

3. CARPINUS Linnaeus, Sp. Pl. 2: 998. 1753.

鹅耳枥属 e er li shu

Trees, sometimes shrubs, deciduous; bark fissured or smooth. Stipules deciduous. Leaves alternate, irregularly and doubly or simply serrate. Male inflorescence pendulous, spicate-cymose, cylindrical, enclosed by buds during winter, with many overlapping bracts; flowers without bracteoles or perianth; stamens 3–12, inserted at base of bracts; filaments forked at apex; anthers 2-loculed, thecae separate, pubescent at apex. Female inflorescence terminal or axillary on dwarf shoots, racemose; flowers paired; bracts leaflike, complanate, overlapping, 2- or 3-lobed at base. Nutlet ribbed, enclosed by lobes of bracts or not.

About 50 species: China, India, Japan, Korea, Laos, Myanmar, Nepal, Thailand, Vietnam; Europe, North and South America; 33 species (27 endemic) in China.

Because of inadequate material, *Carpinus fargesiana* has not been included in the key.

- 1a. Bracts of female flowers densely overlapping, with an inflexed lobe or auricle at base of inner margin, completely covering nutlet; nutlet with very faint ribs.
 - 2a. Female inflorescence to 50 cm; leaves ovate-lanceolate or elliptic-lanceolate, lateral veins 24–34 on each side of midvein 1. *C. fangiana*
 - 2b. Female inflorescence to 15 cm; leaves ovate, ovate-oblong, elliptic, or ovate-elliptic, lateral veins (10–)15–25 on each side of midvein.
 - 3a. Leaves with 20–25 lateral veins on each side of midvein; inner margin of bracts subentire 2. *C. rankanensis*
 - 3b. Leaves with (10–)15–20 lateral veins on each side of midvein; inner margin of bracts serrate . 3. *C. cordata*
- 1b. Bracts of female flowers loosely overlapping, with an inflexed or flattened lobe or auricle at base of inner margin, not completely covering nutlet; nutlet with prominent ribs.
 - 4a. Bracts with lobes at bases of inner and outer margins.
 - 5a. Bracts 2.5–3 cm, with subequal lobes at bases of both margins; nutlet 5–6 mm 4. *C. tientaiensis*
 - 5b. Bracts 1.5–2(–2.5) cm, with unequal lobes at bases of both margins; nutlet 3–4 mm.
 - 6a. Petiole robust, 4–7 mm, densely pubescent; nutlet with dense, brown, resinous glands and light yellow resin; outer margin of bracts entire or undulate-serrate 5. *C. londoniana*
 - 6b. Petiole slender, (1–)1.5–3 cm, glabrous; nutlet with sparse, brown, resinous glands; outer margin of bracts dentate 6. *C. viminea*
 - 4b. Bracts with an inflexed lobe or auricle at base of inner margin.
 - 7a. Bracts with an inflexed lobe at base of inner margin.
 - 8a. Bracts more than 2 cm, apex rounded or obtuse; nutlet ca. 5 mm or more.
 - 9a. Nutlet glabrous; bracts broadly semiovate; leaves elliptic or broadly elliptic, 5–10 × 3.5–5 cm, irregularly and doubly setiform serrate 7. *C. putoensis*
 - 9b. Nutlet densely white pubescent; bracts semiovate-oblong or falcate-oblong; leaves elliptic, narrowly elliptic, oblong, or narrowly oblong, 8–12 × 3.5–5.5 cm, irregularly and doubly minutely serrate 8. *C. kweichowensis*
 - 8b. Bracts less than 2 cm, apex acute or acuminate; nutlet 3–4 mm.
 - 10a. Nutlet sparsely pubescent at apex; leaves ovate, broadly ovate, ovate-elliptic, ovate-rhombic, or ovate-lanceolate, 2–6 × 1.3–4 cm 9. *C. turczaninowii*
 - 10b. Nutlet densely villous at apex; leaves oblong-lanceolate or ovate-lanceolate, 4–5 × 1.8–2.5 cm 10. *C. kawakamii*
 - 7b. Bracts with an inflexed auricle at base of inner margin.
 - 11a. Leaves doubly or simply setiform serrate along margin.
 - 12a. Nutlet with dense, brown or orange, resinous glands; peduncles and rachis densely yellow hirsute; bracts densely hispidulous 25. *C. monbeigiana*
 - 12b. Nutlet without resinous glands; peduncles and rachis pubescent or glabrescent; bracts pubescent.
 - 13a. Bracts 2.5–5 cm, nutlet 4–5 mm, glabrous; leaves 5–12 × 2.5–5 cm, lateral veins 14–16 on each side of midvein 26. *C. tschonoskii*

