rachises, sparsely short hairy along costae and veins, densely short hairy on intercostal areas, adaxially with dense appressed setae along costal grooves, with 1 or more setae along veins and glabrous on intercostal areas. Sori orbicular, attached on middle of veinlets; indusia orbicular-reniform, brown, thick, glabrous, persistent.

*Pseudocyclosorus qingchengensis* is similar to *P. submarginalis* but differs in the plants smaller, laminae ca. 50 cm, proximal pair of veinlets on segment arising above base of costules, and sori attached above middle of veinlets and close to margins.
**THELYPTERIDACEAE**

- Forests on slopes, wet shaded forests by streams. Guangxi (Longsheng), Sichuan (Guanxian, Qingchengshan).

*Pseudocyclosorus qingchengensis* is similar to *P. esquirolii* in laminar outline but differs by the proximal pair of segments on larger pinnae clearly elongate, proximal pair of veinlets arising from above base of costules, and laminae with dense short hairs on intercostal areas abaxially.


狭羽假毛蕨  xia yu jia mao jue

Plants to 90 cm tall. Rhizomes creeping, dark brown, woody, apices with brown scales. Fronds remote; stipes ca. 35 cm, bases dark brown, sparsely scaly, distally stramineous and glabrous; laminae lanceolate, ca. 50 × 16 cm, pinnate-pinnatifid, pinnatifid-acuminate at apices; proximal pinnae reduced into auricles, second pair slightly shorter than above normal ones; normal pinnae ca. 25 pairs, spreading, alternate, sessile, lanceolate, 8–9 × 1.5 cm, rounded-truncate at bases, pinnatifid nearly to costae, long acuminate at apices; segments ca. 20 pairs, ca. 6 × 3 mm, entire, rounded-obtuse at apices. Veins evident on both sides, costules raised on both sides, ca. 10 pairs of veinlets per segment, proximal pair arising above base of costules, acroscopic vein reaching bottom of sinus, basiscopic ones reaching margin above sinus. Laminae grayish green when dry, papery; abaxially with dense long acicular hairs along rachises, sparsely shortly hairy along costae and veins, also finely hairy on intercostal areas, adaxially densely appressed-setaceous along costal grooves, sparsely setaceous along veins, glabrous on intercostal areas. Sori orbicular, attached above middle of veinlets and close to margins, brown, thick, glabrous, persistent.

- Wet forests; ca. 1000 m. Guizhou (Fanjing Shan).


禾杆假毛蕨  he gan jia mao jue

Plants ca. 1.2 m tall. Rhizomes not seen. Stipes ca. 36 cm, with dense acicular hairs. Laminae lanceolate, ca. 65 × 20 cm, tapering to both ends, pinnate-pinnatifid; proximal ca. 8 pairs of pinnae reduced and hastate; normal pinnae more than 25 pairs, alternate, spreading, sessile, narrowly lanceolate, ca. 13 × 1.7 cm, not tapering to bases, 1-pinnatifid, pinnatifid-acuminate at apices; segments more than 30 pairs, lanceolate, ca. 7 × 4 mm, entire, acute at apices. Veins raised on both sides, ca. 9 pairs of veinlets per segment, proximal pair arising above base of costules, basiscoic veinlet reaching to margin above sinuses, acroscopic one reaching bottom of sinuses. Laminae dark brown when dry, papery; rachises with dense long acicular hairs on both sides, along abaxial sides of costae sparsely acicular hairy, with appressed short setae along veins adaxially, with 1 or 2 setae along veinlets and margins. Sori orbicular and attached on middle of veinlets, ca. 7 pairs per segment; indusia orbicular-reniform, brown, thick, glabrous, persistent.

- W Yunnan.


苍山假毛蕨  cang shan jia mao jue


Plants to 2 m tall. Rhizomes creeping. Fronds remote; stipes ca. 55 cm, with sparse appressed ovate scales, distally with sparse grayish white short hairs; laminae ca. 150 × 35 cm, abruptly narrowed to bases, pinnate-pinnatifid, pinnatifid-acuminate at apices; proximal pairs of pinnae reduced to triangular auricles; middle normal pinnae ca. 45 pairs, obliquely spreading, alternate, sessile, lanceolate, 18–20 × 3–3.5 cm, truncate at bases, pinnatifid to broad wing on both sides of costae, long pinnatifid-acuminate at apices; segments ca. 40 pairs, spreading, proximal one 10–12 × ca. 4 mm, entire or not clearly undulate-crenate, acuminate at apices. Veins evident on both sides, 11–13 pairs of veinlets per segment, proximal pair arising from base of costules, acroscopic veinlet reaching bottom of sinuses, basiscopic one reaching margin above sinuses. Laminae dark brown when dry, herbaceous; abaxially with dense acicular hairs along rachises, sparsely shortly hairy along costae and veins, adaxially densely appressed-setaceous along costal grooves, sparsely setaceous along veins and margins, glabrous on both surfaces on intercostal areas. Sori orbicular, attached above middle of veinlets and close to margins; indusia small, orbicular-reniform, brownish, thickly membranous, glabrous, persistent.

- Streamsides. W Yunnan (Dali: Cangshan).


綦江假毛蕨  qi jiang jia mao jue

Plants to 40 cm tall. Rhizomes decumbent, sparsely brown scaly. Fronds approximate; stipes ca. 14 cm, stramineous, sparsely brown scaly on bases, distally glabrous; laminae ovate-lanceolate, ca. 28 × 17 cm, abruptly narrowed at bases, pinnate-pinnatifid, pinnatifid-acuminate at apices; proximal 2 pairs of pinnae reduced and hastate, reflexed, middle normal pinnae ca. 16 pairs, proximal ones opposite, distal ones alternate, sessile, slightly oblique distally, lanceolate, 8.5–9 × ca. 2 cm, broadened and truncate at bases, pinnatifid, long pinnatifid-acuminate at apices; segments 22–24 pairs, pinnatifid nearly to costae, lanceolate, except for proximal pair, all obliquely spreading distally, proximal pair clearly elongated, ca. 6 × 3 mm, proximal pair of segments on lowest 2 pairs of pinnae pinate-lobate and undulate, acuminate at apices, others all obtuse-pointed and entire. Veins evident, 6 or 7 pairs of veinlets per segment, proximal pair arising above base of costules, acroscopic veinlet reaching bottom of sinus, basiscopic one reaching margin above sinus. Laminae dark green when dry, papery; abaxially sparse long acicular hairy along rachises, sparsely setaceous along costae and veins, adaxially densely appressed-setaceous along
costal grooves, sparsely setaceous along veins and margins, glabrous on intercostal areas on both surfaces. Sori orbicular, attached above middle of veinlets or slightly closer to margins; indusia orbicular-reniform, brownish, membranous, persistent, glabrous.

- Raised land by wells. Chongqing (Qijiang).


叉脉假毛蕨  jing lie jia mao jue

Plants 75–150 cm tall. Rhizomes ascending, with dense brown broadly lanceolate scales on apices. Fronds subclustered; stipes 20–50 cm, dark brown at bases and sparsely scaly, distally stramineous and glabrous; laminae oblong-lanceolate, 50–100 × 20–30 cm, abruptly narrowed at bases, pinnate-pinnatifid, pinnatifid-acuminate at apices; proximal pairs of pinnae becoming auricles or hastate; middle normal pinnae 20–25 pairs, spreading, sessile, alternate, narrowly lanceolate, 15–18 × 1.5–3 cm, slightly broadened at bases and broadly cuneate, pinnatifid nearly to costae, pinnatifid and long acuminate at apices; segments 20–30 pairs, oblique distally, lanceolate, proximal pair clearly elongated to ca. 15 mm, distal ones 7–12 × 2–4 mm, entire, obusate-pointed at apices. Veins evident on both sides, costules raised, 9–12 pairs of veinlets per segment, proximal pair arising from base of costules, acroscopic veinlet reaching bottom of sinus, basiscopic one reaching margin above sinus. Laminae dark green when dry, papery; abaxially finely hairy along rhachises, costae, and veins, adaxially densely appressed-setaceous along costal grooves, sparsely setaceous on apices of costae, veinlets, and margins, glabrous on intercostal areas. Sori orbicular, attached on middle of veinlets; indusia orbicular-reniform, brownish, thickly membranous, glabrous, persistent.

- Wetlands in valleys, streamsides; 500–700 m. Fujian, Guangdong, Guangxi, Hunan, Jiangxi, Zhejiang.


峨眉假毛蕨 e mei jia mao jue

Plants to 100 cm tall. Rhizomes not seen. Stipes 15–20 cm, stramineous, glabrous; laminae lanceolate, 80–90 × ca. 20 cm, pinnate-pinnatifid; proximal 4 pairs of pinnae reduced and hastate; middle normal pinnae ca. 20 pairs, spreading, alternate, narrowly lanceolate, 12–14 × ca. 1.4 cm, bases rounded-truncate, sessile, pinnatifid, remote from each other; segments ca. 30 pairs, narrowly ligulate, ca. 5 × 2 mm, margins undulate on distal half; proximal pair of segments not clearly elongated. Veins evident on both sides, ca. 8 pairs of veinlets per segment, simple, basiscopic acroscopic veinlet reaching bottom of sinus, basiscopic one reaching margin above sinus. Laminae dark green when dry, firmly papery; rhachises subglabrous proximally, with few setae distally, setae denser adaxially on rhachises, abaxially finely shortly hairy on costae, costules with appressed soft hairs and glands, adaxially with dense setae along grooves of costae, sparsely hairy on veins, glabrous on intercostal areas on both surfaces. Sori orbicular and attached above middle of veinlets; indusia orbicular-reniform, brown, thick, glabrous, persistent.

- Streamsides, under Larix trees; ca. 700 m. Sichuan (Emei Shan).


叉脉假毛蕨 cha mai jia mao jue

Plants to 130 cm tall. Rhizomes creeping. Stipes ca. 20 cm, bases brown and sparsely scaly, distally stramineous and glabrous; laminae ca. 100 × 40 cm, pinnate-pinnatifid; proximal 6 pairs of pinnae abruptly reduced and hastate; middle normal pinnae to 28 pairs, spreading, alternate, sessile, lanceolate, ca. 20 × 2.5–3 cm, truncate at bases, acuminate at apices, pinnatifid; segments more than 30 pairs, lanceolate, to ca. 16 × 7 mm, shallowly pinnatifid. Veins evident abaxially, 11–13 pairs of veinlets per segment and usually furcate, basal acroscopic veinlet reaching bottom of sinus, basiscopic one reaching margin above sinus. Laminae dark green when dry, papery; abaxially subglabrous along rhachises and costae, sparsely shortly hairy along veins, adaxially densely setaceous along costal grooves, finely hairy along veins and with 1 or 2 setae along veinlets, glabrous on intercostal areas. Sori nearly orbicular, attached above middle of veinlets and closer to margins; indusia orbicular-reniform, papery, brown, glabrous, persistent.

- Forests of Phyllostachys pubescens on S slopes. Sichuan (Junliang).


大明山假毛蕨 da ming shan jia mao jue

Plants ca. 64 cm tall. Rhizomes decumbent, dark brown. Fronds clustered; stipes ca. 14 cm, bases brown and sparsely brown scaly, distally stramineous and glabrous; laminae lanceolate, ca. 32 × 23 cm, tapering to both ends, pinnate-pinnatifid; proximal 3 pairs of pinnae gradually reduced and hastate; middle normal pinnae ca. 17 pairs, spreading, alternate, sessile, narrowly lanceolate, ca. 11 × 1.7 cm, pinnatifid; segments ca. 20 pairs, lanceolate, ca. 8 × 3 mm, entire, acute at apices. Veins raised on both sides, ca. 8 pairs of veinlets per segment, proximal pair arising above base of costules, acroscopic veinlet reaching bottom of sinus, basiscopic one reaching margin above sinus. Laminae dark green when dry, thinly papery; abaxially with few fine short hairs along costae and veins and mixed with 1 or 2 setae along veinlets, glabrous on intercostal areas. Sori nearly orbicular, attached above middle of veinlets and closer to margins; indusia brown, thick, with fine hairs, persistent.

- Guangxi (Daming Shan).


斜展假毛蕨 xie zhan jia mao jue

Plants ca. 1.2 m tall. Rhizomes not seen. Stipes ca. 30 cm, brown and glabrous; laminae oblone-lanceolate, ca. 100 × 30
cm, tapering to both ends, pinnate-pinnatifid; lower 4 pairs of pinnae abruptly reduced and hastate; middle normal pinnae ca. 20 pairs, extremely oblique distally, alternately, narrowly lanceolate, ca. 25 × 3 cm, acuminate at apices, entire, pinnatifid; segments more than 35 pairs per pinna, lanceolate, 1.2–1.5 × ca. 0.3 cm, entire, acuminate at apices, basal acrosopic one slightly elongated. Veins visible on both sides and all raised. ca. 11 pairs of veinlets per segment, proximal veinlet arising from base of costules and reaching margin above sinus, acrosopic one arising above base of costules and reaching bottom of sinus. Laminae grayish green when dry, papery; abaxially with short setae along rachises, subglabrous along costae and veins, adaxially densely setaceous along costal grooves, sparsely hairy along veins and margins, glabrous on intercostal areas on both sides. Sori orbicular and attached on distal parts of veinlets, ca. 9 pairs per segment; indusia orbicular-reiniform, brown, thick, glabrous, persistent.

- Streamsides. Guangxi (Lingui).


普通假毛蕨 pu tong jia mao jue


Plants 90–110 cm tall. Rhizomes short and decumbent, dark brown, sparsely scaly. Fronds approximate or clustered; stipes 20–25 cm, bases dark brown and sparsely scaly, distally stramineous and glabrous; laminae oblong-lanceolate, 70–85 × ca. 20 cm, abruptly narrowed at bases, pinnate-pinnatifid, pinnatifid-acuminate at apices; proximal 3 or 4 pairs of pinnae abruptly reduced into triangular auricles; middle normal pinnae 26–28 pairs, subopposite or alternate, obliquely spreading, sessile, lanceolate, 10–15 × 1.2–2 cm, not or slightly narrowed to bases, rounded-cuneate, pinnatifid nearly to costae, pinnatifid and long acuminate at apices; segments 28–30 pairs, lanceolate, acrosopic one on proximal pair slightly elongated, others 7–9 × 2–3.5 mm, entire, acute or acuminate at apices. Veins evident on both sides, costules raised, 9 or 10 pairs of veinlets per segment, proximal pair arising above bases of costae, acrosopic veinlet reaching bottom of sinus, basiscopic one reaching margin above sinus. Laminae grayish green when dry, papery, glabrous on both intercostal areas, abaxially subglabrous or sparsely shortly hairy along rachises, costae, and veins, adaxially densely appressed-setaceous along costal grooves and with 1 or 2 setae along veins. Sori orbicular, attached above middle of veinlets and slightly closer to margin; indusia orbicular-reiniform, thickly membranous, glabrous, persistent.

Wet places in mixed forests, rocks in valleys; 200–2000 m. S Anhui, Fujian, Guangdong, SE Guangxi, Guizhou, Hunan, Jiangxi, Sichuan, Yunnan, Zhejiang [Japan, Korea].


阔片假毛蕨 kuo pian jia mao jue


Caudex not seen; base of stipes missing, remainder slightly flushed red, glabrous, ca. 25 cm. Laminae ca. 80 cm; pinnae over 20 pairs; basal pinnae slightly reduced and more widely spaced, frond apex not seen. Largest pinnae ca. 16 × 3 cm; aerophores not enlarged; basal acrosopic segments sometimes elongate, basal basiscopic segments of several lower pinnae reduced, edges lobed to 2 mm from costae; segments hardly falcate, oblong or oblong-lanceolate, 1.2–1.7 × ca. 0.6 cm, entire or shallowly undulate, acute at apices; costules ca. 7 mm apart. Veins ca. 11 pairs per segments, concolorous, slender, not prominent. Laminae herbaceous; abaxially rachis with sparse hairs, costae with short spreading hairs near base only, short capitata hairs on distal part, this distribution repeated on costules which also bear some much-reduced scales consisting of 2 cells; adaxially costae densely hairy, costules with sparse short hairs and scattered long ones. Sori small, attached above middle of veinlets and close to margins; indusia pale, firm, with very short capitata hairs on edge; stalks of sporangia slender, sometimes with a sessile spherical cell.

- C Guizhou (Ziyun).


灌县假毛蕨 guan xian jia mao jue

Plants to 80 cm tall. Rhizomes decumbent, dark brown, woody, firm. Fronds approximate; stipes ca. 30 cm, brown proximally, distally stramineous and glabrous; laminae lanceolate, ca. 55 × 24 cm, tapering proximally, pinnate-pinnatifid, pinnatifid-acuminate at apices; free pinnae ca. 20 pairs, slightly obliquely spreading, sessile, subopposite, proximal 2 or 3 pairs of pinnae slightly shortened; middle ones lanceolate, ca. 12 × 1.9 cm, bases subcuneate, pinnatifid nearly to costae, pinnatifid-acuminate at apices; segments ca. 23 pairs, lanceolate, ca. 7 × 4 mm, entire, obtuse-pointed at apices; basal acrosopic segment particularly elongated (to 1 cm). Veins evident on both sides, costules raised abaxially, ca. 9 pairs of veinlets, proximal pair arising above bases of costae, acrosopic veinlet reaching bottom of sinus, basiscopic one reaching margin above sinus. Laminae greenish red when dry, subherbaceous; abaxially with sparse acicular long hairs along rachises, hairs denser along costae and veins, fine and long acicular hairy on intercostal area, adaxially with dense appressed short setae along rachises and costal grooves, subglabrous along veins, hairy along margins, glabrous on intercostal areas. Sori orbicular and attached below middle of veinlets and closer to costules; indusia orbicular-reiniform, hairy, brown, persistent. Sporangia each with 2 or 3 erect acicular hairs.

- Shaded places in forests; ca. 1200 m. Sichuan (Guanzun: Qingcheng Shan).


溪边假毛蕨 xi bian jia mao jue

*Aspidium ciliatum* Wallich ex Bentham, Fl. Hongk. 455.
1861; Dryopteris calcarata (Blume) Kuntze var. sericea (J. Scott ex Beddome) C. Christensen; D. ciliata (Wallich ex Bentham) C. Christensen; D. pseudocalcarata C. Christensen; Lastrea calcarata (Blume) T. Moore var. ciliata (Wallich ex Bentham) Beddome; L. calcarata var. sericea (J. Scott ex Beddome) Beddome; L. ciliata (Wallich ex Bentham) Hooker (1857), not Liebm. (1849), nor C. Presl (1851); L. sericea J. Scott ex Beddome; nephroidium calcaratum (Blume) Hooker var. ciliatum (Wallich ex Bentham) Baker; N. calcaratum var. sericeum (J. Scott ex Beddome) Alderwerelt; Polypodium tenerum Roxburgh; Thelypteris ciliata (Wallich ex Bentham) Ching; T. sericea (J. Scott ex Beddome) C. F. Reed; T. tenera (Roxburgh) C. V. Morton ex Fraser-Jenkins; Trigonospora ciliata (Wallich ex Bentham) Holtum.

