

DENNSTAEDTIACEAE

碗蕨科 wan jue ke

Yan Yuehong (严岳鸿)¹, Qi Xinping (齐新萍)², Liao Wenbo (廖文波)³, Xing Fuwu (邢福武)⁴, Ding Mingyan (丁明艳)³, Wang Faguo (王发国)⁴, Zhang Xianchun (张宪春)⁵, Wu Zhaohong (吴兆洪 Wu Shiew-hung)⁴, Shunshuke Serizawa⁶, Jefferson Prado⁷, A. Michele Funston⁸, Michael G. Gilbert⁹, Hans P. Nootboom¹⁰

Plants terrestrial, sometimes climbing. Rhizome usually long creeping, solenostelic, siphonostelic, or polystelic, usually covered with multicellular hairs, less often with few-celled, cylindrical, glandular hairs or multicellular bristles, scales absent. Fronds medium-sized to large, sometimes indeterminate, monomorphic; stipes not articulate to rhizome, usually hairy, rarely glabrous; lamina 1–4-pinnately compound, thinly herbaceous to leathery, hairy or glabrous, without scales; rachis grooved adaxially, sometimes with buds (*Monachosorum*); pinnae opposite or alternate; veins usually free, pinnate or forked, not reaching margin, reticulate without included veinlets in *Histiopteris*. Sori marginal or intramarginal, linear or orbicular, terminal on a veinlet or on a vascular commissure joining apices of veins; indusia linear or bowl-shaped, sometimes double with outer false indusium formed from thin reflexed lamina margin and inconspicuous inner true indusium; paraphyses present or not. Spores tetrahedral and trilete, or reniform and monolete, spinulose, tuberculate, or smooth. Gametophytes green, cordate. $x = 26, 29, 30, 31, 33, 34, 38, 46, 47, 48$, and probably others.

Ten or 11(–15) genera and ca. 170(–300) species: mostly tropical but also extending into temperate regions; seven genera and 52 species (16 endemic) in China.

Ching Ren-chang, Fu Shu-hsia, Wang Chu-hao & Shing Gung-hsia. 1959. Dennstaedtiaceae and Monachosoraceae. *In*: Ching Ren-chang, ed., *Fl. Reipubl. Popularis Sin.* 2: 198–256, 357–371; Wu Shiewhung. 1990. Pteridiaceae and *Histiopteris*. *In*: Ching Renchang & Shing Kunghsia, eds., *Fl. Reipubl. Popularis Sin.* 3(1): 1–10, 89–90.

- 1a. Sori protected by cup-shaped or half-cup-shaped indusium.
2a. Sori marginal 6. *Dennstaedtia*
2b. Sori intramarginal 7. *Microlepia*
- 1b. Sori naked or protected by reflexed marginal tooth or flap, sometimes also with a linear inner true indusium.
3a. Rhizome with bristlelike, chestnut-brown scales; pinnae always opposite with a reduced pair of basal stipulelike pinnules 4. *Histiopteris*
3b. Rhizome hairy, scales absent; pinnae opposite or alternate with basal pinnules similar to more distal pinnules.
4a. Lamina thinly herbaceous, dark green to blackish; rhizome with glandular hairs; gemmae usually present on rachis 1. *Monachosorum*
4b. Lamina papery to leathery, rarely herbaceous, green to pale green; rhizome with eglandular or a mixture of glandular and eglandular hairs; gemmae absent.
5a. Sori terminal on vein, orbicular or oval, each protected by a reflexed tooth or marginal flap, or naked ... 5. *Hypolepis*
5b. Sori along marginal connecting vein, linear, protected by double indusium, outer layer formed from inrolled lamina margin, inner true indusium thinner, inconspicuous, sometimes absent.
6a. Stipe with several vascular bundles; rachis straight; spores trilete 2. *Pteridium*
6b. Stipe with only 1 vascular bundle; rachis zigzag; spores monolete 3. *Paesia*

1. MONACHOSORUM Kunze, Bot. Zeitung (Berlin) 6: 119. 1848.

稀子蕨属 xi zi jue shu

Zhang Xianchun (张宪春); Hans P. Nootboom

Monachosorella Hayata; *Ptilopteris* Hance.

¹ Herbarium, School of Life Sciences, Hunan University of Science and Technology, Xiangtan, Hunan 411201, People's Republic of China; Chenshan Botanical Garden, 3888 Chenhua Road, Songjiang District, Shanghai 201602, People's Republic of China.

² Chenshan Botanical Garden, 3888 Chenhua Road, Songjiang District, Shanghai 201602, People's Republic of China.

³ Herbarium, Museum of Biology, School of Life Sciences, Sun Yat-sen University, Xin Gang West Road 135, Guangzhou, Guangdong 510275, People's Republic of China.

⁴ South China Botanical Garden, Chinese Academy of Sciences, 723 Xingke Road, Tianhe District, Guangzhou, Guangdong 510650, People's Republic of China.

⁵ 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.

⁶ Herbarium, Department of Biology, Aichi Kyoiku University, Igaya-cho, Kariya-shi, Aichi-ken 448, Japan.

⁷ Herbário SP, Instituto de Botânica, C.P. 68041, CEP 04045-972, São Paulo, Brazil.

⁸ c/o Missouri Botanical Garden, P.O. Box 299, Saint Louis, Missouri 63166-0299, U.S.A.

⁹ Missouri Botanical Garden, c/o Herbarium, Library, Art and Archives, Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AE, United Kingdom.

¹⁰ Naturalis Biodiversity Center, Section NHN, Leiden University, P.O. Box 9514, 2300 RA Leiden, Netherlands.

Rhizome shortly creeping or ascending, dictyostelic, clothed with minute, few-celled, cylindrical, glandular hairs, these hairs also on foliar parts; scales absent. Fronds 1–4-pinnate-pinnatifid, dark green to black, thinly herbaceous; rachis gemmiferous at tip, or bearing 1(–3) axillary buds on upper parts; buds large, consisting of a small rosette of fingerlike trophopods; veins free, ending well behind margin. Sori terminal or nearly so, small, orbicular, exindusiate; sporangia mixed with glandular paraphyses. Spores trilete, tetrahedral-globose, with prominent angles, irregularly tuberculate. $n = 56$.

Six species: from the C Himalaya east to Japan and south to Java and New Guinea; three species in China.

Recent molecular phylogenetic studies indicate that Monachosoraceae are nested within Dennstaedtiaceae.

The chromosome number of *Monachosorum maximowiczii* with $2n = 112$ is diploid, *M. subdigitatum* (Blume) Kuhn with $2n = 224$ is tetraploid, *M. flagellare* with $2n = 336$ is hexaploid, and *M. arakii* Tagawa with $2n = 336$ is hexaploid and with irregular meiosis. A chromosome count for *M. henryi* is needed.

- 1a. Fronds pinnate; rachis elongate and bearing buds at apex 1. *M. maximowiczii*
 1b. Fronds 2- or 3-pinnate.
 2a. Fronds 2-pinnate; rachis elongate and bearing buds at apex 2. *M. flagellare*
 2b. Fronds 3-pinnate; large gemmae 1 to several at middle of rachis or sometimes also on pinna costa, rarely gemmae absent 3. *M. henryi*

1. *Monachosorum maximowiczii* (Baker) Hayata, Bot. Mag. (Tokyo) 23: 29. 1909.

穴子蕨 xue zi jue

Polypodium maximowiczii Baker in Hooker & Baker, Syn. Fil., ed. 2, 504. 1874; *Monachosorella maximowiczii* (Baker) Hayata; *Monachosorum maximowiczii* var. *melanocaulon* (Hayata) Hayata; *Phegopteris maximowiczii* (Baker) Christ; *Polystichum maximowiczii* (Baker) Diels; *P. maximowiczii* var. *melanocaulon* Hayata; *Ptilopteris maximowiczii* (Baker) Hance.

Plants evergreen, small to medium-sized. Rhizome ascending, short, minutely pubescent. Stipe shiny, brown, subglabrescent, 3–10 cm; lamina 1-pinnate, linear-lanceolate, 15–50 × 2–6 cm, thinly herbaceous; rachis elongate and bearing buds at apex; pinnae ca. 50 pairs, broadly lanceolate to narrowly oblong, 1.5–3.2 cm × 3–7 mm, acroscopic base truncate and auriculate, basiscopic base cuneate, sessile, margin deeply dentate, apex acute to moderately so; lateral veinlets simple, parallel, adaxially with sparse, pale yellowish, minute hairs. Sori 1 per tooth, orbicular, small, without indusia but often covered by reflexed teeth at margins of lobes.

Often in colonies in rock crevices and caves, also on forest floor or as a low epiphyte; 800–2500 m. Anhui, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, Taiwan, Yunnan [Japan].

2. *Monachosorum flagellare* (Maximowicz ex Makino) Hayata, Bot. Mag. (Tokyo) 23: 29. 1909.

尾叶稀子蕨 wei ye xi zi jue

Phegopteris flagellaris Maximowicz ex Makino, Bot. Mag. (Tokyo) 9: 181. 1895; *Monachosorella flagellaris* (Maximowicz ex Makino) Hayata; *M. flagellaris* var. *nipponicum* (Makino) Tagawa; *M. nipponicum* (Makino) Hayata; *Monachosorum kweichowense* Ching; *M. nipponicum* Makino; *Polystichum flagellare* (Maximowicz ex Makino) C. Christensen.

Plants evergreen, medium-sized. Rhizome shortly creeping, ascending, with minute hairs, bearing fronds radially. Stipe brownish in lower part, stramineous in upper part, 6–30 cm, with minute transparent hairs; lamina green when fresh, 2- or 3-pinnate, broadly subtriangular-lanceolate, 20–60 × 7–24 cm, thinly herbaceous, abaxially minutely pubescent, adaxially

glabrous; rachis elongate, bearing buds at apex; pinnae 25–40 pairs, shortly stalked; lower pinnae 2-pinnate, large, linear-lanceolate, 5–15 × 1.5–4 cm; pinnules 10–16 pairs, with very short stalk, obliquely oblong; middle pinnules catadromous, large, 8–20 × 4–10 mm, margin deeply dentate to pinnatisect, apex acute or moderately so. Sori orbicular, medial or submarginal.

Usually on rocky ground or on rocks, often in colonies, in valley forests by streams; 600–1500 m. Guangxi, Guizhou, Hunan, Jiangxi, Sichuan, Yunnan [Japan].

3. *Monachosorum henryi* Christ, Bull. Herb. Boissier 6: 869. 1898.

稀子蕨 xi zi jue

Monachosorum elegans Ching; *M. henryi* var. *microphyllum* Christ; *M. subdigitatum* (Blume) Kuhn var. *henryi* (Christ) Tagawa.

Rhizome ascending, short, with minute hairs, bearing fronds radially. Stipe brownish in lower part, stramineous in upper part, (20–)30–50 cm or longer, (1.5–)3–5 mm in diam. near base, with minute hairs; lamina 3-pinnate, ovate-subtriangular to oblong-subtriangular, 30–70(–90) cm, (8–)30–40 cm wide at base, thinly herbaceous, apex acuminate; axes of fronds grooved abaxially, decurrent to each other; large gemmae 1–3 or more, distinct on middle or upper portion of rachis or also on pinna costa, rarely gemmae absent; pinnae ca. 15 pairs, broadly lanceolate to oblong, base truncate and shortly stalked, apex acuminate to caudate; pinnules lanceolate, base truncate and shortly stalked to sessile, apex acuminate; basal pinnule anadromously, occasionally catadromously, arranged; secondary pinnules oblong, apex moderately acute. Sori 1 per segment, orbicular, close to margin of lobes, naked.

Evergreen broad-leaved forests; 500–2000 m. Chongqing, Guangdong, Guangxi, Guizhou, Hunan, Jiangxi, Sichuan, Taiwan, Xizang, Yunnan [Bhutan, NE India, Myanmar, Nepal, Vietnam].

The taxonomy of *Monachosorum henryi* is still problematic. It is almost impossible to separate it from the SE Asian *M. subdigitatum* (Blume) Kuhn when there are no gemmae on the rachis. *Monachosorum elegans* might be a small form of this species, reproduced by gemmae, or an ecological form on rock cliffs based on field observations in Guangxi.

2. PTERIDIUM Gleditsch ex Scopoli, Fl. Carniol. 169. 1760, nom. cons.

蕨属 jue shu

Liao Wenbo (廖文波), Ding Mingyan (丁明艳), Wu Zhaohong (吴兆洪 Wu Shiew-hung); Jefferson Prado

Filix Ludwig (1757), not Séguier (1754), nor Adanson (1763).

Plants terrestrial, robust. Rhizome brownish black, thick, ca. 5 mm in diam., hypogaeal, densely clothed with rusty yellow to castaneous hairs, without scales. Fronds 50–130 cm; stipe with several vascular bundles; lamina large, often ovate or ovate-triangular, subleathery to papery, abaxially ± pilose, adaxially glabrous or sparsely hairy, 3- or 4-pinnate-pinnatifid; costae of ultimate pinnae clothed with fine gray-brown hairs, rarely glabrescent; rachises grooved adaxially, glabrous or pubescent; pinnae subopposite or alternate, stalked, basal pinnae pair larger than other pinnae, triangular; venation of ultimate pinnae pinnate, veins 2-forked, adaxially conspicuously prominent. Sori submarginal, linear, paraphyses not present; indusia formed by two layers; outer layer consisting of thin reflexed margin of lamina, persistent; inner layer thinner, vestigial, not conspicuous, sometimes nearly degenerate; sporangia long stalked; spores trilete, with low nipple-shaped protuberances. $x = 13$.

About 13 species: widely distributed worldwide, but mainly in the tropics; six species (three endemic) in China.

- 1a. Rachises and costae glabrous in adaxial grooves.
 - 2a. Ultimate segments broadly lanceolate to oblong, not wider than their own width apart 1. *P. aquilinum*
 - 2b. Ultimate segments linear, often 1–2 × their own width apart.
 - 3a. Fronds leathery when dried; ultimate segments linear, ca. 2.5 mm wide, abaxially veins hairy 2. *P. esculentum*
 - 3b. Fronds papery when dried; ultimate segments broadly linear-falcate, 3–4 mm wide, abaxially subglabrous except on midvein 3. *P. falcatum*
- 1b. Rachises and costae densely hairy in adaxial grooves (at least when young).
 - 4a. Fronds subleathery; pinnules lanceolate, up to 8 × 1.5 cm 4. *P. revolutum*
 - 4b. Fronds papery or herbaceous; pinnules narrowly linear or linear-lanceolate, 13–20 × ca. 3 cm.
 - 5a. Fronds papery; pinnules narrowly linear, up to ca. 20 cm, adaxially ± glabrous 5. *P. lineare*
 - 5b. Fronds herbaceous; pinnules linear-lanceolate, ca. 13 cm, adaxially pilose 6. *P. yunnanense*

1. *Pteridium aquilinum* (Linnaeus) Kuhn var. ***latiusculum*** (Desvaux) Underwood ex A. Heller, Cat. N. Amer. Pl., ed. 3, 17. 1909.

蕨 jue

Pteris latiuscula Desvaux, Mém. Soc. Linn. Paris 6(3): 303. 1827; *Pteridium aquilinum* f. *glabrum* Tardieu & C. Christensen; *P. aquilinum* subsp. *japonicum* (Nakai) Á. Löve & D. Löve; *P. aquilinum* var. *japonicum* Nakai; *P. aquilinum* subsp. *latiusculum* (Desvaux) Hultén; *P. japonicum* Tardieu & C. Christensen; *P. latiusculum* (Desvaux) Hieronymus ex Fries; *Pteris lanuginosa* Sprengel (1821), not Bory ex Willdenow (1810).

Plants up to 2 m tall. Rhizome long creeping, densely castaneous hairy. Fronds erect, 0.5–1.5 m (sometimes larger in shaded forms); stipe brown, up to 40 cm, woody, basally with short brown hairs, apically glabrous; lamina 3- or 4-pinnate-pinnatifid, triangular to oblong-ovate in outline when pressed, leathery; basal pinnae as long as to ca. 1/2 length of lamina; rachis pale brown, thinly pubescent, becoming glabrous; lobes present between 2 adjacent segments; pinnae ascending or horizontal, ovate-triangular to oblong, up to 40 × 15 cm, apex acute; pinnules or segments linear to oblong, glabrous except for pinnule margins and midvein, deeply pinnatifid in larger pinnae, apex shortly bluntly or long caudate. Sori elongate, submarginal on ultimate segments; outer indusium ca. 0.5 mm wide, membranous, ciliate, inner indusium vestigial and fimbriate. $2n = 104$.

Sunny slopes and forest margins; 100–800 m. Throughout China,

but mostly in S China including Taiwan [Japan (including Ryukyu Islands); Europe, North America].

The typical variety is distributed in Africa and Europe.

2. *Pteridium esculentum* (G. Forster) Cokayne, Rep. Bot. Surv. Tongariro Nat. Park, 34. 1908.

食蕨 shi jue

Pteris esculenta G. Forster, Pl. Esc. 74. 1786.

Plants ca. 1 m tall. Rhizome long creeping. Fronds firmly leathery when dried; stipe yellowish brown, shiny, 40–50 cm, adaxially sulcate; lamina 3-pinnate-pinnatifid, oblong-triangular in outline, 50–60 × 60–80 cm, base rounded-cuneate, apex acuminate; pinnae 15–18 pairs, alternate, stalked (ca. 2 cm), slightly obliquely spreading, oblong-lanceolate, up to 35 × 11–15 cm, base cordate or subtruncate, apex long acuminate, caudate; pinnules ca. 30 pairs per pinna, alternate, sessile, broadly lanceolate, 5.5–7 × 1.5–2.5 cm, base truncate, spreading, apex caudate (1.5–2 cm) to acuminate; segments 12–14 pairs per pinna, linear, lateral ones ca. 10 × 2–2.5 mm, gradually wider upward, alternate, spreading, connate with costules, margins reflexed, serrulate, apex obtuse; middle pinnules similar to lower ones but narrower, apex caudate; apical pinnules linear, up to 30 × ca. 3 mm, not pinnate (entire); apical pinnae lanceolate, pinnate; ultimate pinnules linear, ca. 2.5 mm wide, apically obtuse; veins not conspicuous, hairy abaxially, veinlets somewhat grooved; rachis, costae, and costules shiny, glabrous, adaxially grooved; rachis yellowish brown, costae and costules green.

