

NEPHROLEPIDACEAE

肾蕨科 shen jue ke

Xing Fuwu (邢福武)¹, Wang Faguo (王发国)¹; Peter H. Hovenkamp²

Plants medium-sized, terrestrial or creeping on rocks or small trees. Rhizome with peltate scales, dorsiventral, long creeping, or short and erect, sometimes bearing stolons or tubers, dictyostelic. Fronds distant or tufted, shortly to long stipitate; lamina lanceolate to elliptic-lanceolate, pinnate; pinnae glabrous or sometimes finely hairy; veins forked, free, ending in submarginal hydathodes. Sori orbicular, terminal on a veinlet, dorsal; indusium orbicular-reniform, often with a narrow sinus, or lunulate, broadly attached. Spores monoletate.

One genus and ca. 20 species: most tropical regions of the world; five species (one introduced) in China.

Ching Ren-chang, Fu Shu-hsia, Wang Chu-hao & Shing Gung-hsia. 1959. *Nephrolepis*. In: Ching Ren-chang, ed., *Fl. Reipubl. Popularis Sin.* 2: 313–318, 378; Wu Shiewhung. 1999. Nephrolepidaceae (excluding *Arthropteris*). In: Wu Shiewhung, ed., *Fl. Reipubl. Popularis Sin.* 6(1): 143–150.

1. NEPHROLEPIS Schott, Gen. Fil. t. 3. 1834.

肾蕨属 shen jue shu

Lepidoneuron Fée.

Plants terrestrial or epiphytic. Rhizome erect, short, dictyostelic, producing long wiry stolons and sometimes tubers giving rise to new plants. Stipe tufted; lamina pinnate; pinnae sessile, articulate to rachis, lanceolate or falcate, base usually asymmetrical, often auriculate on upper side, margin crenate. Sori orbicular, terminal on a veinlet; indusia orbicular-reniform, often with a narrow sinus or lunulate, with broad sinus. $x = 41$.

About 20 species: most tropical regions of the world; five species (one introduced) in China.

- 1a. Fronds 1–1.5 cm wide; lamina elliptic or flabellate, ca. 5 mm 1. *N. duffii*
1b. Fronds more than 4 cm wide; lamina lanceolate or falcate, more than 2 cm.
2a. Fronds usually pendulous; middle pinnae falcate 2. *N. falciformis*
2b. Fronds erect; middle pinnae lanceolate.
3a. Sori lunulate, with broad sinus; middle pinnae 2–3 cm 5. *N. cordifolia*
3b. Sori orbicular-reniform with narrow sinus; middle pinnae 4–8 cm.
4a. Sori not close to edge of pinnae (borne between margin and costa); upper base of pinnae not or hardly auriculate 3. *N. biserrata*
4b. Sori near edge of pinnae; upper base of pinnae auriculate 4. *N. brownii*

1. *Nephrolepis duffii* T. Moore, *Gard. Chron.*, n.s., 9: 622. 1878.

圆叶肾蕨 yuan ye shen jue

Fronds brownish green or brown when dry, herbaceous, both surfaces with appressed scales; stipe grayish brown, 10–22 cm, with appressed, brown, linear or ovate-lanceolate scales; scales membranous, margin fimbriate; lamina linear, 30–60 × 1–1.5 cm, irregularly 1–2 times branched in upper portion; pinnae numerous, elliptic or flabellate, basal ones shorter and more widely spaced, upper ones close or touching each other; central pinnae ca. 5 × 7 mm, base usually truncate, margin irregularly crenate; rachis with appressed, brown, ovate-lanceolate scales. Fertile fronds not seen.

Cultivated. NW Yunnan [originally from Melanesia].

This is probably a form of *Nephrolepis hirsutula* (G. Forster) C. Presl.

2. *Nephrolepis falciformis* J. Smith, *Ferns Brit. For.* 287. 1866.

镰叶肾蕨 lian ye shen jue

Rhizome with dark brown scales. Fronds usually pendulous, thinly herbaceous, both surfaces glabrous; stipe 10–25 cm, with sparse, ovate scales; lamina broadly lanceolate, 60–120 × 9–11 cm, pinnate; basal pinnae distant, small, elliptic, 1.5–2.8 × 1–1.5 cm, base truncate and slightly auriculate, apex rounded; middle pinnae falcate, 5–6 × 1.5–1.8 cm, base truncate and slightly auriculate, apex acuminate. Sori orbicular, ca. 2 mm apart, submarginal; indusia brown, reniform.