Plants 20–40 cm tall. Rhizomes short and erect, subglabrous. Fronds clustered; stipes 8–25 cm, dark brown, with sparse ovate-lanceolate scales, distally stramineous, throughout densely grayish white acicular hairy; laminae lanceolate, 12–15 × 7–8 cm, slightly narrowed to bases, pinnate-pinnatifid, pinnatifid-acuminate at apices; pinnae ca. 15 pairs, proximal pair slightly shortened, opposite, reflexed, others ascending distally, alternate, sessile, lanceolate, 3.5–5 × 0.8–1.5 cm, broadly cuneate at bases, pinnatilobate to 1/4–1/3 of distance to costae, pinnatifid-acuminate at apices; segments 9–12 pairs, subtriangular-lanceolate, 1.5–4 × 1–1.5 mm (basal acroscopic one to 6 mm), entire, obtuse at apices. Veins evident on both sides, 4–6 pairs of veinlets per segment, proximal pair arising above base of costules, acroscopic veinlet reaching bottom of sinus, basiscopic one reaching margin above sinus, sometimes 2 veinlets joined and elongated to bottom of sinus. Laminae dark brown when dry, firmly papery, glabrous on both intercostal areas, with dense acicular hairs on both sides of rachises and costae, sparsely setaceous along both sides of veinlets. Sori orbicular and attached on proximal parts of veinlets and close to costules; indusia orbicular-reniform, dark brown, thickly membranous, with dense acicular hairs, persistent. Spores trilete.

Wetlands in mountain valleys, rock crevices by streams; 100–900 m. Guangdong, Guangxi, Hainan, Yunnan [Bhutan, N India, Indonesia, Malaysia, Myanmar, Nepal, Singapore, Sri Lanka, Thailand, Vietnam].


尾羽假毛蕨  weiyujaomiaoju


Plants ca. 55 cm tall. Rhizomes not seen. Stipes ca. 28 cm; laminae broadly lanceolate, ca. 27 × 15 cm, pinnatifid-acuminate at apices, bases not narrowed, pinnate-pinnatifid; pinnae 11–13 pairs, proximal 8 or 9 pairs opposite, distal ones alternate, proximal pair reflexed proximally, middle pinnae spreading, distal ones obliquely spreading, sessile; middle pinnae lanceolate, 7–8 × ca. 1.5 cm, not narrowed to bases, pinnatifid nearly to costae, pinnatifid and long acuminate at apices; segments ca. 15 pairs, broadly lanceolate, basal acroscopic one slightly elongated, others ca. 5 × 4 mm, entire, obtuse-pointed at apices. Veins evident, basal acroscopic veinlet on segments reaching bottom of sinus, basiscopic one reaching margin above sinus. Laminae dark brown when dry, papery; abaxially rachises, costae, and veins with long hairs, finely hairy on intercostal areas, adaxially with dense, appressed setae along costal grooves, sparsely setaceous along veins, glabrous on intercostal areas. Sori orbicular, attached above middle of veinlets and closer to margins; indusia orbicular-reniform, brown, hairy, persistent. Spores trilete.


龙津蕨属  longjinjueshu
Lin Youxing (林尤兴); Kunio Iwatsuki

Plants large, terrestrial, glabrous throughout. Rhizomes long creeping, dark brown, woody, including stipe bases with dense brown lanceolate scales. Fronds remote; stipes strong, glabrous above bases, without tuberculate aerophores; laminae pinnate-pinnatifid, narrowly elliptic, 50–80 × ca. 40 cm; lateral pinnae to 30 pairs, 30–40 × ca. 2 cm, pinnatifid, proximal ones


龙津蕨  longjinjue


Plants to 2 m tall. Stipes angular, to 1.2 m; laminae large, pinnate-pinnatifid, narrowly elliptic, 50–80 × ca. 40 cm; lateral pinnae to 30 pairs, 30–40 × ca. 2 cm, pinnatifid, proximal ones

THELYPTERIDACEAE

371
subopposite, distal ones alternate, obliquely spreading, abaxially ± with minute golden, spherical glands; veinlets 8–10 pairs per segment. Sori orbicular, in 1 or more lines along each side of costa, usually arranged in 2–5 irregular lines, not close to costaules, or attached on proximal pair of veinlets and close to costaules; sterile on distal veinlets.

On wet rocks in open forests on limestone mountains; ca. 100 m. SW Guangxi (Longjin) [N Vietnam].


毛蕨属 mao jue shu

Lin Youxing (林尤兴), Li Zhongyang (李中阳); Kunio Iwatsuki

Amphineuron Holttum; Christella H. Léveillé; Pneumatopteris Nakai; Sphaerostephanos J. Smith.

Plants usually medium-sized, terrestrial. Rhizomes creeping to erect, scaly (sometimes also hairy). Fronds distant to clustered; laminae usually oblong-lanceolate, narrowed or not to bases, pinnate to pinnate-pinnatifid; middle pinnae usually linear-lanceolate, subentire to deeply lobed; segments entire or rarely crenate; veinlets simple or rarely forked, proximal one or more pairs on adjacent segments anastomosing with an excursion veinlet from unifying point to sinus membrane, other veinlets to sinus membrane or margin above sinus. Laminae herbaceous to papery, both surfaces usually hairy along costae and veins, abaxial surface sometimes glandular. Sori orbicular, usually at middle of veinlets; indusia orbicular-reniform, membranous, glabrous or hairy, sometimes glandular, persistent. Sporangia usually bearing hairs or glands. Spores oblong-reniform, cristate, with wings or echinate. x = 36.

About 250 species: distributed throughout tropical and subtropical regions of the Old World, most in Asia; several species also in the New World; 40 species (ten endemic) in China.

“Christella sadlerioides” (H. Léveillé, Fl. Kouy-Tchéou, 475. 1915) is a nomen nudum and was not therefore validly published (Melbourne Code, Art. 38.1(a)). Léveillé recorded C. urophylla (Mettenius) H. Léveillé (Fl. Kouy-Tchéou, 476. 1915; Phegopteris urophylla Mettenius, Abb. Senckenb. Naturf. Ges. 2: 310. 1858; Aspidium urophyllum (Mettenius) Christ; Dryopteris urophylla (Mettenius) C. Christensen; Goniopteris urophylla (Mettenius) Beddome; Nephrodium urophyllum (Mettenius) Beddome; Polypodium urophyllum (Mettenius) Wallich ex Hooker; Thelypteris urophylla (Mettenius) K. Iwatsuki) from Guizhou, but there is no other record of this Malaysian species from China.


1a. Aquatic plants; costae with ovate scales abaxially ................................................................. 1. C. interruptus

1b. Terrestrial plants; costae without scales or rarely with lanceolate scales abaxially.

2a. Pinnae with sessile spherical glands abaxially, or pustular between veins when dried; sporangia bearing sessile galls on capsules; spores yellow to light brown.

3a. Pinnae without glands but pustular between veins when dried; segments truncate at apices .................. 2. C. truncatus

3b. Pinnae with sessile spherical galls abaxially and not pustular; segments acute or obtuse at apices.

4a. Sporangia bearing hairs on capsules; rhizomes creeping ....................................................... 3. C. productus

4b. Sporangia glabrous; rhizomes erect or suberect.

5a. Proximal pinnae gradually shortened; pinnae almost glabrous abaxially ........................................ 4. C. latebrosus

5b. Proximal pinnae abruptly shortened; pinnae hairy abaxially.

6a. Proximal pinnae narrowed at bases; middle pinnae with basal segments not elongate; indusia large, thickly membranous ................................................................. 5. C. heterocarpus

6b. Proximal pinnae not narrowed at bases; middle pinnae with basal segments elongate; indusia small, membranous ................................................................. 6. C. taiwanensis

2b. Pinnae without glands or with ellipsoid/clavate galls abaxially; sporangia bearing galls on stalks or without galls; spores brown to black.

7a. Proximal veinlets on each segment sterile; veinlets with minute yellow galls abaxially.

8a. Veinlets 1 pair beneath sinus; pinnae lobed 1/2–2/3 toward costae ............................................... 7. C. opulentus

8b. Veinlets ca. 2.5 pairs beneath sinus; pinnae lobed 1/3–1/2 toward costae ........................................ 8. C. terminans

7b. Proximal veinlets on each segment usually fertile; veinlets without such minute yellow galls.

9a. Veinlets 1–1.5(–2) pairs beneath sinus; laminae herbaceous to papery.

10a. Rachises distally with scales; lowest pinnae shortened to ca. 1 cm ............................................. 9. C. crinipes

10b. Rachises distally without scales; lowest pinnae much longer than 1 cm.

11a. Proximal pinnae narrowed at bases, with shortened basal segments ........................................... 10. C. shimenensis

11b. Proximal pinnae not narrowed or slightly so at bases, with basal segments not shortened.

12a. Basal pinnae ± reduced; pinnae lanceolate or oblanceolate.

13a. Plants 20–80 cm tall; pinnae without galls abaxially; veinlets ca. 1.5 pairs beneath sinus ........... 11. C. dentatus

13b. Plants to 20 cm tall; pinnae with galls abaxially; veinlets 1 pair beneath sinus.
14a. Pinnae with dense, short acicular hairs; hairs on indusia abaxially shorter than diam. of sori; glands abaxially small ................................................................. 12. *C. subacutus*
14b. Pinnae with sparse acicular hairs; hairs on indusia longer than diam. of sori; glands abaxially large ................................................................. 13. *C. parvifolius*

12b. Proximal pinnae not reduced or slightly so; pinnae linear-lanceolate.
15a. Pinnae without glands abaxially; rhizomes creeping or erect.
16a. Rhizomes erect; excurrent veinlet short, sometimes obscure .................................................. 14. *C. siamensis*
16b. Rhizomes creeping; excurrent veinlet long and evident.
17a. Sporangia bearing glands on stalks; acicular hairs on indusia shorter than diam. of sori ...... 15. *C. procurrens*
17b. Sporangia lacking conspicuous glands; acicular hairs on indusia longer than diam. of sori ........................................................................... 16. *C. mollusculus*

15b. Pinnae glandular abaxially; rhizomes creeping.
18a. Pinnae with long clavate glands; proximal pinnae narrowed at bases ................................ 17. *C. cylindrothrix*
18b. Pinnae with ellipsoid glands or capitately glandular hairs; proximal pinnae not narrowed at bases.
19a. Laminae much longer than stipes; veinlets 10–16 pairs per segment ........................................ 18. *C. procerus*
19b. Laminae no longer than stipes; veinlets 4–8 pairs per segment.
20a. Pinnae with glands abaxially; veinlets 5–8 pairs per segment; pinnae wider than 1 cm .... 19. *C. parasiticus*
20b. Pinnae with glandular hairs abaxially; veinlets 4–6 pairs per segment; pinnae usually narrower than 1 cm ................................................................. 20. *C. pygmaeus*

9b. Veinlets 2 or more pairs beneath sinus; laminae papery.
21a. Sporangia bearing hairs on capsules and eglandular.
22a. Middle pinnae 1–2 cm wide; proximal pinnae not decrescent at bases ........................................ 21. *C. hirtisorus*
22b. Middle pinnae 2–3.5 cm wide; proximal pinnae decrescent at bases ...................................... 22. *C. attenuatus*
21b. Sporangia lacking hairs but with glands (rarely eglandular).
23a. Rhizomes and stipe bases with ovate scales; pinnae with setae along costules; veinlets usually over 6 pairs beneath sinus ................................................................. 23. *C. articulatus*
23b. Rhizomes and stipe bases with ovate-lanceolate to linear-lanceolate scales; pinnae subglabrous or with acicular hairs along costules; veinlets 2–5 pairs beneath sinus.
24a. Sporangia bearing large spherical red glands on stalks; pinnae with minute hairs or subglabrous abaxially.
24b. Sporangia bearing ellipsoid or clavate, golden or reddish orange glands on stalks (rarely eglandular); pinnae usually ± hairy abaxially.
24a. Sporangia bearing large spherical red glands on stalks; pinnae with minute hairs or subglabrous abaxially.
25a. Rhizomes erect; veinlets ca. 2 pairs beneath sinus ............................................................... 24. *C. papilio*
25b. Rhizomes creeping; veinlets ca. 3 pairs beneath sinus .......................................................... 25. *C. evolutus*
24b. Sporangia bearing ellipsoid or clavate, golden or reddish orange glands on stalks (rarely eglandular); pinnae usually ± hairy abaxially.
26a. Lateral pinnae lobed to 1/3 toward costa, sometimes subentire; pinnae with dense, capitately glandular hairs abaxially ................................................................. 26. *C. latipinnus*
26b. Lateral pinnae usually more lobed; pinnae usually without glandular hairs.
27a. Pinnae eglandular abaxially (sometimes with glandular hairs).
28a. Veinlets ca. 2 pairs beneath sinus; middle pinnae with elongate basal acroscopic segment ............................................................................................................ 27. *C. acuminatus*
28b. Veinlets more numerous; middle pinnae with normal or shortened basal acroscopic segment.
29a. Rhizomes shortly creeping; proximal pinnae not shortened or 1 or 2 pairs slightly shortened.
30a. Veinlets 5–8 pairs per segment; middle pinnae usually less than 1.5 cm wide ............... 28. *C. nanxiensis*
30b. Veinlets 8–11 pairs per segment; middle pinnae usually more than 2 cm wide.
31a. Lateral pinnae usually more than 12 pairs; sori orbicular .................................................. 29. *C. scaberulus*
31b. Lateral pinnae usually less than 12 pairs; sori usually slightly elongate ....................... 30. *C. calvescens*
29b. Rhizomes long creeping; proximal 3 or more pairs of pinnae shortened.
32a. Pinnae with long acicular hairs abaxially; proximal shortened pinnae caudate at apices ................................................................................................. 31. *C. kokouensis*
32b. Pinnae without hairs abaxially; proximal shortened pinnae acute or obtuse at apices.
33a. Sporangia without glands; proximal shortened pinnae with basal segments not enlarged ................................................................................................. 32. *C. gustavii*
33b. Sporangia bearing glands on stalks; proximal shortened pinnae with enlarged basal segments ...................................................................................... 33. *C. wulingshanensis*
27b. Pinnae glandular abaxially.
34a. Veinlets ca. 2 pairs beneath sinus; rhizomes erect to suberect ........................................ 34. *C. jinghongensis*

\textit{Pteris interrupta} Willdenow, Phytographia, 13. 1794; \textit{Aspidium gongylodes} Schkuhr; \textit{A. unitum} (Linnaeus) Swartz var. \textit{glabrum} Mettenius; \textit{A. unitum} var. \textit{hirsutum} Mettenius; \textit{Cyclosorus gongylodes} (Schkuhr) Link; \textit{C. gongylodes} var. \textit{glaber} (Mettenius) Ching; \textit{C. gongylodes} var. \textit{hirsutus} (Mettenius) Farwell; \textit{Dryopteris gongylodes} (Schkuhr) Kuntze; \textit{D. gongylodes} var. \textit{hiruta} (Mettenius) C. Christensen; \textit{D. interrupta} (Willdenow) Ching; \textit{Nephrodium gongylodes} (Schkuhr) Schott; \textit{Thelypteris gongylodes} (Schkuhr) Small; \textit{T. interrupta} (Willdenow) K. Iwatsuki.

Plants 40–100 cm tall. Rhizomes long creeping, black, including bases of stipes with sparse ovate-lanceolate scales. Fronds distant; stipes 20–60 cm, bases black, distally stramineous; laminae 20–50 × 10–20 cm, bases not narrowed, apices caudate with apical pinna similar to lateral ones; lateral pinnae 10–25 pairs, linear-lanceolate, 5–10 × ca. 1 cm, shortly stalked, bases rounded-truncate, lobed 1/4–1/2 toward costae, apices acuminate; segments 20–30 pairs on middle pinnae, triangular, 3–5 × 2–4 mm, apices pointed; veinlets 6–10 pairs, proximal pair anastomosing, next 0.5–1 pair running to sinus membrane. Laminae somewhat leathery, reddish when dried, subglabrous adaxially, abaxially with acicular hairs and reddish orange ses-sile spherical glands along veins and several membranous broadly ovate scales along costae. Sori orbicular, medial to submarginal, proximal 1 or 2 pairs of veins sterile; indusia sparsely hairy. Sporangia bearing spherical reddish orange glands on stalks. Spores sparsely minutely echinulate. 2n = 72, 144.

Swamps, wetlands; near sea level to 500 m. Fujian, Guangdong, Guangxi, Hainan, Jiangxi, Taiwan, S Yunnan [inclusive tropical and subtropical regions of the world].

According to recent molecular study by Smith and Cranfill (Amer. Fern J. 92(2): 131–149. 2002), \textit{Cyclosorus interruptus} is distantly related to other species in this genus but is quite close to \textit{Ampecopteris prolifera}. This relationship requires further study.


\textit{Polypodium truncatum} Poiret, Encycl. 5: 534. 1804; \textit{Cyclosorus pustulifer} var. \textit{acutiloba} Ching; \textit{C. truncatus} f. \textit{kwashtokensis} (Hayata) H. Ito; \textit{C. truncatus} f. \textit{laevifrons} (Hayata) H. Ito; \textit{C. truncatus} f. \textit{sublaevifrons} (Tagawa) H. Ito; \textit{Dryopteris kwashtokensis} Hayata; \textit{D. laevifrons} Hayata; \textit{D. laevifrons} var. \textit{kwashtokensis} (Hayata) Tagawa; \textit{D. sublaevifrons} Tagawa; \textit{D. truncata} (Poiret) Kuntze; \textit{Nephrodium truncatum} (Poiret) C. Presl; \textit{Pneumatopteris truncata} (Poiret) Holttum; \textit{Polystichum truncatum} (Poiret) Gaudichaud; \textit{Thelypteris truncata} (Poiret) K. Iwatsuki; \textit{T. truncata} f. \textit{kwashtokensis} (Hayata) C. F. Reed; \textit{T. truncata} f. \textit{angustipinnus} (Hayata) C. F. Reed; \textit{T. truncata} f. \textit{sublaevifrons} (Tagawa) H. Ito; \textit{T. truncata} f. \textit{laevifrons} (Hayata) H. Ito; \textit{T. truncata} f. \textit{acutiloba} Ching.

Plants 0.6–2 m tall. Rhizomes erect, stipes throughout with brown ovate-lanceolate scales. Fronds clustered; stipes 20–50 cm; laminae oblong-lanceolate, 40–150 ∞ 20–40 cm, bases abruptly narrowed, apices acuminate; pinnae 20–35 pairs, proximal 2–6 pairs abruptly shortened, middle pinnae linear, 12–30 ∞ 1–2.5 cm, bases rounded-truncate and usually slightly narrowed on proximal pinnae, lobed 1/4–1/2 toward costae, apices long acuminate; aerophores beneath pinna bases swollen; segments 25–40 pairs, rectangular, 3–6 × 2–4 mm, margins usually dentate, apices truncate or rounded-truncate; veinlets 4–10 pairs, proximal 1 or 2 pairs anastomosing, next pair running to sinus membrane. Laminae papyry, yellowish green or grayish green and pustular between veins when dried, glabrous on both surfaces. Sori orbicular, medial; indusia membranous, glabrous. Sporangia bearing light yellow glands on capsules. Spores dark yellow, irregularly thinly cristate or with small wings.