Sunny forest gaps on slopes; ca. 1000 m. SW Guangxi (Longjin,

Napo), Hainan (Diaoluo Shan) [Cambodia, India, Indonesia, Malaysia, Philippines, Thailand, Vietnam; Australia, Pacific islands].

3. *Pteridium falcatum* Ching, Acta Bot. Austro Sin. 2: 2: 1986.

镰羽蕨 *lian yu jue*

Plants ca. 2 m tall. Rhizome creeping. Fronds papery when dried; stipe brownish black, apically reddish brown to brown-straw-colored, slightly shiny, up to 1 m, ca. 5 mm in diam. at base, adaxially grooved; lamina pale green, 3-pinnate-pinnatifid, narrowly triangular-ovate in outline, ca. 100 × 50 cm, abaxially with light gray-brown hairs along costae, adaxially glabrous, base rounded-cuneate, apex acuminate; pinnae ca. 6 pairs, opposite or subopposite; basal pinnae ovate-triangular, base rounded-cuneate, stalked (ca. 6 cm), 2-pinnate-pinnatifid (1-pinnate apically), apex acuminate; pinnules ca. 10 pairs per pinna, alternate, slightly obliquely spreading; basal pair ca. 22 × 7–8 cm, pinnate, narrowly triangular, base truncate, stalked (ca. 1 cm), apex long caudate (2.5–3 cm); ultimate pinnules to 18 pairs per pinnule, alternate, spreading, falcate-lanceolate, up to 30 × 3–4 mm, apex acute; lower ones nearly separate from costules or slightly connected to costules, basal ones generally triangular auriculate, entire, costules not winged, only ultimate segments slightly expanded on both sides; veins approximate, anadromous, conspicuous on both surfaces; rachises and costae glabrous, costules glabrescent, adaxially deeply grooved, glabrous, straw-colored.

- Sunny slopes. E Guangxi (Hexian).

4. *Pteridium revolutum* (Blume) Nakai, Bot. Mag. (Tokyo) 39: 109. 1925.

毛轴蕨 *mao zhou jue*

Plants up to 1 m tall. Rhizome long creeping. Fronds subleathery when dried, margins often revolute; stipe straw-colored or brown, 35–50 cm, 5–8 mm in diam. at base, adaxially grooved, densely clothed with pallid hairs when young, glabrous when old; lamina 3-pinnate-pinnatifid, broadly triangular or ovate-triangular in outline, 30–80 × 30–50 cm, apex acuminate; pinnae 4–6 pairs, opposite, decumbent, oblong, base subtruncate, stalked (2–3 cm), apex acuminate; basal pinnae 2-pinnate-pinnatifid, slightly triangular, 20–30 × 10–15 cm, stalked (2–3 cm); pinnules to 12–18 pairs per pinna, opposite or alternate, spreading, sessile, lanceolate, 6–8 × 1–1.5 cm, base truncate, not adnate to costule, deeply pinnate, apex shortly caudate-acuminate; ultimate pinnules ca. 20 pairs per pinna, opposite or alternate, slightly obliquely spreading, lanceolate-falcate, ca. 8 × 3 mm, base connate to costule, often entire, apex obtuse or acute; apical pinnae 2-pinnate-pinnatifid, lanceolate; segments approximate, with pallid or light brown hairs abaxially; veins prominent abaxially, grooved adaxially; rachises, costae, and costules approximate, with pallid or light brown hairs or verrucose, glabrescent.

Sunny slopes, open shaded forests; 600–3000 m. Gansu, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangxi, Shaanxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [widely distributed in tropical and subtropical regions of Asia; N Australia].

1a. Costae not verrucose, with pallid or light

brown hairs, glabrescent; pinnule

segment apices acute or shortly

caudate-acuminate 4a. var. *revolutum*

1b. Costae scabrous verrucose abaxially,

glabrous; pinnule segment apices

obtuse or rounded 4b. var. *muriculatum*

4a. *Pteridium revolutum* var. *revolutum*

毛轴蕨(原变种) *mao zhou jue* (yuan bian zhong)

Pteris revoluta Blume, Enum. Pl. Javae 2: 214. 1828; *Pteridium aquilinum* (Linnaeus) Kuhn subsp. *revolutum* (Blume) X. Q. Chen & X. C. Zhang; *P. aquilinum* subsp. *wightianum* (J. Agardh) W. C. Shieh; *P. aquilinum* var. *wightianum* (J. Agardh) R. M. Tryon; *P. capense* (Thunberg) Krasser var. *densa* Nakai; *Pteris recurvata* Wallich var. *wightiana* J. Agardh; *P. villosa* Fée.

Costae with pallid or light brown hairs, gradually glabrescent, not verrucose; segment apices acute or shortly caudate-acuminate.

Sunny slopes, open shaded forests; 600–3000 m. Gansu (Wenxian), Guangdong, Guangxi, Guizhou, Henan, Hubei (Badong, Gucheng), Hunan (Qianyang), Jiangxi (Jinggangshan), Shaanxi (S slopes of Qin Ling), Sichuan, Taiwan, Xizang (Jiazhongka, Yadong), Yunnan [widely distributed in tropical and subtropical regions of Asia; N Australia].

“*Pteridium aquilinum* var. *osmundoides*” (Christ ex H. Léveillé, Bull. Acad. Int. Géogr. Bot. 20: 9. 1910), “*Pteris densa*,” and “*Pteris wightiana*” (Wallich, Numer. List, nos. 99 & 2178. 1829–1830) all belong here but are nomina nuda and were not therefore validly published (*Melbourne Code*, Art. 38.1(a)).

4b. *Pteridium revolutum* var. *muriculatum* Ching & S. H. Wu, Acta Bot. Austro Sin. 2: 2. 1986.

糙轴蕨 *cao zhou jue*

Costae scabrous verrucose abaxially, glabrous; segment apices obtuse or rounded.

- Slopes; 800–2700 m. Sichuan (Emei Shan, Lixian), Yunnan (Jinping, Mengzi).

5. *Pteridium lineare* Ching, Acta Bot. Austro Sin. 2: 3. 1986.

长羽蕨 *chang yu jue*

Plants up to 2 m tall. Rhizome creeping. Fronds papery when dried; stipe apically straw-colored, robust, ca. 0.8 m, up to 1 cm in diam., glabrous; lamina abaxially cinereous-green, adaxially green, 3-pinnate-pinnatifid, triangular in outline, ca. 1.2 m, abaxially with sparse pallid hairs or glabrescent, adaxially glabrous; pinnae ca. 5 pairs; basal pinnae opposite, obliquely spreading, 2-pinnate-pinnatifid, oblong-triangular, up to 90 × 40–50 cm, base broadly cuneate, stalked (up to 9 cm), apex acuminate; pinnules ca. 50 pairs, alternate, spreading, at nearly 90° angle to costa, narrowly linear; basal basisopic pinnules ca. 20 × 3 cm, base truncate, sessile, apex acuminate; ultimate pinnules ca. 40 pairs per pinnule, spreading, linear-lanceolate, ± falcate, 1.5–2 cm, base nearly symmetrical, adnate to costules, not decurrent, separated by narrow sinuses, generally basal margins ± slightly lobed or undulate, entire upward,

apex acute; basal pair close to costules and parallel to costules; basal acroscopic pinnules shorter, 1/3–1/2 as long as basicopic pairs (0.5–1 cm); middle pinnules similar to basal pair, apical pairs shorter; veins forked twice from base, veinlets approximate, abaxially conspicuous, adaxially somewhat grooved; rachis, costae, and costules adaxially grooved, often with sparse pallid hairs in grooves, abaxially sparsely pubescent or glabrate.

- Acidic soils of wastelands; ca. 1000 m. W Yunnan (Mangshi).

6. *Pteridium yunnanense* Ching & S. H. Wu, *Acta Bot. Austro Sin.* 2: 4. 1986.

云南蕨 *yun nan jue*

Plants ca. 1 m tall. Rhizome creeping. Fronds herbaceous when dried; stipe apically light straw-colored, robust, ca. 30 cm, ca. 5 mm in diam., glabrous; lamina green, 4-pinnate-pinnatifid, ovate-triangular in outline, ca. 70 × 70 cm, abaxially

densely hirsute (especially on costules), adaxially sparsely hirsute; basal pinnae largest, opposite, decumbent, 3-pinnate-pinnatifid, oblong-triangular, up to 60 × 22 cm, base broadly cuneate, long stalked (ca. 6 cm), apex acuminate; pinnules ca. 20 pairs, opposite or subopposite, spreading or decumbent, linear-lanceolate, ± falcate; basal ones 2-pinnate-pinnatifid, ca. 13 × 3 cm, base truncate, symmetrical, subsessile, apex long acuminate; ultimate pinnules 20–23 pairs per pinna, spreading, lanceolate, ca. 15 × 5 mm, base acuminate, connate with costules at base, symmetrical, separated by a wide sinus, pinnatifid; segments 6 or 7 pairs per pinnule, spreading, oblong, entire, basal pair larger; middle pinnules same size as basal ones, reduced in size upward; veins pinnate, veinlets 2-forked, conspicuous abaxially, grooved adaxially; rachis, costae, and costules adaxially deeply grooved and costules with sparse pallid hairs, abaxially pubescent or glabrate.

- About 1500 m. W Yunnan (Yingjiang).

3. *PAESIA* J. Saint-Hilaire, *Voy. Distr. Diam.* 1: 381. 1833.

曲轴蕨属 *qu zhou jue shu*

Liao Wenbo (廖文波), Ding Mingyan (丁明艳), Wu Zhaohong (吴兆洪 Wu Shiew-hung); Jefferson Prado

Plants terrestrial. Rhizome long creeping, with castaneous hairs, without scales. Fronds distant, long stipitate; stipe with only 1 vascular bundle; lamina pinnate, thinly leathery; rachis often zigzag, flexuous, ciliate. Sori submarginal, on a vascular commissure joining apices of veins; indusia double, formed by two layers, outer layer false, formed by reflexed edge of lamina, inner layer true, not conspicuous; annulus consisting of (12–)17–20 incrassate cells; spores monolete, smooth as if polished. $x = 13$.

About 14 species: widely distributed in tropical America and SE Asian–Pacific islands, from New Zealand to Tahiti, Philippines (Luzon), Indonesia (Sumatra), and China (Taiwan); one species (endemic) in China.

1. *Paesia taiwanensis* W. C. Shieh, *J. Jap. Bot.* 45: 161. 1970.

台湾曲轴蕨 *tai wan qu zhou jue*

Plants ca. 85 cm tall. Rhizome long creeping, 1.5–4.5 mm in diam., hairy, hairs castaneous, lucid, bristlelike. Fronds firmly herbaceous when dried; stipe brown, shiny, slender, 10–45 cm, slightly grooved adaxially, hispid at base, muricate apically; lamina green, 3-pinnate-pinnatifid, ovate-oblong in outline, 22–60 × 11–25 cm, abaxially sparsely pubescent, adaxially glabrous; pinnae ca. 15 pairs, alternate, decumbent, shortly stalked or subsessile, oblong-lanceolate, base subtruncate, apex acuminate; basal pair largest, 6–18 × 2.5–9 cm; rachis zigzag,

straw-colored, scabrous or glabrous; pinnules many, shortly stalked or sessile, oblong-lanceolate, 1–5 × 0.5–0.8 cm, base subtruncate; ultimate pinnules 5–14 pairs, oblong or broadly subulate, to 8 × 3 mm, 2–5-aristate on each side; veins simple or 2-forked. Sori absent at segment apex; indusia linear, membranous, entire, persistent.

- Taiwan (Taidong).

Reviewer Ralf Knapp noted that this species, which is extremely rare, is generally lumped into *Paesia radula* (Baker) C. Christensen, described from Sumatra (e.g., C. M. Kuo, *Taiwania* 30: 59. 1985; Knapp, *Ferns Fern Allies Taiwan*, 108, 470. 2011).

4. *HISTIOPTERIS* (J. Agardh) J. Smith, *Hist. Fil.* 294. 1875.

栗蕨属 *li jue shu*

Liao Wenbo (廖文波), Ding Mingyan (丁明艳), Wu Zhaohong (吴兆洪 Wu Shiew-hung); Jefferson Prado

Pteris sect. *Histiopteris* J. Agardh, *Recens. Spec. Pter.* 76. 1839.

Plants terrestrial, climbing. Rhizome thick and long creeping, vascular system a corrugate solenostele, densely clothed with lanceolate, thick, castaneous-brown scales. Fronds sparse, large, indeterminate; stipe reddish castaneous, shiny, long, terete, glabrous; costae same as stipes in color, slightly grooved adaxially; lamina 2- or 3-pinnate, triangular, papery to subleathery, glabrous, basally usually pallid; pinnae opposite, often sessile; pinnules at base a pair, auricle-like; pinnules opposite; venation reticulate, without included veinlets. Sori along margin of lamina, with collecting vein near margin, protected by a narrowly linear false indusium formed by a membranous margin, paraphyses present, without velum; indusia long stalked and annulus composed of 18 thick-walled cells; spores dihedral, oblong to reniform, hyaline, with prominent wart. $x = 12$.

About seven species: widely distributed in pantropical regions, southward to the Cape of Good Hope of Africa, Australia (Tasmania), and islands near Antarctica; sometimes those species treated as one species; one species in China.

Histiopteris is morphologically similar to *Pteris* but molecular data indicates that this similarity is superficial and that *Histiopteris* belongs to the Dennstaedtiaceae. It differs from *Pteris* by the long-creeping rhizome, with bristlelike, chestnut-brown scales; proliferous apex of the lamina; opposite pinnae and pinnules, and pinna bases with a pair of reduced, auricle-like pinnules; all veins anastomosing, and forming a row of narrow areoles on both sides of the costules; and dihedral, hyaline spores.

1. *Histiopteris incisa* (Thunberg) J. Smith, Hist. Fil. 295. 1875.

栗蕨 li jue

Pteris incisa Thunberg, Prodr. Pl. Cap. 171. 1800; *Histiopteris aurita* (Blume) J. Smith; *Litobrochia aurita* (Blume) J. Smith; *L. incisa* (Thunberg) C. Presl; *Pellaea fauriei* Christ; *Pteris aurita* Blume.

Plants ca. 2 m tall. Rhizome long creeping, robust, to 5 mm in diam., densely scaly; scales castaneous-brown, shiny, lanceolate, thick, often twisted at apex; stipe reddish castaneous, shiny, ca. 1 m × up to 5 mm, terete, basally tuberculate and ± rough, apically glabrous; lamina cinereous-green or light cinereous, adaxially brown-green, 2- or 3-pinnate, triangular or oblong-triangular, 50–100 cm, herbaceous or papery when dried, glabrous; pinnae opposite, spreading or oblique, or distally acroscopically falcate, sessile, lowest pinnules much smaller than next pair, seated like stipules at very base of pinnae; basal pinnae narrowly triangular, often 25–45 × 13–30 cm, basally truncate, 1-pinnate or 2-pinnatipartite, apically acute;

pinnules many, opposite, spreading, sessile, basal 1–3 pairs larger, lanceolate or oblong-lanceolate, 10–15 × 3–4 cm, basally rounded-truncate to broadly cuneate, 1-pinnate or pinnatifid at costule, apically long caudate (2.5–4 cm); segments 6–9 pairs, opposite, spreading or slightly decumbent, second pair often larger, oblong or oblong-lanceolate, 1.5–4 cm × 5–8 mm, segment base usually connate with costule, incision equal to segment width, or slightly wider, entire or pinnatifid up to 1/2, margin undulate, or undulate rounded-serrate, apex obtuse or shortly acuminate; veins reticulate, with regular rows of costal and costular areoles, remaining areoles smaller, conspicuous on both surfaces; rachises and costules shiny, glabrous, slightly grooved adaxially, often changing from reddish brown to brown-straw-colored to straw-colored.

Forests; 500–2300 m. ?Fujian, Guangdong, Guangxi, Guizhou, Hainan (Baisha, Diaoluo Shan), Hunan (Tongdao, Yizhang), Jiangxi (Jinggangshan), Taiwan, Xizang (Médog, Zayü), Yunnan, ?Zhejiang [Bhutan, NE India, S Japan; pantropical areas, islands near Antarctica, Madagascar].

5. *HYPOLEPIS* Bernhardt, Neues J. Bot. 1(2): 34. 1805.

姬蕨属 ji jue shu

Xing Fuwu (邢福武), Wang Faguo (王发国); A. Michele Funston, Michael G. Gilbert

Plants terrestrial. Rhizome long creeping, solenostelic, covered with multicellular bristles. Fronds medium-sized to large, monomorphic; stipes not articulate to rhizome; lamina 1–4-pinnate, herbaceous or papery, both surfaces often with many gray multicellular hairs; pinnules or terminal lobes oblique, base asymmetrical, lower part cuneate and upper part truncate; veins free, pinnate; rachis grooved, hairy. Sori almost marginal, orbicular, protected by a reflexed tooth or marginal flap, or naked, terminal on veins; annulus of 12–18 thickened cells; paraphyses linear, often absent; spores bilateral, elliptic, spinulose or tuberculate, rarely smooth.

About 50 species: pantropical, mainly in the W Hemisphere; eight species (two endemic) in China.

According to Brownsey (Blumea 32: 227–276. 1987), on whom this account is largely based, the names *Hypolepis punctata* and *H. tenuifolia* have been widely misapplied, and so older records need to be treated with caution. The very important indumentum characters are much more easily observed in living material.

The authors have not seen any material of *Hypolepis glandulosopilosa* H. G. Zhou & H. Li (Guihaia 11: 41–42. 1991), described from Guangxi.

1a. Sori protected by distinct, translucent, membranous indusia.

2a. Lamina with both glandular and eglandular hairs 1. *H. tenuifolia*

2b. Lamina with only eglandular hairs 2. *H. pallida*

1b. Sori unprotected or ± covered by reflexed green marginal flap or tooth.

3a. Lamina with only eglandular hairs 8. *H. polypodioides*

3b. Lamina with both glandular and eglandular hairs or bristles.