Epiphytic on trunks in forests; 600–800 m. Yunnan [Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, Vietnam; SW Asia, Pacific islands].

This material was treated as *Nephrolepis falcata* (Cavanilles) C. Christensen in *FRPS* 6(1): 144. 1999). Although one of us (Hovenkamp) has examined the type and identified it as a Philippine endemic, two of us (Xing and Wang) prefer to use *N. falcata*, pending further studies.

3. *Nephrolepis biserrata* (Swartz) Schott, *Gen. Fil.* ad t. 3. 1834.

长叶肾蕨 chang ye shen jue

¹ South China Botanical Garden, Chinese Academy of Sciences, 723 Xingke Road, Tianhe District, Guangzhou, Guangdong 510650, People's Republic of China.

² Naturalis Biodiversity Center, Section NHN, Leiden University, P.O. Box 9514, 2300 RA Leiden, Netherlands.

Rhizome with rufous, lanceolate scales. Stipe grayish brown, 10–50 cm × ca. 4 mm, covered with lanceolate and fibrillar scales at base; lamina brownish green when dry, narrowly elliptic, 0.7–2 m or longer, 14–30 cm wide, papery, with sparse, lanceolate or linear scales when young, glabrous on both surfaces when mature; pinnae 30–55 pairs, 1.5–3 cm apart, subsessile, margin minutely serrulate, teeth remote, apex acute or acuminate, basal pairs of pinnae gradually shorter. Sori submedial, 1–2 mm apart, orbicular, 1.5–2 mm in diam.; indusia brown, orbicular-reniform, glabrous, sinus narrow.

Forests; near sea level to 800 m. Guangdong, Hainan, Taiwan, Yunnan [Cambodia, India, Indonesia, Japan (including Ryukyu Islands), Laos, Malaysia, Myanmar, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, Vietnam; Africa, SW Asia, Australia, North and South America, Pacific islands].

- 1a. Base of pinnae not auriculate on
acrosopic side 3a. var. *biserrata*
1b. Base of pinnae auriculate (auricle
ca. 1 cm) on acrosopic side 3b. var. *auriculata*

3a. *Nephrolepis biserrata* var. *biserrata*

长叶肾蕨(原变种) chang ye shen jue (yuan bian zhong)

Aspidium biserratum Swartz, J. Bot. (Schrader) 1800(2): 32. 1801; *Hypopeltis biserrata* (Swartz) Bory; *Lepidoneuron rufescens* (Schrader) Fée; *Nephrodium biserratum* (Swartz) C. Presl; *N. rufescens* Schrader; *Nephrolepis exaltata* (Linnaeus) Schott var. *biserrata* (Swartz) Baker; *N. hirsutula* (G. Forster) C. Presl var. *biserrata* (Swartz) Kuntze; *N. rufescens* (Schrader) C. Presl ex Wawra.

Middle pinnae 8–19 × 1–2.5 cm, base of pinnae asymmetrical but not auriculate acrosopically; rachis sparsely hairy.

Forests; near sea level to 800 m. Guangdong, Hainan, Taiwan, Yunnan [Cambodia, India, Indonesia, Japan, Laos, Malaysia, Myanmar, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, Vietnam; Africa, SW Asia, Australia, North and South America, Pacific islands].

3b. *Nephrolepis biserrata* var. *auriculata* Ching, Fl. Reipubl. Popularis Sin. 2: 378. 1959.

耳叶肾蕨 er ye shen jue

Nephrolepis platyotis Kunze.

Middle pinnae 14–16 × 1.6–2.2 cm, base of pinnae auriculate (auricle ca. 1 cm) on acrosopic side; rachis densely covered with long hairs abaxially; pinnae with brown fibrillar scales along costae abaxially.

- Hainan (Baoting, Lingshui).

4. *Nephrolepis brownii* (Desvaux) Hovenkamp & Miyamoto, Blumea 50: 293. 2005.

毛叶肾蕨 mao ye shen jue

Nephrodium brownii Desvaux, Mém. Soc. Linn. Paris 6: 252. 1827; *Aspidium floccigerum* Blume; *Davallia multiflora* Roxburgh; *Nephrolepis floccigera* (Blume) T. Moore; *N. multiflora* (Roxburgh) F. M. Jarrett ex C. V. Morton.