Stream-sides, wet places in forests; 100–1300 m. S Fujian, Guangdong, Guangxi, S Guizhong, Hainan, S Hunan, Taiwan, SE Xizang, S Yunnan [India, Indonesia, Japan, Laos, Malaysia, Myanmar, Philippines, Sri Lanka, Thailand, Vietnam; N Australia, Pacific islands (Polynesia)].

1a. Pinnae 1–1.5 cm wide, lobed 1/3–1/2 toward costae. 2a. var. \textit{truncatus}

1b. Pinnae 1–1.5 cm wide, lobed to 1/3 toward costae. 2b. var. \textit{angustipinnus}
truncata f. laevifrons (Hayata) C. F. Reed; T. truncata f. sub-
laevifrons (Tagawa) C. F. Reed.

Plants 0.6–2 m tall. Middle pinnae 18–30 × 1.5–2.5 cm, lobed 1/3–1/2 toward costae; veinlets 6–10 pairs per segment, proximal 1 or 2 pairs anastomosing, next pair running to sinus membrane. 2n = 72, 144.

Streamsides, wet places in forests; 100–1300 m. S Fujian, Guang-
dong, Guangxi, S Guizhou, Hainan, S Hunan, Taiwan, SE Xizang, S Yunnan [India, Indonesia, Japan, Laos, Malaysia, Myanmar, Philip-
pines, Sri Lanka, Thailand, Vietnam; N Australia, Pacific islands (Poly-
nesiæ)].

In FRPS (4(1): 257. 1999), K. H. Shing mentioned that many specimens from China with broadened pinna bases differed from the type. Although both broadened and narrowed pinna bases exist, all of the Chinese specimens are ± different in general outline from the type. More detailed studies are needed.


线羽截裂毛蕨 xian yu jie lie mao jue

Cyclosorus angustipinnus (Ching) K. H. Shing.

Plants 0.6–1 m tall. Middle pinnae 12–18 × 1–1.5 cm, lobed to 1/3 toward costae; veinlets 4–6 pairs per segment, proximal pair anastomosing, next pair running to sinus membrane.

● Wet places in forests; 400–600 m. Hainan.

Compared with the typical variety, Cyclosorus truncatus var. angustipinnus has a smaller laminar outline, narrower pinnae, and fewer anastomosing veinlets. According to Holttum (Blumea 21(2): 314. 1973), it might be a diploid.


兰屿大叶毛蕨 lan yu da ye mao jue

Aspidium productum Kaulfuss, Enum. Filic. 237. 1824; Cyclosorus kotoensis (Hayata) W. C. Shieh; C. truncatus (Poirit) Farwell var. kotoensis (Hayata) H. Itô; Dryopteris koto-
eensis Hayata; D. producta (Kaulfuss) C. Christensen; Sphaero-
stephanos kotoensis (Hayata) Holttum ex C. M. Ku; S. pro-
ductus (Kaulfuss) Holttum; Thelypteris kotoensis (Hayata) K. Iwatsuki; T. producta (Kaulfuss) C. F. Reed.

Plants ca. 100 cm tall. Rhizomes shortly creeping, including bases of stipes with brown dark linear-lanceolate scales. Fronds approximate; stipes ca. 20 cm; stramineous; laminae ca. 100 × 30 cm, bases narrowed, apices acuminate; pinnae ca. 30 pairs, proximal ca. 10 pairs abruptly shortened with lowest 1 pair ca. 5 mm; middle pinnae linear-lanceolate, ca. 20 × 1.5–2 cm, bases truncate, lobed 1/3–1/2 toward costae, apices long acuminate; segments 30–40 pairs on middle pinnae, oblong, ca. 3 × 3 mm, subacute or obtuse at apices; veinlets 6–8 pairs per segment, proximal 1.5 pairs anastomosing, next pair running to sinus membrane. Laminae papery, shortly pubescent and with several acicular hairs on both surfaces along costae and veins, abaxially also with sessile spherical yellow glands. Sori orbicu-
lar, medial; indusia glandular and shortly hairy. Sporangia bearing several hairs and sessile spherical glands on capsules, and similar glands on stalks. Spores light brown, echinate or cristate. 2n = 72.

Forest margins, slopes of ravines; 100–400 m. SE Taiwan (Lan Yu) [Philippines].


阴生毛蕨 yin sheng mao jue

Aspidium laterbrosum Kunze ex Mettenius, Abb. Sencken-

Plants 50–100 cm tall. Rhizomes erect. Fronds clustered; stipes 5–10 cm, dark stramineous, bases with sparse brown lanceolate scales; laminae 40–90 × 20–30 cm, bases gradually narrowed, apices acuminate; pinnae 30–40 pairs, proximal ca. 10 pairs gradually shortened with lowest one ca. 5 mm, slightly reflexed; middle pinnae lanceolate, 10–18 × 1–2 cm, bases broadly cuneate to truncate, lobed 1/2–2/3 toward costae, apices acuminate; aerophores beneath pinna bases slightly swollen; segments 20–30 pairs on middle pinnae, oblong, 5–8 × 3–4 mm, entire, obtuse at apices; veinlets 6–8 pairs, proximal pair anastomosing, next 0.5–1 pair running to sinus membrane. Laminae papery, reddish brown when dried, adaxially with sparse short acicular hairs along costae and veins, abaxial surface with yellow sessile spherical glands throughout and almost glabrous. Sori orbicular, medial; indusia glabrous, sometimes glandular. Sporangia bearing yellow spherical glands on capsules. Spores light brown, densely echinate.

Wet places in dense forests; 300–400 m. S Yunnan (Jinping) [Bangladesh, Indonesia, Malaysia, Philippines].

“Cyclosorus glabellus” (Ching ex W. M. Chu & S. G. Lu, Fl. Yunnan. 20: 608. 2006) belongs here but was not validly published because no Latin description or diagnosis, or reference to such, was provided and no type was indicated (Melbourne Code, Art. 39.1 and 40.1).


异果毛蕨 yi guo mao jue

1828; Dryopteris heterocarpa (Blume) Kuntze; Nephrodium heterocarpum (Blume) T. Moore; Sphaerostephanos hetero-
carpus (Blume) Holttum; Thelypteris heterocarpa (Blume) C. V. Morton.

Plants 60–120 cm tall. Rhizomes erect, with brown lanceolate scales. Fronds clustered; stipes 10–20 cm, bases dark brown and scaly, dark stramineous distally; laminae 40–100 × 20–30 cm, bases abruptly narrowed, apices acuminate to cau-
date; pinnae 20–40 pairs, sessile, proximal 5–10 pairs shortened and auriculate with lowest 1 pair tuberculate; proximal pinnae narrowed toward bases; middle pinnae linear-lanceolate, 10–16 × 1–1.5 cm, bases truncate, lobed 1/2–2/3 toward costae, apices long acuminate; aerophores beneath pinna bases slightly swollen; segments 20–30 pairs, 4–5 × 2–2.5 mm, entire, apices obtuse; veinlets 6–9 pairs, proximal pair anastomosing, some-
times next vein running to sinus membrane. Laminae herbaceous, brownish green when dried, with short hairs along costae on both surfaces and along veins adaxially, also golden sessile spherical glands abaxially (sometimes also adaxially). Sori orbicular, medial; indusia slightly hairy, sometimes glandular. Sporangia bearing spherical glands on capsules. Spores light brown, densely echinulate. $2n = 72$.

Wet places in forests; 100–1100 m. Guangdong, Guangxi, Hainan [Indonesia, Malaysia, Philippines, Thailand; Vietnam; Australia, Pacific islands (Polynesia)].


台灣毛蕨 tai wan mao jue

*Dryopteris taiwanensis* C. Christensen, Index Filic. 297. 1905; *Aspidium lobulatum* Christ (1904), not Blume (1828); *D. subhispida* Rosenstock; *Sphaerostephanos taiwanensis* (C. Christensen) Holttum ex C. M. Kuo; *Thelypteris taiwanensis* (C. Christensen) K. Iwatsuki.

Plants 60–120 cm tall. Rhizomes suberect to erect, including bases of stipes with brown ovate-lanceolate scales. Fronds clustered; stipes 10–20 cm, dark stramineous; laminae broadly lanceolate, 50–100 × 20–30 cm, bases abruptly narrowed, apices acuminate; pinnæ 30–45 pairs, proximal 4–6 pairs abruptly shortened and auriculate with lowest 1 pair sub-tuberculate; middle pinnæ linear-lanceolate, 10–18 × 0.8–1.2 cm, bases truncate, apices long acuminate; lobed ca. 1/2 toward costae; aerophores beneath pinna bases slightly swollen; segments 25–35 pairs, 3–5 × 2–2.5 mm, basal acroscopic ones longer, subrectangular, entire, obtuse at apices; veinlets 5–8 pairs per segment, proximal pair anastomosing, next 0.5–1 pair running to sinus membrane. Laminae papery, brownish green when dried, with several acicular hairs along costae and veins, adaxially with short hairs and yellow sessile spherical glands along veins abaxially, also minute hairs between veins abaxially. Sori orbicular, submarginal, usually sterile on proximal 1 or 2 pairs of veins; indusia glabrous or glandular along margins. Sporangia bearing golden spherical glands on stalks. Spores cristaete.

Streamside in forests or thickets; 100–300 m. Hainan [S India, Indonesia, Malaysia, Myanmar, Philippines, Sri Lanka, Thailand; E Africa, tropical America, N Australia, Micronesia].


顶育毛蕨 ding yu mao jue

*Nephrodium terminans* J. Smith ex Hooker, Sp. Fil. 4: 73. 1862; *Amphineuron terminans* (J. Smith ex Hooker) Holttum; *Thelypteris terminans* (J. Smith ex Hooker) Panigrahi.

Plants 40–100 cm tall. Rhizomes long creeping, including bases of stipes with brown linear-lanceolate scales. Fronds distant; stipes 20–55 cm, dark stramineous; laminae deltoid-lanceolate, 20–45 × 20–40 cm, bases not narrowed or slightly so, apices caudate with an apical pinnæ similar to lateral ones; lateral pinnæ 10–15 pairs, subsessile; middle pinnæ linear-lanceolate, 15–25 × 1–1.8 cm (usually narrowed toward bases), bases rounded-truncate, lobed 1/3–1/2 toward costae, apices long acuminate; segments 20–35 pairs, triangular, 3–4 × 3–4 mm, subacute or obtuse at apices; veinlets 6–8 pairs, proximal pair anastomosing, next 1–1.5 pairs running to sinus membrane. Laminae papery, brownish green or yellowish green when dried, adaxially shortly hairy along costae and veins, abaxially with short hairs and yellow sessile spheri-cal glands throughout. Sori orbicular, medial or inframedial; indusia shortly hairy and glandular. Sporangia bearing sessile spherical glands on capsules. Spores yellow to light brown, densely echinulate. $2n = 72$.

Streamside, wet places in dense forests; 200–700 m. Fujian, Guangdong, Guangxi, Jiangxi, Taiwan [S Japan].


腺脉毛蕨 xian mai mao jue

*Aspidium opulentum* Kaulfuss, Enum. Filic. 238. 1824; *Amphineuron opulentum* (Kaulfuss) Holttum; *Aspidium extensus* Blume; *Cyclosorus extensus* (Blume) H. Ito; *Dryopteris extensa* (Blume) Kunze; *Nephrodium extensum* (Blume) T. Moore; *N. opulentum* (Kaulfuss) C. Presl; *Thelypteris extensa* (Blume) C. V. Morton; *T. opulenta* (Kaulfuss) Fosberg.

Plants 60–100 cm tall. Rhizomes shortly creeping, apices and bases of stipes with dark brown linear-lanceolate scales. Fronds approximate; stipes ca. 30 cm, brownish; laminae 30–60 × 20–30 cm, bases not narrowed or slightly so, apices caudate; pinnæ 10–20 pairs, almost sessile; proximal pair of pinnæ slightly shortened; middle pinnæ linear-lanceolate, 15–25 × 1–2 cm, bases rounded-truncate (or slightly cuneate on proximal pinnæ), lobed 1/2–2/3 toward costae, apices long acuminate; segments 25–40 pairs, middle ones subfalcate, 4–8 × 2–3 mm, entire, subacute to obtuse at apices; veinlets 8–10 pairs, proximal pair anastomosing or only connivent, sometimes next vein running to sinus membrane. Laminae herbaceous, yellowish green when dried, with several acicular hairs along veins on both surfaces, minute hairs and many minute yellow spherical glands along veins abaxially, also minute hairs between veins abaxially. Sori orbicular, submarginal, usually sterile on proximal 1 or 2 pairs of veins; indusia glabrous or glandular along margins. Sporangia bearing golden spherical glands on stalks. Spores cristaete.

Wet places in forests or thickets; 200–500 m. Hainan [India, Indonesia, Japan, Malesia, Myanmar, Thailand, Vietnam; Africa, N Australia, Pacific islands (Micronesia, Polynesia)].

The epithet is derived from "*Aspidium terminans*" (Wallich, Numer. List, no. 386. 1829; Kunze, Linnaea 23: 230. 1850), which is a non-nomen nudum and was not therefore validly published (*Melbourne Code*, Art. 38.1(a)).


鳞柄毛蕨 lin bing mao jue

*Nephrodium crinipes* Hooker, Sp. Fil. 4: 71. 1862; *Christella crinipes* (Hooker) Holttum; *Dryopteris crinipes* (Hooker) Kunze; *Thelypteris crinipes* (Hooker) K. Iwatsuki.
Plants 0.5–1.5 m tall. Rhizomes erect, apices with dense dark brown lanceolate scales. Fronds clustered; stipes 20–40 cm, dark stramineous, with dense scales from bases to rachises; laminae 30–120 × 25–45 cm, bases abruptly narrowed, apices acuminata; pinnae 20–45 pairs, proximal 3–5 pairs shortened, triangular-auculate, lowest one ca. 1 × 1 cm; middle pinnae linear-lanceolate, 10–25 × 1–1.5 cm, bases truncate, lobed 1/2–2/3 toward costae, apices long acuminata; segments ca. 30 pairs, oblong, 3–5 × ca. 3 mm, entire, apices obtuse; veinlets 7–9 pairs, proximal 1–1.5 pairs anastomosing, next pair running to sinus membrane. Laminae papery, grayish green when dried, with several acicular hairs along veins adaxially, with short acicular hairs along costae and veins abaxially, also with minute hairs and minute glands throughout. Sori oribcular, medial; indusia shortly hairy. Sporangia bearing reddish orange glands on stalks. Spores dark brown, echinate. 2n = 72.

Wet forest margins, wet places in forests; 100–1300 m. S Guangdong, S Guangxi, S Guizhou, Hainan, SE Xizang, S Yunnan [Bhutan, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Thailand, Vietnam].


**石门毛蕨**  shi men mao jue


Plants 40–100 cm tall. Rhizomes shortly creeping, with dark brown lanceolate scales and setae. Fronds approximate; stipes 20–50 cm, dark stramineous; laminae 50–120 × 30–60 cm, bases slightly narrowed, apices acuminata to caudate; pinnae 10–15 pairs, shortly stalked, proximal 1 or 2 pairs sometimes slightly shortened; middle pinnae falcate-lanceolate, 8–15 × 1.5–2.5 cm, bases rounded-cuneate (decurrent on proximal pinnae), lobed 2/3–3/4 toward costae, apices long acuminata; segments 20–30 pairs on middle pinnae, proximal segments shortened or missing on proximal pinnae; middle segments falcate-lanceolate, 4–10 × 3–4 mm, obtuse or subacute at apices; veinlets 6–12 pairs, proximal pair anastomosing, excurrent veinlets usually obsolete on basal segments, next 0.5–1 pair running to sinus membrane. Laminae papery, grayish green when dried, with short acicular hairs along costae and veins and minute hairs between veins adaxially, shortly hairy throughout abaxially. Sori small, medial or supramedial; indusia shortly hairy. Sporangia with reddish orange glands on stalks. Spores brown, irregularly crista. 2n = 72, 144, 288.

**Polypodium dentatum** Forsskål, Fl. Aegypt.-Arab. 185. 1775; **Christella dentata** (Forsskål) Brownsey & Jermy; **Cyclosorus angustus** Ching (1982), not (Copeland) Ching (1941); **C. fengii** Ching ex K. H. Shing; **C. jiulongshanensis** P. S. Chiu & G. Yao ex Ching; **C. mekongensis** Ching ex K. H. Shing; **C. mianningensis** Ching ex K. H. Shing; **C. paradentatus** Ching ex K. H. Shing; **C. pingxianensis** Ching & H. S. Kung ex K. H. Shing; **C. proximus** Ching; **C. shapingbaensis** Ching ex K. H. Shing; **C. stenopexis** Ching & K. H. Shing; **C. wangi** Ching; **Dryopteris dentata** (Forsskål) C. Christensen; **D. obtusifolia** Tagawa; **Thelypteris dentata** (Forsskål) E. P. St. John.

Plants (20–)40–60(–100) cm tall. Rhizomes suberect to shortly creeping, apices including bases of stipes with brown linear-lanceolate scales. Fronds subul弹stated; stipes (5–)10–20(–35) cm, bases dark brown, stramineous distally; laminae (10–)15–40(–60) × 10–20 cm, bases slightly narrowed, apices acuminata; lateral pinnae 10–20 pairs, proximal 2 or 3 pairs slightly shortened; middle pinnae lanceolate to oblanceolate, 5–10 × (0.8–)1–2 cm, bases rounded-truncate, lobed 1/2–2/3 toward costae, apices acuminata; segments 10–20 pairs, rectangular or oblong, 3–5 × 3–4 mm (basal acrosopic one slightly longer, sometimes crenate), rounded-obtuse at apices; veinlets 5–8 pairs per segment, proximal pair anastomosing, next 0.5–1 pair running to sinus membrane. Laminae herbaceous to papery, brownish green when dried, shortly hairy adaxially, along veins with several acicular hairs, densely puberulent abaxially, sometimes with glandular hairs. Sori oribcular, medial; indusia shortly hairy. Sporangia bearing minute golden glands on stalks. Spores brown, irregularly crista. 2n = 72, 144, 288.

**Habitat variable, usually semi-open to open places; near sea level to 2800 m.** Chongqing, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, Jiangxi, Sichuan, Taiwan, SE Xizang, Yunnan, S Zhejiang [N Africa, tropical America, tropical and subtropical Asia].

The type of **Cyclosorus longishanensis** K. H. Shing (FRPS 4(1): 337, 1999) has features intermediate between *C. dentatus* and *C. acuminatus*. Only one gathering (the type) with few sori has been collected. This taxon might be a hybrid.