4a. Sori unprotected.

5a. Large ferns often forming extensive colonies; stipe 3–10 mm in diam.; lamina normally 4-pinnate, with dense, soft, red-brown, glandular hairs to 1 mm 7. *H. resistens*

5b. Smaller ferns in restricted patches; stipe 2–4 mm in diam.; lamina normally 3-pinnate, with sparse, coarse, pale brown, glandular hairs to 2 mm 3. *H. punctata*

4b. Sori covered by reflexed green marginal flap or tooth.

6a. Lamina with glandular and eglandular hairs 6. *H. alpina*

6b. Lamina with bristles.

7a. Pinnules broadly lanceolate, apex obtuse, lobes coarsely serrate 4. *H. glabrescens*

7b. Pinnules lanceolate, apex acuminate, lobes subtire or sparsely finely serrate 5. *H. tenera*

1. *Hypolepis tenuifolia* (G. Forster) Bernhardt in Schrader, Neues J. Bot. 1(2): 34. 1805.

细叶姬蕨 xi ye ji jue

Lonchitis tenuifolia G. Forster, Fl. Ins. Austr. 80. 1786; *Cheilanthes arborescens* Swartz; *Hypolepis gigantea* Ching; *H. nausoriensis* Brownlie; *H. neocaledonica* Rosenstock; *Phegopteris tenuifolia* (G. Forster) Keyserling.

Rhizome 3–10(–13) mm in diam., young parts with dense pale brown hairs, older parts with sparser red-brown hairs. Stipe dark chestnut-brown to almost black, 35–150 cm, 3–15(–20) mm in diam., very base with long, red-brown hairs, upper stipe with colorless, glandular and eglandular hairs, to 5 mm on uncoiling fronds, slightly rough, both sides with narrow wing ca. 1 mm wide; rachis yellow-brown at base, green adaxially, hairs colorless, glandular or eglandular, to 2 mm; lamina 4- or 5-pinnate, broadly ovate to triangular-ovate or broadly elliptic in outline, 25–150 × 28–140 cm, both surfaces with dense, fine, colorless, glandular and eglandular hairs to 1 mm on midribs and veins; pinnae 10–30 pairs, opposite or subopposite, largest at or near base, ± ovate, 16–90 × 11–50 cm; pinnules ovate, 7–30 × 3.5–15 cm, those on lower pinnae reduced markedly in length along pinna, ultimate pinnules narrowly ovate, 5–20 × 2–8 mm. Sori circular or ovate, without hairs between sporangia, protected by well-developed reflexed membranous flaps. *n* = 52.

Shrubs on wet hillsides, forests; below 100–1600 m. Hainan (Lingshui), Taiwan [Indonesia, New Guinea, Philippines; Australia, Pacific islands (including Pitcairn Islands)].

2. *Hypolepis pallida* (Blume) Hooker, Sp. Fil. 10: 64. 1852.

灰姬蕨 hui ji jue

Cheilanthes pallida Blume, Enum. Pl. Javae 2: 139. 1828; *Hypolepis beddomei* N. C. Nair & S. R. Ghosh; *H. punctata* Beddome (1892), not (Thunberg) Mettenius (1868).

Rhizome 2–3.5 mm in diam., with pale brown hairs to 2.5 mm. Stipe red-brown to dark chestnut at base, chestnut distally, 20–100 cm, 2–6 mm in diam., stipe with abundant colorless and brown-tinged eglandular hairs to 1 mm, ± smooth; rachis chestnut-brown proximally, yellow-brown distally, hairs colorless or brown tinged, eglandular, to 1 mm; lamina 4-pinnate, broadly ovate to triangular, often broader than long, 25–90(–100) × 30–120 cm, abaxially with dense, stiff, often curved, colorless, eglandular hairs to 1.5 mm on all surfaces, adaxially with hairs similar but shorter and sparser; pinnae 20–30 pairs, opposite or subopposite, largest at or near base, ovate to triangular, 18–95 × 13–50 cm; pinnules narrowly triangular to ovate, 8–30 × 4–13 cm; ultimate pinnules 6–13 × 2–5 mm, often slightly falcate, apex obtuse. Sori circular or ovate, without hairs between sporangia, protected by well-developed reflexed membranous flaps.

Broad-leaved forests; ca. 1000 m. Taiwan [India, Malaysia, Philippines, Vietnam].

3. *Hypolepis punctata* (Thunberg) Mettenius in Kuhn, Filic. Afr. 120. 1868.

姬蕨 ji jue

Polypodium punctatum Thunberg, Fl. Jap. 337. 1784; *Dryopteris punctata* (Thunberg) C. Christensen (1905), not Kuntze (1891); *Hypolepis yunnanensis* Ching; *Nephrodium punctatum* (Thunberg) Diels; *Phegopteris punctata* (Thunberg) Mettenius.

Rhizome 1.5–4 mm in diam., with pale brown hairs to 2 mm. Stipe pale chestnut-brown, distally sometimes becoming yellow-brown or darker, 15–75 cm, 2–4 mm in diam., smooth or slightly rough, with sparse, brown-tinged, glandular and eglandular hairs to 2 mm; rachis pale chestnut-brown or yellow-brown throughout, hairs similar to those of stipe; lamina 3(or 4)-pinnate, ovate to broadly ovate in outline, (22–)35–80(–100) × 17–27(–70) cm, iridescent when dry, firmly herbaceous or papery, abaxially with fine, colorless or brown-tinged, glandular and eglandular hairs rather variable in length and density, adaxially with hairs similar but shorter and sparser; pinnae 8–15(–25) pairs, opposite or subopposite, largest at or near base, narrowly triangular, triangular, or ovate, 9–50 × 3.5–20 cm; pinnules oblong or narrowly triangular, 2–11 × 1–4 cm; ultimate pinnules oblong, 4–19 × 2–8 mm, apex obtuse. Sori circular or ovate, without hairs between sporangia, unprotected.

Near streams, dense forests; 100–2400 m. Anhui, Fujian, Guangdong, Guizhou, Jiangsu, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [Cambodia, Japan, Korea, Laos, Malaysia, Philippines, Sri Lanka, Vietnam; Australia, tropical America].

Records of *Hypolepis punctata* from the Indian subcontinent were based on misidentifications of *H. polypodioides* (Fraser-Jenkins, Taxon. Revis. Indian Subcontinental Pteridophytes, 558. 2008). Material of *H. resistens* was also routinely included within *H. punctata* prior to its recognition as a distinct species in 1987.

4. *Hypolepis glabrescens* Ching, Fl. Reipubl. Popularis Sin. 2: 371. 1959.

亚光姬蕨 ya guang ji jue

Stipe dark brown abaxially and pale castaneous adaxially, 30–40 cm, ca. 3 mm in diam. at base, with sparse gray hairs, coarse; rachis pale castaneous, coarse, indumentum same as stipe; lamina iridescent when dry, 3-pinnate, ovate-triangular in outline, 60–75 × 25–30 cm, papery, both surfaces with slender bristles along veins; pinnae 16–18 pairs, subopposite, 1.5–2.5 cm apart, with 1.5–2 cm stalk; basal 1 or 2 pairs larger, oblong-lanceolate, 18–20 × 8–10 cm, with stalk 2–3 mm, apex acuminate; pinnules broadly lanceolate, 3–4 × 0.8–1.2 cm, apex obtuse; ultimate pinnules separate from each other, oblong, 10–15 × ca. 5 mm, sessile, ± adnate to rachis, pinnatilobate to 1/3 to midvein, apex and margin of lobes sharply toothed; costa slightly prominent, secondary veins pinnate to serrate. Sori 3–6 pairs on both sides of midvein, circular, at bases of marginal sinus, protected by reflexed, green, glabrous teeth.

• Dense forests; ca. 1000 m. W Yunnan.

5. *Hypolepis tenera* Ching, Fl. Reipubl. Popularis Sin. 2: 370. 1959.

狭叶姬蕨 xia ye ji jue

Stipe 60–65 cm, ca. 2 mm in diam. at base, base dark

brown, glabrous, upper part coarse, with short, brown hairs, shallowly grooved adaxially; rachis similar, with sparse, short, brown hairs; lamina brown-green when dry, 3-pinnate, oblong-triangular in outline, 75–80 × 25–30 cm, papery, both surfaces with sparse bristles along veins, apex acuminate; pinnae 18–20 pairs, 10–12 cm apart, subopposite, basal pairs lanceolate, 20–25 × 5–6 cm, with ca. 1 cm stalk, apex acuminate, upper pairs lanceolate, 12–15 × 3–4 cm; pinnules 22–26 pairs, alternate, 1–2 cm apart, lanceolate, 3–4 × 1–1.2 cm, shortly stalked, pin-natifid almost to costae, apex acuminate; ultimate lobes 8–10 pairs, oblong, ca. 5 × 1.5–1.8 mm, connate at base, separated by sinus, entire or toothed, apex obtuse and acute; midvein prominent abaxially, secondary veins pinnate to marginal. Sori 1–3 pairs, circular, at base of sinus, protected by semicircular, brownish green marginal flap.

- Dense forests. Yunnan.

6. *Hypolepis alpina* (Blume) Hooker, Sp. Fil. 2: 63. 1852.

台湾姬蕨 tai wan ji jue

Cheilanthes alpina Blume, Enum. Pl. Javae 2: 138. 1828; *C. dissecta* Hooker & Arnott; *Hypolepis alte-gracillima* Hayata; *H. dissecta* (Hooker & Arnott) Brackenridge.

Rhizome 2–5 mm in diam., with dense red-brown hairs to 3 mm. Stipe usually red-brown, sometimes chestnut-brown, distally paler, 12–70 cm, 1.5–5 mm in diam., grooved adaxially, stipe with dense, red-brown, glandular hairs to 0.5 mm and occasional eglandular hairs to 2 mm, ± rough; rachis red-brown or chestnut-brown at base, chestnut-brown to yellow-brown distally, hairs similar to those of stipe; lamina 3- or 4-pinnate, ovate in outline, 20–80(–130) × 10–90 cm, abaxially with stout, often rather rigid, red-brown, brownish tinged, or ± colorless, glandular hairs to 0.5 mm, plus occasional longer, chestnut-brown, eglandular hairs on midribs and veins, adaxially with hairs similar but shorter and sparser; pinnae 20–30 pairs, opposite or subopposite, largest at or near base, ovate to narrowly triangular, 10–52 × 3–28 cm; pinnules narrowly ovate to ovate, 2–14 × 0.8–5 cm; ultimate pinnules to 10 × 5 mm. Sori circular or ovate, without hairs between sporangia, protected by broad, reflexed, green marginal flaps.

Usually at forest margins; 500–2100 m. Taiwan [Indonesia, Papua New Guinea, Philippines, Vietnam; Australia, Pacific islands (New Caledonia, New Hebrides, New Zealand)].

Records of *Hypolepis alpina* from the Indian subcontinent were based on misidentifications of *H. polypodioides* (Fraser-Jenkins, Taxon. Revis. Indian Subcontinental Pteridophytes, 558. 2008). Taiwanese material has been included within *H. tenuifolia* (Fl. Taiwan, ed. 2, 1: 156. 1994).

7. *Hypolepis resistens* (Kunze) Hooker, Sp. Fil. 2: 64. 1852.

密毛姬蕨 mi mao ji jue

Cheilanthes resistens Kunze, Linnaea 24: 275. 1851; *C. dicksonioides* Endlicher var. *phyllochaena* Kunze; *Hypolepis glandulifera* Brownsey & Chinnock; *H. longa* A. Biswas.

Rhizome 4–8 mm in diam., with soft, red-brown hairs to 0.5 mm. Stipe basally chestnut-brown, distally yellow-brown, 28–120 cm, 3–10 mm in diam., stipe with dense, fine, colorless and brown-tinged, glandular and eglandular hairs to 1 mm, slightly rough; rachis yellow-brown, hairs similar to those of stipe; lamina 4-pinnate, broadly ovate in outline, 45–180 × 30–150 cm, abaxially with dense, fine, colorless or brown-tinged, glandular and eglandular hairs to 1 mm on all surfaces, adaxially with hairs similar but sparser except on midrib; pinnae 20–30 pairs, opposite or subopposite, largest at or near base, ovate, 21–65 × 10–48 cm; pinnules oblong to narrowly ovate or triangular, 6–25 × 2–11 cm; ultimate pinnules to 10 mm, apex obtuse to acute. Sori circular, sometimes with fine glandular hairs between sporangia when young, unprotected or only partially protected by partially reflexed, green marginal flap.

Hainan [India, Indonesia, Malaysia, New Guinea, Philippines, Sri Lanka; Australia, Pacific islands].

8. *Hypolepis polypodioides* (Blume) Hooker, Sp. Fil. 2: 64. 1852.

无腺姬蕨 wu xian ji jue

Cheilanthes polypodioides Blume, Enum. Pl. Javae 2: 139. 1828; *Hypolepis coerulea* A. Biswas; *H. gamblei* A. Biswas; *H. indica* A. Biswas; *H. robusta* Hayata; *H. sikkimensis* A. Biswas; *H. viridula* A. Biswas.

Rhizome 1.5–4 mm in diam., with chestnut-brown hairs to 2 mm. Stipe chestnut-brown, sometimes distally yellow-brown, 20–90(–110) cm, 2–5 mm in diam., stipe with abundant colorless and brown-tinged, eglandular hairs to 2 mm, ± smooth; rachis chestnut-brown, sometimes distally yellow-brown, hairs colorless or brown tinged, eglandular, to 1 mm; lamina 3- or 4-pinnate, ovate or broadly ovate, (21–) 35–125 × 25–55(–85) cm, abaxially with abundant, colorless or brown-tinged, eglandular hairs to 1.5 mm on midribs and veins, sparsely hairy along veins on both surfaces; pinnae 18–25 pairs, basal pairs subopposite, largest at or near base, ovate or triangular, (13–) 15–55 × 7.5–35 cm; pinnules oblong to narrowly ovate or triangular, 4.5–18 × 1.6–7.5 cm; ultimate pinnules oblong, 8–40 × 4–15 mm, pinnatifid, sessile, apex obtuse. Sori circular or ovate, with eglandular hairs to 0.4 mm between sporangia, unprotected or only partially protected by partially reflexed green marginal flap.

Forest margins, exposed places; 700–1700 m (in Taiwan). Guangdong, Hainan, Taiwan, Yunnan [Bangladesh, Bhutan, Cambodia, India, Indonesia, Kashmir, Laos, Malaysia, Myanmar, Nepal, Philippines, Thailand, Vietnam; Pacific islands].

6. DENNSTAEDTIA Bernhardt, J. Bot. (Schrader) 1800(2): 124. 1801.

碗蕨属 wan jue shu

Yan Yuehong (严岳鸿), Qi Xinping (齐新萍); Shunshuke Serizawa

Emodiopteris Ching & S. K. Wu.

Plants terrestrial. Rhizome creeping, very stout, clothed with multicellular, rather stiff, dark hairs. Fronds homomorphic; stipe grooved above, hairy when young, hairs abscising with age, slightly scabrous; lamina triangular to oblong, many times pinnate, usually densely hairy, especially on rachis, rarely glabrous; pinnules oblique, asymmetrically cuneate at base. Veins free, pinnately branching, veinlet not reaching margin, with hydathode at apex. Sori orbicular, marginal, terminal on each veinlet, separate, usually extrusive from lobes; indusium bowl-shaped, two layers (fused from an internal and external valve), external valve derived from deteriorated lobules or serrations, margin entire, rarely notched, usually \pm curved downward like a tobacco pipe, thick; receptacle short, sporangium with slender long stalk, annulus erect, interrupted by sporangiophore at lower part. Spore tetrahedral.

About 70 species: mostly distributed in tropics and subtropics; eight species (two endemic) in China.

- 1a. Pinnae subsessile, linear-lanceolate, 2–3 cm wide, basal pinnules shorter or not.
 2a. Basal pinnae obviously progressively shorter; middle pinnae $6-8 \times 1.2-1.5$ cm, 1.5–2 cm apart 1. *D. appendiculata*
 2b. Basal pinnae not obviously shortened; middle pinnae ca. $13 \times 2-2.3$ cm, 3–3.5 cm apart 2. *D. elwesii*
 1b. Pinnae stalked, lanceolate, 5–10 cm wide, basal pinnules longest.
 3a. Stipe and rachis sparsely spiny, spines conical, ca. 1.5 mm; fronds of indefinite length, scandent 3. *D. scandens*
 3b. Stipe and rachis glabrous or only with hairs; fronds free standing.
 4a. Plants to 30 cm tall; fronds 2- or 3-pinnatisect, pinnae 2–6 cm.
 5a. Stipe shiny, chestnut-brown at base, lamina glabrous 4. *D. wilfordii*
 5b. Stipe not shiny, straw-colored, lamina densely hairy 5. *D. hirsuta*
 4b. Plants 50–200 cm tall or more; fronds 3- or 4-pinnate, pinnae 10–30 cm.
 6a. Stipe to 100 cm, 20–30 mm in diam.; indusium brown 6. *D. smithii*
 6b. Stipe 20–60 cm, 2–5 mm in diam.; indusium green or gray-green.
 7a. Stipe chestnut-brown at base; lamina $20-29(-50) \times 15-20$ cm, usually densely hairy
 (\pm glabrous in var. *glabrescens*) 7. *D. scabra*
 7b. Stipe dark or dark chestnut-brown; lamina $60-70 \times 24-28$ cm, always glabrous 8. *D. melanostipes*

1. *Dennstaedtia appendiculata* (Wallich ex Hooker) J. Smith, Hist. Fil. 265. 1875.

顶生碗蕨 ding sheng wan jue

Dicksonia appendiculata Wallich ex Hooker, Sp. Fil. 1: 79–80. 1844; *D. glutinosa* Wallich ex Hooker; *Emodiopteris appendiculata* (Wallich ex Hooker) Ching & S. K. Wu; *Patania appendiculata* (Wallich ex Hooker) Beddome.

