

ONOCLEACEAE

球子蕨科 qiu zi jue ke

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Plants terrestrial. Rhizome robust and short, erect or creeping, dictyostelic, covered with ovate-lanceolate to lanceolate scales. Fronds tufted or distant, dimorphic. Sterile lamina pinnatifid to bipinnatifid, green, deltoid-ovate, elliptic-lanceolate, or oblanceolate, papery or thinly papery; pinnae alternate, sessile or adnate, linear-lanceolate to narrowly elliptic, undulate or pinnatifid; pinnules hemielliptic-oblong, entire or subserrate with few teeth; veins free, pinnate or anastomosing, without included veinlets. Fertile lamina pinnate or bipinnate, elliptic to linear; pinnae or pinnules much inrolled, dull purple to dark brown, cylindrical or globose; veins free, pinnate or furcate. Sori orbicular, indusiate or exindusiate; sporangia long stalked, annulus a longitudinal row consisting of 36–40 thick-walled cells; spores monolete, with perispore transparent, membranous, with a few folds.

Four genera and five species: temperate zone of the N Hemisphere and Mexico; three genera and four species in China.

The following taxon is excluded from the present treatment, pending further research: *Struthiopteris cavalieriana* Christ (Bull. Acad. Int. Géogr. Bot. 13: 118. 1904; *Matteuccia cavalieriana* (Christ) C. Christensen), type from China (“entre Pin-fa et Tou-Yunn”).

Wu Shiew-hung. 1999. Onocleaceae. In: Wu Shiew-hung, ed., *Fl. Reipubl. Popularis Sin.* 4(2): 157–165.

- 1a. Rhizome long creeping; veins in sterile lamina anastomosing; fertile pinnae moniliform 1. *Onoclea*
1b. Rhizome short, erect or creeping; veins in sterile lamina free; fertile pinnae cylindrical.
2a. Stipe and rachis deeply grooved adaxially, sterile lamina elliptic-oblanceolate to oblanceolate, with markedly narrowed base; sori indusiate 2. *Matteuccia*
2b. Stipe and rachis not grooved adaxially, sterile lamina ovate-deltoid or elliptic, with slightly narrowed base; sori indusiate or exindusiate 3. *Pentarhizidium*

1. ONOCLEA Linnaeus, Sp. Pl. 2: 1062. 1753.

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Angiopteris Adanson (1763), not Hoffmann (1796, nom. cons.); *Pterinodes* Siegesbeck ex Kuntze.

Plants medium-sized. Rhizome long creeping, dark brown, covered with brown scales. Fronds distant. Sterile lamina pinnate, green, ovate-triangular, papery, both surfaces glabrous, with white long filiform hairs only on rachis and costae; pinnae narrowly elliptic, margin shallowly lobed, basal 1 or 2 pairs shortly stalked, adnate to rachis; rachis always with narrow wings; veins obvious, anastomosing with hexagonal areoles, without included veinlets. Fertile lamina bipinnate, much contracted; pinnae linear, shortly stalked, much oblique; pinnules much inrolled into small spheres, subopposite, separate from each other. Sori orbicular, with raised receptacles, terminal at ends of veinlets, indusiate. Sporangia globose, slenderly stalked; spores narrowly elliptic, perispore transparent, with folds.

One species: E Asia (var. *interrupta*) and North America.

1. *Onoclea sensibilis* Linnaeus var. ***interrupta*** Maximowicz, Prim. Fl. Amur. 337. 1859.

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Onoclea interrupta (Maximowicz) Ching & P. S. Chiu.

Rhizome long creeping, dark brown, sparsely scaly; scales brown, broadly ovate, ca. 5 mm, membranous, margin entire or slightly undulate, apex acuminate. Stipe of sterile frond 20–50 cm, stramineous except at chestnut-brown base, sparsely brown scaly; sterile lamina basally pinnatifid-pinnate, apically pinnatifid, dark green when dry, ovate-triangular or ovate, 14–30 ×

13–25 cm, papery, slightly scaly, glabrous when mature; pinnae 5–8 pairs, 1.5–3 cm apart, narrowly elliptic, basal 1 or 2 pairs largest, 8–12 × 1.5–3 cm, shortly stalked, undulate or lobed at margin, sessile or adnate upward, connected by rachis wing; veins reticulate. Stipe of fertile frond 20–45 cm; fertile lamina bipinnate, much contracted, 15–25 × 2–4 cm; pinnae narrowly linear; pinnules globose, hardened, separate from each other. Indusium membranous, fixed at posterior base, free distally.

Wet meadows and wetlands in valleys; 200–900 m. Hebei, Heilongjiang, Henan, Jilin, Liaoning, Nei Mongol [Japan, Korea, Russia].

The typical variety occurs in North America.

2. MATTEUCCIA Todaro, Giorn. Sci. Nat. Econ. Palermo 1: 235. 1866, nom. cons.

荚果蕨属 jia guo jue shu

Pteretis Rafinesque.