The type of **Cyclosorus wenzhouensis** K. H. Shing & C. F. Zhang (FRPS 4(1): 341, 1999) resembles *C. dentatus* but differs in having a larger laminar outline and 2 pairs of veinlets joined beneath the sinuses. Only one gathering (the type) with irregular spores has been collected. This taxon might be a hybrid.

12. **Cyclosorus subacutus** Ching, Fl. Fujian. 1: 598. 1982.

**短尖毛蕨**  duan jian mao jue

Plants 15–20 cm tall. Rhizomes short, suberect, with dense dark brown lanceolate scales at apices. Fronds clustered; stipes 3–7 cm, stramineous; laminae 8–14 × 3.5–6 cm, bases slightly narrowed, apices acuminata; pinnae 6–12 pairs, sessile, proximal 2 or 3 pairs slightly shortened; middle ones oblong-lanceolate to oblanceoblong-lanceolate, 2–3 × ca. 1 cm, bases truncate, lobed 1/2–2/3 toward costae, apices acuminata or acute; segments 6–10 pairs on middle pinnae, oblong, 2–3 × ca. 2 mm (basal acrosopic one slightly longer), entire, obtuse at apices; veinlets 3–5 pairs, proximal pair anastomosing with an excurrent veinlet running to sinus membrane. Laminae herbaceous, grayish green or brownish green when dried, adaxially with...
dense short acicular hairs along costae, with sparse acicular hairs along veins and shorter hairs between veins; abaxial surface with dense short thin acicular hairs and golden to orange small glands. Sori small, orbicular, medial; indusia densely hairy. Sporangia bearing golden to orange glands on stalks. Spores with long to short wings.

- Semi-open places by forest margins; near sea level to 100 m. Fujian, Guangdong, Jiangxi, ?Taiwan, S Zhejiang.

*Cyclosorus subacutus* differs from *C. dentatus* in being much smaller plants and having glandular hairs abaxially, but in other aspects, the two species are quite similar. Knapp (*Ferns Fern Allies Taiwan, in being much smaller in stature. The spores are not well developed. 72x317

C. procurrens* differs from *C. dentatus* in being much smaller plants and having glandular hairs abaxially, but in other aspects, the two species are quite similar. Knapp (*Ferns Fern Allies Taiwan, in being much smaller in stature. The spores are not well developed. 72x317


小叶毛蕨  xiao ye mao jue

Plants 10–20 cm tall. Rhizomes suberect to shortly creeping, with sparse brown lanceolate scales at apices. Fronds clustered; stipes 3–8 cm, stramineous; laminae 6–10 × 3–5 cm, bases slightly narrowed, apices acuminate; pinnae 5–8 pairs, sessile, proximal 1 or 2 pairs slightly modified; middle ones oblong-lanceolate to broadly lanceolate, 1.5–2.5 × 0.5–1 cm, bases broadly cuneate to subtruncate, slightly projected on acroscopic side, lobed 1/3–1/2 toward costae, apices obtuse or subacute; segments 5 or 6 pairs on middle pinnae, subrectangular, 2–3 × 2–3 mm, entire, obtuse at apices; veinlets 3 or 4 pairs, proximal 1 pair anastomosing with an excurrent veinlet running into sinus membrane. Laminae herbaceous, yellowish green when dried, with several thin short acicular hairs on both surfaces, and reddish orange glands along veins abaxially. Sori orbicular, at end of basal veins and usually confluent; indusia with short thin acicular hairs. Sporangia bearing reddish orange glands on stalks. Spores with short wings.

- Fujian.

*Cyclosorus parvifolius* resembles *C. parasiticus* and differs only in being much smaller in stature. The spores are not well developed.


泰国毛蕨  tai guo mao jue


Plants 70–100 cm tall. Rhizomes erect, apices along with stipe bases with dense linear-lanceolate brown scales. Fronds clustered; stipes 20–40 cm, stramineous, subglabrous or with sparse pale long acicular hairs distally; laminae 50–70 × 30–40 cm, bases not narrowed or slightly so, apices acuminate; lateral pinnae 25–35 pairs, middle ones linear-lanceolate, 10–20 × 1.5–2 cm, bases broadly cuneate or truncate, sessile, lobed 2/3–4/5 toward costae, apices long acuminate; segments 20–30 pairs on middle pinnae, oblong, 5–8 × ca. 3 mm, obtuse at apices, basal acroscopic ones usually longer and crenate; veinlets 6–12 pairs, proximal pair anastomosing or sometimes only connivent, distal veins ending before margin and above sinus. Laminae herbaceous, yellowish green when dried, with pale long acicular hairs along rachises, costae, and veins on both surfaces. Sori orbicular, medial; indusia with dense pale acicular hairs. Sporangia bearing golden glands on stalks. Spores echinate or tuberculate.

Well places in forests; 1300–1400 m. ?Taiwan, S Yunnan (Jinping) [?NE India, Thailand].

The character of veinlets not reaching the margin is unique in this species of *Cyclosorus* but also occurs in *Metathelypteris*. The connivent veinlets resemble those of *Pseudocyclosorus*. The systematic position of this species requires more study.


无腺毛蕨  wu xian mao jue


Plants 35–100 cm tall. Rhizomes shortly creeping, including bases of stipes with sparse brown lanceolate scales. Fronds approximate; stipes 15–60 × 25 cm, brown at bases, distally dark stramineous; laminae 20–60 × 15–25 cm, bases not narrowed or slightly so, apices long acuminate; pinnae 15–25 pairs, sessile, proximal 1 or 2 pairs sometimes slightly modified and reflexed; middle pinnae linear-lanceolate, 10–18 × 1.5–2 cm, bases truncate, lobed ca. 2/3 toward costae, apices long acuminate; segments 20–30 pairs on middle pinnae, subfalcate-oblong, 4–8 × 3–4 mm (basal acroscopic one longer), obtuse at apices; veinlets 6–10 pairs, proximal pair anastomosing, next 0.5–1 pairs running into sinus membrane. Laminae herbaceous to papery, yellowish green to brownish green when dried, with sparse short acicular hairs adaxially, abaxial surface with dense pale acicular hairs. Sori orbicular, medial; indusia densely hairy. Sporangia bearing reddish orange glands on stalks. Spores winged or otherwise ornamented.

Semi-open places by forest margins, thickets; 300–1400 m. Guangdong, Guangxi, S Guizhou, Hainan, Taiwan, S Yunnan [S India, Indonesia, Malaysia, Myanmar, Philippines].

*Cyclosorus procurrens* is quite similar to *C. parasiticus* and differs only in being eglandular on the pinnae. But there are many intermediate specimens. Holtttum (*Kew Bull.* 31: 309. 1976) regarded *C. procurrens* as a synonym of *C. parasiticus*. This treatment seems reasonable but we cannot confirm it. Based on similar morphology, these two species probably belong to the same complex.


美丽毛蕨  mei li mao jue

*Aspidium molliusculus* Wallich ex Kuhn, Bot. Zeitung (Berlin) 26: 41. 1868; *Cyclosorus acutilobus* Ching ex K. H. Shing; *C. densissimus* Ching ex K. H. Shing; *Thelypteris molliscula* (Wallich ex Kuhn) K. Iwatsuki.

Plants 40–100 cm tall. Rhizomes shortly to long creeping, including bases of stipes with dark brown lanceolate scales. Fronds approximate to distant; stipes 20–40 cm, stramineous; laminae 30–80 × 15–30 cm, bases not narrowed or slightly so, apices acuminate; lateral pinnae 10–20 pairs, sessile, proximal
1–3 pairs slightly shortened and reflexed; middle pinnae linear-lanceolate, 8–15 × 1–2.5 cm, bases truncate, lobed 2/3–4/5 toward costae, apices long acuminate; segments 20–25 pairs, middle ones lanceolate, 5–11 × 3–4 mm (basal acrosopic one longer and crenate), obnute at apices; veninlets simple (occasionally forked on basal segment), 6–12(–14) pairs, proximal pair anastomosing, next vein running to sinus membrane. Laminae herbaceous, yellowish green when dried, both surfaces particularly along costae and veins with sparse slender acicular hairs, adaxially with several short acicular hairs between veins. Sori orbicular, supramedial, proximal pair usually confluent; indusia small, with acicular hairs. Sporangia without conspicuous glands. Spores brown, with long fimbriate wings.

Semi-open places by forest margins, roadsides, thickets; 100–1600 m. Guangxi, S Guizhou, S Yunnan [India, Myanmar, Nepal, Thailand].

According to Iwatsuki (Fl. Thailand 3: 424. 1988) and K. H. Shing (FRPS 4(1): 198. 1999), Cyclosorus mollisculus is distributed from SW China to Thailand. However, the present authors found that the specimens from S Yunnan, although similar in outline, are quite different from those from SE Xizang, Nepal, and N India. It may be the specimens from S Yunnan, although similar in outline, are quite different from those from SE Xizang, Nepal, and N India. It may be the specimens from S Yunnan, although similar in outline, are quite different from those from SE Xizang, Nepal, and N India. It may be the specimens from S Yunnan, although similar in outline, are quite different from those from SE Xizang, Nepal, and N India. It may be the specimens from S Yunnan, although similar in outline, are quite different from those from SE Xizang, Nepal, and N India. It may be the specimens from S Yunnan, although similar in outline, are quite different from those from SE Xizang, Nepal, and N India. It may be the specimens from S Yunnan, although similar in outline, are quite different from those from SE Xizang, Nepal, and N India. It may be


**C. zhuxianmaoju**

_C. zhuxianmaoju_

Dryopteris cylindrothrix Rosenstock, Repert. Spec. Nov. Regni Veg. 12: 246. 1913; Christella cylindrothrix (Rosenstock) Holttum; Cyclosorus parasiticus (Linnaeus) Farwell var. cylindrothrix (Rosenstock) Tardieu & C. Christensen; _Thelypteris cylindrothrix_ (Rosenstock) K. Iwatsuki.

Plants 40–80 cm tall. Rhizomes short to long creeping. Fronds usually distant; stipes 20–40 cm, stramineous; laminae 40–90 × 20–30 cm, bases slightly narrowed, apices acuminate; lateral pinnae 20–30 pairs, proximal 2–5 pairs slightly shortened; middle pinnae lanceolate, 8–18 × 1.5–4 cm, bases truncate, lobed 4/5 or more toward costae, apices long acuminate; segments 20–30 pairs, lanceolate, 10–15 × 2–3 mm, entire (basal acrosopic segment longer and crenate), pointed or acute at apices; veninlets 10–15 pairs, basal pair anastomosing. Laminae herbaceous, yellowish green when dried, with sparse long pale acicular hairs along abaxial surface of rachises and both sides of veins, and minute yellow glands along veins abaxially, glabrous between veins on both surfaces. Sori orbicular, submarginal; indusia very small, glabrous or with several long acicular hairs. Sporangia bearing small orange glands on stalks. Spores variously winged, tuberculate, or echinate.

Semi-open places in sparse forests, roadsides; 1100–2400 m. SE Xizang, W Yunnan [Bhutan, N India, Nepal, Thailand].

K. H. Shing (FRPS 4(1): 202. 1999) mentioned that the type of _Cyclosorus dulongjiangensis_ might be a hybrid and needed further research. We have examined the type in PYU, and the spores appeared well developed; thus, the spores of this species do not support its putative hybrid status.


**P. huananmaoju**

_P. huananmaoju_


Plants 30–50–70(–100) cm tall. Rhizomes short to long creeping, including stipe bases with brown lanceolate scales. Fronds distant; stipes 20–40 cm, stramineous; laminae 40–90 × 20–30 cm, bases slightly narrowed, apices acuminate; lateral pinnae 20–30 pairs, proximal 2–5 pairs slightly shortened; middle pinnae lanceolate, 8–18 × 1.5–4 cm, bases truncate, lobed 4/5 or more toward costae, apices long acuminate; segments 20–30 pairs, lanceolate, 10–15 × 2–3 mm, entire (basal acrosopic segment longer and crenate), pointed or acute at apices; veninlets 10–15 pairs, basal pair anastomosing. Laminae herbaceous, yellowish green when dried, with sparse long pale acicular hairs along abaxial surface of rachises and both sides of veins, and minute yellow glands along veins abaxially, glabrous between veins on both surfaces. Sori orbicular, submarginal; indusia very small, glabrous or with several long acicular hairs. Sporangia bearing small orange glands on stalks. Spores variously winged, tuberculate, or echinate.

Semi-open places in sparse forests, roadsides; 1100–2400 m. SE Xizang, W Yunnan [Bhutan, N India, Nepal, Thailand].

This is a new record for China.
caudate-acuminate; lateral pinnae 10–15 (20) pairs, proximal 1 or 2 pairs reflexed; middle pinnae lanceolate, (5–)10–15 (20) × (0.5–)1–1.5 cm, bases truncate, lobed 1/2–2/3 toward costae, apices long acuminate; segments 20–25 pairs, 3–4 × ca. 3 mm (basal acroscopic one longer, sometimes crenate), obtuse to subacute at apices; veinlets 5–8 pairs, simple (ca. 10 pairs on basal acroscopic segment, occasionally forked), proximal pair anastomosing, sometimes next vein running to sinus membrane. Laminae herbaceous, brownish green or yellowish green when dried, with thin acicular hairs throughout on both surfaces, and reddish orange glands throughout abaxially. Sori orbicular, medial; indusia densely hairy. Sporangia bearing reddish orange glands on stalks. Spores with short wings.

- Among rocks along streams, wet forest margins; below 100–800 m. Jiangxi, Zhejiang.


*Mao nang mao jue*

*Cyclosorus mollissimus* Ching ex K. H. Shing

Plants 50–100 cm tall. Rhizomes long creeping, with ovate-lanceolate dark brown scales. Fronds distant; stipes 20–50 cm, dark brown and scarcely scaly at bases, dark stramineous distally; laminae 40–70 × 20–40 cm, bases slightly or not narrowed, apices caudate with a large apical pinna; pinnae 10–15 pairs, stalked, proximal pair abruptly reduced to 2–5 cm or sometimes longer; middle pinnae linear, 10–25 × 1–2 cm, bases broadly cuneate to truncate, lobed to 1/3 toward costae or only serrate, apices long acuminate; segments 30–45 pairs, triangular or oblong, 2–4 × ca. 4 mm, subacute or pointed at apices; veinlets 7–10 pairs, quite oblique, proximal 1 or 2 pairs anastomosing, next 1.5–2.5 pairs running to sinus membrane. Laminae papery, brownish green when dried, on both surfaces with acicular hairs along costae and veins, also with minute hairs between veins abaxially. Sori orbicular, medial; indusia densely hairy. Sporangia bearing several hairs on capsules. Spores with fimbriate wings.

Wet places in forests, semi-open forest margins; 500–1800 m. Guangxi, S Yunnan [Laos, Myanmar, Thailand].


下延毛蕨


矮毛蕨

*Cyclosorus chengii* Ching ex K. H. Shing & J. F. Cheng

Plants 15–40 cm tall. Rhizomes suberect, with brown lanceolate scales. Fronds clustered; stipes 5–15 cm, stramineous; laminae equal to stipes or slightly shorter in length, 5–15 × 3–7 cm, bases not narrowed, apices acuminate; pinnae ca. 10 pairs, sessile, proximal pinnae lanceolate, 1.5–4 × 0.3–0.7 cm, bases truncate, lobed ca. 1/2 toward costae, apices acuminate; segments oblong, obtuse or subtruncate at apices; veinlets 4–6 pairs per segment, proximal pair anastomosing, others to margin above sinus. Laminae herbaceous when dry, yellowish green, with short acicular hairs on both surfaces, and many glandular hairs abaxially. Sori small, submarginal, proximal pair usually confluent; indusia with short thin acicular hairs. Sporangia bearing fimbriate wings. Spores shortly and thickly cristate.

- Along streams, wet forest margins; below 100–800 m. Jiangxi, Zhejiang.

节状毛蕨  jie zhuang mao jue

*Nephrodium articulatum* Houlston & T. Moore, Gard. Mag, Bot. 3: 293. 1851; *Christella euphlebia* (Ching) Holtum; *Cyclosorus euphlebius* Ching; *C. laetestrigosus* (C. B. Clarke) Ching; *C. nigrescens* Ching ex K. H. Shing; *C. transitorius* Ching ex K. H. Shing; *C. yunnanensis* Ching ex K. H. Shing; *N. glandulosum* J. Smith var. *laetestrigosum* C. B. Clarke; *Proephradium articulatum* (Houlston & T. Moore) Holtum; *Thelypteris articulata* (Houlston & T. Moore) Tagawa & K. Iwatsuki; *T. euphlebia* (Ching) C. F. Reed.

Plants 0.6–1.5 m tall. Rhizomes massive, shortly creeping, including stipe bases with brown ovate-lanceolate scales and brown setae. Fronds clustered to approximate; stipes 20–60 cm, bases blackish brown, dark stramineous or reddish; laminae 40–100 × 20–40 cm, bases slightly narrowed, apices acuminate to caudate; lateral pinnae 30–40 pairs, sessile, proximal 1 or 2 pairs slightly shortened, shortly stalked, bases cuneate and decurrent; middle pinnae almost sessile, sterile pinnae 10–35 cm, dark stramineous or reddish green when dried, subglabrous. Sporangia bearing minute light yellow glands on stalks. Spores echinate. 2n = 72, 216.

Wet places in forests, on rocks in streams or beside streams; 500–2400 m. S. Sichuan, Taiwan, SE Xizang, Yunnan [N India, Kashmir, Nepal, Sri Lanka].


展羽毛蕨  zhan yu mao jue


Plants 60–120 cm tall. Rhizomes shortly to long creeping, including stipe bases with brown dark lanceolate scales. Stipes 15–40 cm, dark stramineous; laminae 40–80 × 20–40 cm, bases abruptly narrowed, apices caudate with a large apical pinna; lateral pinnae 10–20 pairs, proximal 1–5 pairs abruptly shortened, proximal pair triangular-auculicate, ca. 3 × 2 cm or longer, reflexed, sometimes hasteate; middle pinnae lanceolate, 12–20 × (1.5–)2–4 cm, bases truncate to rounded-truncate, sessile or subsessile, lobed 1/5–1/3 toward costae, sometimes only crenate, apices long acuminate or caudate; segments 20–30 pairs per pinna on middle pinnae, ovate or oblong, 2–6 × 5–7 mm, obtuse at apices; veinlets 7–9 pairs per segment, proximal 1–3 pairs anastomosing, next 1–3 pairs running to sinus membrane. Laminae papery, grayish green when dried, subglabrous or glabrous on both surfaces (rarely shortly hairy). Sori orbicular, inframedial or supramedial; indusia glabrous. Sporangia bearing large reddish orange spherical glands on stalks. Spores thickly cristate.

Wet places in dense forests; 300–1600 m. Chongqing, Guangxi, Guizhou, Hunan, Yunnan [India, Thailand].

There are several specimens of *Cyclosorus evolutus* with short hairs on the abaxial surface; but other characteristics are similar to the type, so no infraspecific name is given here.