Rhizome creeping, black, ca. 5 mm in diam., slightly compressed on both sides, glabrous. Fronds scattered; stipe ca. 20 cm, ca. 3 mm in diam., black at base, dark brown upward, rounded beneath, grooved above, with brown scabrous marks; lamina black-brown adaxially when dried, deep brown abaxially, tripinnatisect, oblong-lanceolate, ca. 60×14 cm, herbaceous, abaxially slightly gray transparent glandular hairy, adaxially glabrous, both ends attenuate; pinnae 26–30 pairs, opposite, 1.5–2 cm apart, spreading, slightly oblique upward, very shortly stalked or almost sessile, lanceolate, basal pinnae shortened, only 1–2.5 cm, distant, middle pinnae $6-8 \times 1.2-1.5$ cm, bipinnatisect; pinnules 18–20 pairs, adjacent, spreading, oblong, $6-9 \times 3-4$ mm, base symmetrical, margin pinnatisect almost to costule, apex blunt; ultimate pinnules oblong, 2–2.5 mm, oblique upward, 2- or 3-forked at lower apex; lobules entire. Veins obvious abaxially, pinnate and furcate, veinlets not reaching margin, each lobule with one veinlet, hydathode at apex obscure; rachis and pinna rachis scabrous, with brown articulate hairs abaxially. Sori orbicular, terminal on upper side of lobules; indusium brownish, hemitelioid, glabrous, curved downward like a tobacco pipe.

1500–2500 m. Chongqing, Sichuan, Xizang [Bhutan, N India, Nepal].

“*Sitobolium glutinosum*” (J. Smith, London J. Bot. 1: 434. 1842, nom. nud., based on “*Dicksonia glutinosa* Wallich,” nom. nud.) belongs here.

2. *Dennstaedtia elwesii* (Baker) Beddome, Handb. Ferns Brit. India, 26. 1883.

峨山碗蕨 e shan wan jue

Dicksonia elwesii Baker in Hooker & Baker, Syn. Fil., ed. 2, 54. 1874; *Emodiopteris elwesii* (Baker) Ching & S. K. Wu; *Patania elwesii* (Baker) Beddome.

Rhizome black, stout, woody, glabrous. Fronds scattered, stipe ca. 68 cm, ca. 5 mm in diam., black at base; rachis brownish straw-colored and concolorous upward, with brown scabrous marks, rounded beneath, grooved above; lamina brown-green when dried, tripinnatisect, narrowly oblong, ca. $50 \times 22-25$ cm, herbaceous, glabrous on both surfaces, attenuate acroscopically; pinnae many, almost opposite, 3–3.5 cm apart, spreading, very shortly stalked or almost sessile, basal pinnae ca. 7 cm, middle pinnae linear-lanceolate, ca. $13 \times 2-2.3$ cm, bipinnatisect; pinnules 25–30 pairs, oblong, very shortly stalked, complanate and spreading, catadromous or almost opposite, basal pair slightly longer, almost parallel to rachis or covering rachis, $1-1.5 \text{ cm} \times 4-6 \text{ mm}$, pinnatisect almost to costule; ultimate pinnules oblong, ca. 3 mm, slightly oblique upward, adjacent, 2- or 3-forked at apex; lobules entire, apex acute. Veins obvious on both surfaces, veinlets not reaching margin, each lobule with one veinlet, with clavate hydathode at apex. Sori orbicular, terminal on upper side of lobules of ultimate pinnules; indusium gray-green, bowl-shaped, glabrous, curved downward like a tobacco pipe.

About 2400 m. Sichuan [NW India].

3. *Dennstaedtia scandens* (Blume) T. Moore, Index Fil. 307. 1861.

刺柄碗蕨 ci bing wan jue

Dicksonia scandens Blume, Enum. Pl. Javae 2: 240. 1828.

Plants several meters tall, growth indeterminate, scandent. Rhizome long creeping. Fronds scattered; stipe coarse and stiff, brownish, with short spines; spines 1–1.5 mm, slightly curved at apex; lamina brown-green when dried, firmly herbaceous, with dense, short, slender hairs along midrib abaxially, glabrous adaxially; pinnae many, subopposite, 9–13 cm apart, shortly stalked (2–3 mm), oblong-lanceolate, 20–30 × 8–12 cm, tripinnatisect, densely shortly brown hairy at axil, acuminate at apex; pinnules 12–14 pairs, alternate, 1.5–3 cm apart, almost sessile, basicopic pinnae shortest, oblong, ca. 2 cm × 7–8 mm, pinnatisect; other pinnae broadly lanceolate or subfalcate, 4–5 × 1.5–2.8 cm, bipinnatisect, acuminate at apex; ultimate pinnae 8–12 pairs, oblong, 8–15 × 5–6 mm, oblique at base, slightly truncate above, broadly cuneate below, sessile, disarticulate, pinnatisect 1/2–2/3 to midrib, rounded at apex; lobes elliptic, not serrate, rounded at apex. Veins pinnately furcate up to margin, 2–4 veinlets per lobe; rachis, pinna rachis, and stalk concolorous, grooved adaxially, with sparse short spines, small pinna rachis gray-green, densely shortly brown hairy abaxially. Sori orbicular, located near notch of lobule base; indusium brown-green, bowl-shaped, glabrous.

200–1000 m. Taiwan [Indonesia, Malaysia, New Guinea, Philippines; Pacific islands (Tahiti)].

4. *Dennstaedtia wilfordii* (T. Moore) Christ in C. Christensen, *Index Filic.*, Suppl. 1: 24. 1913.

溪洞碗蕨 xi dong wan jue

Microlepia wilfordii T. Moore, *Index Fil.* 299. 1861, based on *Davallia rhomboidea* Hooker, *Sec. Cent. Ferns*, t. 48. 1860, not Wallich ex Kunze (1850); *Coptidipteris wilfordii* (T. Moore) Nakai & Momose; *Davallia wilfordii* (T. Moore) Baker.

Plants ca. 30 cm tall. Rhizome slender and long creeping, black, with sparse, brown, articulate, long hairs. Fronds distichous, scattered or nearly caespitose; stipe ca. 14 cm, only ca. 1.5 mm in diam., black-chestnut-brown at base, with same long hairs as on rhizome, red-brown upward, or straw-colored, glabrous, shiny; lamina light green or grass-green when dried, 2- or 3-pinnatisect, oblong-lanceolate, ca. 27 × 6–8 cm, thinly herbaceous, glabrous throughout, acuminate or caudate at apex; pinnae 12–14 pairs, alternate, 2–3 cm apart, oblique upward, with stalk 3–5 mm, ovate, broadly lanceolate, or lanceolate, 2–6 × 1–2.5 cm, pinnatisect or bipinnatisect, acuminate or caudate at apex; pinnules ovate-oblong, 1–1.5 cm, less than 1 cm wide, anadromous, cuneate at base, decurrent, oblique upward, pinnatisect or coarsely serrate; ultimate pinnae entire, 2- or 3-forked and shortly acuminate at apex. Midrib obscure, lateral veins slender and obvious, pinnate and furcate, each lobule with one veinlet, not reaching margin, with obvious fusiform hydathode at apex; rachis straw-colored, rounded abaxially, grooved adaxially. Sori orbicular, on ultimate pinna axil, or terminal on acroscopic lobules; indusium light green, half cup-shaped, erose at rim, glabrous.

• Anhui, Chongqing, Fujian, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Shaanxi, Shandong, Shanxi, Sichuan, Zhejiang.

The authors have not seen material of *Davallia wilfordii* var. *contracta* Christ (*Nuovo Giorn. Bot. Ital.*, n.s., 4: 87–88. 1897).

5. *Dennstaedtia hirsuta* (Swartz) Mettenius ex Miquel, *Ann. Mus. Bot. Lugduno-Batavi* 3: 181. 1867.

细毛碗蕨 xi mao wan jue

Davallia hirsuta Swartz, *J. Bot.* (Schrader) 1800(2): 87. 1801; *D. pilosella* Hooker; *Dennstaedtia pilosella* (Hooker) Ching; *Fuziifilix pilosella* (Hooker) Nakai & Momose; *Humata hirsuta* Desvaux; *Microlepia lipingensis* P. S. Wang; *M. pilosella* (Hooker) T. Moore; *Trichomanes japonicum* Poiret (1808), not Thunberg (1784).

Plants ca. 30 cm tall. Rhizome creeping or ascending, with dense, gray-brown, long hairs. Fronds ± clustered; stipe straw-colored, 9–14 cm, ca. 1 mm in diam., with dense, gray, articulate hairs when young, abscising to leave scabrous marks when old; rachis and stalk concolorous, rachillae with dense, gray, articulate hairs; lamina green or yellow-green when dried, 2-pinnatisect, oblong-lanceolate in outline, 10–20 × 4.5–7.5 cm, herbaceous, both surfaces with dense gray, articulate, long hairs, apex acuminate; pinnae 10–14 pairs, opposite or almost alternate, 1.5–2.5 cm apart, spreading obliquely upward or slightly curved, lower pinnae pinnatifid or pinnatisect, 3–5 × 1.5–2.5 cm, with short, narrowly winged stalk or almost sessile; ultimate segments 6–8 pairs, oblong or broadly lanceolate, 10–17 × ca. 5 mm, anadromous; basal acroscopic pinnules longest, parallel with rachis, base cuneate, decurrent and connected with costa, both sides lobed, apex sharply 2- or 3-serrate; lobules with 1–3 small sharp teeth at apex. Veins pinnate and furcate, not reaching tip of teeth, each small sharp tooth with one veinlet, hydathode obscure. Sori orbicular, axillary on lobules; indusium green, shallowly bowl-shaped, hairy.

Shaded rock crevices on mountains; 200–2200 m. Chongqing, Gansu, Guangdong, Guangxi, Guizhou, Heilongjiang, Hubei, Hunan, Jilin, Liaoning, Shaanxi, Sichuan, Taiwan, Zhejiang [Japan, Korea, Russia (Far East)].

Thunberg (*Fl. Jap.* 337. 1784) incorrectly applied the name *Trichomanes hirsutum* Linnaeus to this taxon.

6. *Dennstaedtia smithii* (Hooker) T. Moore, *Index Fil.* 308. 1861.

司氏碗蕨 si shi wan jue

Dicksonia smithii Hooker, *Sp. Fil.* 1: 80. 1844; *Culcita formosae* (Christ) Maxon; *Dennstaedtia formosae* Christ; *D. leptophylla* Hayata.

Plants ca. 2 m tall. Fronds ± clustered; stipe to 100 cm, 20–30 mm in diam., stipe and rachis with dense, short, reddish brown hairs; rachis tea-brown, scabrous, rachillae and rachis concolorous, scabrous, with bilateral brown hairs; lamina 3- or 4-pinnate, to 100 cm, herbaceous, abaxially dark green, with sparse, scattered, transparent, glaucous, articulate, long hairs along veins and rachillae, adaxially brown when dried, with 1 or 2 short setae along rachilla and veins; pinnae many, alternate, 7–9 cm apart, spreading, with stalk ca. 5 mm, broadly lanceolate in outline, ca. 30 × 8–9 cm, broad at base, acuminate at apex, 2-pinnate; pinnules 20–25 pairs, alternate, ca. 2 cm apart, stalk ca. 1.5 mm, 1-pinnate; acroscopic pinnae spreading, broadly lanceolate, 4–6 × 1.8–2 cm, gradually shorter upward, slightly falcate, apex acuminate; basicopic pinnae somewhat

decurrent; ultimate pinnules 8–10 pairs, very shortly stalked to sessile, oblong, 5–8 × 3–5 mm, base asymmetrically cuneate, with decurrent narrow wings, anadromous, almost spreading, margin pinnatifid 1/3–1/2 to midrib or undulate-lobed, apex crenate; lobules entire or with 1 or 2 obtuse teeth. Veins obvious, pinnate furcate, veinlet not reaching margin, with obscure clavate hydathode at apex. Sori orbicular, located near notch of lobule base; indusium brown, bowl-shaped.

Wet places, often at forest margins in valleys; 400–800 m. Taiwan [Indonesia (Sulawesi), Philippines].

"*Balantium formosae*" (Christ, Geogr. Farne, 155. 1910) is sometimes treated as a synonym of *Dennstaedtia formosae* within this species, but it is nomen nudum of very uncertain application and not therefore validly published (*Melbourne Code*, Art. 38.1(a)).

7. *Dennstaedtia scabra* (Wallich ex Hooker) T. Moore, Index Fil. 307. 1861.

碗蕨 wan jue

Rhizome long creeping, red-brown, with dense, brown, transparent, articulate hairs. Fronds scattered; stipe red-brown or light chestnut-brown, slightly shiny, 20–35 cm, 2–3 mm in diam., abaxially rounded, adaxially grooved, stipe, rachis, and rhizome usually densely long hairy, glabrescent and scabrous when old. Lamina brown-green when dried, 3- or 4-pinnatisect at base, 3-pinnatisect above middle, triangular-lanceolate or oblong in outline, 20–29(–50) × 15–20 cm, firmly herbaceous, rachis and veins with dense, gray, transparent, articulate hairs on both surfaces; pinnae 10–20 pairs, almost alternate, oblique upward, oblong or oblong-lanceolate in outline, apex acuminate; basal pair largest, usually 10–14 × 4.5–6 cm, stalk ca. 1 cm, ca. 6 mm from next pair of pinnae, 2- or 3-pinnatisect; pinnules 14–16 pairs, oblong, usually 2.5–5 × 1–2 cm, gradually shorter upward, narrowly winged, shortly stalked, spreading, anadromous; acroscopic pinnae almost parallel with or covering rachis, bipinnatisect; pinnules broadly lanceolate, connected by narrow wing at base, pinnatisect 1/2–2/3 to midrib, apex obtuse or acuminate; ultimate pinnules entire or 1- or 2-divided; lobules obtuse, not serrate at margin. Veins pinnate and furcate, veinlets not reaching margin, each lobule with one veinlet, with fusiform hydathode at apex. Sori orbicular, terminal on lobule veinlets; indusium gray-green, bowl-shaped, densely hairy to glabrous.

Forests, near streams; 1000–2400(–3400) m. Chongqing, Fujian, Guangdong, Guangxi, Guizhou, Hunan, Jiangxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Bhutan, India, Japan, Korea, Laos, Malaysia, Philippines, Sri Lanka, Vietnam].

- 1a. Both sides of lamina, rachis, rachillae, and costae densely hairy; indusium densely hairy 7a. var. *scabra*
- 1b. Lamina glabrous or with a few sparse hairs; indusium glabrous 7b. var. *glabrescens*

7a. *Dennstaedtia scabra* var. *scabra*

碗蕨(原变种) wan jue (yuan bian zhong)

Dicksonia scabra Wallich ex Hooker, Sp. Fil. 1: 80. 1844;

Dennstaedtia deltoidea (Hooker) T. Moore; *Dicksonia deltoidea* Hooker; *Patania scabra* (Wallich ex Hooker) Beddome.

Both surfaces of lamina, rachis, rachillae, and costae densely hairy. Indusium densely hairy.

Forests, near streams; 1000–2400 m. Chongqing, Guangdong, Guangxi, Guizhou, Hunan, Jiangxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [India, Japan, Korea, Laos, Malaysia, Philippines, Sri Lanka, Vietnam].

Reviewer Ralph Knapp states that the material of *Dennstaedtia scabra* in Taiwan has the lamina distinctly hairy on both surfaces and indusia almost glabrous such that it is not practicable to place it in either of the varieties recognized in this treatment.

7b. *Dennstaedtia scabra* var. *glabrescens* (Ching) C. Christensen, Index Filic., Suppl. 3: 76. 1934.

光叶碗蕨 guang ye wan jue

Dennstaedtia glabrescens Ching, Bull. Dept. Biol. Sun Yatsen Univ. 6: 24. 1933; *Hypolepis apicularis* B. S. Wang.

Both surfaces of lamina, rachis, rachillae, and costae glabrous or very sparsely hairy. Indusium glabrous.

Evergreen broad-leaved forests; 1800–2300 m. Chongqing, Fujian, Guangdong, Guangxi, Guizhou, Hunan, Jiangxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [India, Japan, Korea, Laos, Malaysia, Philippines, Sri Lanka, Vietnam].

One of us (Serizawa) treats *Dennstaedtia scabra* var. *glabrescens* as a distinct species.

8. *Dennstaedtia melanostipes* Ching, Fl. Reipubl. Popularis Sin. 2: 357. 1959.

乌柄碗蕨 wu bing wan jue

Plants more than 1 m tall. Stipes ebony or chestnut-brown, slightly shiny, 45–60 cm, 3–5 mm in diam., with brown articulate hairs, abscising when old, leaving scabrous marks; rachis abaxially and stalks concolorous, gradually discolored upward, sparsely hairy, scabrous; rachillae chestnut-brown, glabrous. Lamina dark green when dried, 3-pinnate, ovate-oblong in outline, 60–70 × 24–28 cm, papery, both surfaces glabrous, apex attenuate; pinnae 15–20 pairs, almost opposite, lower 1–3 pairs distant, 7–10 cm apart, closer upward, 4–5 cm apart, spreading obliquely upward, with stalk 5–10 mm and brown hairy, middle pinnae broadly lanceolate or oblong in outline, usually 16–20 × 6–8 cm, base symmetrical, apex acuminate; pinnules 14–18 pairs, alternate, 1–1.2 cm apart, shortly stalked, anadromous, flat, narrowly lanceolate, 3–4.5 × ca. 1 cm wide at base, gradually shorter upward, base asymmetrical, basisopic base obliquely cuneate, acroscopic base auriculate, pinnatisect almost to costa, notched at wide interval, apex long and acuminate; ultimate pinnae elliptic or subovate, 1–3-lobed; lobules entire, sharp or obtuse at apex. Costa obvious, lateral veins pinnate and furcate, impressed adaxially, slightly prominent abaxially, each lobule with one veinlet, not reaching lobule margin, with fusiform hydathode at apex. Sori orbicular, terminal on lobule apex; indusium green, small bowl-shaped, thick, glabrous, entire.

• Yunnan.

7. MICROLEPIA C. Presl, Tent. Pterid. 124–125. 1836.

鳞盖蕨属 lin gai jue shu

Yan Yuehong (严岳鸿), Qi Xinping (齐新萍); Shunshuke Serizawa

Scypholepia J. Smith.

