

7. **CARYA** Nuttall, Gen. N. Amer. Pl. 2: 220. 1818, nom. cons.

山核桃属 shan he tao shu

Hicoria Rafinesque, nom. rej.

Trees deciduous, monoecious. Branchlets with solid pith. Terminal buds naked or with false-valved scales (or overlapping). Leaves odd-pinnate; leaflets 3–17, margin serrate. Inflorescences lateral or terminal on old or new growth; male and female inflorescences separate: male spikes in clusters of 3, lateral at base of new growth or rarely on old growth, pendulous; female spike terminal on new growth, erect. Flowers anemophilous. Male flowers with an entire bract; bracteoles 2; sepals usually absent; stamens (2 or)3–7(–10), anthers pubescent or rarely glabrous. Female flowers with an entire bract adnate to ovary; bracteoles 3, adnate to ovary; sepals absent; style absent; stigmas commissural, stigmatic disc 4-lobed. Fruiting spike erect. Fruit a drupelike nut with a thick, 4-valved husk covering a smooth or wrinkled shell 2–4-chambered at base. Germination hypogeal.

About 17 species: E Asia, North America; five species (three endemic, one introduced) in China.

1a. Terminal bud scales 4 or more, false valved; leaflets (7 or)9–13(–17), commonly falcate 1. *C. illinoensis*

1b. Terminal buds naked; leaflets 5–9, not falcate.

2a. Buds brownish black; rachis glabrous; peltate scales virtually absent on leaflets abaxially; anthers glabrous; lacunae present in nut shell 2. *C. kweichowensis*

2b. Buds rusty brown; rachis pubescent; peltate scales conspicuous on leaflets abaxially; anthers pubescent (*C. hunanensis* unknown); lacunae absent in nut shell.

3a. Petiole tomentose; nuts subglobose 3. *C. tonkinensis*

3b. Petiole glabrescent; nuts ellipsoid or obovoid.

4a. Leaflets 5 or 7; husk winged to base; nuts ellipsoid, 2–3 × 1.5–2.3 cm; shell 1–2 mm thick 4. *C. cathayensis*

4b. Leaflets (5 or)7 or 9; husk winged to middle; nuts obovoid, 3–3.7 × 2.3–2.8 cm; shell 1.5–2.5 mm thick 5. *C. hunanensis*

1. ***Carya illinoensis*** (Wangenheim) K. Koch, Dendrologie 1: 593. 1869.

美国山核桃 mei guo shan he tao

Juglans illinoensis Wangenheim, Beytr. Teut.

Forstwiss. 54. 1787; *Hicoria olivaeformis* (Michaux)

Nuttall; *H. pecan* (Marshall) Britton; *Juglans*

olivaeformis Michaux; *J. pecan* Marshall.

Trees to 50 m tall. Terminal buds with 4 or more false-valved scales, yellowish brown. Leaves 25–35 cm; petiole 4–8 cm, glabrous or glabrescent; rachis generally glabrous or glabrescent; leaflets (7 or)9–13(–17), lateral ones shortly petiolulate or sessile, blade ovate-lanceolate to elliptic-lanceolate or long elliptic, 7–18 × 2.5–4 cm, with scattered, peltate scales, abaxially pubescent or glabrescent, base oblique, broadly cuneate or subrounded, apex acuminate; terminal petiolule 5–25 mm. Male spikes 8–14 cm; peduncle nearly absent. Anthers sparsely pilose. Nuts ovoid-ellipsoid, 3–5 × 2–3 cm; husk without prominent wings; shell without longitudinal ridges, ca. 1 mm thick, 2-chambered at base, lacunae present. Fl. May, fr. Sep–Nov. 2n = 32, rarely 64.

Cultivated. Fujian, Hebei, Henan, Hunan, Jiangsu, Jiangxi [native to United States].

Grown extensively in China for its edible nuts.

2. ***Carya kweichowensis*** Kuang & A. M. Lu ex Chang & Lu, Acta Phytotax. Sin. 17(2): 43. 1979.