- 13b. Bracts 8–15 mm; nutlet less than 3.5 mm, pubescent or villous at apex; leaves 4–8 × 1.5–3.5 cm, lateral veins 12–20 on each side of midvein.
- 14a. Leaves leathery, lateral veins distinctly impressed adaxially 33. *C. rupestris*
- 14b. Leaves papery, lateral veins not impressed adaxially.
- 15a. Leaves glaucous abaxially 32. *C. omeiensis*
- 15b. Leaves not glaucous abaxially.
- 16a. Leaves rust-colored softly villous abaxially; branchlets, petioles, and peduncles white or light rust-colored softly villous; nutlet densely villous 31. *C. mollicoma*
- 16b. Leaves pubescent abaxially; branchlets, petioles, and peduncles glabrous; nutlet pubescent or glabrous.
- 17a. Leaves elliptic-lanceolate, oblong-lanceolate, lanceolate, or ovate-lanceolate, lateral veins 16–20 on each side of midvein; nutlet pubescent or villous only at apex.
- 18a. Leaves elliptic-lanceolate or oblong-lanceolate, 4–8 × 1.5–2.5 cm, margin doubly setiform serrate; nutlet pubescent 27. *C. polyneura*
- 18b. Leaves lanceolate or ovate-lanceolate, 2.5–4.5 × 1–1.5 cm, margin simply setiform serrate; nutlet glabrous except villous at apex 28. *C. dayongina*
- 17b. Leaves ovate, ovate-elliptic, elliptic, or elliptic-oblong, lateral veins 12–16 on each side of midvein; nutlet glabrous.
- 19a. Leaves ovate or ovate-elliptic, 4–5 × 2–2.5 cm, apex acuminate, lateral veins 12–15 on each side of midvein 29. *C. sungpanensis*
- 19b. Leaves elliptic or elliptic-oblong, 5–9 × 3.4–4 cm, apex caudate-acuminate, lateral veins 15 or 16 on each side of midvein 30. *C. tsunyiensis*
- 11b. Leaves doubly or simply serrate along margin.
- 20a. Bracts broadly semiovate, 2.5–3 × 1.5–1.8 cm; nutlet 5–6 mm, densely pubescent, with orange resinous glands 11. *C. tsaiiana*
- 20b. Bracts semiovate or broadly semiovate, 2–2.5 × 0.6–0.8 cm; nutlet ca. 4 mm or less, pubescent or glabrous, with brown, resinous glands or not.
- 21a. Rachis of female inflorescence densely hirsute 12. *C. chuniana*
- 21b. Rachis of female inflorescence sparsely pubescent or villous.
- 22a. Nutlet densely resinous glandular 13. *C. minutiserrata*
- 22b. Nutlet sparsely resinous glandular distally or not resinous glandular.
- 23a. Bracts less than 1.5 cm; leaves ovate-lanceolate, oblong-lanceolate, lanceolate, or narrowly lanceolate, 0.9–5 × 0.7–1.8 cm.
- 24a. Leaves simply serrate along margin; branchlets glabrous; nutlet sparsely pubescent, with resinous glands distally; bracts semiovate, loosely and irregularly dentate along outer margin 22. *C. purpurinervis*
- 24b. Leaves doubly serrate along margin; branchlets densely pubescent; nutlet densely pubescent, sparsely resinous glandular or not resinous glandular, bracts broadly semiovate, incised-dentate or minutely dentate.
- 25a. Nutlet with resinous glands; bracts 7–10 × ca. 5 mm, incised-dentate along outer margin; leaves lanceolate, 5–5.5 × 1.4–1.8 cm; trees 23. *C. hebestroma*
- 25b. Nutlet without resinous glands; bracts 7–13 × 4–6 mm, minutely serrate along outer margin; leaves ovate-lanceolate, 0.9–3.8 × 0.7–1.2 cm; shrubs 24. *C. microphylla*
- 23b. Bracts 1.5–2.5(–3) cm; leaves ovate, elliptic, oblong, or lanceolate, 5–10 × 2.5–4.5 cm.
- 26a. Leaves oblong or obovate-oblong; nutlet sparsely resinous glandular, villous distally 14. *C. shensiensis*
- 26b. Leaves elliptic-lanceolate, ovate-lanceolate, rarely elliptic or ovate; nutlet without resinous glands, glabrous or densely pubescent.
- 27a. Leaves and bracts without glands abaxially; leaves acutely doubly serrate along margin 21. *C. fargesiana*