Plants terrestrial, medium-sized. Rhizome creeping, siphonostelic, covered with multicellular grayish stiff hairs, without scales. Fronds medium-sized to large, stipe base without articulation, hairy, vertically grooved above; lamina 1–4-pinnately compound, oblong to ovate-oblong; pinnules or lobes slightly oblique, acroscopic pinnule at base larger than basiscopic, usually parallel to rachis or pinna rachis, mostly triangular, rarely lanceolate, usually grayish hispid or with soft hairs, especially on rachis and pinna rachis. Veins free, pinnately branching, veinlets not reaching margin. Sori orbicular, intramarginal (slightly farther from margin), terminal on one veinlet, usually near notch; indusium hemitelioid, fixed at base and both sides, opening toward margin, truncate above, or indusium orbicular-reniform, basifixed; stalk short; annulus erect, cut off by sporangiophore at base. Spore tetrahedral, glabrous or slightly verrucate.

About 60 species: tropics and subtropics; 25 species (eight endemic) in China; five additional species (all endemic) are doubtful.

Molecular data (Inouye et al., J. Pl. Res. 117 (Suppl.): 42–43. 2004) suggested that *Microlepia marginata* includes cryptic species and hybrids. Herbarium collections are often inconsistently named, and it seems that this is a genus in need of revision.

Five doubtful species are included at the end of the account, along with the recently described *Microlepia boluoensis*, but could not be included in the following key to species.

The following taxa are excluded from the present treatment, pending further research: *Microlepia tenella* Ching (Fl. Reipubl. Popularis Sin. 2: 365. 1959), described from Guangxi, and *M. hirsutissima* Hayata (Icon. Pl. Formosan. 5: 301. 1915), described from Taiwan, which was treated as a synonym of *M. bipinnata* in FRPS (2: 217. 1959).

- 1a. Terminal segment of lamina entire, ± hastate, like lateral pinnae but symmetrical, distal lateral pinnae distinct, entire with single basal acroscopic blunt tooth 1. *M. hookeriana*
- 1b. Terminal segment of lamina pinnatisect to pinnatifid, formed by merging of distal pinnules.
 - 2a. Terminal pinnules more than 1 cm wide.
 - 3a. Lamina densely hairy on both surfaces 4. *M. kurzii*
 - 3b. Lamina glabrous or sparsely shortly hairy on both surfaces.
 - 4a. Fronds 2-pinnate, terminal pinnules pinnatifid apically but entire basally, apex obtuse 2. *M. matthewii*
 - 4b. Fronds 3-pinnate, terminal pinnules pinnatifid throughout, apex acuminate 3. *M. platyphylla*
 - 2b. Terminal pinnules not more than 1 cm wide.
 - 5a. Fronds 3- or 4-pinnate.
 - 6a. Lamina membranous, semitransparent.
 - 7a. Basal pinnae shorter or slightly shorter, pinnules and lobes ascending 15. *M. tenera*
 - 7b. Basal pinnae largest and not shorter, pinnules and lobes patent to rachis 16. *M. membranacea*
 - 6b. Lamina herbaceous, not semitransparent.
 - 8a. Fronds abaxially glabrous or with sparse short hairs.
 - 9a. Lamina triangular, basal pinnae longest, stipe longer than lamina 17. *M. firma*
 - 9b. Lamina ovate or oblong-lanceolate, basal pinnae shorter or slightly shorter than adjacent pinnae, stipe not longer than lamina.
 - 10a. Fronds 3-pinnate only below middle, terminal pinnules serrate 18. *M. khasiyana*
 - 10b. Fronds 3-pinnate to 4-pinnatifid, terminal pinnules pinnatifid.
 - 11a. Plants more than 2 m tall; lobe apex entire or crenate 19. *M. todayensis*
 - 11b. Plants not more than 1.5 m tall; lobe apex serrate 20. *M. hancei*
 - 8b. Fronds abaxially with long needlelike hairs.
 - 12a. Fronds with both long needlelike hairs and shorter gray hairs.
 - 13a. Plants 1.2–1.5(–2) m tall; basal pinnae as long as adjacent pinnae 23. *M. speluncae*
 - 13b. Plants more than 2 m tall; basal pinnae shorter than adjacent pinnae 24. *M. subtrichosticha*
 - 12b. Fronds with only long needlelike hairs, short hairs absent.
 - 14a. Fronds with needlelike hairs dense, terminal pinnules obtuse at apex 21. *M. trapeziformis*
 - 14b. Fronds with needlelike hairs sparse, terminal pinnules acute at apex.
 - 15a. Lateral pinnae 3–5 cm wide, ultimate lobes acute at apex 12. *M. substrigosa*
 - 15b. Lateral pinnae ca. 7 cm wide, ultimate lobes rounded at apex 22. *M. rhomboidea*
 - 5b. Fronds 1- or 2-pinnate.
 - 16a. Pinnae pinnatifid ca. 1/2 way to costa 5. *M. marginata*
 - 16b. Pinnae pinnate at least at bases of proximal pinnae.

- 17a. Lateral pinnae pinnatisect, all lobes sessile and adnate to rachis, pinnules serrate 5. *M. marginata*
- 17b. Lateral pinnae pinnate, lobes stalked and adnate to rachis only at its apex, pinnules
± pinnatifid.
- 18a. Rachises, pinnules, and indusia hairy, hairs long and stiff.
- 19a. Plants ca. 30 cm tall, lateral pinnae triangular-lanceolate, basal pinnae longest 6. *M. modesta*
- 19b. Plants more than 50 cm tall, lateral pinnae linear-lanceolate, basal pinnae
shortest or not 7. *M. trichocarpa*
- 18b. Rachises, pinnules, and indusia subglabrous, or if hairy then hairs usually short.
- 20a. Terminal pinnules oblong, apex rounded, lobes entire.
- 21a. Fronds 2- or 3-pinnate; lamina thick, almost leathery, rachis hairs stiff
and adnate to surface 8. *M. obtusiloba*
- 21b. Fronds 2- or 3-pinnatifid; lamina thin herbaceous, rachis hairs crinkled 9. *M. krameri*
- 20b. Terminal pinnules ovate or lanceolate, apex acuminate, lobes serrate.
- 22a. Fronds leathery, bright green and shiny when dried 10. *M. crassa*
- 22b. Fronds herbaceous, not shiny when dried.
- 23a. Hairs on stipe golden, stiff and long; pinnae lanceolate or
ovate-lanceolate 11. *M. chrysocharpa*
- 23b. Hairs on stipe gray, crinkled and short; pinnae linear or
linear-lanceolate.
- 24a. Veins and veinlets with long needlelike hairs 12. *M. substrigosa*
- 24b. Veins and veinlets with short hairs.
- 25a. Terminal pinnules pinnatifid to pinnatisect, densely
hairy on veinlets and indusium 13. *M. strigosa*
- 25b. Terminal pinnules serrate to pinnatifid, glabrous or
sparsely hairy on veinlets and indusium 14. *M. pseudostrigosa*

1. *Microlepia hookeriana* (Wallich ex Hooker) C. Presl, Epimel. Bot. 95. 1851.

虎克鳞盖蕨 hu ke lin gai jue

Davallia hookeriana Wallich ex Hooker, Sp. Fil. 1: 172. 1845; *D. phanerophlebia* Baker; *Microlepia hookeriana* var. *marginalis* (Copeland) Tagawa; *M. paucipinnata* B. S. Wang; *M. phanerophlebia* (Baker) C. Christensen; *Nephrolepis marginalis* Copeland; *Saccoloma hookerianum* (Wallich ex Hooker) Fée; *Scypholepia hookeriana* (Wallich ex Hooker) J. Smith.

Plants terrestrial, ca. 80 cm tall. Rhizome long and creeping, 3.5–5 mm in diam., with dense long red-brown or brown hairs. Fronds remote, 1–2[–5] cm apart; stipe brown-straw-colored, [10–]20–30 cm, ca. 2.5 mm in diam., densely gray-brown villous; rachis and stalks with same hairs; lamina green when dried abaxially, black-green adaxially, 1-pinnate, broadly lanceolate to narrowly oblong in outline, 40–50 × 11–15 cm, base ± narrowed, apex long caudate; pinnae 20–40 pairs, opposite or alternate, basally 3–4 cm apart, shortly stalked to distally sessile, lower pinnae smaller, slightly reflexed; middle pinnae linear-lanceolate or falcate, 6–12 × 1–1.5 cm, herbaceous, abaxially grayish villous on veins, adaxially densely softly brown hairy on lobule midribs, each vein with sparse long hairs, base rounded-cuneate or asymmetrically hastate, both sides somewhat auriculate, acroscopic lobe larger, margin undulate-denticulate, distally serrate, often crispate, apex acuminate; terminal pinna to 15 cm, similar to lateral pinnae but symmetrical, often subhastate. Veins obliquely arising from costa, dichotomous, with 1 veinlet per tooth. Sori terminal on slender veinlet, arranged in a line near margin; indusium becoming brown when old, hemitelioid, as long as wide or slightly wider, glabrous, persistent.

Forests, damp places; below 100–1100 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, Jiangxi, Taiwan, Yunnan, Zhejiang [Borneo, N India, Indonesia, Japan (Ryukyu Islands), Malaysia, Nepal, Vietnam].

The name *Microlepia hookeriana* was first introduced by Wallich (Numer. List, no. 2684. 1831).

2. *Microlepia matthewii* Christ, Notul. Syst. (Paris) 1: 54. 1909.

岭南鳞盖蕨 ling nan lin gai jue

Davallia matthewii (Christ) Dunn & Tutcher; *Microlepia herbacea* Ching & C. Christensen.

Plants terrestrial. Rhizome creeping, ca. 3 mm in diam., with red-brown hairs. Fronds distant; stipe brown-straw-colored, ca. 20 cm, ca. 2.5 mm in diam., with short appressed hairs; rachis and rachillae with soft brownish hairs; lamina grass-green when dried, 2-pinnate, broadly lanceolate in outline, ca. 50 × 35 cm, thinly herbaceous, both surfaces glabrous, abaxially with 1 or 2 long hairs on costa, apex caudate; pinnae ca. 20 pairs below pinnatifid apical section, alternate, spreading, stalk ca. 3 cm, lower pinnae obliquely reflexed, middle pinnae 1-pinnate, broadly lanceolate in outline, ca. 20 × 5 cm, base symmetrically subcuneate, apex long acuminate; pinnules ca. 20 pairs, slightly overlapping, almost spreading, subsessile, oblong, ca. 2.5 × 1.2 cm, slightly oblique, base asymmetrical, basiscopically cuneate, acroscopically truncate with small auriculate prominence, parallel with rachis, margin 5- or 6-lobed, distally rounded and coarsely toothed, apex acute or subobtuse. Veins oblique, slender, obscure, pinnate in lobes, 2 or 3 pairs. Sori small, not distinct, at base of notch, terminal on acroscopic veinlet of each group veinlet; indusium light green, small, hemitelioid, glabrous.

Forests, near streams; 500–1000 m. Guangdong, Guangxi, Hunan [Vietnam].

3. *Microlepia platyphylla* (D. Don) J. Smith, London J. Bot. 1: 427. 1842.

阔叶鳞盖蕨 *kuo ye lin gai jue*

Davallia platyphylla D. Don, Prodr. Fl. Nepal. 10. 1825; *Microlepia grandissima* Hayata.

Plants terrestrial. Rhizome creeping, 15–20 mm in diam., stiff and woody, with dense, dark red-brown, subulate bristles. Fronds approximate, ca. 2 m tall; stipe light brown to straw-colored, shiny, 70–100 cm, ca. 1 cm in diam. at base, woody, hairy only at base; rachis similar, glabrous; lamina yellow-green when dried, 2-pinnate, broadly triangular in outline, 100–140 cm, almost as wide as long, nearly leathery, both surfaces glabrous except for dense, short, light brown hairs on rachillae; pinnae ca. 8 pairs, alternate, 15–20 cm apart, spreading obliquely upward, stalk 20–40 mm, basal pair largest, 1-pinnate, triangular in outline, 45–60 cm, apex acuminate; pinnules 6 or 7 pairs, alternate, anadromous, ca. 5 cm apart, spreading obliquely upward, lanceolate, subfalcate, 10–15 × 2.5–3.5 cm at base, base unequally cuneate, acroscopically obliquely truncate above, with rounded auriculate prominence, margin rounded lobed to pinnatifid, becoming rounded lobed and serrulate, narrowly cartilaginous, apex long acuminate and with rounded notch; pinnules progressively shorter distally, connate at base, decurrent, merging into pinnatifid and acuminate terminal segment. Veins abaxially coarse and distinct, adaxially obscure, pinnate in lobules, 4 or 5 pairs, not furcate, very oblique, not reaching margin. Sori 2–5 per lobule, orbicular and large; indusium brown, orbicular-reniform, large, membranous, entire, basifixed, glabrous, persistent.

Forests; 1000–2100 m. Guangxi, Guizhou, Hainan, SC Taiwan (Jiayi), Xizang, Yunnan [Bhutan, India, Laos, Myanmar, Nepal, Philippines, Sri Lanka, Thailand, Vietnam].

4. *Microlepia kurzii* (C. B. Clarke) Beddome, Handb. Ferns Brit. India, 66. 1883.

毛阔叶鳞盖蕨 *mao kuo ye lin gai jue*

Davallia kurzii C. B. Clarke, Trans. Linn. Soc. London 1: 446. 1880; *Microlepia longipilosa* Ching.

Plants terrestrial, more than 2 m tall. Rhizome brownish, 20–30 mm in diam., stiff and woody, with dense yellow-brown hairs. Fronds distant; stipe ca. 100 cm, ca. 1 cm in diam. at base, with dense brown hairs, distally glabrous; rachis and pinnule stalks concolorous, glabrous, rachillae densely brown shortly hairy from above middle. Lamina yellow-green abaxially, dark green adaxially when dried, 3-pinnate, more than 100 cm; pinnae 7–9 pairs, alternate, ca. 14 cm apart, with stalk ca. 5 cm, 2-pinnatisect, oblong in outline, ca. 60 × 30 cm, herbaceous, abaxially densely brown pubescent, adaxially glabrous, apex acuminate; pinnules 10–12 pairs, 5–6 cm apart, spreading, with stalk 0.4–0.8 mm, broadly lanceolate, ca. 15 × 5–6 cm, base asymmetrical, basiscopically shortly cuneate, acroscopically truncate, margin pinnatisect almost to costa,

apex acuminate; ultimate pinnules 12–14 pairs, alternate, anadromous, basal acroscopic pinnule longest, ovate-oblong, ca. 3 × 1.2–1.4 cm, parallel to rachis, apex shortly acuminate; lobules oblong or subtriangular, 15–18 × ca. 8 mm, obtuse at apex, compact, progressively reduced distally to form a long acuminate pinnatifid terminal segment; ultimate lobules subentire with few obtuse teeth. Veins distinct, lateral veins pinnate, not reaching margin. Sori orbicular, terminal on veinlet, 3–5 pairs; indusium reniform, densely brown tomentose.

Forests, near streams; 300–1300 m. Yunnan [Myanmar, Thailand].

5. *Microlepia marginata* (Panzer) C. Christensen, Index Filic. 212. 1905.

边缘鳞盖蕨 *bian yuan lin gai jue*

Plants terrestrial, robust, 0.6–1.2 m tall. Rhizome 4–5 mm in diam., with dense, red-brown, subulate hairs. Fronds ca. 2[–5] cm apart; stipe straw-colored, 50–70 cm, thick and strong, base with hairs like those of rhizome; rachis and rachillae abaxially with dense, brown-yellow, short, soft hairs; lamina brown-green when dried, 1- or 2-pinnate, oblong in outline, ca. 70 × 24–26 cm, papery, glabrous or hairy, costa densely pubescent, apex long caudate; pinnae 22–25 pairs, proximally subopposite, 5.5–8 cm apart, distally alternate, obliquely spreading, with stalk ca. 7 mm, pinnatisect to pinnate, narrowly lanceolate in outline, falcate, 18–20 × 2.3–2.7 cm, base asymmetrical, basiscopically shorter, cuneate, progressively reduced distally to form a long acuminate pinnatifid terminal segment; lobes obliquely oblong, 7–8 mm wide, compact, margin serrate. Veins 4 or 5 pairs, pinnate, thick and prominent, simple or 2-forked, oblique. Sori 5–7 per lobe, orbicular, near margin; indusium hemitelioid, wider, truncate above, glabrous or hairy.

Forests, shrublands; below 100–1800 m. Anhui, Chongqing, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [India, Indonesia, Japan (including Ryukyu Islands), Nepal, Papua New Guinea, Sri Lanka, Thailand, Vietnam].

The following variety is incompletely known: *Microlepia marginata* var. *jinfoshanensis* Ching & Z. Y. Liu (Bull. Bot. Res., Harbin 3(4): 23. 1983), described from Sichuan (Nanchuan).

- 1a. Fronds 2-pinnate, basal pinnules stalked, distal pinnules adnate to rachis.
 - 2a. Lamina hairy on both surfaces, pinnules acuminate at apex 5d. var. *bipinnata*
 - 2b. Lamina glabrous or sparsely hairy on both surfaces, pinnules obtuse at apex 5e. var. *intramarginalis*
- 1b. Fronds 1-pinnate, pinnae subentire to pinnatifid.
 - 3a. Pinnae glabrous on both surfaces, shortly hairy only on veins; sori fewer per lobe, mostly near sinus 5b. var. *calvescens*
 - 3b. Pinnae hairy on or between veins.
 - 4a. Hairs sparse 5a. var. *marginata*
 - 4b. Hairs dense 5c. var. *villosa*

5a. *Microlepia marginata* var. *marginata*

边缘鳞盖蕨(原变种) bian yuan lin gai jue (yuan bian zhong)

Polypodium marginatum Panzer in Christmann, Vollst. Pflanzensyst. 13(1): 199. 1786; *Davallia marginalis* Baker; *D. scabra* D. Don; *Dicksonia marginalis* Swartz; *Microlepia caudipinnata* B. S. Wang; *M. marginalis* Beddome; *M. scabra* (D. Don) J. Smith; *Polypodium marginale* Thunberg (1784), not Linnaeus (1753).