宽羽毛蕨  kuan yu mao jue

*Aspidium molle* Swartz var. *latipinnum* Bentham, Fl. Hongk. 455. 1861; *A. latipinnum* (Bentham) Hance; *Christella latipinna* (Bentham) H. Léveillé; *Cyclosorus decipiens* Ching; *C. grossodontatus* Ching ex K. H. Shing; *C. nanpingensis* Ching; *C. oblancoeatus* K. H. Shing & C. F. Zhang; *C. papillocrurus* K. H. Shing & C. F. Zhang; *C. paralatipinnus* Ching ex K. H. Shing; *Dryopteris latipinna* (Bentham) Kuntze; *D. paraparthenica* (Linnaeus) Kuntze var. *latipinna* (Bentham) C. Christensen; *Nephrodium latipinum* (Bentham) Hooker ex Baker; *Thelypteris latipinna* (Bentham) K. Iwatsuki.
Plants (15–)20–40(–60) cm tall. Rhizomes shortly creeping, dark brown, apices and stipe bases with sparse brown linear-lanceolate scales. Fronds approximate; stipes 5–20 cm; laminae 10–30 × 5–15 cm, bases narrowed, apices ciliate with a large and deeper lobed apical pinna; lateral pinnae 4–10 pairs, proximal 1–4 pairs shortened with lowest pair ca. 1 × 0.5 cm, triangular-aureculate; middle pinnae lanceolate or oblanceolate, 3–10 × 1.5–2 cm, bases rounded-truncate, lobed 1/4–1/3 toward costae, sometimes subentire, apices acuminate or acute; segments 10–20 pairs, 1–3 × ca. 3 mm, entire, obtuse at apices; veinlets 5 or 6 pairs, proximal pair anastomosing, next 0.5–1 pair running to sinus membrane, excurrent veinlet usually interrupted. Laminae herbaceous, yellowish green when dried, shortly hairy along costae and veins adaxially, abaxial surface with very minute hairs and several reddish orange glands along veins, also with capitiate glandular hairs throughout. Sori orbicular, subdried, both surfaces with short acicular hairs along costae and membrane. Laminae papery to subleathery, grayish green when dried, also with minute hairs throughout. Sori orbicular, subdried, both surfaces with short acicular hairs along costae and veins, also with minute hairs throughout. Sori orbicular, subdried, both surfaces with short acicular hairs along costae and membrane. Laminae papery to subleathery, grayish green when dried, also with minute hairs throughout. Sori orbicular, subdried, both surfaces with short acicular hairs along costae and membrane. Laminae papery to subleathery, grayish green when dried, also with minute hairs throughout.

Subgenus Christella

Christella subpubescens

Holttum (Kew Bull. 31: 324. 1976; Fl. Males., Ser. 2, 1. 1982) treated both Cyclosorus latipinnus and C. jaculosus as synonyms of Christella subpubescens (Blume) Holttum (Aspidium subpubescens Blume; Cyclosorus subpubescens (Blume) Ching; Thelypteris subpubescens (Blume) K. Iwatsuki), which makes the application of the name Christella subpubescens questionable. Pending detailed studies of the type, we maintain the use of the name C. latipinnus.

27a. Cyclosorus acuminatus var. acuminatus

渐尖毛蕨 (原变种) jian jian mao jue (yu an bian zhong)


Proximal pinnae usually not shortened, acuminate at apices; laminae with usually 2 pairs of veinlets beneath sinus.

27b. Cyclosorus acuminatus var. kuliangensis

渐尖毛蕨 (原变种) jian jian mao jue (yu an bian zhong)


Proximal pinnae usually not shortened, acuminate at apices; laminae with usually 2 pairs of veinlets beneath sinus.

Plants (20–)40–60(–80) cm tall. Rhizomes long creeping, dark brown, apices and stipe bases with sparse brown linear-lanceolate scales. Fronds distant; stipes (10–)20–30(–40) cm, stramineous to brown; laminae (10–)20–40(–60) × 10–25 cm, bases not narrowed or slightly so, apices ciliate to acuminate; lateral pinnae (5–)10–20 pairs, shortly stalked; middle pinnae linear-lanceolate to lanceolate, (5–)8–15(–18) × (0.5–)0.8–1.5(–2) cm, bases truncate or shallowly cordate, lobed 1/2–2/3 toward costae, apices acuminate to acute; segments (10–)15–30 pairs, 2–5 × 2–4 mm, basal acroscopic one (sometimes also basiscopic one) longer, sharply pointed or acute at apex; veinlets 6–10 pairs, simple (sometimes forked on basal acroscopic segment), proximal pair anastomosing, next (0.5–)1–1.5 pairs running to sinus membrane. Laminae papery to subleathery, grayish green when dried, both surfaces with short acicular hairs along costae and veins, also with minute hairs throughout. Sori orbicular, subdried, both surfaces with short acicular hairs along costae and veins, also with minute hairs throughout. Sori orbicular, subdried, both surfaces with short acicular hairs along costae and veins, also with minute hairs throughout. Sori orbicular, subdried, both surfaces with short acicular hairs along costae and veins, also with minute hairs throughout.
The type of Cyclosorus nanxiensis Ching & Z. Y. Liu (Bull. Bot. Res., Harbin 4(3): 14. 1984) has not been examined by us, but it seems quite similar to C. acuminatus var. acuminatus according to the photo. Thus, this taxon is synonymized here, pending further study.


C. acuminatus var. kuliangensis is endemic to Taiwan. This variety is a probable hybrid between C. acuminatus var. acuminatus and C. acuminatus var. kuliangensis.


Plants 40–100 cm tall. Rhizomes shortly creeping, including stipe bases with dense brown linear-lanceolate scales. Fronds approximate; stipes 15–30 cm, dark stramineous or reddish; laminae 25–70 × 20–30 cm, proximally slightly narrowed, apices acute to acuminate; lateral pinnae 10–15 pairs, sub-sessile, proximal 1 or 2 pairs shortened; middle pinnae 5–15 × 1–2 cm, sterile ones usually broader, lanceolate, bases subtruncate or broadly cuneate, lobed to 1/2 toward costa or only serrate, apices long acuminate; segments 15–25 pairs on middle pinnae, oblong, 2–5 × ca. 3 mm, subacute or obtuse at apices; veinlets 5–8 pairs, proximal 1.5–2.5 pairs anastomosing, next 1–1.5 pairs running to sinus membrane. Laminae papery, brownish green or grayish green when dried, adaxially with sparse acicular hairs along costa and veins, abaxially with sparse short hairs along costa and veins, with minute hairs throughout. Sori orbicular, medial or sub-paired; indusia subglabrous or shortly hairy. Sporangia bearing orange glands on stalks. Spores echinate or slightly crista. 2n = 72.

Wet places in forests; 100–700 m. Hainan.


Christella calvescens (Ching) Holtttum; Cyclosorus sanduensis K. H. Shing & P. S. Wang; Thelypteris calvescens (Ching) C. F. Reed.

Plants 60–100 cm tall. Rhizomes shortly creeping, including stipe bases with brown lanceolate scales. Fronds approximate; stipes 20–50 cm, dark stramineous; laminae ovate-lanceolate, 40–60 × 20–35 cm, bases not narrowed or slightly so, apices acute to long apical pinna; lateral pinnae 10–15 pairs, middle ones 15–20 × 2–3 cm, bases cuneate (decurrent on proximal pinnae), shortly stalked, lobed 1/4–1/3 toward costa, apices long acuminate; proximal 1 or 2 pairs shortened to less than 1/2 length of middle pinnae or sometimes longer; segments 20–30 pairs on middle pinnae, triangular, entire, obtuse or subacute at apices; veinlets 8–10 pairs, proximal 1.5–2 pairs anastomosing, next 1.5–2.5 pairs running to sinus membrane. Laminae papery, grayish green or brownish green when dried, adaxially with sparse acicular hairs along costa and veins, abaxial surface subglabrous. Sori orbicular or elongate, medial; indusia subglabrous. Sporangia bearing orange or golden glands on stalks. Spores irregularly crista or echinate.

Wet places in forests; 300–1600 m. Guangxi, S Guizhou, S Yunnan [Vietnam].


Christella houkouensis (Ching) Holtttum; Thelypteris houkouensis (Ching) C. F. Reed.

Plants 0.8–1.3 m tall. Rhizomes long creeping, dark brown, including stipe bases with sparse dark brown lanceolate scales and brown setae. Fronds distant; stipes 10–15 cm, dark stramineous; laminae 70–120 × 20–35 cm, bases abruptly nar-
rowed, apices caudate; pinnae 20–35 pairs, proximal 5–15 pairs abruptly reduced into hasteate pinnae with caudate apices, proximal pair ca. 1 × 0.5 cm; middle pinnae linear-lanceolate, 10–18 × 1–2 cm, bases truncate, lobed 1/4–1/3 toward costae, apices long acuminate; segments 20–30 pairs on middle pinnae, oblong, 2–5 × ca. 3 mm, entire, subacute at apices; veinlets 8–11 pairs, proximal 2 or 3 pairs anastomosing, next 1–1.5 pairs running to sinus membrane. Laminae papery, brownish green when dried, with dense acicular hairs along costae on both surfaces, with several acicular hairs along veins adaxially, with dense acicular hairs throughout and several capitulate glandular hairs abaxially. Sori orbicular, medial; indusia hairy. Sporangia with small reddish orange glands on stalks. Spores with short wings.

Semi-open forests, wet places in forests, forest margins; 100–1100 m. SW Guangxi, SE Yunnan [E India].

The type of Cyclosorus caii Ching ex K. H. Shing (FRPS 4(1): 346. 1999) has features intermediate between C. hokouensis and C. aridis. Only one gathering (3 sheets of the type) with rare fertile sori has been collected. This taxon might be a hybrid.


古斯塔毛蕨 gu si ta mao jue

Nephrodium gustavii Beddome, J. Bot. 31: 227. 1893; Christella gustavii (Beddome) Holttum.

Plants 50–100 cm tall. Rhizomes long creeping, including stipe bases with linear-lanceolate dark brown scales, similar scales on stipe bases. Fronds distant; stipes 15–25 cm, dark stramineous; laminae 40–80 × 25–35 cm, bases gradually narrowed, apices acuminate with a large apical pinna; lateral pinnae 10–15 pairs, lanceolate, 12–18 × 2–3 cm, lobed 1/3 toward costae, bases truncate, lobed 1/3 toward costae, apices broadly cuneate, almost sessile, apices acuminate; apical pinnae similar to lateral ones; proximal 3–5 pairs of lateral pinnae gradually shortened, lowest pair ca. 2 cm; segments 20–30 pairs on middle pinnae, 3.4 × 3.4–4 mm, entire, obtuse at apices; veinlets 6–12 pairs, proximal 2 or 3 pairs anastomosing, next 1–1.5 pairs running to sinus membrane. Laminae papery, grayish green when dried, with several acicular hairs along costae and veins adaxially, with short acicular hairs along veins and minute hairs between veins abaxially. Sori orbicular, medial; indusia shortly hairy. Sporangia lacking conspicuous glands. Spores brown with long fimbriate wings.

Wet places in forests; 600–1000 m. W Yunnan [India, Thailand].

Cyclosorus gustavii has only two gatherings from W Yunnan, so our knowledge about it is quite limited. The distinction between this species and C. assamicus (Beddome) Ching, which also occurs in NE India, is not obvious. Here, we follow the treatment in Fl. Yunnan. (20: 613. 2006).


武陵毛蕨 wu ling mao jue


Plants 70–120 cm tall. Rhizomes long creeping, with lanceolate dark brown scales and setae. Stipes 10–30 cm, dark stramineous; laminae 60–100 × 15–30 cm, bases gradually narrowed, apices acuminate to caudate; lateral pinnae 15–25 pairs, proximal 3–6 pairs gradually shortened, sometimes hasteate with longer basal acrosopic segments, lowest pair 1.5–3 × ca. 2 cm; middle pinnae lanceolate, 10–18 × 1.5–2.5 cm, bases rounded truncate, lobed 1/4–2/5 toward costae, apices long acuminate; segments 25–35 pairs on middle pinnae, 2−5 × ca. 3 mm (basal acrosopic segment longer), obtuse at apices; veinlets 6–9 pairs, proximal 1.5–2 pairs anastomosing, next 0.5–1 pair running to sinus membrane. Laminae papery, grayish green when dried, adaxially with sparse short acicular hairs along costae (occasionally along veins), abaxial surface subglabrous except for several short acicular hairs on costae. Sori orbicular, medial; indusia subglabrous. Sporangia bearing golden to orange glands on stalks. Spores thinly cristicate.

● Wet places in forests, forest margins; 300–2100 m. Chongqing, Guangxi, W Hunan, S Sichuan, SE Zixang, Yunnan.


景洪毛蕨 jing hong mao jue


Plants 30–80 cm tall. Rhizomes erect to suberect, apices including stipe bases with dark brown lanceolate scales. Fronds clustered; stipes 5–20 cm, stramineous; laminae 25–60 × 8–18 cm, bases gradually narrowed, apices acuminate to caudate; pinnae 10–20 pairs, proximal 3–5 pairs gradually shortened, proximal pair ca. 1 × 1 cm; middle pinnae lanceolate, 5–10 × 1–2 cm, bases subtruncate, lobed 1/3 toward costae, apices acuminate; segments 15–20 pairs, subsquare, 2.4 × 3 mm, entire, obtuse at apices; veinlets 5–7 pairs, proximal 1–1.5 pairs anastomosing, next 1–1.5 pairs running to sinus membrane. Laminae herbaceous, grayish green when dried, veins with sparse short hairs on both surfaces, abaxial surface with reddish orange glands along and between veins. Sori orbicular, medial; indusia shortly hairy. Sporangia bearing red orange glands on stalks. Spores thinly cristicate.

Wet places in forests, semi-open places by forest margins; 200–1000 m. Guangxi, Hainan, S Yunnan [Thailand, Vietnam].


闽台毛蕨 min tai mao jue

Aspidium jaculosum Christ, Bull. Herb. Boissier, sér. 2, 4: 615. 1904; Christella jaculosa (Christ) Holttum; C. subarida (Tatewaki & Tagawa) Holttum ex C. M. Kuo; Cyclosorus aureoglândulifer Ching ex K. H. Shing; C. houi Ching; C. pararidus Ching ex K. H. Shing; C. simillimus Ching ex K. H. Shing; C. sparsiorus Ching ex K. H. Shing; C. subarida Tatewaki & Tagawa; Dryopteris jaculosa (Christ) C. Christensen; Nephrodium jaculosum (Christ) Hayata; Thelypteris houi (Ching) C. F. Reed; T. jaculosa (Christ) Panigrahi; T. subarida (Tatewaki & Tagawa) C. F. Reed.
Plants 40–100 cm tall. Rhizomes long creeping, dark brown, including stipe bases with dark brown lanceolate scales. Fronds distant; stipes 5–30 cm, dark stramineous; laminae 30–90 × 10–30 cm, bases gradually narrowed, apices caudate to acuminated; pinnae 20–30 pairs, proximal 3–8 pairs gradually shortened with lowest pair ca. 1.5 × 1.5 cm; middle pinnae lanceolate, 6–18 × 1–2 cm, bases rounded-truncate, lobed 1/3–1/2 toward costae, apices long acuminated; segments 15–30 pairs, triangular-oblong, 3–5 × ca. 3 mm, margins sometimes crenate on proximal ones, rounded-obtuse to subacute at apices; veinlets 5–8 pairs, proximal 1–1.5 pairs anastomosing, next 1–1.5 pairs running to sinus membrane. Laminae papery, brownish green to grayish green when dried, adaxially with several acicular hairs along costae and veins and minute hairs between veins, abaxial surface with dense minute hairs and many reddish orange glands throughout. Sori orbicular, medial; indusia glabrous or with sparse minute hairs. Sporangia bearing reddish orange glands on stalks. Spores shortly cristate and echinate. 2n = 72.

Streamside, wet places in forests, semi-open places; near sea level to 1200 m. Fujian, Guangdong, Guangxi, Guizhou, Hunan, S Jiangxi, Taiwan, Yunnan, S Zhejiang [Bhutan, India, Japan, Nepal, Vietnam].


广叶毛蕨 guang ye mao jue

Dryopteris ensifera Tagawa, Acta Phytotax. Geobot. 6: 89. 1937; Christella ensifera (Tagawa) Holtttm ex C. M. Kuo; Cyclosorus gaoxiongensis Ching ex K. H. Shing; C. subnamburensis Ching ex K. H. Shing; Thelypteris ensifera (Tagawa) K. Iwatsuki.

Plants 25–40 cm tall. Rhizomes shortly to long creeping, with dark brown linear-lanceolate scales. Fronds approximate to distant; stipes 10–15 cm, dark stramineous; laminae 15–30 × 5–10 cm, bases slightly narrowed, apices caudate; lateral pinnae 4–10 pairs, proximal 1 or 2 pairs shortened, ca. 1 cm or longer; middle pinnae oblanceolate, 3–10 × 1–2 cm, bases truncate to shallowly cordate, lobed 1/3–1/2 toward costae, apices acuminated; segments 8–20 pairs, 3–8 × ca. 3 mm (basal acrosopic one longer and crenate), acute at apices; veinlets 6–10 pairs, simple (sometimes forked on longer segments), proximal 2 pairs anastomosing, next pair running to sinus membrane. Laminae papery, adaxially with several acicular hairs along costae and veins, also with dense minute hairs along and between veins, abaxial surface with several acicular hairs and several clavate glands along veins, and dense minute hairs along and between veins. Sori orbicular, medial; indusia shortly hairy. Sporangia bearing clavate glands on stalks. Spores cristate. 2n = 72.

- Wet places in forests; near sea level to 700 m. S and SE Taiwan.


干旱毛蕨 gan han mao jue


Plants (30–)50–100(–150) cm tall. Rhizomes long creeping, including stipe bases with sparse brown lanceolate scales. Fronds distant; stipes 10–35 cm; laminae (20–)40–80(–120) × (10–)15–35 cm, bases abruptly or gradually narrowed, apices caudate to acuminated; pinnae 15–40 pairs, proximal 2–10 pairs shortened; middle pinnae linear-lanceolate, (5–)10–18 × 1–2 cm, bases truncate, lobed to 1/3 toward costae or sometimes only dentate, apices long acuminated; segments 20–40 pairs on middle pinnae, triangular, 1–3 × ca. 3 mm, entire, acute or pointed at apices; veinlets 6–12 pairs, much oblique, proximal 2 or 3 pairs anastomosing, next 1 or 2 pairs running to sinus membrane. Laminae papery to somewhat leathery, brownish green or yellowish green when dried, adaxially subglabrous except for several short acicular hairs along costae, abaxial surface with short acicular hairs along costae and veins, also with yellow or orange clavate glands along veins. Sori orbicular, medial; indusia glandular, sometimes hairy. Sporangia bearing yellow or orange clavate glands on stalks. Spore with long wings or ridged folds. 2n = 72.