Rhizome erect, short, producing long, dark brown stolons;

scales lanceolate to ovate-lanceolate, appressed, with rufous center and brown, densely fimbriate margin. Fronds dark green when dry, bearing scattered, linear scales along veins abaxially, with sparse, curved hairs and stellate scales adaxially; stipe grayish brown, 15–45 cm × 2–3 mm, grooved adaxially, with appressed, brown, lanceolate scales; lamina broadly lanceolate or elliptic-lanceolate, 30–70(–100) × 9–15 cm, pinnate; pinnae numerous (20–50 pairs), approximate, basal ones gradually shorter and more widely spaced, upper ones never so close as to touch each other, subsessile; middle pinnae lanceolate or linear-lanceolate, 4–8 × 1–1.3 cm, base unequal, triangularly auriculate on acrosopic side, margin obviously crenate, apex acuminate; rachis densely covered with brown, fibrous scales on upper side. Sori ca. 2 mm apart, submarginal, orbicular; indusia rufous, orbicular-reniform.

Forests; 200–1200 m. Fujian, Guangdong, Guangxi, Hainan, Taiwan, Yunnan [Cambodia, India, Indonesia, Japan (including Ryukyu Islands), Laos, Malaysia, Myanmar, Philippines, Singapore, Sri Lanka, Thailand, Vietnam; SW Asia, Australia, North and South America (introduced), Pacific islands].

This material was treated as *Nephrolepis hirsutula* (G. Forster) C. Presl in FRPS (6(1): 149. 1999). However, one of us (Hovenkamp) has examined the type and maintains that *N. hirsutula* is a Malay/Pacific species and does not occur in China.

5. *Nephrolepis cordifolia* (Linnaeus) C. Presl, Tent. Pterid. 79. 1836.

肾蕨 shen jue

Polypodium cordifolium Linnaeus, Sp. Pl. 2: 1089. 1753, nom. cons.; *Aspidium cordifolium* (Linnaeus) Swartz; *A. tuberosum* Bory ex Willdenow; *Dryopteris auriculata* (Linnaeus) Kuntze; *Nephrodium tuberosum* (Bory ex Willdenow) Desvaux; *Nephrolepis auriculata* (Linnaeus) Trimen, nom. utique rej.; *N. tuberosa* (Bory ex Willdenow) C. Presl; *P. auriculatum* Linnaeus, nom. utique rej.

Plants terrestrial or epiphytic. Rhizome erect, short, covered with yellowish brown, narrowly lanceolate scales; stolons bearing scaly tubers (1–1.5 cm in diam.). Stipe 5–15 cm, densely covered with same scales as on rhizome; lamina linear-lanceolate or narrowly lanceolate, 25–75 × 3–6 cm, pinnate; pinnae 40–120 pairs, approximate, lanceolate, 1.5–2.5 × 0.6–1.2 cm, unequal at base, margin serrulate to crenate, auricle acute, lower pinnae obtuse, gradually shorter upward; rachis with sparse, fibrillar scales. Sori lunulate or rarely orbicular-reniform; indusia brown, elongate.

Forests, along streams; near sea level to 1500 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, Taiwan, Xizang, Yunnan, Zhejiang [Bangladesh, Bhutan, Cambodia, India, Indonesia, Japan, Korea, Laos, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, Vietnam; Africa, SW Asia, Australia, North and South America, Pacific islands].

Slender plants of *Nephrolepis cordifolia* are sometimes mistaken for *N. undulata* (Afzelius) J. Smith (Bot. Mag. 72: 35. 1846; *Aspidium undulatum* Afzelius, J. Bot. (Schrader) 1800(2): 32. 1801; *Nephrodium delicatulum* Decaisne; *Nephrolepis delicatula* (Decaisne) Pichi Sermolli; *N. occidentalis* Kunze; *N. paucifrons* J. F. R. Almeida), but this species has not (?yet) been found in China. *Nephrolepis undulata* can be recognized by its slender, seasonal rhizome, which usually does

not bear more than one or two fronds at the same time, whereas *N. cordifolia* forms perennial rhizomes that regularly bear five or more well-developed fronds.

We do not follow the identification by Jarvis (Order Out of Chaos, 759. 2007) of *Polypodium auriculatum* Linnaeus (Sp. Pl. 2: 1088. 1753) with *Nephrolepis biserrata*.