Fronds 1-pinnate or bipinnatifid, thickly papery or herbaceous, sparsely hairy on both surfaces. Indusium hairy.

Forests, shrublands; 100–1500 m. Anhui, Chongqing, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [India, Indonesia, Japan (including Ryukyu Islands), Nepal, Papua New Guinea, Sri Lanka, Vietnam].

5b. *Microlepia marginata* var. *calvescens* (Wallich ex Hooker) C. Christensen, Index Filic. 208. 1905.

光叶鳞盖蕨 guang ye lin gai jue

Davallia calvescens Wallich ex Hooker, Sp. Fil. 1: 172. 1845; *D. urophylla* Wallich ex Hooker; *Microlepia calvescens* (Wallich ex Hooker) C. Presl; *M. marginalis* var. *calvescens* (Wallich ex Hooker) Beddome; *M. urophylla* T. Moore.

Fronds 1-pinnate or bipinnatifid, thickly papery, both surfaces glabrous or almost glabrous; pinnae long stalked. Sori mostly near sinus; indusium glabrous or almost glabrous.

Forests, shrublands; below 100–1300 m. Chongqing, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, Sichuan, Taiwan, Yunnan, Zhejiang [India, Indonesia, Thailand, Vietnam].

5c. *Microlepia marginata* var. *villosa* (C. Presl) Y. C. Wu, Bull. Dept. Biol. Sun Yatsen Univ. 3: 112. 1932.

毛叶边缘鳞盖蕨 mao ye bian yuan lin gai jue

Microlepia villosa C. Presl, Epimel. Bot. 95. 1851.

Fronds 1-pinnate or bipinnatifid, both surfaces densely hairy. Indusium densely hairy.

Forests, shrublands, usually in limestone regions; 100–1800 m. Anhui, Chongqing, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Jiangsu, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [N India, Japan, Nepal, Papua New Guinea, Sri Lanka, Vietnam].

Reviewer M. G. Gilbert is of the opinion that *Microlepia marginata* var. *villosa* is only arbitrarily distinguished from *M. marginata* var. *marginata* and that it would be better to merge these two varieties.

5d. *Microlepia marginata* var. *bipinnata* Makino, J. Jap. Bot. 3(12): 47. 1926.

二回边缘鳞盖蕨 er hui bian yuan lin gai jue

Microlepia × *bipinnata* (Makino) Y. Shimura.

Fronds larger, 2-pinnate, herbaceous, both surfaces hairy; basal pinnules stalked, lobes acuminate at apex.

Forests, shrublands; 100–1000 m. Anhui, Chongqing, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Jiangsu, Jiangxi, Si-

chuan, Taiwan, Yunnan, Zhejiang [N India, Japan, Nepal, Papua New Guinea, Sri Lanka, Vietnam].

Material in the Natural History Museum, London (BM) named as the hybrid *Microlepia marginata* × *M. strigosa* seems to be a good match with this taxon, and it has been suggested that var. *bipinnata* is of hybrid origin (Shimura, Taxon 27(1): 41. 1979).

5e. *Microlepia marginata* var. *intramarginalis* (Tagawa) Y. H. Yan, **comb. nov.**

羽叶鳞盖蕨 yu ye lin gai jue

Basionym: *Microlepia strigosa* (Thunberg) C. Presl var. *intramarginalis* Tagawa, Acta Phytotax. Geobot. 10: 202. 1941; *M. calvescens* var. *intramarginalis* (Tagawa) W. C. Shieh.

Fronds 2-pinnatifid or 2-pinnatisect to 2-pinnate, lamina lanceolate in outline, firmly herbaceous, both surfaces glabrous or sparsely hairy; pinnae many, linear-lanceolate; basal pinnules stalked, obliquely ovate-oblong or triangular-ovate, margin serrate-dentate, apex obtuse. Indusium hairy.

• Forests; 800–1600 m. Taiwan.

One of us (Serizawa) believes that this taxon is most probably of hybrid origin, *Microlepia calvescens* × *M. strigosa*.

6. *Microlepia modesta* Ching, Fl. Reipubl. Popularis Sin. 2: 358. 1959.

皖南鳞盖蕨 wan nan lin gai jue

Plants terrestrial, ca. 30 cm tall. Rhizome creeping, densely gray-brown acicular hairy. Fronds approximate; stipe straw-colored, ca. 7.5 cm, 1–1.5 mm in diam., base only sparsely gray acicular hairy; rachis almost glabrous; lamina brown-green when dried, 2-pinnate, oblong in outline, 20–22 × ca. 10 cm, herbaceous, sparsely appressed gray pubescent on both surfaces and pinna rachis, apex acuminate; pinnae 8–12 pairs, alternate, ca. 3 cm apart, slightly reflexed, with stalk ca. 1 mm, slightly shorter at base, 1-pinnate, lanceolate, 4.5–5 × 1.5–2.5 cm, base subtruncate, almost parallel to narrowly winged rachis, apex acuminate; pinnules to 11 pairs, approximate, almost sessile, spreading, oblong, base asymmetrical, basiscopically cuneate, acroscopically truncate, slightly auriculate, margin pinnatifid to 1/3–1/2 of lobes, apex rounded; lobules broad, apex slightly serrate. Veins obvious abaxially but not adaxially, pinnate, veinlets simple. Sori small, at base of notch; indusium orbicular, small, sparsely hairy.

• Forests; 200–300 m. Anhui, Jiangxi, Zhejiang.

7. *Microlepia trichocarpa* Hayata, Icon. Pl. Formosan. 4: 210. 1914.

毛果鳞盖蕨 mao guo lin gai jue

Microlepia herbacea Ching & C. Christensen var. *trichosora* (Ching) Serizawa; *M. hispida* C. Christensen; *M. trichosora* Ching.

Plants terrestrial. Rhizome creeping, black-brown, ca. 5 mm in diam., with dense, red-brown, acicular hairs. Fronds remote; stipe brown, 25–35 cm, 3–4 mm in diam., with dense, long, spreading, gray, acicular hairs, abscising to leave coarse

marks; lamina brown-green when dried, 2-pinnate, oblong in outline, 30–60 × 20–30 cm, herbaceous, apex caudate acuminate; pinnae 18–25 pairs, alternate, 5–6 cm apart, with stalk 3–5 mm, slightly shorter at base, 1-pinnate, lanceolate, 12–18 × 3.2–3.6 cm, base subtruncate, parallel to rachis, apex acuminate; pinnules 20–30 pairs, adjacent, almost sessile, oblong, base asymmetrical, basiscopically cuneate, acroscopically truncate, slightly auriculate, margin pinnatifid to 1/3–1/2 of lobes, apex rounded or obtuse; lobules broad, with 1 or 2 coarse obtuse teeth at apex; pinnae progressively shorter toward apex, merging to form long acuminate or almost caudate terminal segment. Veins obvious on both surfaces, pinnate, veinlets simple. Sori at notch base; indusium hemitelioid, with dense, long, gray, acicular hairs, not easily seen.

Forests; 500–1500 m. Guangdong, Guangxi, Guizhou, Taiwan, Yunnan [NE India (Darjeeling), Nepal].

8. *Microlepia obtusiloba* Hayata, Bot. Mag. (Tokyo) 23: 27. 1909.

团羽鳞盖蕨 *tuan yu lin gai jue*

Microlepia ampla Ching; *M. chishuiensis* P. S. Wang; *M. hainanensis* Ching; *M. parastrigosa* Ching; *M. pseudostrigosa* Makino var. *tripinnata* Tardieu & C. Christensen; *M. taiwaniana* Tagawa.

Plants terrestrial. Rhizome creeping, ca. 4 mm in diam., with dense red-brown bristles. Fronds remote; stipe brown-straw-colored, ca. 40 cm, ca. 3 mm in diam., with spreading, gray, long, acicular hairs, abscising to leave scabrous marks; rachis and rachillae with spreading brown bristles; lamina brown-green when dried, 3-pinnatifid to 3-pinnate at base, 2-pinnate at middle, narrowly ovate in outline, 40–60 × 15–30 cm, thickly papery, glabrous adaxially, costa and veinlets abaxially with brown long bristles, apex long acuminate; pinnae upswept, with stalk ca. 10 mm, lanceolate in outline, 10–20 × 2–5 cm, basal pair longest, base symmetrical, rounded-cuneate, apex acuminate; pinnules ca. 9 pairs, oblong, ca. 2.5 × 1.2 cm, with thick teeth, base asymmetrical, basiscopically cuneate, acroscopically erect-truncate and parallel to pinna rachis, slightly auriculate, margin pinnatisect nearly to costule, apex obtuse; ultimate lobules 3 or 4 pairs, oblong, apex rounded, with few teeth; pinnae progressively shorter toward apex, merging to form long acuminate terminal segment. Veins obvious on both surfaces, 2 or 3 pairs in ultimate lobules, upswept, simple. Sori orbicular, small, at base of notch on lobules; indusium brown, hemitelioid, hairy.

Near streams in forests; below 100–1200 m. Guangdong, Guangxi, Guizhou, Hainan, Taiwan, Yunnan [N Vietnam].

Fraser-Jenkins (Taxon. Revis. Indian Subcontinental Pteridophytes, 85. 2008) included *Microlepia taiwaniana* as a synonym of the C Indian species *M. hallbergii* (d'Almeida) C. Christensen, the inclusion of which would extend the distribution significantly westward.

Microlepia subpinnata Hayata (Icon. Pl. Formosan. 4: 209. 1914), described from Taiwan, was treated as a synonym of *M. hainanensis* in FRPS (2: 224. 1959).

9. *Microlepia krameri* C. M. Kuo, Taiwania 30: 59. 1985.

克氏鳞盖蕨 *ke shi lin gai jue*

Plants terrestrial. Rhizome creeping, ca. 5 mm in diam. Fronds distant; stipe ca. 45 cm, densely scabrous hairy; rachis, rachillae, and veins densely puberulent. Lamina yellow-green when dried, bipinnate, ovate-oblong in outline, 60–80 × 40–50 cm, thinly papery, both surfaces glabrous; pinnae ca. 15 pairs, alternate, obliquely spreading, with stalk 2–4 mm, 4–8 cm apart, 20–25 × ca. 5 cm, with slender hairs; pinnules 20–25 pairs, alternate, ca. 1 cm apart, sessile, rhombiform-oblong, 1.5–2.5 × 1.2–1.3 cm, base cuneate, margin acroscopically pinnatifid up to 1/2 way to costa, apex shallowly crenate, obtuse. Veins abaxially prominent. Sori intramarginal; indusium slightly hairy.

• Forests; below 100–500 m. Hong Kong, Taiwan.

10. *Microlepia crassa* Ching, Fl. Reipubl. Popularis Sin. 2: 360. 1959.

革质鳞盖蕨 *ge zhi lin gai jue*

Plants terrestrial, more than 1 m tall. Rhizome creeping, densely dark brown hairy. Stipe 40–60 cm, ca. 4 mm in diam. at base, densely hairy, hairs distally caducous, almost glabrous; rachis and rachillae with dense, brown, short hairs abaxially, glabrous adaxially; lamina brown-green when dried, shiny, 2-pinnate, oblong in outline, 40–50 × 15–20 cm, leathery, both surfaces glabrous, with sparse, brown, short hairs only on lower veins, base slightly narrowed or not, apex long acuminate; pinnae ca. 20 pairs, alternate, basally ca. 9 cm apart, obliquely spreading, with stalk ca. 5 mm, 1-pinnate, broadly lanceolate, 15–20 × 4–6 cm, base asymmetrical, basiscopically cuneate (pinnule slightly shorter), acroscopically truncate, almost parallel to rachis, apex long acuminate, caudate; pinnules more than 20 pairs, compact, ± overlapping, with stalk ca. 1 mm, spreading, nearly rhombiform, 2.5–3.5 × 1.2–1.3 cm, unequal at base, basiscopically narrowly cuneate, acroscopically truncate, parallel to rachis, pinnatifid to 1/2 way to costa, margin dentate, apex acute; lobes oblong, apex rounded with 2 or 3 scattered teeth. Veins prominent abaxially, obvious adaxially, pinnate in lobes, 3 or 4 pairs, veinlets simple. Sori small; indusium brown, hemitelioid, sparsely shortly hairy.

• Forests. Yunnan.

11. *Microlepia chrysocarpa* Ching, Sinensia 1: 3. 1929.

金果鳞盖蕨 *jin guo lin gai jue*

Plants terrestrial, 60–80 cm tall. Rhizome long creeping, 3–4 mm in diam., with dense, long, brown-red hairs. Fronds distant; stipe brown, slightly shiny, 32–40 cm, as thick as rhizome, base with dense long brown-red hairs, distally with short hairs; rachis and rachillae with dense short hairs; lamina brown-green when dried, 3-pinnatisect, oblong-ovate in outline, 35–40 × 10–15 cm, herbaceous, both surfaces glabrous, small rachillae sparsely shortly hairy, apex acuminate; pinnae 14–17 pairs, alternate, usually overlapping, obliquely spreading, with stalk ca. 5 mm, 2-pinnatisect, broadly lanceolate in outline, 10–12 × 4–5 cm, base unequal, basiscopically cuneate, acroscopically truncate, apex acuminate; pinnules 14–17 pairs, adjacent, obliquely spreading, shortly stalked, pinnatisect, oblong-lanceo-

late, 2–2.5 × 0.7–1 cm, base unequal, basiscopically cuneate, acroscopically truncate and parallel to rachis, apex acuminate; pinnules 6 pairs, compact, obliquely spreading, oblong, 5–7 × 3–4 mm, margin crenate, apex obtuse. Veins in lobules pinnate, 4 or 5 pairs, veinlets furcate. Sori small, distant from margin, terminal on one of furcate veinlets; indusium brown, hemitelioid, almost glabrous.

• Wet limestone areas; 300–500 m. Chongqing, Guangxi, Guizhou, Hunan.

12. *Microlepia substrigosa* Tagawa, Acta Phytotax. Geobot. 5: 189. 1936.

亚粗毛鳞盖蕨 ya cu mao lin gai jue

Plants terrestrial, ca. 60 cm tall. Rhizome long and creeping, ca. 3 mm in diam., with dense, long, chestnut-brown, acicular hairs. Fronds distant; stipe brown-straw-colored, 30–50[–70] cm, ca. 3 mm in diam., stipe, rachis, and rachillae abaxially with short brown hairs, adaxially almost glabrous; lamina green when dried, 2-pinnate, oblong-lanceolate in outline, 50–100(–125) × 30–50(–60) cm, herbaceous, with sparse, acicular, long hairs on both surfaces and along veins, glabrous between veins, apex acuminate; pinnae ca. 18 pairs, opposite at base, alternate distally, ca. 5 cm apart, obliquely spreading, with stalk ca. 5 mm, lanceolate, 10–20 × 3–5 cm, basal basiscopic pinna longer, base asymmetrical, basiscopically broadly cuneate to rounded, acroscopically truncate, apex slightly obtuse, rarely acute; pinnules 12 or 13 pairs, adjacent, stalked, oblong, 2–2.2 × ca. 1.1 cm, basiscopically pinnatifid, acroscopic ones slightly shorter at base, apex obtuse or acute; lobules obovate to oblong, basal acroscopic lobes largest, entire, with few notches, apex rounded. Veins slender, obvious abaxially, not distinct adaxially, pinnate, veinlets bifurcate or simple distally. Sori small; indusium brown, orbicular-reniform, hirsute.

Semi-shaded to shaded areas in broad-leaved forests; 700–1600 m. Taiwan [Japan].

13. *Microlepia strigosa* (Thunberg) C. Presl, Epimel. Bot. 95. 1851.

粗毛鳞盖蕨 cu mao lin gai jue

Trichomanes strigosum Thunberg in Murray, Syst. Veg., ed. 14, 941. 1784; *Davallia japonica* (Swartz) Kunze; *D. strigosa* (Thunberg) Kunze; *Dennstaedtia strigosa* (Thunberg) J. Smith; *Dicksonia japonica* Swartz; *D. strigosa* (Thunberg) Thunberg; *Microlepia formosana* Ching; *M. japonica* (Swartz) C. Presl; *M. kwangtungensis* B. S. Wang; *M. neostrigosa* Ching.

Plants terrestrial, 80–110 cm tall. Rhizome long and creeping, ca. 4[–5] mm in diam., with dense, long, gray-brown, acicular hairs. Fronds distant; stipe brown, ca. 50 cm, ca. 4 mm in diam. at base, basally densely hairy, hairs abscising easily to leave scabrous marks; rachis and rachillae abaxially with dense, short, brown hairs, adaxially glabrous; lamina green or brown when dried, 2-pinnate, oblong in outline, basal pinnae slightly shorter, middle pinnae [20–]50[–70][–80] × 15–35 cm, papery, abaxially with sparse, short, gray-brown, stiff hairs, adaxially glabrous, apex acuminate; pinnae 25–35 pairs, alternate, 4–6 cm apart, obliquely spreading, shortly stalked, linear-lanceolate,

15–17 × ca. 3 cm, base asymmetrical, basiscopic pinnae slightly shortened, apex long acuminate; pinnules 25–28 pairs, adjacent, sessile, spreading, variously pinnatifid, nearly rhombiform, 1.4–2 × 0.6–0.8 cm, base asymmetrical, basiscopically narrowly cuneate, ± decurrent, basal acroscopic lobule largest, margin coarsely and irregularly toothed, apex acute. Veins prominent abaxially, obvious adaxially, pinnate or bifurcate. Sori small, near margin of lobes; indusium brown, hemitelioid, with short brown hairs.

Forests; 100–1000 m. Chongqing, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [Himalaya, Indonesia, Japan, Philippines, Sri Lanka, Thailand; Pacific islands].

14. *Microlepia pseudostrigosa* Makino, Bot. Mag. (Tokyo) 28: 337. 1914.

假粗毛鳞盖蕨 jia cu mao lin gai jue

Microlepia caudifolia Ching; *M. critica* Ching; *M. glabra* Ching; *M. micangshanensis* X. S. Guo & B. Li; *M. omeiensis* Ching; *M. sinostrigosa* Ching; *M. wentongensis* B. S. Wang.