Wet or semi-open places, usually among tall grasses; near sea level to 2500 m. S Anhui, Chongqing, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, Jiangxi, Sichuan, Taiwan, SE Xizang, Yun-nan, Zhejiang [Bhutan, India, Indonesia, Kashmir, Malesia, Nepal, Philippines, Vietnam; Australia, Pacific islands].

K. H. Shing mentioned in FRPS (4(1): 278. 1999) that Cyclosorus subaridus represented a small form of C. aridus. However, after careful examination, we found that C. subaridus resembles the type of C. jaculosus, and it is here included in synonymy of that species.

The type of Cyclosorus medogensis Ching & S. K. Wu (Fl. Xizang. 1: 171. 1993) resembles this species but differs by deeper lobed segments and less anastomosing veins. Its type has quite rare fertile sori. Only one gathering (the type) has been collected. This taxon might be a hybrid.

The type of Cyclosorus omeigenisis Ching (Bull. Fan Mem. Inst. Biol., n.s., 1: 289. 1949; Christella omeigenisis (Ching) Holtttm; Thelypteris omeigenisis (Ching) C. F. Reed) has features intermediate between Cyclosorus arida and Pronephrium penangianum. Only one gathering (the type) lacking fertile sori has been collected. This taxon might be a hybrid.

The type of Cyclosorus pseudoarida Ching ex K. H. Shing (FRPS 4(1): 278. 1999) has features intermediate between C. arida and C. acuminatis. Only one gathering (the type) with rare fertile sori has been collected. This taxon might be a hybrid.


狭基毛蕨 xia ji mao jue

Cyclosorus clavatus K. H. Shing.

Plants 0.8–1.5 m tall. Rhizomes long creeping, including stipe bases with sparse brown lanceolate scales and brown short setae. Fronds distant; stipes 30–60 cm, dark stramineous; laminae 50–90 × 30–40 cm, bases not or slightly narrowed, apices caudate with a large apical pinna; lateral pinnae 4–12
pairs, proximal ones stalked; proximal pair sometimes shortened to ca. 3 cm; middle pinnae lanceolate, 15–22 × 2.5–3.5 cm, bases cuneate, lobed 1/4–1/3 toward costae, apices long acumin-ate; segments 30–40 pairs on middle pinnae, falcate-triangul ar, 3–5 × 4–5 mm, obtuse or subacute at apices; veinlets 8–12 pairs, proximal 2 pairs anastomosing with usually an interrupted excurrent veinlet, next 2 or 3 pairs running to sinus membrane. Laminae papyraceous, grayish green when dried, acicular hairs along costae (sometimes also veins) adaxially, abaxially with golden clavate glands and minute hairs along veins. Sori orbicular or slightly elongate, medial or inframedial; indusia with sparse short hairs. Sporangia bearing clavate glands on stalks. Spores with fimbriate wings on stalks.

Wet places in dense forests; 600–700 m. Chongqing, Guangxi, Guizhou [Vietnam].


福建毛蕨 fu jian mao jue


Plants 40–100 cm tall. Rhizomes long creeping, including stipe bases with brown lanceolate scales and setae. Fronds distant; stipes 10–30 cm; laminae 30–80 × 15–30 cm, bases gradually narrowed or slightly so, apices caudate with a medium-sized to large apical pinna; pinnae 5–15 pairs, short stalked or almost sessile, proximal 1–5 pairs gradually shortened, or sometimes only 1 pair slightly shortened; middle pinnae lanceolate, 10–18 × 1.5–3 cm, bases truncate or broadly cuneate, lobed 1/5–1/3 toward costae, apices acuminate; seg-ments 20–30 pairs on middle pinnae, 2–4 × 3–5 mm, obtuse or subtruncate at apices; veinlets 5–10 pairs, proximal 2 pairs anastomosing, next 1.5–2 pairs running to sinus membrane. Laminae papyraceous, brownish green when dried, with short acicular hairs along costae and veins and minute hairs between veins on both surfaces, also with golden clavate glands along veins and minute hairs between veins abaxially. Sori orbicular, medial; indusia shortly hairy. Sporangia bearing orange to golden clavate glands on stalks. Spores with short fim-briate wings.

Wet places in forests, semi-open forest margins; 200–1500 m. Guangxi, S Yunnan [India, Laos, Myanmar, N Thailand].

The type of Cyclosorus grandissimus Ching & K. H. Shing (Fl. Fujian. 1: 599, 1982) has features intermediate between C. fukienensis and C. aridis. Only one gathering (the type) with rare sori has been collected. This taxon might be a hybrid.

The type of Cyclosorus hirtipes K. H. Shing & C. F. Zhang (FRPS 4(1): 345–346, 1999) has features intermediate between C. fukienensis and C. acuminatus. Only one gathering (the type) with rare fertile sori has been collected. This taxon might be a hybrid.


巨型毛蕨 ju xing mao jue


Plants 0.6–1.5 m tall. Rhizomes short or long creeping, massive and woody, including stipe bases with dark brown lanceolate scales. Fronds approximate or distant; stipes 10–30 cm, bases dark brown, stramineous distally; laminae 50–120 × 30–40 cm, bases narrowed, apices caudate; pinnae 15–30 pairs, stalked or almost sessile, proximal 2–10 pairs gradually shortened and narrowed, proximal pair ca. 1 cm; middle pinnae lanceolate, 10–20 × 2–3.5 cm, bases rounded-truncate, lobed 1/4–1/3 toward costae, apices long acumin-ate; segments 20–35 pairs on middle pinnae, oblong, 2.5–3 × 5–5 mm, entire, obtuse to subacute at apices; veinlets 8–12 pairs, proximal 1 or 2 pairs anastomosing, next 1–3 pairs running to sinus membrane. Laminae papyraceous, brownish green when dried, with short acicular hairs along costae and veins on both surfaces, also with clavate glands along veins and also minute hairs between veins abaxially. Sori orbicular, medial or supramedial; indusia shortly hairy. Sporangia bearing orange to golden clavate glands on stalks. Spores with medium-sized to long fimbriate wings.

Wet places in forests, forest margins; near sea level to 1100 m. Fujian, N Guangdong, S Hunan, S Jiangxi, S Zhejiang.


Plants 0.6–1.5 m tall. Rhizomes short or long creeping, massive and woody, including stipe bases with dark brown lanceolate scales. Fronds approximate or distant; stipes 10–30 cm, bases dark brown, stramineous distally; laminae 50–120 × 30–40 cm, bases narrowed, apices caudate; pinnae 15–30 pairs, stalked or almost sessile, proximal 2–10 pairs gradually shortened and narrowed, proximal pair ca. 1 cm; middle pinnae lanceolate, 10–20 × 2–3.5 cm, bases rounded-truncate, lobed 1/4–1/3 toward costae, apices long acumin-ate; segments 20–35 pairs on middle pinnae, oblong, 2.5–3 × 5–5 mm, entire, obtuse to subacute at apices; veinlets 8–12 pairs, proximal 1 or 2 pairs anastomosing, next 1–3 pairs running to sinus membrane. Laminae papyraceous, brownish green when dried, with short acicular hairs along costae and veins on both surfaces, also with clavate glands along veins and also minute hairs between veins abaxially. Sori orbicular, medial or supramedial; indusia shortly hairy. Sporangia bearing orange to golden clavate glands on stalks. Spores with medium-sized to long fimbriate wings.

Wet places in forests, semi-open forest margins; 200–1500 m. Guangxi, S Yunnan [India, Laos, Myanmar, N Thailand].

The type of Cyclotis grandissimus Ching & K. H. Shing (FRPS 4(1): 342. 1999), not (Mettenius ex Kuhn) Alston (1956), has features inter-mEDIATE BETWEEN Cyclotis subelata AND Cyclotis dentata. ONLY ONE GATHERING (THE TYPE) WITH MOSTLY STERILE SORI HAS BEEN COLLECTED. THIS TAXON MIGHT BE A HYBRID.


溪边蕨属 xi bian jue shu

Lin Youxing (林尤兴); Kunio Iwatsuki

Plants medium-sized, on soil. Rhizomes short, erect or ascending, with dense unicellular or multicellular long hairs and sparse brown setaceous lanceolate scales. Fronds clustered; stipes dark brown, bases scaly and with grayish white unicellular or multi-separated acicular long hairs; laminae oblong-lanceolate or broadly lanceolate, not narrowed to bases or slightly so, 1-pinnate, pin-natifid-acuminate at apices; pinnae ca. 10 pairs, spreading, sessile or very shortly stalked on proximal several pairs, distal ones ± adnate to rachises, lanceolate or ovate-lanceolate, rounded-cuneate or truncate at bases, subopposite, undulate or crenate along margins, or lobed to 1/3 of distance to costule, shortly acute or rounded-obtuse at apices, sometimes acuminate, both surfaces ± with hairs, costae obviously raised abaxially, grooved adaxially, with dense acicular hairs. Veins goniopteroid, 3–5 pairs of veinlets per
segment, proximal 1–3(–5) pairs joining to form triangular areoles, proximal pair arising above bases of costules, distally veins all reaching margin above sinuses. Laminae herbaceous, dark brown-green when dry, abaxially with grayish white acicular hairs, adaxially sparsely setaceous; usually with multicellular long hairs and short hairs along rachises. Sori linear, attached along veins, exindusiate or sometimes indusiate; sporangia bearing short hairs, sometimes glabrous; spores bilateral, elliptic, sharply echinate.

More than ten species: SW China, India, Malesia, Myanmar, Vietnam; six species (five endemic) in China.


屏边溪边蕨 ping bian xi bian jue

Cyclosorus dictyoclinoides (Ching) C. M. Kuo; Thelypteris dictyoclinoides (Ching) C. M. Kuo.

Plants ca. 50 cm tall. Rhizomes short and thick, ascending, almost scaly. Fronds clustered; stipes 15–23 cm, dark stramineous, glabrous on bases, throughout with spreading grayish white acicular hairs and short hairs; laminae broadly lanceolate, 15–25 × 7–10 cm, 1-pinnate, pinnatifid-acuminate at apices; pinnae 7 or 8 pairs, spreading, 1 or 2 pairs free, sessile, slightly shortened, distal ones adnate to rachises and connected by narrow apical ones connected by broad wings; proximal pinnae oblong-lanceolate, 3–4 × ca. 1.5 cm, bases truncate or rounded-cuneate, symmetrical, margins crenate, apices shortly acute, proximal 3 or 4 pairs of pinnae shortened and reflexed; endemic to Yunnan (Gongshan) ................. 4. S. latipinna

2. Stegnogramma xingwenensis

S. xingwenensis

Plants ca. 50 cm tall. Rhizomes short and thick, ascending, almost scaly. Fronds clustered; stipes 14–20 cm, dark stramineous, with scales and throughout with mixed grayish white different-sized acicular hairs; laminae lanceolate, 30–40 × ca. 10 cm, slightly narrowed to bases, 1-pinnate, pinnatifid-acuminate at apices; pinnae 10–14 pairs, alternate, obliquely spreading, almost sessile, except for proximal several pairs of pinnae slightly reduced others ± adnate to rachises; proximal pinnae slightly reduced, ovate-lanceolate, ca. 4 × 1.5 cm, bases rounded-cuneate, not symmetrical, apices shortly acute; middle pinnae lanceolate, ca. 6 × 1.8 cm, bases rounded-cuneate, margins pinnately lobed, apices acuminate; costae raised on both sides. Veins evident, veins obliquely spreading, 1 or 2 veins joining into 2 or 3 triangular or subrhomboid areoles. Laminae grayish green when dry, herbaceous, both surfaces with dense appressed setae along veins, with sparse short hairs abaxially, glabrous adaxially. Sori linear, attached along veins, exindusiate; sporangia glabrous.

● Forests at roadsides; ca. 1300 m. Sichuan (Xingwen).


贯众叶溪边蕨 guan zhong ye xi bian jue

Dryopteris stegnogramme (Blume) C. Christensen var. cyrtomioides C. Christensen, Acta Horti Gothob. 1: 56. 1924.

Plants 28–50 cm tall. Rhizomes short and erect, with dense hairy brown narrowly lanceolate scales and multicellular acicular long hairs. Fronds clustered; stipes 8–25 cm, stramineous, with sparse scales on bases, throughout with dense grayish white multicellular long acicular hairs when young, hairs gradually fallen when old; laminae lanceolate, 15–25 × 4–8 cm, not narrowed to bases, 1-pinnate, pinnatifid-acuminate at apices; pinnae 8–10 pairs, alternate, spreading, proximal pair slightly shortened, proximal 3 or 4 pairs free, sessile, distal ones ± adnate to rachises; middle pinnae ovate-oblong, 2–3.5 × ca.
1.5 cm, bases broader, rounded-truncate, symmetrical, margins subentire or slightly undulate, apices shortly acute. Veins evident, 2 or 3 pairs of veinlets between veinlets, proximal pair joining, sometimes an excurrent veinlet arising at this union and connected to an acroscopic veinlet of second pair, forming a triangular plus a rhomboidal areole. Laminae yellow-green, herbaceous or papery, abaxial surface on intercostal areas shortly hairy, adaxially setaceous along margins and apices; along abaxial side of rachises with dense multicellular long acicular hairs, shortly hairy along abaxial sides of costae and veins, setaceous adaxially. Sori linear, attached along veinlets, exindusiuate, remaining clustered and with erect short hairs at attached places of sori after fallen; sori with 2 or 3 short hairs.

- Scrub; 600–1500 m. Guizhou, Sichuan.


阔羽溪边蕨 kuo yu xi bian jue

Plants ca. 70 cm tall. Rhizomes short, erect, including stipe bases with dense setaceous brown lanceolate scales and spreading multicellular grayish white acicular long hairs. Fronds clustered; stipes 20–24 cm, dark stramineous, sparsely setaceous at bases; laminae 30–35 × 10–13 cm, slightly narrowed to bases, 1-pinnate, pinnatifid-acuminate at apices; pinnae 10–12 pairs, alternate, spreading, sessile, proximal ones free from rachises, distal ones ± adnate to rachises and completely combined near apical part; middle pinnae broadly lanceolate, ca. 7 × 2.2 cm, bases round-torundate and slightly broadened, not symmetrical, lobed to 1/4 of distance to costule, apices shortly acuminate; segments ovate-triangular, ca. 4 × 4 mm, entire, obtuse-rounded at apices. Veins evident, 4 or 5 pairs of veinlets per segment, proximal 2 pairs (sometimes 1.5 pairs) joining by their ends, veinlets of proximal pair arising far above base of costules. Laminae dark green when dry, herbaceous, abaxial surface with acicular hairs along rachises, costae, veins, and intercostal areas, adaxially with dense setae along rachises, costae, and veins, sparsely setaceous along margins, glabrous on intercostal areas. Sori linear, attached along veinlets, exindusiuate; sporangia each with 3 or 4 erect acicular hairs near apices.

- Streamsides in forests; 2300–2500 m. NW Yunnan (Gongshan).


缙云溪边蕨 jin yun xi bian jue

Plants ca. 60 cm tall. Rhizomes strong, suberect, with dark brown shortly hairy lanceolate scales and few multicellular translucent acicular hairs at apices. Fronds clustered; stipes 25–30 cm, dark stramineous on proximal part and sparsely scaly, distally stramineous, throughout shortly setaceous; laminae oblong-lanceolate, 25–34 × 10–12 cm, almost or slightly narrowed to bases, 1-pinnate, pinnatifid-acuminate at apices; pinnae 10–14 pairs (proximal 5 or 6 pairs free from rachises), subopposite, sessile, spreading, proximal pair slightly shortened (ca. 4.5 cm), above one lanceolate, 5–6 × ca. 1.5 cm, bases rounded-cuneate and slightly narrowed, sessile, distal ones of similar shape, but ± adnate to rachises at bases, distal ones gradually reduced and completely adnate to rachises at bases, entire or slightly undulate. Veins evident, veinlets oblique distally, veinlets ca. 3 pairs, bent, proximal 2 pairs (sometimes 1.5 pairs) joining by their ends, proximal pair arising far above base of costules. Laminae greenish when dry, somewhat papery, abaxially with sparse short hairs on laminae, adaxially glabrous, setaceous along margins, with unicellular long setae along abaxial side of rachises, shortly setaceous along costae and veins, with dense appressed setae along adaxial side of costae, sparsely setaceous along veins. Sori linear, attached along veinlets; indusia shortly setaceous near apices of sporangia.

- Beneath bamboo on sunny slopes. Chongqing (Beibei, Jinyun Shan).


金佛山溪边蕨 jin fo shan xi bian jue

Plants 35–40 cm tall. Rhizomes short and ascending, including stipe bases with dense multicellular acicular hairs and hairy reddish brown lanceolate scales. Fronds clustered; stipes 10–20 cm, grayish brown, with sparse scales and spreading multicellular acicular hairs mixed with unicellular setae on proximal part; laminae lanceolate, 18–27 × 5.2–7 cm, not or slightly narrowed to bases, 1-pinnate, pinnatifid-acuminate at apices; pinnae 8–12 pairs, alternate, obliquely spreading, sessile, proximal 3 or 4 pairs free, distal ones ± adnate to rachises; middle pinnae broadly lanceolate, 4–5 × ca. 1.6 cm, bases broadened, subtruncate, symmetrical, margins crenate or pinna-tilate, apices acute or obtuse. Veins evident, veinlets 3 or 4 pairs, proximal 1.5 pairs joining by their ends, proximal pair arising from far above base of costules. Laminae grayish green or greenish when dry, thinly papery, abaxially with short acicular hairs on intercostal areas, adaxially usually shortly hairy on intercostal areas, with unicellular long setae along both sides of rachises, shortly hairy along costae and veins, with dense appressed setae along adaxial side of costae and sparsely setaceous along veins. Sori linear, attached along veinlets, usually confluent at apices, exindusiuate, with remaining glandlike material at attachment of sori; sporangia setaceous near apices.

- Shaded thickets at foot of limestone mountains; ca. 2500 m. Chongqing, Sichuan, Yunnan.


星毛蕨属 xing mao jue shu

Lin Youxing (林尤兴); Kunio Iwatsuki

Plants trailing, in soil. Rhizomes long creeping, stipe bases with sparse hairy dark brown scales. Fronds clustered or approximate; stipes subglabrous; laminae lanceolate; rachises usually prolonged, whiplike and rooting on soil and forming a new plant, 1-
pinnate; pinnae ca. 30 pairs; pinna axils often with gemmae producing a 1-pinnate small lamina. Veins evident, veinlets obliquely spreading and joining by their ends, a tortuous excurrent veinlet connected with veinlets of every pair to marginal sinus and forming a line of oblique square areoles. Laminae papery, greenish or dark brown-green, with forked or simple short hairs along both sides of rachises and intercostal areas, glabrous when old. Sori suborbicular or oblong, exindusiate. Sporangia glabrous. Spores elliptic, monolete, perispore thin and translucent, minutely reticulate and with small spines.

One species: tropical and subtropical regions of the Old World.