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Rhizome robust, erect or oblique, covered with brown lanceolate scales. Fronds tufted. Stipe and rachis grooved adaxially. Sterile lamina bipinnatifid and apex pinnatifid, elliptic-oblongate to oblanceolate, papery or thinly papery, subglabrous or with few hairs or scales on rachis and costae; pinnae alternate, sessile, narrowly lanceolate, pinnatifid to 1/2; lobes oblique, oblong to elliptic, subentire or subserrate; veins free, pinnate, veinlets reaching lamina margin. Fertile lamina smaller than sterile lamina; lamina pinnate, elliptic to broadly oblanceolate; pinnae linear, alternate, subsessile, much inrolled into brown cylinders, concealing sori. Sori globose, with raised receptacles, borne at ends of veinlets, indusiate; sporangia spheroidal, slenderly stalked, annulus longitudinal, consisting of ca. 40 thick-walled cells; spores elliptic, perispore transparent, slightly folded.

One species: temperate zone of the N Hemisphere.

1. *Matteuccia struthiopteris* (Linnaeus) Todaro, Giorn. Sci. Nat. Econ. Palermo 1: 235. 1866.

荚果蕨 *jia guo jue*

Rhizome short and robust, erect, dark brown, stoloniferous, densely covered with brown scales; scales lanceolate, ca. 5 mm, membranous, entire, apex fibriform. Fronds tufted; stipe brown, 6–10 × 0.5–1 cm, deeply grooved adaxially, base swollen, triangular and densely scaly, sparsely scaly upward. Sterile lamina bipinnatifid, green or brown-green when dry, elliptic-oblongate to oblanceolate, 50–100 × 18–25 cm, markedly narrowed downward, papery, rachis and costae hairy or scaly; pinnae 40–60 pairs, alternate or subopposite, sessile, oblique, basal pairs gradually contracted to small auricles; pinnae above middle largest, lanceolate or linear-lanceolate, 10–15 × 1–1.5 cm, sessile, pinnatifid, pectinate, apex acuminate; lobes 20–25 pairs, close, oblong or subtriangular; veins obvious, 1.5–2 cm apart, pinnate, veinlets simple. Fertile lamina shorter than sterile lamina, pinnate, oblanceolate, 20–40 × 1–8 cm, gradually narrowed downward, lower pinnae much reduced; pinnae dark brown, linear-moniliform, hardened, much inrolled, concealing sori. Indusium membranous, fixed at posterior end, free distally.

Forests, valley wetlands, also cultivated as ornamentals; 100–3800 m. Gansu, Hebei, Heilongjiang, Henan, Hubei, Jilin, Liaoning, Shanxi, Sichuan, Xinjiang, Xizang [Japan, Korea, Russia; Europe, North America].

- 1a. Pinna lobes hemielliptic or suboblong, apex obtuse 1a. var. *struthiopteris*
 1b. Pinna lobes triangular-elliptic, apex acute 1b. var. *acutiloba*

1a. *Matteuccia struthiopteris* var. *struthiopteris*

荚果蕨(原变种) *jia guo jue* (yuan bian zhong)

Osmunda struthiopteris Linnaeus, Sp. Pl. 2: 1066. 1753; *Onoclea germanica* (Willdenow) Hooker; *O. struthiopteris* (Linnaeus) Hoffmann; *Pterinodes struthiopteris* (Linnaeus) Kuntze; *Pteris sinuata* Thunberg; *Struthiopteris europaea* Hornemann; *S. filicastrum* Allioni; *S. germanica* Willdenow.

Pinna lobes hemielliptic or suboblong, obtuse at apex.

Forests, valley wetlands, also cultivated as ornamentals; 100–3000 m. Gansu, Hebei, Heilongjiang, Henan, Hubei, Jilin, Liaoning, Shanxi, Sichuan, Xinjiang, Xizang [Japan, Korea, Russia; Europe, North America].

1b. *Matteuccia struthiopteris* var. *acutiloba* Ching, Fl. Tsingling, 2: 221. 1974.

尖裂荚果蕨 *jian lie jia guo jue*

Pinna lobes triangular-elliptic, acute at apex.

• Forests, valley wetlands; 1500–3800 m. Henan, Hubei, Shanxi, Sichuan.

3. PENTARHIZIDIUM Hayata, Bot. Mag. (Tokyo) 41: 715. 1927.

东方荚果蕨属 *dong fang jia guo jue shu*

Rhizome robust, erect or shortly creeping, apex ascending, dark brown, apical part densely covered with brown scales; scales lanceolate or broadly lanceolate, membranous, entire. Fronds approximate or tufted. Stipe of sterile frond brown, base swollen, bearing short or prominent pneumatophores, densely scaly, upward sparsely scaly; sterile lamina bipinnatifid, ovate-deltoid or elliptic, narrowed upward, slightly narrowed downward, papery, with sparse fibriform scales on rachis; pinnae 15–25 pairs, basal pinnae as long as above or shortened, base slightly narrowed, sessile, apex acuminate; lobes narrowly hemielliptic or oblong, entire or slightly dentate, apex obtuse, acute, or truncate; veins obvious, pinnate, veinlets simple or occasionally furcate, reaching lamina margin. Fertile lamina as long as or shorter than sterile lamina, pinnate, elliptic; pinnae close, dark purple, linear. Sori fused into linear coenosori when mature, indusiate or exindusiate.