Plants terrestrial, 60–100 cm tall. Rhizome long and creeping, ca. 4 mm in diam., with dense, long, red-brown, acicular hairs. Fronds distant; stipe 30–40 cm, ca. 4 mm in diam. at base, basally sparsely brown hispid; rachis and rachillae with dense, short, brown hairs, glabrous adaxially; lamina brown-green when dried, bipinnate, oblong in outline, 30–60 × 20–25 cm, base slightly shorter, apex long acuminate; pinnae more than 25 pairs, alternate, 4–5 cm apart, obliquely spreading, with stalk ca. 2 mm, 1-pinnate, linear-lanceolate, lowest 2 or 3 pairs of pinnae slightly shorter, middle pinnae 12–15 × 2–3 cm, firmly herbaceous, both surfaces glabrous except for sparsely hairy veins abaxially, base asymmetrical, basiscopically cuneate, acroscopically truncate and slightly auriculate, widest at middle, gradually narrowed upward, apex acuminate; pinnules 20–22 pairs, adjacent, spreading, very shortly stalked, nearly rhombiform, 1.5–2.5 × 0.5–1 mm, with teeth, base asymmetrical, basiscopically narrowly cuneate, acroscopically truncate; lobes 2 or 3, oblong, serrate or pinnatisect, basal acroscopic lobe largest, margin coarsely denticulate, apex acute. Veins pinnate abaxially prominent, adaxially obscure. Sori small, terminal on apical furcate veinlets; indusium brown, orbicular-reniform, situated on broad base, brown, glabrous.

Near streams, shrublands; 100–1700 m. Chongqing, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Shaanxi, Sichuan, Yunnan, Zhejiang [Japan, Vietnam].

Microlepia attenuata from Fujian is very close to *M. pseudostrigosa* and could prove to be a somewhat depauperate form with the lamina only 6–9(–14) cm wide with 11–14 pairs of pinnae and with a cupular indusium. (See “Doubtful species” at the end of the treatment.)

15. *Microlepia tenera* Christ, Notul. Syst. (Paris) 1: 53. 1909.

薄叶鳞盖蕨 bao ye lin gai jue

Leucostegia tenera (Christ) Ching; *Microlepia singpienensis* Ching; *Oenotrichia tenera* (Christ) Tagawa.

Plants terrestrial. Rhizome slender, long and creeping, ca. 1.5 mm in diam., with sparse gray hairs. Fronds distant; stipe

gray-brown, ca. 20 cm, ca. 1.4 mm in diam., with scattered hairs, almost glabrous and with scabrous marks below; rachis and rachillae with sparse, gray, acicular hairs; lamina green when dried, 3-pinnatisect, oblong in outline, 20–36 × 12–15 cm, thinly herbaceous, both surfaces and along veins with sparse, gray, acicular hairs, base slightly wider, apex long acuminate; pinnae ca. 20 pairs, alternate, 5–6 cm apart, spreading, shortly stalked, closely connected upward, upswept, basal 8–10 pairs of pinnae bipinnate, oblong, slightly falcate, base rounded, symmetrical, apex acuminate, basalmost pair slightly longer, ca. 8 × 3–3.5 cm, pinnatisect; pinnules ca. 10 pairs, alternate, adjacent, spreading, almost sessile, 2-pinnatisect, oblong, slightly falcate, 15–20 × 8–10 mm, base asymmetrical, basiscopically cuneate, acroscopically truncate, apex obtuse; ultimate pinnules 6 or 7 pairs, oblong, 4–5 × ca. 2 mm, basal acroscopic pinnules largest, parallel with rachis, decurrent along narrowly winged rachillae, margin entire or distally with few broad obtuse teeth, apex rounded. Sori orbicular, small, at base of notch; indusium greenish, orbicular-reniform, small, fixed at basal notch, free laterally, membranous, glabrous, persistent.

• Forests, beside rocks; 1100–1400 m (in Taiwan). Guangxi, Guizhou, Taiwan, Yunnan.

16. *Microlepidia membranacea* B. S. Wang, Acta Sci. Nat. Univ. Sunyatseni 1961(2): 46. 1961.

膜质鳞盖蕨 mo zhi lin gai jue

Plants terrestrial. Rhizome slender, long and creeping, 5–6 mm in diam., with dense, long, dark brown hairs. Fronds distant; stipe gray-brown, columnar, 40–50 cm, 3–4 mm in diam., scabrous when hairs fall; lamina green when dried, 3-pinnate, oblong in outline, 45–60 × 25–30 cm, thinly herbaceous, semi-transparent, both surfaces and along veins glabrous or sparsely hairy; pinnae 12–15 pairs, alternate or subopposite, compact, 6–8 cm apart, spreading, shortly stalked; basal pinnae largest, 2-pinnate, ovate or ovate-lanceolate, 15–20 × 8–12 cm, slightly narrowed at base, asymmetrical, basiscopically cuneate, acroscopically truncate and parallel to rachis, ± covering rachis, apex acuminate; pinnules 12–15 pairs, alternate, adjacent, lanceolate to triangular-lanceolate, 5–6 × ca. 2 cm, base asymmetrical, basal pinnules shorter, at 90° to rachis, pinnate, apex acuminate; ultimate pinnules 5–8 pairs, pinnatifid, oblong in outline, 10–20 × 5–8 mm, base cuneate, decurrent, acroscopic margin serrate, perpendicular to small rachillae, apex rounded and serrate. Veins pinnate, with club-shaped hydathodes at tip of veinlets. Sori orbicular, small; indusium semicircular, small, membranous, glabrous.

• Near streams in dense forests; 300–500 m. Guangdong, Hunan.

17. *Microlepidia firma* Mettenius ex Kuhn, Linnaea 36: 146. 1869.

长托鳞盖蕨 chang tuo lin gai jue

Plants terrestrial. Rhizome creeping, 7–8 mm in diam., branching, with dense, red-brown, stiff hairs. Fronds ca. 1 cm apart; stipe ca. 75 cm, 5–6 mm in diam. at base, gray-straw-colored, base with long gray-brown hairs, scabrous, distally glabrescent; rachis, rachillae, and stalk concolorous, abaxially

densely gray-brown pubescent, adaxially glabrous. Lamina dark yellow-green abaxially, deep brown adaxially when dried, 3-pinnate or 4-pinnatifid, triangular-ovate in outline, 45–60[–70] × 30–35[–50] cm; pinnae 12–14 pairs, alternate, upswept, 9–10 cm apart, stalk 1–3 cm, lower pinnae 2- or 3-pinnatisect, broadly lanceolate–triangular, basal pinnae largest, 20–26 × 10–15[–20] cm, firmly papery or subleathery, abaxially with sparse gray bristles along veins, especially on rachillae, adaxially glabrous, apex acuminate or caudate; pinnules ca. 15 pairs, alternate, anadromous, ca. 2 cm apart, spreading or upswept, stalk 3–4 mm, lower ones 1-pinnate or 2-pinnatifid, broadly lanceolate–triangular, 6–7.5 × 2–3 cm, base unequal in width, basiscopically broadly cuneate, acroscopically erect and truncate, parallel with rachis, apex long caudate; ultimate pinnules 10–12 pairs, alternate, sessile, anadromous, compact, acroscopic pinnules usually pinnatisect or not, obviously elongated at base, ca. 2 × 1 mm, base asymmetrical, acroscopically truncate, basiscopically broadly cuneate, margin subentire, apex rounded; ultimate lobes sessile, obovoid, decurrent at base, almost entire or with sparse obtuse teeth toward apex, apex obtuse; ultimate pinnules shortened upward, pinnatifid, oblong, 1–1.5 × 0.4–0.6 mm, entire toward obtuse apex. Veins abaxially prominent, adaxially not distinct, pinnate, reaching margin. Sori at base of notch along acroscopic margin of ultimate lobules, usually becoming shortly columnar and protruding from indusium; indusium brownish, hemitelioid, large, with dense long hairs.

Forests; 1200–2500 m. Sichuan, Xizang, Yunnan [Bhutan, India, Myanmar, Nepal, Sri Lanka, Thailand].

18. *Microlepidia khasiyana* (Hooker) C. Presl, Epimel. Bot. 95. 1851.

西南鳞盖蕨 xi nan lin gai jue

Davallia khasiyana Hooker, Sp. Fil. 1: 173. 1845; *Microlepidia angustipinna* Ching; *M. kansuensis* Ching; *M. medogensis* Ching; *M. szechuanica* Ching.

Plants terrestrial, ca. 100 cm tall. Rhizome long and creeping, ca. 5 mm in diam., with dense, long, gray-brown, acicular hairs. Fronds ca. 3 cm apart; stipe ca. 30 cm, 4–5 mm in diam. at base, with long, brown, acicular hairs, distal hairs abscising to leave marks; rachis and pinna rachis abaxially with dense brown hairs, adaxially glabrous; lamina green when dried, bipinnate, narrowly oblong in outline, 60–70 × 20–30 cm, firmly papery, abaxially with short, gray-brown, stiff hairs on rachillae and all veins, adaxially glabrous, base slightly shortened or not, apex long acuminate; pinnae 18–25 pairs, alternate, 5–8 cm apart, obliquely upward spreading, with stalk 3–4 mm, linear-lanceolate in outline, 10–15 × 2.5–3.5 cm, base asymmetrical, cuneate, apex long acuminate; pinnules 20–23 pairs, adjacent, almost sessile, spreading, pinnatisect, subrhombic, 1.5–2 × 0.5–0.8 cm, base asymmetrical, basiscopically narrowly cuneate, acroscopically truncate, parallel to rachillae, acroscopic pinnule largest at base, obtuse at apex; all lobules subentire, undulate, or with thick obtuse teeth. Veins prominent abaxially, obvious adaxially, pinnate in lobules, veinlets simple or furcate. Sori small, terminal on simple veinlets or acroscopic branch of furcate veinlets; indusium brown, hemitelioid, almost glabrous.

Forests, near streams; 500–2200 m. Chongqing, Gansu, Guizhou, Hunan, Sichuan, Xizang, Yunnan [India, Myanmar, Nepal].

Fraser-Jenkins (Taxon. Revis. Indian Subcontinental Pteridophytes, 80. 2008) suggested that *Microlepia khasiyana* is not separable from species 13 in this account, *M. strigosa*. C. B. Clarke (Trans. Linn. Soc. London, Bot. 1: 447. 1880) identified material of this species as *Davallia polypodioides* (Swartz) D. Don, here treated as a synonym of *M. speluncae*.

19. *Microlepia todayensis* Christ, Philipp. J. Sci., C, 3: 272. 1908.

乔大鳞盖蕨 qiao da lin gai jue

Microlepia crenata Ching; *M. crenatoserrata* Ching; *M. gigantea* Ching.

Plants terrestrial, ca. 2 m tall. Rhizome stout, creeping. Fronds distant; stipe 60–80 cm, 5–12 mm in diam. at base, slightly shiny, densely hairy, slightly scabrous; rachillae dark brown, with sparse short hairs. Lamina dark green abaxially, dark brown adaxially, 3-pinnatisect to 3-pinnate, 120–150 × 80–100 cm; pinnae many, 2-pinnatisect, 35–40 × 8–12 cm, papery, abaxially sparsely hairy, adaxially glabrous except for rachillae with sparse short hairs, apex acuminate; pinnules 20–25 pairs, alternate, 1.5–2.5 cm apart, spreading obliquely upward or patent, with narrowly winged stalk, broadly lanceolate, 5–10 cm, 2–2.5 cm wide at base, base unequal, parallel to rachillae, apex acute or acuminate; ultimate lobes 6–12 pairs, compact or ± overlapping; basal acroscopic lobes largest, oblong, ca. 15 × 6–7 mm, shallowly crenate, with rounded lobules on both sides, apex rounded, other ultimate lobes oblong, ca. 10 × 5 mm, apex crenate. Costa obscure, lateral veins obvious, pinnately branching, veinlets not reaching margin. Sori orbicular, small, on notch base and adjacent ultimate lobules; indusium brownish, shallowly bowl-shaped, hairy.

Forests or shrublands by roads; below 100–1300 m. Guangxi, Hainan, Yunnan [Indonesia (Sumatra), Malaysia, Philippines, Vietnam].

20. *Microlepia hancei* Prantl, Arbeiten Königl. Bot. Gart. Breslau 1: 35. 1892.

华南鳞盖蕨 hua nan lin gai jue

Microlepia caudiformis Ching; *M. chingii* B. S. Wang; *M. speluncae* (Linnaeus) T. Moore var. *hancei* (Prantl) C. Christensen.

Plants terrestrial. Rhizome creeping, gray-brown, densely villous with gray-brown, transparent, segmented hairs. Fronds distant; stipe brown-straw-colored or brown-yellow, slightly shiny, 30–40 cm, 2.5–4 mm in diam. at base, glabrous except for slightly scabrous base; rachis, rachillae, and stalk concolorous, scabrous, sparsely gray slender hairy (more so on pinna rachis). Lamina green or yellow-green when dried, 3-pinnatisect, ovate-oblong in outline, 50–60 × 25–30 cm, herbaceous, both surfaces and veins sparsely bristly, apex acuminate; pinnae 10–16 pairs, alternate, 8–10 cm apart, almost spreading, with stalk ca. 3 mm, narrowly winged bilaterally, basalmost pair narrowly triangular, slightly shorter, ca. 10 cm, ca. 5 cm wide at base, middle pinnae 2-pinnatisect, broadly lanceolate, 13–20 × 5–8 cm; pinnules 14–18 pairs, broadly lanceolate, ca. 2.5 × 1–

1.4 cm, anadromous, ca. 1.5 cm apart, sessile, equally wide at base, basispicopic pinnules slightly oblique, basal acroscopic pinnules parallel with rachis, slightly broad at base, asymmetrical, basispicopically cuneate, acroscopically truncate, parallel with or covering rachillae, gradually shorter upward, interval pinnatisect almost to small pinna rachis, apex obtuse; lobes 5–7 pairs, basal acroscopic lobe oblong, ca. 7 × 4–5 mm, basispicopic lobes subovate, ca. 5 × 3 mm, progressively shorter distally, base decurrent, somewhat connate, margin narrowly notched, apex obtuse-rounded. Veins abaxially slightly prominent, adaxially obscure, lateral veins slender, pinnate, not reaching margin. Sori orbicular, near acroscopic notch at pinnule bases; indusium gray-brown, nearly reniform, membranous, occasionally hairy.

Forests, damp places beside streams, roadsides, shrublands; sea level to 1500 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, Jiangxi, Taiwan, Yunnan, Zhejiang [Bhutan, ?Cambodia, India, Japan (including Ryukyu Islands), ?Laos, Nepal, Vietnam].

Bentham (Fl. Hongkong. 461. 1861) misidentified material of *Microlepia hancei* as *Davallia polypodioides* (Swartz) D. Don, now a synonym of *M. speluncae*. The Ferns of Thailand, Laos and Cambodia website (Lindsay & Middleton, http://rbg-web2.rbge.org.uk/thaiferns/factsheets/index.php?q=Microlepia_speluncae.xml; accessed 28 Mar 2012) treats *M. hancei* as a synonym of *M. speluncae*.

21. *Microlepia trapeziformis* (Roxburgh) Kuhn, Festschr. 50. Jähr. Jub. Königstädt. Realschule Berlin, 347. 1882.

针毛鳞盖蕨 zhen mao lin gai jue

Davallia trapeziformis Roxburgh, Calcutta J. Nat. Hist. 4: 516. 1844; *Microlepia rhomboidea* (Wallich ex Kunze) Prantl var. *trapeziformis* (Roxburgh) Prantl; *M. trichoclada* Ching; *M. yaoshanica* Ching; *M. yunnanensis* Ching.

Plants terrestrial. Rhizome creeping, deep brown, ca. 6 cm in diam., sparsely long gray bristly. Fronds distant; stipe straw-colored to grayish straw-colored, 30–60 cm, 3–4 mm in diam., almost glabrous, base sparsely hairy and with coarse marks. Lamina dark green when dried, 3-pinnate, broadly lanceolate in outline, 50–60 × 25–40 cm at middle, herbaceous, abaxially with dense, long, gray, shiny, appressed, acicular hairs, as in all rachillae abaxially, adaxially sparsely long acicular hairy or almost glabrous, apex subcaudate and acuminate; pinnae 15 pairs or more, alternate, 6–9 cm apart, spreading obliquely upward, with stalk ca. 1 cm, lower 6 or 7 pairs bipinnate, others 1-pinnate, basalmost pair slightly shorter, second pair broadly lanceolate to narrowly oblong-lanceolate, 17–24 × 5–7 cm, base broad, asymmetrical, basispicopically cuneate, acroscopically auriculate and parallel with pinna rachis, basispicopic lobe usually covering rachis, apex long acuminate; pinnules ca. 20 pairs, alternate, anadromous, compact, spreading, shortly stalked, 1-pinnate or pinnatisect to narrowly winged rachillae, oblong, 2–4 × 1–1.5 cm, acroscopic lobes longest, base asymmetrical, basispicopically cuneate, acroscopically truncate and parallel with pinna rachis, apex rounded or acute; distal pinnules 5–10 pairs, adjacent, spreading obliquely upward, oblong, 5–7 × 3–4 mm, base cuneate, somewhat decurrent along rachillae, entire or with 1 or 2 shallow notches, acroscopic side wider, usually with 2 or 3 acroscopic lobes, with basal pinnules largest, parallel to rachilla, apex rounded. Veins slender,

obvious on both surfaces, pinnately furcate, simple, or furcate in large lobules, not reaching margin. Sori orbicular, small, on top of ultimate lobes, distant from margin; indusium greenish, hemitelioid, small, very broad, with long hairs.

Forests; 500–1900 m. Guangdong, Guangxi, Hainan, Taiwan, Xizang, Yunnan [India, Indonesia, Malaysia, Myanmar, Philippines, Thailand, Vietnam].

Fraser-Jenkins (Taxon. Revis. Indian Subcontinental Pteridophytes, 84. 2008) believes that *Microlepidia trapeziformis* is a synonym of *M. pilosiuscula* (Smith) C. V. Morton. Reviewer Ralf Knapp suggests that the records from Taiwan are based on material of the following species, *M. rhomboidea*.

22. *Microlepidia rhomboidea* (Wallich ex Kunze) Prantl, Arbeiten Königl. Bot. Gart. Breslau 1: 31. 1892.