- 27b. Leaves and bracts distinctly glandular abaxially; leaves doubly or simply mucronate serrate along margin.
- 28a. Nutlet densely pubescent except villous at apex.
 - 29a. Leaves papery, oblong, oblong-lanceolate, ovate-lanceolate, or ovate-elliptic, 5–10 × 2–3.5 cm, lateral veins not impressed adaxially 15. *C. pubescens*
 - 29b. Leaves leathery, ovate or elliptic, (2.7–)4–5 × 2–3.5 cm, lateral veins distinctly impressed adaxially 16. *C. firmifolia*
- 28b. Nutlet glabrous except sparsely villous at apex.
 - 30a. Leaves doubly serrate along margin.
 - 31a. Leaves ovate-lanceolate, ovate-elliptic, or elliptic-lanceolate, 6–10 × 2.5–4.5 cm; petiole gray villous 17. *C. hupeana*
 - 31b. Leaves obovate-oblong or oblong, 3.5–7 × 2.5–3.5 cm; petiole densely yellow villous 18. *C. oblongifolia*
 - 30b. Leaves simply serrate along margin.
 - 32a. Leaves narrowly lanceolate, narrowly elliptic-lanceolate, or oblong-lanceolate, 5–8 × 2–3 cm, margin subincurved serrate, apex acuminate or caudate-acuminate 19. *C. henryana*
 - 32b. Leaves ovate, ovate-elliptic, or ovate-lanceolate, margin 2–3.5 × 1–3 cm, mucronate serrate, apex acuminate 20. *C. stipulata*

1. *Carpinus fangiana* Hu, J. Arnold Arbor. 10: 154. 1929.
 川黔千斤榆 *chuan qian qian jin yu*
 Trees to 20 m tall; bark dark gray or gray-brown. Branchlets purple-brown, glabrescent. Petiole glabrous, ca. 1.5 cm; leaf blade ovate-lanceolate or elliptic-lanceolate, 6–27 × 2.5–8 cm, both surfaces glabrous except sparsely villous along midvein and lateral veins, bearded in axils of lateral veins, base cordate, subrounded, or broadly cuneate, margin irregularly and doubly setiform serrate, apex acuminate; lateral veins 24–34 on each side of midvein. Female inflorescence 45–50 × 3–4 cm; peduncle 3–5 cm, densely pubescent and sparsely villous; bracts densely overlapping, obliquely elliptic, 1.8–2.5 × 1–1.2 cm, papery, both surfaces sparsely villous along veins, abaxially bearded at base, outer margin remotely serrate and slightly inflexed, inner margin remotely minutely serrate proximally, with small, inflexed basal lobe covering nutlet, apex acute; veins 5 from base, reticulate veins faint. Nutlet oblong, ca. 3.5 mm, glabrous, faintly ribbed. Fl. May–Jun, fr. Jul–Sep.
 • Forests in mountain valleys and on shaded slopes; 900–2000 m. N Guangxi, Guizhou, Sichuan, E Yunnan.

2. *Carpinus rankanensis* Hayata, Icon. Pl. Formosan. 6: 63. 1916.

兰邯千斤榆 *lan han qian jin yu*

Trees; bark dark gray. Branchlets brown, glabrous. Petiole 5–10 mm, glabrous; leaf blade oblong, ovate-oblong, or elliptic, 8–10 × 3–4 cm, abaxially villous along midvein and lateral veins, adaxially glabrous except hirtellous along midvein, base cordate, margin irregularly and doubly setiform serrate, apex acuminate or caudate-acuminate; lateral veins 20–25 on each side of midvein. Female inflorescence terminal, 10–12 cm; peduncle 2–3 mm, hirtellous; bracts densely

overlapping, ovate-oblong or lanceolate, ca. 13 × 7 mm, abaxially bearded at base, outer margin remotely serrate and inflexed, without basal lobe, inner margin entire or remotely serrate distally, with small, inflexed basal lobe covering nutlet, apex acute or acuminate; veins 3 from base, reticulate veins faint. Nutlet oblong or ovoid, ca. 3.5 mm, with very faint ribs. Fl. May–Jun, fr. Jul–Aug.

• Mixed forests; 1000–2000 m. Taiwan.