星毛蕨 ？

*Hemionitis prolifera* Retz., Observ. Bot. 6: 36. 1791; *Abacopteris prolifera* (Retzius) W. C. Shieh; *Ampelopteris elegans* Kunze; *Aspidium proliferum* (Retzius) Hieronymus (1895), not R. Brown (1810); *Cyclosorus prolifer* (Retzius) Tardieu & C. Christensen; *Dryopteris prolifera* (Retzius) C. Christensen; *Goniopteris prolifera* (Retzius) C. Presl; *Meniscium proliferum* (Retzius) Swartz; *Phegopteris luxurians* (Kunze) Mettenius; *P. prolifera* (Retzius) Kuhn (1879), not (Kaulfuss) Mettenius (1856); *Polypodium luxurians* Kunze; *P. proliferum* (Retzius) Hooker (1864), not Kaulfuss (1824); *Thelypteris prolifera* (Retzius) C. F. Reed.

Plants ca. 1 m tall. Stipe bases with sparse dark brown stellate-hairy lanceolate scales. Stipes stramineous, firm, ca. 40 cm; laminae lanceolate, bases slightly narrowed; pinnae spreading, subopposite, subsessile, lanceolate, 5–10(–15) × ca. 2 cm, bases rounded-truncate, margins undulate, apices shortly pointed. Sori attached on middle of veinlets, usually confluent when mature. n = 36.

On sandy floodplains by streams in sunny areas; 100–1000 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, Jiangxi, Sichuan, Taiwan, Yunnan [tropical and subtropical regions of the world except the Americas].

The young fronds are eaten as a vegetable.


新月蕨属 ？

Lin Youxing (林尤兴); Kunio Iwatsuki

*Abacopteris* Fée.

Plants, medium-sized, in soil. Rhizomes long creeping, or short and decumbent, with sparse usually hairy brown scales. Fronds remote or approximate; stipes glabrous except at bases, but often (particularly when young) ± with unicellular acicular hairs; laminae usually 1-imparipinnate, sometimes simple or ternate; pinnae large, usually 3–10(–15) pairs, terminal pinna free, of similar shape as lateral ones, proximal pair not or slightly shortened, lanceolate, bases rounded or cuneate, subsessile or shortly stalked, not adnate to rachises, margins entire or thickly serrate, apices acuminata; costae evident, veinlets mostly obliquely spreading; venation meniscioid, i.e., veinlets joining into oblique square areoles between veinlets, an excurrent veinlet arising from joining point of every pair of veinlets continuous or interrupted and with hydathodes at apices. Laminae herbaceous or papery, sometimes somewhat leathery, green or dark brown when dry, often reddish (at least abaxially along rachises, costae and veinlets), usually ± with acicular and hooked hairs (at least abaxially along rachises and costae), abaxially usually foveolate on intercostal areas. Sori orbicular, in 2 lines between veinlets, one per veinlet, if attached on distal part of veinlets then usually confluent when mature, rarely spreading throughout abaxial surface of pinnae, exindusiate or indusiate, hairy or glabrous; sporangia glabrous or with acicular hairs. Spores bilateral, reniform, perispore transparent or translucent, perispore ridged corrugate, verrucate, or echinate. x = 36.

Sixty-one species: tropical and subtropical regions of Asia; 18 species (eight endemic) in China.


1a. Plants with hooked hairs throughout.

2a. Laminae simple, strongly dimorphic, sterile laminae cordate or hastate (i.e., occasionally with one pair of small auricles proximally), sori spreading throughout abaxially on mature laminae .......................................................... 1. *P. simplex*

2b. Laminae ternate or pinnate (occasionally with one pair of small auricles proximally), sori arranged in lines when mature.

3a. Laminae ternate (sometimes with 2 pairs of lateral pinnae), green when dry ........................................... 2. *P. triphyllum*

3b. Laminae pinnate and with multiple pairs of lateral pinnae, green or reddish when dry.

4a. Rhizomes short and decumbent; fronds approximate, pinnae distally usually with axillary buds in their axes .......................................................... 3. *P. caspidatum*

4b. Rhizomes long creeping; fronds remote, pinnae distally lacking buds in their axes.

5a. Proximal pinnae obviously reduced; pinna apices abruptly narrowed into a long tail 2–4 cm .... 4. *P. megacuspe*

5b. Proximal pinnae usually largest; pinna apices not narrowed or caudate.

6a. Apical pinnae lobed throughout .......................................................... 5. *P. insularis*
6b. Apical pinnae entire (at most crenate along margins).
7a. Laminae oblong to ovate-rounded, lateral pinnae smaller than ca. 9 × 2 cm .......... 6. P. longipetiolatum
7b. Laminae triangular, lateral pinnae ca. 15 × 3 cm, proximal pair of pinnae largest .......... 7. P. parishii

1b. Plants without hooked hairs on every part.
8a. Sori exindusiate or with very small indusia.
9a. Laminae normally greenish when dry; pinnae linear-lanceolate, margins regularly and sharply serrate, pinna lobes triangular ................................................................. 8. P. penangianum
9b. Laminae ± purplish red when dry; pinnae ovate-lanceolate, margins entire or slightly undulate.
10a. Pinnae narrowly ovate, broadest at bases and rounded-cuneate; laminae completely glabrous on both surfaces; sori ovate and confluent when mature; Xizang .................................................. 9. P. medogensis
10b. Pinnae lanceolate, broadest at middle, costae and veins with short hairs; sori orbicular and not confluent when mature; throughout China.
11a. Laminae abaxially with only sparse short hairs along racines and costae, elsewhere glabrous; sori with small indusia ........................................................................... 10. P. lakhimpurense
11b. Laminae abaxially with acicular hairs along racines, costae, veins, and intercostal areas; sori exindusiate ........................................... 11. P. hirsutum

8b. Sori obviously indusiate.
12a. Pinnae broadly linear-lanceolate, bases not or slightly narrowed, margins regularly serrate.
13a. Sporangia glabrous; indusia occasionally with one or two short hairs .............................. 12. P. nudatum
13b. Sporangia and indusia all with hairs.
14a. Stipes throughout with acicular setae, laminae abaxially with dense acicular long hairs along costae, veins, and on intercostal areas ............................................................ 13. P. setosum
14b. Stipes glabrous, laminae abaxially with only sparse hairs along costae and veins ............... 14. P. yunguiensis

12b. Pinnae ovate-lanceolate or falcate, bases cuneate, margins entire or irregularly undulate-crenate.
15a. Rhizomes short and decumbent; plants smaller; lateral pinnae 2 or 3 pairs, pinnae ca. 7 × 2–2.5 cm ............................................................... 15. P. gracilis
15b. Rhizomes long creeping; plants much larger; lateral pinnae more than 4 pairs, more than ca. 15 × 3 cm.
16a. Laminae abaxially with sparse short hairs along costae and veins .............................. 16. P. gymnopteridifrons
16b. Laminae abaxially with dense long hairs along costae, veins, and intercostal areas.
17a. Pinnae ovate-lanceolate, bases rounded-cuneate; laminae not foveolate on intercostal areas, with unicellular acicular hairs; sori attached on middle of veinlets, not confluent when mature ......................................................... 17. P. macrophyllum
17b. Pinnae obl-long-lanceolate, bases cuneate; laminae obviously foveolate abaxially on intercostal areas, with dense multicellular articulate long hairs; sori attached on distal part of veinlets and confluent when mature ......................................................... 18. P. hekouensis


单叶新月蕨 dan ye xin yue jue

Meniscium simplex Hooker, London J. Bot. 1: 294. 1842; Abacopteris simplex (Hooker) Ching; Aspidium simplex (Hooker) Hance; Asplenium simplex (Hooker) Hance; Cyclosorus simplex (Hooker) Copeland; Dryopteris simplex (Hooker) C. Christensen; Nephrodium simplex (Hooker) Diels; Phegopteris simplex (Hooker) Mettenius; Polypodium simplex (Hooker) E. J. Lowe (1858), not N. L. Burman (1768), nor Swartz (1801); Thelypteris simplex (Hooker) K. Iwatsuki.

Plants 30–40 cm tall. Rhizomes long creeping, with sparse, dark brown lanceolate scales and hooked hairs at apices. Fronds remote, simple, dimorphic; sterile stipes 14–18 cm, stramineous, occasionally with 1 or 2 scales at bases, distally with dense hooked short hairs, sometimes with acicular long hairs; laminae elliptic-lanceolate, 15–20 × 4–5 cm, entire or undulate. Veins visible, oblique distally, parallel to each other, one subrectangular areole between veinlets, above with 2 lines of subsquare areoles. Laminae papery when dry, with hooked short hairs on both surfaces, denser hairs along racines and veins sometimes with long acicular hairs. Fertile fronds much taller than sterile ones; stipes 30–35 cm; laminae lanceolate, 5–10 × 8–15 cm, entire, bases cordate, apices long acuminate; veins and hairs same as those on sterile fronds. Sori attached on veinlets, orbicular when young, exindusiate, spreading throughout abaxial surface of pinnae when mature.

Forests by streams, forests in valleys; sea level to 1500 m. Fujian, Guangdong, Hainan, Taiwan, SE Yunnan [Japan, Vietnam].

The correct position of Abacopteris simplex var. trifoliata Ching (Bull. Fan Mem. Inst. Biol., Bot. 10: 10. 1946; Cyclosorus simplex var. trifoliata (Ching) T. J. Liu; Thelypteris simplex var. trifoliata (Ching) C. F. Reed), described from Fujian, is not known.


三羽新月蕨 san yu xin yue jue

Meniscium triphyllum Swartz in Schrader, J. Bot. 1800(2): 16. 1801; Abacopteris triphylla (Swartz) Ching; Cyclosorus
**Pronephrium cuspida** (Blume) Holttum, Blumea 20: 123. 1972.

1. **Meniscium cuspidatum** (Blume) Decaisne, Enum. Pl. Javae 2: 114. 1828; *Abacopteris cuspida* (Blume) Ching; *C. liukiuensis* (Christ ex Matsumura) Tagawa; *Cyclosorus cuspidatus* (Blume) Copeland; *C. liukiuensis* (Christ ex Matsumura) Masumune; *Dryopteris cuspida* (Blume) Christ; *D. liukiuensis* (Christ ex Matsumura) C. Christensen; *M. liukiuensis* Christ ex Matsumura; *Nephrodium clavivenum* Yabe ex Matsumura & Hayata; *Phegopteris cuspida* (Blume) Mettenius; *Thelypteris liukiensis* (Christ ex Matsumura) K. Iwatsuki.

Plants ca. 1 m tall. Rhizomes short and decumbent, with dark brown scales; scales lanceolate, sparsely shortly hairy. Fronds approximate; stipes 15–35 cm, with dark brown scales and hooked hairs, distally glabrous; laminae ovate, 25–30 cm, 1-imparipinnate; lateral pinnae 2–4 pairs, oblanceolate, 8–14 × 2–3.5 cm, cuneate or narrowly rounded at bases, shortly stalked, usually with a gemma in axil, entire or undulate-cuneate at margins, caudate-acuminate at apices; terminal pinnae larger than lateral ones. Laminae papery when dry, brown and tinged scarlet. Veinlets obvious, 6–8 pairs regularly joining into areoles, excurrent veinlets usually not reaching next pair of joined veins. Sori orbicular or elongate, attached on middle of veinlets, usually confluent and spreading throughout pinna surface, exindusiate.

**Dense forests on low mountains. Taiwan [Japan, Malaysia; Pacific islands (Solomon Islands)].**

Knapp (Ferns Fern Allies Taiwan, 444. 2011) does not treat *Cyclosorus cuspidatus* and *C. liukiuensis* as conspecific, accepting only *C. liukiuensis* for Taiwan. *Dryopteris cuspida* var. *epigea* Copeland (Philipp. J. Sci. 3: 278. 1908), described from Guangdong (Tai Mo Shan), may belong here.


**Polypodium megacuspe** Baker, J. Bot. 28: 266. 1890; *Abacopteris sampsonii* (Baker) Ching; *P. sampsonii* Baker; *Pronephrium sampsonii* (Baker) Ching ex K. H. Shing.

Plants 50–70 cm tall. Rhizomes creeping, blackish brown, with dense hooked hairs and hairy brown lanceolate scales. Fronds remote; stipes 25–35 cm, stramineous, sparsely hairy at bases, distally sparsely setaceous; laminae oblong, 25–35 × ca. 30 cm, slightly narrowed to bases, 1-imparipinnate, cuneate or narrowly rounded at bases, distally sparsely setaceous; laminae oblong-lanceolate, 12–14 × ca. 2.5 cm, cuneate at bases, entire or undulate, caudate-acuminate at apices; terminal pinnae of similar shape as lateral ones, but very large, stalk 2–4 mm. Veins evident, veinlets oblique distally and parallel, veinlets sub-oblquely spreading and forming triangular areoles at bases between veinlets, distally forming a line of V-shaped areoles, with an expanded hydathode at excurrent vein arising from joining point. Laminae papery when dry, reddish, abaxial surface with more hooked hairs along and short hairs when young, fallen when old and with few remaining on rachises and veins only. Sori attached above middle of veinlets and confluent when mature and forming a horizontal, equidistant row between veinlets, exindusiate; sporangia bearing hairs when young.

**Dense forests, along streams, wetlands; 100–400 m. Guangdong, Guangxi, Jiangxi, S Taiwan, Yunnan [Japan, Thailand, Vietnam].**


**岛生新月蕨** dao sheng xin yue jue


Rhizomes long creeping, with dense hooked hairs and sparsely hairy triangular-lanceolate scales. Fronds remote; stipes 10–15 cm, with linear-lanceolate scales at bases; laminae triangular or ovate, 20–35 × 15–25 cm, terminal pinna very large, linear-lanceolate, bases pinnatifid; lateral pinnae 4–7 pairs, lanceolate, bases rounded-obtuse, not symmetrical, apices acu-
minate; proximal pinnae stalked. Sori orbicular, well separated, attached on middle of veinlets, exindusiate.

Forests; ca. 1000 m. E Taiwan [Japan].


長柄新月蕨 chang bing xin yue jue


Plants 30–50 cm tall. Rhizomes long and decumbent, with dense hooked hairs and scales; scales narrowly triangular-lanceolate, sparsely hairy on surface and margins, acuminate at apices. Fronds remote; stipes 10–30 cm, stramineous, with hooked hairs, bases slightly scaly; laminae subdimorphic, oblong to ovate-oblong, 15–20 × 9–14 cm, imparipinnate; terminal pinna very large; lateral pinnae 2–4 pairs, oblong to lanceolate, 5–9 × 1.5–2 cm, bases rounded-cuneate, obviously shortly stalked, margins entire or irregularly undulate, apices acuminate to shortly caudate-acuminate; terminal pinna oblong-lanceolate, 9–13 × 2.5–4 cm, usually not symmetrical, long stalked, shortly caudate-acuminate at apices; rachises and costae with sparse hooked hairs on both sides. Veinlets not obviously raised abaxially and slightly oblique distally, veinlets forming areoles and spreading an excurrent veinlet from joining point. Sori attached on middle of veinlets, confluent when mature, exindusiate, hooked-hairy on sporangia.

- Forests; 200–500 m. S and SE Taiwan.


羽叶新月蕨 ye ye xin yue jue

Meniscium parishii Beddome, Ferns Brit. Ind. t. 184. 1866; Abacopteris triphylla (Swartz) Ching var. parishii (Beddome) Ching; Cyclosorus parishii (Beddome) Tardieu; M. triphyllum Swartz var. parishii (Beddome) Beddome; Pronephrium triphyllum (Swartz) Holttum var. parishii (Beddome) Nakaike; Theleyteris triphylla (Swartz) K. Iwatsuki var. parishii (Beddome) K. Iwatsuki.

Plants 30–50 cm tall. Rhizomes long creeping, blackish brown, with dense white hooked short hairs and brown hairy lanceolate scales. Fronds monomorphic or dimorphic; stipes 10–40 cm, dark stramineous, with sparse scales and throughout with dense hooked hairs; laminae oblong-triangular, 25–30 × 10–15 cm, long acuminate at apices; lateral pinnae 2–5 pairs (fertile laminae sometimes ternate), oblique distally, sub- or oblong-lanceolate; proximal pair of pinnae longest, 6–15 × 2–3 cm, stalk 1–2 mm, rounded or rounded-cuneate at base, entire, shortly acuminate at apices; distal pinnae adnate to rachises and decurrent; terminal pinna ca. 20 × 3–4 cm, margins undulate, usually with 1 or 2 free small auricles at bases, acuminate at apices. Veins evident abaxially, veinlets obliquely spreading and parallel, in middle of lateral pinnae usually 8 or 9 pairs, oblique or spreading, veinlet pairs joining by theirs ends and forming triangular areoles, an excurrent veinlet arising from joining point connected with veinlets of others forming subsquare areoles. Laminae firmly papery, adaxially glabrous except for dense hooked hairs in costal grooves, abaxially with hooked hairs along costae and veinlets and also with scattered hooked hairs on intercostal areas. Sori attached on veinlets, orbicular when young, becoming narrowly ovate and confluent, exindusiate; sporangia each with 2 hooked hairs.

Forests; 200–500 m. Taiwan [S India, Japan, Malaysia, Myanmar, Sri Lanka].


披针新月蕨 pi zhen xin yue jue

Polypodium penangianum Hooker, Sp. Fil. 5: 13. 1863 ["penangianum"]; Abacopteris penangiana (Hooker) Ching; Aspidium porphyrophlebia Christ; A. rampans (Baker) Christ; Christella porphyrophlebia (Christ) H. Léveillé; Dryopteris porphyrophlebia (Christ) C. Christensen; D. rampans (Baker) C. Christensen; Goniopteris penangiana (Hooker) Beddome; Neoplophorus rampans Baker; Theleyteris penangiana (Hooker) C. F. Reed; T. porphyrophlebia (Christ) C. F. Reed; T. rampans (Baker) C. F. Reed.

Plants 1–2 m tall. Rhizomes long creeping, dark brown, ca. 1.2 cm in diam., occasionally with 1 or 2 brown lanceolate scales. Fronds remote; stipes ca. 1 m, dark brown, distally reddish brown, glabrous; laminae oblong-lanceolate, 40–80 × 25–40 cm, 1-imparipinnate; lateral pinnae 10–15 pairs, obliquely spreading, alternate, stalked, broadly linear, pinnae from proximal middle part 20–30 × 2–2.7 cm, broadly cuneate at bases, sharply cartilaginous-serrate or teethlike along margins, acuminate at apices; pinnae distally slightly shortened; terminal pinna of similar shape and size as lateral pinnae, stalks ca. 1 cm. Veinlets evident abaxially, spreading and parallel to each other, 9 or 10 pairs, joining by theirs ends and forming triangular areoles between veinlets, an excurrent veinlet arising from joining point connected with more distal veinlets (sometimes interrupted) and forming 2 rows of elongated square areoles, distal 2 or 3 pairs of veinlets free and reaching margins. Laminae papery when dry, dark brown or reddish brown, glabrous throughout. Sori orbicular, attached on middle or proximal middle of veinlets and in 2 rows between veinlets, 6 or 7 per row, exindusiate.