斜方鳞盖蕨 xie fang lin gai jue

Davallia rhomboidea Wallich ex Kunze, Bot. Zeitung (Berlin) 8: 158. 1850; *D. strigosa* (Thunberg) Kunze var. *rhomboidea* (Wallich ex Kunze) Hooker & Baker, p.p.; *Microlepidia communis* Ching; *M. lofoushanensis* Ching; *M. pallida* Ching; *M. scyphoformis* Ching & Chu H. Wang; *M. strigosa* (Thunberg) C. Presl f. *pinnata* Y. C. Wu.

Plants terrestrial, ca. 1.4 m tall. Rhizome stout, ca. 5 mm in diam., densely long brownish acicular hairy. Fronds distant; stipe 60–70 cm, ca. 4 mm in diam., base with long brownish hairs, hairs abscising distally to leave scabrous marks and only sparse, short, brown hairs; rachis and rachillae with dense, short, brown hairs; lamina green when dried, 2- or 3-pinnate, oblong in outline, ca. 70 × 40 cm, herbaceous, both surfaces and veins with sparse, long, acicular hairs, base gradually narrowed, almost half as wide as widest part, apex acuminate; pinnae ca. 15 pairs, alternate, ca. 10 cm apart at base, spreading, with stalk ca. 5 mm, 2-pinnatisect, triangular-oblong or broadly lanceolate, falcate, ca. 25 × 7 cm, base asymmetrically subrounded, apex acuminate; pinnules 9–12 pairs, approximate, almost spreading, with stalk ca. 1 mm, narrowly oblong, ca. 4.5 × 1.2–1.7 cm, base asymmetrical, acroscopically truncate, basiscopically cuneate, slightly decurrent; ultimate pinnules or lobes oblong, apex rounded-obtuse, basal acroscopic lobules largest, margins entire or shallowly notched, apex obtuse to subtruncate. Veins obvious on both surfaces, pinnate at lobules, veinlets furcate. Sori small, at base of lobules; indusium greenish, hemitelioid, sparsely hairy.

Forests, near streams; 500–1000 m. Guangdong, Guangxi, Hainan, Yunnan [Bhutan, N India, Indonesia, Myanmar, Nepal, Philippines, Vietnam].

Reviewer Ralf Knapp indicates that *Microlepidia rhomboidea* is rare in Taiwan at altitudes of 1400–2000 m (see comment under previous species, *M. trapeziformis*).

23. *Microlepidia speluncae* (Linnaeus) T. Moore, Index Fil. 93. 1857.

热带鳞盖蕨 re dai lin gai jue

Polypodium speluncae Linnaeus, Sp. Pl. 2: 1093. 1753; *Aspidium speluncae* (Linnaeus) Willdenow; *Davallia flaccida* R. Brown; *D. polypodioides* (Swartz) D. Don; *D. polypodioides*

var. *pilosa* Hooker; *D. polypodioides* var. *pubescens* Hooker; *D. speluncae* (Linnaeus) Baker; *D. villosa* D. Don; *Dennstaedtia villosa* (D. Don) Copeland; *Dicksonia polypodioides* Swartz; *Microlepidia flaccida* (R. Brown) J. Smith; *M. ganlanbaensis* Ching; *M. hispidula* Alderwerelt; *M. intermedia* Ching; *M. mollifolia* Tagawa; *M. pilosissima* Ching; *M. pingpienensis* Ching; *M. polypodioides* (Swartz) C. Presl; *M. puberula* Lacaita (1916), not Alderwerelt (1913); *M. puberula* f. *pilosior* Lacaita; *M. pyramidata* Lacaita; *M. speluncae* var. *hirta* Beddome; *M. speluncae* var. *pubescens* (Hooker) Sledge; *M. speluncae* var. *pyramidata* (Lacaita) Tardieu & C. Christensen; *M. subrhomboidea* Ching; *M. subspeluncae* Ching; *M. villosa* (D. Don) Ching (1959), not C. Presl (1851).

Plants terrestrial, 1.2–1.5(–2) m tall. Rhizome creeping, more than 7 mm in diam., glabrescent. Fronds scattered; stipe straw-colored, ca. 50[–70] cm, stiff, usually with dense, short, gray-brown, segmented hairs; rachis and rachillae also straw-colored, with scattered soft hairs. Lamina yellow-green when dried, 3- or 4-pinnate, ovate-oblong in outline, 60–100 × 30–40[–50] cm, thinly papery, both surfaces with often dense, adpressed, slender hairs, base wider, gradually shorter distally, apex acuminate; pinnae 10–15[–20+] pairs, alternate, 10–15 cm apart, spreading obliquely upward, with stalk 1–1.5 cm, bipinnate, broadly lanceolate in outline, lowermost pinnae slightly smaller, largest pinnae 28–30 cm, 10–15 cm wide at base, apex long acuminate; pinnules 15–20 pairs, upswept, parallel with rachis, broadly lanceolate, 2.5–4 × 0.8–1 cm, pinnatisect almost to rachillae, base unequal in width, decurrent, cuneate basiscopically, subtruncate acroscopically, apex acuminate; distal lobes 6–8 pairs, suprabasal ones longer, parallel with rachillae, others oblong, 7–8 × ca. 4 mm, truncate acroscopically, straight-cuneate basiscopically, margin obtusely pinnatifid, apex rounded; lobules entire or apex with 2 or 3 dwarf obtuse teeth. Veins slightly prominent abaxially, pinnately branching. Sori near notch at margin of lobules; indusium brownish, shallowly saucer- or fan-shaped, small, firm, densely hairy.

Roadsides, shrublands; below 100–1100 m. Guangdong, Guangxi, Guizhou, Hainan, Taiwan, Xizang, Yunnan [Bhutan, Cambodia, India, Indonesia, Japan (Ryukyu Islands), Laos, Myanmar, Nepal, Philippines, Sri Lanka, Thailand, Vietnam; Africa, Australia (Queensland), Pacific islands (Polynesia), South America (Brazil), West Indies].

“*Microlepidia pilosula*” (C. Presl, Tent. Pterid. 125. 1836, nom. nud.), based on “*Davallia pilosula*” (Wallich, Numer. List, no. 263. 1839, nom. nud.), probably belongs here. It has also been placed within *M. trapeziformis*.

24. *Microlepidia subtrichosticha* Ching, Fl. Reipubl. Popularis Sin. 2: 368. 1959.

尖山鳞盖蕨 jian shan lin gai jue

Plants terrestrial, ca. 2.6 m tall. Rhizome creeping, ca. 15 mm in diam., densely brownish shortly hairy. Fronds distant; stipe brown, 1.2–1.5 cm in diam., smooth abaxially; rachillae densely brownish villous; lamina yellow-brown when dried, 4-pinnatisect, oblong, 100–200 × 70–150 cm, thinly herbaceous, abaxially gray pubescent throughout, with brown short hairs adaxially and along veins; pinnae many, spreading obliquely upward, with stalk ca. 1.5 cm, ovate-oblong, middle pinnae tri-

pinnate, ca. 90 × 26 cm, apex caudate and acuminate; pinnules more than 20 pairs, alternate, ca. 5 cm apart, with stalk ca. 3 mm, anadromous, almost spreading, lower pinnules 2-pinnate, broadly lanceolate, ca. 13 × 4–4.5 cm, base equal in width, apex acuminate; ultimate pinnules 16–18 pairs, adjacent, ca. 1 cm apart, spreading, sessile, 1-pinnate, broadly lanceolate, 2.5–3 × 7–9 mm, base asymmetrical, basiscopically broadly cuneate, decurrent, acroscopically truncate, parallel to rachillae, apex acuminate; distal lobes 5 or 6 pairs, oblong to obovoid, margins shallowly crenate, apex rounded-obtuse, suprabasal ones slightly longer, pinnatifid, entire upward. Veins obvious abaxially, pinnately branching. Sori on margin and along ultimate lobules; indusium brownish, shallowly bowl-shaped, slightly hairy.

- Fertile sandy beaches in forests; 500–800 m. Hainan.

25. *Microlepia boluoensis* Y. Yuan & L. Fu, *Nordic J. Bot.* 30: 170. 2012.

博罗鳞盖蕨 bo luo lin gai jue

Plants large, to 35 m tall. Rhizome short, creeping, up to 15 mm in diam., with dense, dark brown, multicellular, uniseriate hairs. Fronds remote, 1.5–2 cm apart; stipe to 13 m, ca. 14 mm in diam. at base, with elongate uniseriate hairs toward base and short uniseriate hairs toward apex; rachis with dark

brown, uniseriate hairs and prominently grooved abaxially; lamina light green abaxially, deeply tripinnatifid in medial and proximal portion in well-developed plants, ovate, 180–250 cm, papery when dry, with long, scattered, yellow-brown hairs on abaxial surface, rachis, and veins, gradually acuminate at apex; pinnae ca. 23 pairs, ascending, deeply pinnatifid, lanceolate, to 69 × 17 cm, cuneate at base, acuminate at apex; basal two pairs 2–4 cm apart, slightly reduced, subopposite; remaining pinnae alternate, subacute or rounded at apex and with lobed margins; pinnules ca. 33 pairs, linear-lanceolate, ca. 9 cm × 22–28 mm, pinnate except medial and distal portion with small subfalcate lobes, gradually acuminate at apex; ultimate pinnules ca. 15 pairs, ovate or oblong, subsessile, first basal acroscopic pinnule largest, usually parallel to rachis, remaining pinnules smaller, obtuse or rounded at apex, acroscopic base oblique, basiscopic base cuneate with incised margins. Veins simple or forked, oblique and visible on both surfaces of pinnules. Sori 1–13 on each pinnule, brownish, small, intramarginal and terminal on veins; indusium cup-shaped, thin, covered with hairs, rounded at base, cuneate at apex.

- Semi-shaded slopes along forest margins and roadsides; 200–300 m. Guangdong (Luofu Shan).

It has not been possible to include this recently described species, known to us only from the protologue, in the key to species.

Doubtful species

Microlepia attenuata Ching, *Wuyi Sci. J.* 1: 1. 1981.

渐狭鳞盖蕨 jian xia lin gai jue

Plants ca. 60 cm tall. Rhizome creeping, densely hairy. Fronds distant; stipe light straw-colored, ca. 23 cm, ca. 1.5 mm in diam., adaxially glabrous; rachillae adaxially glabrous, abaxially densely hairy. Lamina green when dried, bipinnate, oblong-lanceolate in outline, ca. 42 × 6–9 cm at middle, herbaceous, with sparse acicular hairs on veins abaxially, apex acuminate; pinnae 11–14 pairs, alternate, stalked, basally distant, distally adjacent, basal pinnae slightly shorter, lanceolate, falcate, ca. 5 cm, base asymmetrical, apex acuminate, middle pinnae lanceolate, ca. 8 × 1.4 cm, oblique; pinnules ca. 14 pairs, oblong, ca. 7 × 5 mm, acroscopic one larger at base, margin entire or undulate, apex obtuse. Veins adaxially distinct, bifurcate. Sori at tips of lobes; indusium cupular, subglabrous.

- Fujian.

See the note under *Microlepia pseudostrigosa* Makino. We could not locate the type for our study.

Microlepia tripinnata Ching, *Fl. Reipubl. Popularis Sin.* 2: 367. 1959.

浓毛鳞盖蕨 nong mao lin gai jue

Plants terrestrial, ca. 1.5 m tall. Stipe not seen; lamina yellow-brown when dried, 3-pinnate, ca. 60 × 46 cm, herbaceous, abaxially densely pilose, adaxially sparsely bristly on veins; pinnae many, subopposite below, alternate above, 12–15 cm apart at apex, spreading obliquely upward, 2-pinnate, oblong-lanceolate, lowermost pinnae with stalk ca. 8 mm, ca. 30 × 10 cm, middle pinnae with stalk ca. 5 mm, ca. 25 × 6 cm, base

broadly rounded-cuneate, almost symmetrical, apex long acuminate; secondary pinnae ca. 20 pairs, alternate, anadromous, shortly stalked, 1-pinnate, lanceolate, subfalcate, basal pinnae ca. 4 × 1 cm, base unequal, basiscopically cuneate, acroscopically prominently auriculate and parallel to rachillae, apex shortly acuminate; ultimate pinnules 8 or 9 pairs, remote from each other, spreading obliquely upward, 7–10 × 3–5 mm (suprabasal one largest), base somewhat connate, margin entire, apex obtuse. Pinnae lanceolate toward apex, ca. 10 × 2 cm, shortly stalked, bipinnate, gradually shorter upward. Veins obvious on both surfaces, pinnate in ultimate lobes, 3 or 4 pairs. Sori on base of suprabasal notch, ca. 0.5 mm from margin; indusium deeply cupular, thick, densely pilose.

- Forests. Yunnan.

We could not locate the type of *Microlepia tripinnata*, so we treat it here as a doubtful species. It was originally keyed out with *M. communis* Ching, which is here treated as a synonym of *M. rhomboidea*.

Microlepia ×hirtiindusiata P. S. Wang, *Pterid. Fl. Guizhou*, 441. 2001.

毛盖鳞盖蕨 mao gai lin gai jue

Plants terrestrial, 74–85 cm tall. Rhizome long and creeping, ca. 3 mm in diam., straw-colored to brownish; stipe and rachis covered with brown, articulate, long, acicular hairs. Fronds distant; stipe 27–37 cm, slightly shiny; lamina brownish green when dried, bipinnate, narrowly ovate, 47–54 × 18–25 cm, herbaceous to thinly papery, both surfaces densely long gray articulate hairy, with sparse short hairs between veins, base not narrowed; pinnae ca. 25 pairs, alternate, spreading, pinnatifid, long acuminate at apex; basal pinnae largest, linear-lan-

ceolate, 11–18 × 2.5–3.5 cm, oblique and broadly cuneate at base, acuminate to long acuminate at apex, pinnate; pinnules 15–20 pairs, alternate, compact, slightly oblique and spreading, obliquely oblong or obliquely rhombiform-ovate, almost sessile below, asymmetrical at base, subtruncate acroscopically, slightly convex to rounded-auriculate or not convex, cuneate basiscopically, narrow wing connected to pinna rachis, blunt or rounded at apex, with irregular serrate teeth at margin, acroscopic pinnule largest at base, usually lobed. Veins pinnate, prominent abaxially. Sori obvious, terminal on veinlets, intramarginal, sporangia abortive; indusium shallowly bowl- or fan-shaped, membranous, with dense, long, articulate hairs.

- Forest margins; ca. 1200 m. Guizhou.

The author Wang noted that this species (*Microlepia ×hirtiindusiata*) was intermediate between *Microlepia marginata* and *M. pseudostrigosa*: lamina bipinnate, indusium hemiteloid with dense long articulate hairs, and sporangia not developed and without spores. Accordingly, this is presumed to be a hybrid.

Microlepia straminea Ching, Fl. Reipubl. Popularis Sin. 2: 364. 1959.

广西鳞盖蕨 *guang xi lin gai jue*

Plants terrestrial, ca. 1.2 m tall. Rhizome not seen. Stipe dark straw-colored, shiny, ca. 45 cm, ca. 2.5 mm in diam., glabrous; lamina dull green when dried, 3-pinnatipartite, oblong in outline, ca. 60 × 30–35 cm, herbaceous, both surfaces sparsely very shortly villous, apex acuminate; pinnae ca. 15 pairs, alternate, 8–12 cm apart, obliquely spreading, with stalk ca. 3 mm, basal pairs bipinnatifid, lanceolate, 12–15 × 3–4 cm, equal in width at base, apex acuminate, shortly caudate; pinnules 15–18 pairs, shortly stalked, sessile upward, acroscopic pinna longer, 2–2.5 × ca. 1 cm, anadromous, alternate, almost spreading, broadly lanceolate, other pinnules oblong, 1.2–1.8 × 0.6–0.8 cm, base asymmetrical, basiscopically broadly cuneate, decurrent, acroscopically truncate and almost parallel to rachis,

pinnatifid nearly to pinna rachis, apex obtuse; ultimate lobes 5 or 6 pairs, obovate, apex rounded and coarsely serrate, compact, basal acroscopic lobes larger and with 2 pairs of lobules, others shallowly divided or not. Pinnae gradually shortened upward, oblong, forked, pinnatifid, ultimate lobules entire. Sori small, on notch of ultimate lobules; indusium light green, shallowly bowl-shaped, slightly hairy.

- 800–1500 m. ?Guangxi or ?Yunnan.

The type of *Microlepia straminea* was cited as *R. C. Ching 50192*. However, we found that *R. C. Ching 50192* (PE! KUN!), collected from the location cited in the protologue, is a species of Asteraceae. Another puzzle: the type is from Yunnan, but the Chinese vernacular name means “Guangxi *Microlepia* fern.” Based on the description, *M. straminea* is close to *M. speluncae* (Linnaeus) T. Moore.

Microlepia fujianensis Ching, Wuyi Sci. J. 1: 1. 1981.

福建鳞盖蕨 *fu jian lin gai jue*

Plants ca. 70 cm tall. Stipe straw-colored, ca. 28 cm, ca. 2 mm in diam., glabrous above. Lamina green, 2-pinnate, ovate, ca. 40 × 36 cm, base narrowed, apex acuminate; pinnae ca. 15 pairs, subopposite, adjacent, obliquely spreading, with stalk ca. 5 mm, pinnate, lanceolate, basal pinnae shorter, ca. 11 cm, largest pinnae to ca. 17 × 4.5 cm, herbaceous, adaxially glabrous, hairy on veins, base asymmetrical, apex acuminate; pinnules ca. 20 pairs, adjacent, pinnatifid, lanceolate, ca. 2.4 × 1 cm, base asymmetrical, basiscopically cuneate, acroscopically truncate, apex subacuminate; acroscopic lobes 4 or 5, dentate at apex. Sori intramarginal; indusium hemiteloid, subglabrous.

- Fujian.

Microlepia fujianensis is only known from the type specimen from Taining, Fujian, which we have not seen. It is evidently very close to *M. substrigosa*, but in *M. fujianensis* the rachis is strigose; the pinnules apically acuminate, with the upper margin deeply incised, the apex of the lobes dentate; and the indusium hemiteloid.