- 1a. Bracts ovate-oblong, apex acute; nutlet ovoid 2a. var. *rankanensis*
- 1b. Bracts lanceolate, apex acuminate; nutlet oblong 2b. var. *matsudae*

2a. *Carpinus rankanensis* var. *rankanensis*

兰邯千斤榆(原变种) *lan han qian jin yu* (*yuan bian zhong*)

Bracts ovate-oblong, apex acute. Nutlet ovoid.

• Mixed forests; 1000–2000 m. Taiwan.

2b. *Carpinus rankanensis* var. *matsudae* Yamamoto, Suppl. Icon. Pl. Formos. 5: 15. 1932.

细叶兰邯千斤榆 *xi ye lan han qian jin yu*

Bracts lanceolate, apex acuminate. Nutlet oblong.

• Mixed forests; ca. 1000 m. Taiwan (Gaoxiang Shi).

This variety is not treated as distinct from typical *Carpinus rankanensis* by J. C. Liao in Fl. Taiwan, ed. 2.

3. *Carpinus cordata* Blume, Mus. Bot. 1: 309. 1850.

千斤榆 *qian jin yu*

Trees to 18 m tall; bark gray or black-gray, scaly fissured. Branchlets brown or yellow-brown, glabrous or sparsely villous when young and glabrescent or densely pubescent and villous. Petiole 1.5–2 cm, glabrescent or sparsely villous to densely pubescent or

tomentose; leaf blade ovate, ovate-oblong, or obovate-oblong, 8–15 × 4–5 cm, abaxially sparsely to densely villous along midvein and lateral veins or densely pubescent and tomentose, adaxially sparsely villous or glabrescent, base unequally cordate, margin irregularly and doubly setiform serrate, apex acuminate or caudate-acuminate; lateral veins 15–20 on each side of midvein. Female inflorescence 5–12 × 4–4.5 cm; peduncle 3–4 cm, sparsely pubescent or glabrescent; bracts densely overlapping, broadly ovate-oblong, 1.5–2.5 × 1–1.3 cm, glabrous except abaxially bearded at base, outer margin remotely serrate and inflexed, inner margin remotely serrate distally, with oblong basal lobe enclosing nutlet; veins 5, reticulate veins faint. Nutlet oblong, 4–6 × ca. 2 mm, glabrous, faintly ribbed. Fl. May–Jun, fr. Jul–Aug. $2n = 16$.

Forests on moist mountain slopes; 200–2500 m. Anhui, Gansu, Guizhou, Hebei, Hubei, Hunan, Jiangsu, Jiangxi, Liaoning, S Ningxia, Shaanxi, Shandong, Shanxi, Sichuan, Zhejiang [Japan, Korea, Russia].

The wood is used for making agricultural tools and furniture.

- 1a. Branchlets, petioles, and rachis of inflorescence glabrous or sparsely villous when young 3a. var. *cordata*
- 1b. Branchlets, petioles, and rachis of inflorescence densely villous.
 - 2a. Leaves sparsely villous along midvein and lateral veins abaxially ... 3b. var. *chinensis*
 - 2b. Leaves densely pubescent and tomentose abaxially 3c. var. *mollis*

3a. *Carpinus cordata* var. *cordata*

千斤榆(原变种) qian jin yu (yuan bian zhong)
Carpinus erosa Blume; *Ostrya mandshurica* Budischtschew ex Trautvetter.

Branchlets, petioles, and rachis of inflorescence glabrous or sparsely villous when young.

Forests on moist mountain slopes; 200–2500 m. SE Gansu, Hebei, Liaoning, Shaanxi, Shandong (Kunyu Shan), Shanxi [Japan, Korea, Russia].

3b. *Carpinus cordata* var. *chinensis* Franchet, J. Bot. (Morot) 13: 202. 1899.

华千斤榆 hua qian jin yu

Carpinus chinensis (Franchet) Pei.

Branchlets, petioles, and rachis of inflorescence densely pubescent and villous. Leaves sparsely villous along midvein and lateral veins abaxially.

• Forests on moist mountain slopes; 700–2400 m. Anhui, SE Gansu, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, SW Shaanxi (Taibai Shan), Sichuan, Zhejiang.

3c. *Carpinus cordata* var. *mollis* (Rehder) W. C. Cheng ex Chun in Y. Chen, Ill. Manual Chin. Trees & Shrubs 163. 1937.

毛叶千斤榆 mao ye qian jin yu

Carpinus mollis Rehder, J. Arnold Arbor. 11: 154. 1930. Branchlets, petioles, and rachis of inflorescence densely villous. Leaves densely pubescent and tomentose abaxially.