Two species: E and S Asia; two species in China.

- 1a. Pinnae 2–3.5 cm wide; sori indusiate 1. *P. orientale*
 1b. Pinnae 1.5–1.8 cm wide; sori exindusiate 2. *P. intermedium*

1. *Pentarhizidium orientale* (Hooker) Hayata, Bot. Mag. (Tokyo) 42: 345. 1928.

东方荚果蕨 *dong fang jia guo jue*

Struthiopteris orientalis Hooker, Sec. Cent. Ferns, t. 4.

1861; *Matteuccia japonica* (Hayata) C. Christensen; *M. orientalis* (Hooker) Trevisan; *Onoclea orientalis* (Hooker) Hooker; *Pentarhizidium japonicum* Hayata; *Pteris japonica* (Hayata) Ching; *P. orientalis* (Hooker) Ching; *Pterinodes orientalis* (Hooker) Kuntze.

Rhizome shortly creeping, apex ascending, dark brown, apical part densely covered with brown scales; scales lanceolate, ca. 2 cm, membranous, entire, apex fibriform. Fronds approximate. Stipe of sterile frond brown, 30–70 × 0.3–1 cm, base swollen, triangular, bearing short pneumatophores, densely scaly, upward sparsely scaly; sterile lamina bipinnatifid, ovate-deltoid, narrowed upward, slightly narrowed downward, 40–82 × 18–40 cm, thinly papery, with sparse fibriform scales on rachis and costae; pinnae 15–20 pairs, alternate, oblique, 2.5–3 cm apart, basal pinnae as long as above, base slightly narrowed, sessile, apex acuminate; lobes narrowly hemielliptic, oblique, entire or slightly dentate, apex obtuse or acute; veins obvious, pinnate, veinlets simple or occasionally furcate, reaching lamina margin. Stipe of fertile frond 20–45 cm; fertile lamina as long as or shorter than sterile lamina, pinnate, elliptic, 12–40 × 5–10 cm; pinnae oblique, close, dark purple, linear, ca. 10 × 0.5 cm, hardened. Sori fused into linear coenosori when mature; indusium membranous, fixed at posterior end, free distally. $2n = 80, 82$.

Streams in dense forests, slopes at forest margins, semi-shaded places in forests; 1000–2700 m. Anhui, Chongqing, Gansu, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangxi, Shanxi, Sichuan, Taiwan, Xizang, Zhejiang [India, Japan, Korea, Russia].

Matteuccia orientalis f. *monstra* Ching & K. H. Shing (J. Arnold Arbor. 64(1): 25. 1983) was described from Hubei.

2. *Pentarhizidium intermedium* (C. Christensen) Hayata, Bot. Mag. (Tokyo) 42: 346. 1928.

中华荚果蕨 *zhong hua jia guo jue*

Matteuccia intermedia C. Christensen, Bot. Gaz. 56: 337. 1913; *Onoclea intermedia* (C. Christensen) M. Kato, T. Suzuki & Nakato.

Rhizome short and robust, erect, dark brown, apical part densely covered with dark brown scales; scales broadly lanceolate, ca. 1.5 cm × 4 mm, membranous, entire, apex acuminate. Fronds tufted. Stipe of sterile frond brown, 20–30 × ca. 0.5 cm, base dark brown, firm, bearing prominent pneumatophores, with sparse lanceolate scales; sterile lamina bipinnatifid, elliptic, 40–60 × 15–25 cm, slightly narrowed downward, papery, glabrous, with brown linear-lanceolate scales on rachis; pinnae 20–25 pairs, alternate, oblique, close, midveins ca. 1.5 cm apart, basal 2 or 3 pairs of pinnae shortened, slightly reflexed; middle pinnae largest, linear or oblong-lanceolate, 13–15 × 1.5–2 cm, base truncate, sessile, margin pinnatifid, apex acuminate; lobes 20–30 pairs, close, oblong, entire, apex rounded or truncate with points; veins obvious, pinnate, veinlets simple or sometimes furcate, reaching lamina margin. Stipe of fertile frond 20–25 × 0.5–0.8 cm; fertile lamina shorter than sterile lamina, pinnate, elliptic, 30–45 × 8–15 cm; pinnae close, dark purple, linear, 3.5–5.5 × 0.2–0.3 cm. Sori exindusiate, fused into linear coenosori when mature. $2n = 80$.

Forests; 1500–3200 m. Guizhou (Hezhang), Hebei, Hubei, Shanxi, Sichuan, Yunnan [India (Sikkim)].