贵州山核桃 gui zhou shan he tao

Trees to 20 m tall. Terminal buds naked, immature leaflets brownish black. Leaves 11–20 cm; petiole 2–4

cm, glabrous; rachis glabrous; leaflets 5, lateral ones with petiolule 1–5 mm, blade elliptic to elliptic-lanceolate, (3–)6–14 × 2–7 cm, virtually without peltate scales, abaxially glabrous except for hairs along midvein and clusters in axils of secondary veins, base oblique, obtuse or cuneate, apex obtuse or acute; terminal petiolule 5–10 mm. Male spikes ca. 14 cm; peduncle ca. 1 cm. Anthers glabrous. Nuts compressed-globose, 2–2.5 × 2–2.5 cm; husk wingless; shell without longitudinal ridges, ca. 2.5 mm thick, 4-chambered at base, lacunae present. Fl. Mar–Apr, fr. Oct.

• Forests on mountain slopes; 1000–1300 m. SW Guizhou.

3. ***Carya tonkinensis*** Lecomte, Bull. Mus. Hist. Nat. (Paris) 27: 437. 1921.

越南山核桃 yue nan shan he tao

Trees to 15 m tall. Terminal buds naked, brown. Leaves 15–25 cm; petiole ca. 6 cm, pubescent; rachis pubescent; leaflets 5 or 7, lateral ones sessile or shortly petiolulate, blade ovate-lanceolate to elliptic-lanceolate or obovate-lanceolate, 7–18 × 2–6 cm, with abundant, peltate scales, abaxially glabrous except for hairs along midvein and in axils of secondary veins, base oblique, apex acuminate; terminal petiolule 0–5(–10) mm. Male spikes 12–13 cm; peduncle 1–5 cm. Anthers puberulent. Nuts subglobose, 2.2–2.5 × 2.6–3 cm; husk without prominent wings; shell with 4 faint, longitudinal ridges, 1.2–2.3 mm, 4-chambered at base, lacunae absent. Fl. Apr–May, fr. Sep.

Mountain slopes; 1300–2200 m. Guangxi, NW to S Yunnan [India, N Vietnam].

There are no reports of the cultivation of this tree in China, but the oil is used for cooking.

4. *Carya cathayensis* Sargent, Pl. Wilson. 3: 187. 1916.

山核桃 shan he tao

Hicoria cathayensis (Sargent) Chun.

Trees to 20 m tall. Terminal buds naked, rusty brown. Leaves 16–30 cm; petiole 4–9 cm, glabrous; rachis pubescent; leaflets 5 or 7, lateral ones sessile or with petiolule ca. 1 mm, blade lanceolate or ovate-lanceolate, 10–18 × 2–5 cm, with abundant, peltate scales, abaxially glabrous except for hairs along midvein and in axils of secondary veins, base cuneate or subrounded, apex acuminate; terminal petiolule 4–10 mm. Male spikes 10–15 cm; peduncle 1–2 cm. Anthers puberulent. Nuts ellipsoid, 2–3 × 1.5–2.3 cm; husk winged to base; shell with 4 faint, longitudinal ridges, 1–2 mm thick, 4-chambered at base, lacunae absent. Fl. Apr–Jun, fr. Aug–Sep.

- Forests on mountain slopes, valleys, riverbanks; 400–1500 m. Anhui, S Guizhou, Jiangxi, Zhejiang. Commonly cultivated for its oily, edible nuts.

5. *Carya hunanensis* W. C. Cheng & R. H. Chang ex Chang & Lu, Acta Phytotax. Sin. 17(2): 42. 1979.

湖南山核桃 hu nan shan he tao

Trees to 14 m tall. Terminal buds naked, rusty brown. Leaves 20–30 cm; petiole 4–8 cm, glabrous; rachis pubescent; leaflets (5 or) 7 or 9, lateral ones sessile, blade elliptic to elliptic-lanceolate, (6–)11–18 × (2–)3.5–7 cm, with abundant, peltate scales, abaxially ± glabrous except for hairs along midvein and in axils of secondary veins, base cuneate, apex acuminate; terminal petiolule 0–5 mm. Male spikes unknown. Nuts obovoid, (2–)3–3.7 × 2.3–3 cm; husk winged to middle; shell with 4 faint, longitudinal ridges, 1.5–2.5 mm thick, 4-chambered at base, lacunae absent. Fl. Mar–Apr, fr. Sep–Nov.

- Forests in valleys, riverbanks; 900–1000 m. Guangxi, Guizhou, Hunan.

Cultivated for its edible nuts, which are also pressed for oil. *Carya cathayensis* and *C. hunanensis* are very similar, including the leaf color which tends to be green adaxially and rusty brown or bronze abaxially. They differ mainly in the number of leaflets, nut size, and the extent of wings on the husk.

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