• Forests on moist mountain slopes; 1700–2400 m. Gansu, S Ningxia, Shaanxi (Hua Shan).

4. *Carpinus tientaiensis* W. C. Cheng, Contr. Biol. Lab. Chin. Assoc. Advancem. Sci., Sect. Bot. 8: 135. 1932.

天台鹅耳枥 tian tai e er li

Carpinus laxiflora Siebold & Zuccarini var. *tientaiensis* (W. C. Cheng) Hu.

Trees 16–20 m tall; bark smooth, gray. Branchlets yellow-brown, pilose, glabrescent in 2nd year. Petiole 0.8–1.5 cm, densely villous in furrow; leaf blade ovate or elliptic, rarely ovate-lanceolate, 5–10 × 3–5.5 cm, subleathery, abaxially bearded in axils of lateral veins, glabrescent except villous along midvein and lateral veins, adaxially glabrous except pilose along midvein, base subcordate or subrounded, margin doubly and obtusely shortly serrate, apex acute, rarely acuminate; lateral veins 12–15 on each side of midvein. Female inflorescence 5–10 cm; peduncle ca. 2.5 cm, densely villous when young; bracts loosely overlapping, 2.5–3 cm × 7–8 mm, sparsely pubescent along veins, 3-lobed, middle lobe subobliquely or straight oblong or lanceolate, outer margin obtusely serrate, with broadly ovate, 1–3-toothed basal lobe, inner margin entire or subundulate, with ovate, entire basal lobe slightly smaller than lobe of outer margin, apex obtuse, rarely acute; veins 5–7, reticulate veins present. Nutlet broadly ovoid or triangular-ovoid, 5–6 × 4.5–5.5 mm, villous at apex, 7–11-ribbed. Fl. Apr–Jun, fr. Jul–Aug.

• Forests on mountain slopes; 800–1000 m. NW Zhejiang (Tianmu Shan).

5. *Carpinus londoniana* H. Winkler in Engler, Pflanzenr. IV. 61 (Heft 19): 32. 1904.

短尾鹅耳枥 duan wei e er li

Trees 10–13 m tall; bark dark gray or gray-white. Branchlets drooping, black-brown, densely pubescent, filamentous villous. Petiole 4–7 mm, densely pubescent; leaf blade elliptic-lanceolate, oblong-lanceolate, narrowly lanceolate, lanceolate, or oblong, 6–12 × 1.7–3.5(–5) cm, subleathery, abaxially bearded in axils of lateral veins, adaxially glabrous, base rounded-cuneate, cuneate, or subrounded, rarely subcordate or rounded, margin irregularly and doubly mucronate serrate, rarely incised-serrate, apex acuminate, caudate-acuminate, or caudate; lateral veins 11–13 on each side of midvein. Female inflorescence 8–10 mm; peduncle ca. 2.5 cm, densely villous when young, glabrescent; bracts loosely overlapping, 2.5–3 cm × 7–8 mm, glabrous, 3-lobed, middle lobe narrowly oblong, falcate-oblong, lanceolate, or falcate-lanceolate, outer margin entire or undulate-serrate, with ovate, flattened basal lobe 2–3 mm, inner margin entire, with inflexed basal lobe equal to lobe of outer margin, apex obtuse, acute, or subrounded; veins 3–5, reticulate veins present. Nutlet broadly ovoid, 3–4 × 2.5–3.5 mm, with dense, brown, resinous glands and light yellow resin, prominently ribbed. Fl. Apr–Jun, fr. Jul–Sep.

Forests on moist mountain slopes, subtropical forests; 300–1800 m. S Anhui, Fujian, N Guangdong, Guangxi, SE Guizhou, Hainan, Hunan, Jiangxi, SC Sichuan, S Yunnan, Zhejiang [Laos, SE Myanmar, N Thailand, Vietnam].