Sparse forests, shaded streamsides; 900–3600 m. Guangdong, Guangxi, Guizhou, S Henan, Hubei, Hunan, Jiangxi, Sichuan, Zhejiang [Bhutan, India, Kashmir, Nepal, Pakistan].

Pronephrium penangianum is used as a medicinal herb at Emei Shan, Sichuan. The fronds are used in traditional Chinese medicine for irregular menstruation.

3.5 cm, broadest at bases and subrounded, long caudate-acuminate at apices, sessile; terminal pinna of similar shape as proximal ones. Veins visible adaxially, raised abaxially, costae prominent; lateral veinlets subobliquely spreading and parallel to each other, neighboring ones joining with each other into V-shaped areoles, excurrent veins very short. Laminae somewhat leathery when dry, reddish, rachises, costae, and intercostal areas glabrous throughout. Sori orbicular, attached above middle of veinlets and confluent when mature, exindusiate.

- Monsoon forests; ca. 700 m. Xizang (Beibeng, Mèdog).


红色新月蕨  hong se xin yue jue

Dryopteris lakhimpurensis Rosenstock, Meded. Rijks-Herb. 31: 7. 1917; Abacopteris rubra (Ching) Ching: Cyclosorus rubras (Ching) Tardieu ex Tardieu & C. Christensen; D. rubra Ching; Meniscium cuspisatum Blume var. longifrons Walllich ex C. B. Clarke; Polypodium uphylhum Walllich ex Hooker & Baker var. khasianum C. B. Clarke; Thelypteris lakhimpurensis (Rosenstock) K. Iwatsuki; T. rubra (Ching) K. Iwatsuki.

Plants ca. 1.5 m tall. Rhizomes long creeping. Fronds remote; stipes 80–90 cm, occasionally with 1 or 2 scales at bases, dark stramineous; laminae oblong-lanceolate or ovate-oblong, 60–85 cm, 1-imparsipinnate, acuminate at apices; lateral pinnae 8–12 pairs, subobliquely spreading, pinnae on proximal to middle part broadly lanceolate, 24–32 × 4–6 cm, stalk ca. 2 mm, somewhat rounded at bases, entire or undulate, shortly caudate-pointed at apices; terminal pinna of similar shape as proximal ones, stalk 1.5–2 cm. Veins slender, evident abaxially, veinlets subobliquely spreading and parallel to each other, veinlets 13–17 pairs, subobliquely spreading, proximal pairs joined to form triangular areoles, distally every pair of veinlets connected with excurrent veinlet forming 2 rows of rhomboid areoles, excurrent veinlets reaching or near joining point of above pair of veinlets. Laminae thinly papyry or herbaceous, dark brown, glabrous on both surfaces, occasionally with 1 or 2 occasional setae along veins, also along both sides of rachises and costae, and veins with sparse short hairs. Sori orbicular, attached on middle or above middle part of veinlets, not confluent when mature, exindusiate.

- Gregarious on shaded wet precipitous slopes, wetlands by rivers, marshlands. Chongqing, Fujian, Guangdong, Guizhou, Yunnan.


大羽新月蕨 da yu xin yue jue

Polypodium nudatum Roxburgh, Calcutta J. Nat. Hist. 4: 491. 1844; Abacopteris multilineta (Wallich ex Hooker) Ching: Aspidium moulineense (Beddome) Christ; A. multilineatum (Wallich ex Hooker) Christ (1897), not Mettenius (1858); Christella moulineense (Beddome) H. Léveillé; Cyclosorus moulineense (Beddome) Tardieu & C. Christensen; C. multilineata (Wallich ex Hooker) Tardieu & C. Christensen; Dryopteris moulineense (Beddome) C. Christensen; Goiophteris lineata (Colebrook ex Hooker) Beddome; G. multilineata (Wallich ex Hooker) Beddome; Nephrodium moulineense Beddome; N. multilineatum (Wallich ex Hooker) Beddome; Phegopteris lineata (Colebrook ex Hooker) Mettenius; P. multilineata (Wallich ex Hooker) Luerssen; Polypodium lineatum Colebrook ex Hooker; P. multilineatum Walllich ex Hooker; Thelypteris multilineata (Wallich ex Hooker) C. V. Morton; T. nudata (Roxburgh) C. V. Morton.

Plants to 2.5 m tall. Rhizomes strong, creeping, woody, dark brown, with sparse broadly lanceolate scales. Fronds remote; stipes 50–80(–140) cm, bases with brown scales, distally glabrous, dark brown, distally brownish; laminae broadly ovate-oblong, 60–90 × 26–40(–60) cm, 1-imparsipinnate; lateral pinnae 8–14(–16) pairs, obliquely spreading, alternate, subsessile, pinnae on low and middle parts broadly linear-lanceolate, 26–30(–35) × 3–4(–5) cm, bases somewhat rounded or cuneate, margins regularly shortly and sharply serrate, apices long acuminate; distal pinnae slightly shortened; terminal pinna of similar shape as middle ones, slightly shorter, bases with both sides not symmetrical, stalk ca. 1 cm. Veins evident, veinlets raised on both sides, spreading or obliquely spreading and parallel to each other, veinlets obliquely spreading distally, raised abaxially and forming triangular areoles between veinlets, distally forming juxtaposed rhomboid areoles. Laminae herbaceous when dry, green or greyish green, abaxial surface with sparse short setae along veins, also along both sides of rachises and costae, abaxial surface foveolate on intercostal areas. Sori
orbicular, attached on middle of veinlets, arranged in 2 rows between costules; indusia small, shortly hairy adaxially. Sporangia glabrous.

Shaded sparse forests on slopes; 100–1600 m. Guizhou, Xizang, Yunnan [Bhutan, N India, Indonesia, Myanmar, Nepal, Philippines, Vietnam].

“Polypodium lineatum Colebrook ex Wallich” (Numer. List, no. 300. 1829, nom. nud.) and “Goniopusites lineata C. Presl” (Tent. Pterid. 183. 1836, nom. nud.) belong here. The taxon was validated by Hooker in 1864 as P. lineatum. Beddome named the taxon Neophyton moulmeinense because of the blocking name N. lineatum (Blume) Beddome.


刚毛新月蕨  gang mao xin yue jue

Plants 50–100 cm or taller. Rhizomes creeping, ca. 1 cm in diam., with dense lanceolate brown scales. Fronds remote; stipes 30–100 cm, woody, dark stramineous, bases with dark brown lanceolate scales, throughout with acicular setae; laminae elliptic, 50–80 × 30–60 cm, 1-imparipinnate; lateral pinnae 8–11 pairs, subobliquely spreading, alternate, proximal pair slightly reduced; middle ones narrowly ovate, 15–40 × 3–3.5 cm, bases rounded-cuneate, shortly stalked, margins regularly serrate, apices acuminate; terminal pinna of similar shape and size as lateral ones, long stalked. Veins evident, costae grooved adaxially, raised abaxially, veinlets raised on both sides, proximal pair of veinlets forming a triangular areole, distally every pair with excurrent veinlets joining into multipaired subrectangular areoles. Laminae papery when dry, yellowish brown, adaxially with dense appressed setae along costal grooves, occasionally with 1 or 2 setae along veinlets, elsewhere glabrous, abaxial surface with dense long acicular hairs along veins and intercostal areas. Sori orbicular, attached on middle of veinlets, with dense short hairs on indusia, also shortly hairy on sporangia.

- Dense forests; 500–1300 m. Yunnan.


云贵新月蕨  yun gui xin yue jue

Plants 70–150 cm tall. Rhizomes creeping, thick, ca. 1 cm in diam., with narrowly lanceolate scales. Fronds remote; stipes 40–100 cm, woody and glabrous; laminae ovate-lanceolate, 55–80 × 40–60 cm, 1-imparipinnate; lateral pinnae 8–16 pairs, proximal pair slightly reduced; middle pinnae narrowly ovate, 30–50 × 3.5–4.5 cm, bases rounded-cuneate, shortly stalked, margins regularly serrate, apices long caudate; terminal pinna larger than proximal ones, of similar shape, long stalked. Veins evident, raised abaxially, costae grooved adaxially. Laminae dark brown-green when dry, papery, adaxially with dense appressed setae along costal grooves, abaxial surface with very sparse short hairs along costae and veinlets, elsewhere glabrous, usually not foveolate on intercostal areas. Sori orbicular, attached on middle of veinlets; indusia and sporangia hairy.

- Sparse forests on slopes; 200–800 m. Guizhou, Yunnan.


小叶新月蕨  xiao ye xin yue jue

Plants 25–40 cm tall. Rhizomes short and decumbent, with sparse narrowly lanceolate brown scales. Fronds remote; stipes 20–30 cm, bases sparsely scaly, distally shortly setaceous, stramineous; laminae elliptic, 12–18 × 11–14 cm, 1-imparipinnate; lateral pinnae 2 or 3 pairs, alternate, slightly bent distally, subsessile, proximal pair not reduced, ovate-lanceolate, 7–8 × 2–2.5 cm, not symmetrical, bases cuneate, margins slightly unulate, apices acuminate or acute; terminal pinna very large, symmetrical, bases cuneate, long stalked, apices acuminate. Veins evident, raised abaxially, costae grooved adaxially, proximal pair of veinlets forming a triangular areole, distally every pair joining with an excurrent veinlet into square or rectangular or subhomboid areoles. Laminae dark brown-green when dry, papery, adaxially with dense appressed setae along costal grooves, veinlets and tissue between veins with sparse short hairs; abaxially veins with short hairs, mesophyll with long acicular hairs and foveolate. Sori orbicular, attached near ends of veinlets and often confluent, hairy on indusia and also on sporangia.

- Yunnan.


新月蕨  xin yue jue

Dryopteris gymnopteridifrons Hayata, Icon. Pl. Formosan. 8: 148. 1919; Abacopteris gymnopteridifrons (Hayata) Ching; Cyclosorus gymnopteridifrons (Hayata) C. M. Kuo; C. pustulosus Copeland; D. glandulosa C. Christensen; Polypodium trophyllosum Wallich ex Hooker & Baker var. uniseriale Hooker; Thelypteris gymnopteridifrons (Hayata) C. M. Kuo; T. pustulosa (Copeland) C. F. Reed.

Plants 80–120 cm tall. Rhizomes long creeping, with dense brown lanceolate scales. Fronds remote; stipes 28–80 cm, bases scaly, distally with dense short hairs, stramineous; laminae broadly ovate or ovate-oblong, 40–80 × 15–30 cm, 1-imparipinnate; lateral pinnae 3–8 pairs, rarely more, sessile, oblique distally, proximal pair shorter, subopposite, distal ones alternate; middle pinnae oblong-lanceolate, 15–30 × 3.5–5.5 cm, rounded-cuneate at bases, entire or serrate along margins, shortly caudate at apices; pinnae distally slightly smaller, terminal pinna of similar shape as middle ones, slightly larger, not symmetrical at bases and long stalked. Veins visible adaxially, obviously raised abaxially, costae grooved adaxially, veinlets parallel to each other, veinlets oblique distally, proximal pair joining into a triangular areole, distally every pair joining with an excurrent veinlet forming subsquare or rectangular areoles. Laminae greenish when dry, papery, adaxially with appressed short hairs along costal grooves, elsewhere glabrous, abaxially with sparse short hairs along veins, occasionally with 1 or 2 hairs and slightly foveolate on intercostal areas. Sori orbicular, attached on middle of veinlets and arranged in 2 rows between costules and not confluent; indusia small, shortly hairy, sporangia also hairy.

Dense forests by streams, sparse forests on slopes;
Plants medium-sized, terrestrial. Rhizomes short and erect or ascending, including stipe bases with sparse scales; scales lanceolate, dark brown, thick, margins setaceous. Fronds clustered; stipes grayish stramineous, with appressed setae; laminae oblong, ca. 90 × 40–50 cm, 1-imparipinnate; lateral pinnae 8–11 pairs, alternate, obliquely spreading, sessile, proximal pair slightly reduced; middle pinnae oblong-lanceolate, 25–35 × ca. 6 cm, broadly cuneate at bases, obviously crenate along margins, acumenate at apices; distal pinnae becoming smaller, terminal pinna of similar shape and size as middle ones, bases not symmetrical and long stalked. Veins visible adaxially, obviously raised abaxially, costae grooved adaxially, veinlets slightly raised, obliquely spreading and parallel, proximal pair of veinlets joining into triangular areoles, distally every pair joining with concurrent veinlet into subrectangular areoles. Laminae herbaceous when dry, green, greenish, or yellow-green, adaxially glabrous except for appressed setae along grooves of costae, elsewhere, abaxial surface with dense acicular long hairs along veins and also slightly foveolate on intercostal areas. Sori orbicular, attached on middle of veinlets; indusia and sporangia hairy.


Aspidium griffithii (T. Moore) Diels (1899), not (Baker) Beddome (1876); Cyclosorus griffithii (T. Moore) C. M. Kuo; Gymnogramma griffithii (T. Moore) Hance; Hemionitis griff.
thii (T. Moore) J. D. Hooker & Thomson; H. griffithii var. pinnata Hooker; Stegnogramma griffithii (T. Moore) K. Iwatsuki; Thelypteris griffithii (T. Moore) C. F. Reed.

Plants 40–70 cm tall. Rhizomes short and ascending, including stipe bases with sparse scales and dense acicular long setae; scales lanceolate, reddish brown, thick, ciliate along margins. Laminae narrowly elliptic, 20–35 × 12–19 cm, not narrowed to bases, imparipinnate, caudate at apices; lateral pinnae 2 or 3 pairs (sometimes 1 pair only), free, almost sessile, proximal pair not shortened and of similar shape and size as above ones, narrowly lanceolate, bent distally, 10–15 × 3–3.5 cm, bases rounded-cuneate or rounded, symmetrical, margins entire, apices acumenate; terminal pinnae ternate, bases cuneate or rounded-cuneate, stalk ca. 2 cm, one pair of lateral segment of similar shape as proximal pinnae, middle segment larger, entire, acuminate at apices. Costae straight, raised on both sides, with dense thick setae, veinlets evident, oblique distally and reaching margins, veinlets reticulate between veinlets; areoles in 2 or 3 rows, subtetragonal or oblique-square, rarely pentagonal, without included vein. Laminae papery when dry, dark brown, throughout with hairs, abaxial surface with acicular thick hairs along veins, adaxially sparsely setaceous. Sori scattered along reticulate veins; sporangia shortly stalked, each with 3 or 4 erect setae near annuli; spores elliptic, echinate.

Dense forests, shaded wet stream-sides; 600–1400 m. Fujian, Guangxi, Guizhou, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [N India, Japan, Myanmar, Vietnam].


闽浙圣蕨 min zhe sheng jue

Dictyocline griffithii T. Moore var. tenissima Ching.

Plants ca. 50 cm tall. Rhizomes short and ascending, with dense reddish brown setaceous lanceolate scales and grayish white acicular hairs. Fronds clustered; stipes ca. 20 cm, stramineous, with sparse acicular hairs, with 1 or 2 scales on bases; laminae narrowly oblong, 26–30 × 12–14 cm, not narrowed to bases, 1-pinnae, acuminate at apices; lateral pinnae 4–6 pairs, opposite, almost sessile, spreading, proximal pair not reduced, broadly lanceolate, 7–8 × ca. 2 cm, rounded at bases, entire or ± undulate, acuminate at apices; terminal pinna particularly large, bases decurrent, margins pinnatifid, apices acuminate; proximal segments of similar shape as lateral pinnae. Costae raised on both sides and with acicular hairs, veinlets evident, oblique distally, veinlets reticulate between veinlets, areoles in 2 rows, subtetragonal, without included veinlets. Laminae papery, grass-green when dry, abaxial surface with acicular setae along veins, adaxially glabrous or with 1 or 2 short sparse hairs along veins. Sori sparsely attached along veins.

- Shaded wet places in valleys or forests; 300–900 m. Fujian, Jiangxi, Zhejiang.

3. Dictyocline wilfordii (Hooker) J. Smith, Hist. Fil. 149. 1875.

羽裂圣蕨 yu lie sheng jue

Hemionitis wilfordii Hooker, Fil. Exot. t. 93. 1859; Dictyocline griffithii T. Moore var. pinnatifida Beddome; D. griffithii var. wilfordii (Hooker) T. Moore; H. griffithii (T. Moore) J. D. Hooker & Thomson var. pinnatifida Hooker; Stegnogramma griffithii (T. Moore) K. Iwatsuki var. wilfordii (Hooker) K. Iwatsuki; Thelypteris griffithii (T. Moore) C. F. Reed var. wilfordii (Hooker) C. M. Kuo.

Plants 30–50 cm tall. Rhizomes short and thick, ascending, with dense blackish brown lanceolate scales; scales acicular long hairy along margins. Fronds clustered; stipes 17–30 cm, dark stramineous, firm, with dense scales and short setae and acicular long hairs on proximal part; laminae triangular, ca. 20 × 17 cm, cordate at bases, pinnatifid nearly to rachis on proximal part, distally lobate, undulate and acuminate at apices; lateral segments 3 pairs, proximal pair largest, broadly lanceolate, ca. 9 × 2.5–3.5 cm, slightly bent distally, entire or undulate, acuminate at apices, connected with above pair (sometimes nearly free) by broad wing; other segments of similar shape but shortened distally, distalmost triangular; costae of segments all raised on both sides and with dense acicular hairs; lateral veins distinct, veinlets between lateral veins reticulate, areoles in 3 rows, subtetragonal or pentagonal, usually with simple or forked included veinlets. Laminae papery when dry, dark brown, abaxial surface with acicular hairs along veins, adaxially with dense appressed setae. Sori sparsely attached along reticulate veinlets.

Shaded wet places in valleys or forests; 100–1100 m. Fujian, Guangdong, Guangxi, Guizhou, Jiangxi, Sichuan, Taiwan, SE Yunnan, Zhejiang [Japan, Vietnam].


戟叶圣蕨 ji ye sheng jue

Stegnogramma sagittifolia (Ching) L. J. He & X. C. Zhang.

Plants 30–40 cm tall. Rhizomes short and ascending, with sparse linear-lanceolate scales; scales ciliate along margins. Fronds clustered; stipes 15–30 cm, with dense brown short setae; laminae hastate, ca. 17 × 11–13 cm, deeply cordate at bases, entire or sometimes undulate, shortly acuminate at apices; costae raised on both sides, lateral veins distinct, obliquely spreading, with 5–7 distinct transverse veins between lateral veins divided into large rectangular areoles and divided again into ca. 2 × 4 subtetragonal smaller areoles, with simple or forked included veinlets in smallest areoles. Laminae papery when dry, dark brown, adaxially with dense short pubescence along costae and appressed short hairs on intercostal areas, abaxial surface with dense short pubescence along costae and veinlets, sparsely pubescent along reticulate veinlets. Sori scattered and attached along reticulate veinlets.

- Evergreen forests, rock crevices; 400–700 m. Guangdong, Guangxi, Hunan, Jiangxi.