- 1a. Leaves oblong, base rounded, apex caudate 5d. var. *latifolius*
- 1b. Leaves elliptic-lanceolate, oblong-lanceolate,
or narrowly lanceolate, base rounded-cuneate, cuneate, rarely subrounded or subcordate,
apex acuminate, caudate-acuminate, obtuse, or acute.
 - 2a. Leaves 6–8 × 1.7–2.6 cm; middle lobe of bracts 4–5 mm wide 5c. var. *lanceolata*
 - 2b. Leaves 6–12 × 2.5–3.5 cm; middle lobe of bracts 6–7 mm wide.
 - 3a. Leaves irregularly and doubly mucronate serrate at margin; middle lobe of bracts oblong or falcate-oblong, apex obtuse or acute 5a. var. *londoniana*
 - 3b. Leaves irregularly and doubly incised-serrate at margin; middle lobe of bracts lanceolate or falcate-lanceolate, apex acuminate 5b. var. *xiphobracteata*

5a. *Carpinus londoniana* var. *londoniana*
短尾鹅耳枥(原变种) duan wei e er li (yuan bian zhong)

Carpinus poilanei A. Camus.
Leaves elliptic-lanceolate, oblong-lanceolate, or narrowly lanceolate, 6–12 × 2.5–3.5 cm, base rounded-cuneate or cuneate, rarely subrounded or subcordate, margin irregularly and doubly mucronate serrate. Middle lobe of bracts oblong or falcate-oblong, apex obtuse or acute.

Forests on moist mountain slopes; 300–1800 m. S Anhui, Fujian, N Guangdong, Guangxi, SE Guizhou, Hunan, Jiangxi, SC Sichuan, S Yunnan, Zhejiang [Laos, SE Myanmar, N Thailand, Vietnam].

5b. *Carpinus londoniana* var. *xiphobracteata* P. C. Li, Acta Phytotax. Sin. 17(1): 87. 1979.

剑苞鹅耳枥 jian bao e er li
Leaves oblong-lanceolate or elliptic-lanceolate, 6–12 × 2.5–3 cm, margin irregularly and doubly incised-serrate. Middle lobe of bracts lanceolate or falcate-lanceolate, apex acuminate.

• Forests on moist mountain slopes; ca. 700 m. Zhejiang (Yin Xian).
5c. *Carpinus londoniana* var. *lanceolata* (Handel-Mazzetti) P. C. Li in P. C. Li & S. H. Cheng, Fl. Reipubl. Popularis Sin. 21: 68. 1979.

海南鹅耳枥 hai nan e er li

Carpinus lanceolata Handel-Mazzetti, Oesterr. Bot. Z. 80: 22. 1931.

Leaves lanceolate, 6–8 × 1.7–2.6 cm. Middle lobe of bracts 4–5 mm wide.

• Subtropical forests; 600–800 m. Hainan.

5d. *Carpinus londoniana* var. *latifolia* P. C. Li, Acta Phytotax. Sin. 17(1): 87. 1979.

宽叶鹅耳枥 kuan ye e er li

Leaves oblong, 6–7 × 4–5 cm, base rounded, apex caudate.

• Forests on moist mountain slopes; ca. 600 m. Zhejiang (Ningbo Xian).

6. *Carpinus viminea* Lindley in Wallich, Pl. Asiat. Rar. 2: 4. 1830.

雷公鹅耳枥 lei gong e er li

Trees 10–20 m tall; bark dark gray. Branchlets brown, glabrous. Petiole (1–)1.5–3 cm, glabrous, rarely sparsely pubescent; leaf blade elliptic, oblong, or ovate-lanceolate, 6–11 × 3–5 cm, abaxially sparsely villous along midvein and lateral veins, sometimes bearded in axils of lateral veins, adaxially glabrous, base subcordate, rarely rounded-cuneate or subrounded, margin doubly mucronate serrate or setiform serrate, apex acuminate, acute, or caudate; lateral veins 12–15 on each side of midvein. Female inflorescence 5–15 × 2.5–3 cm; peduncle slender, 1.5–4 cm, sparsely pubescent; bracts semiovate-lanceolate, 1.5–2.5(–3) cm, subglabrous, unequally 3-lobed, middle lobe semiovate-lanceolate or oblong, straight or subfalcate, outer margin coarsely dentate, with ovate, flattened basal lobe ca. 3 mm, inner margin entire, with ovate, inflexed basal lobe 3–3.5 mm, apex acute or obtuse; veins 4, reticulate veins prominent. Nutlet broadly ovoid, 3–4 × 2.5–3.5 mm, glabrous except villous at apex, sparsely resinous glandular, prominently ribbed. Fl. Apr–Jun, fr. Jul–Sep. *2n* = 16.

Subtropical broad-leaved forests; 400–2000 m. Anhui, Fujian, N Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Xizang, Yunnan, Zhejiang [Bhutan, India, Kashmir, Myanmar, Nepal, Sikkim, Thailand, Vietnam].

- 1a. Leaves regularly or irregularly doubly mucronate serrate, apex acute, acuminate, or caudate 6a. var. *viminea*
- 1b. Leaves regularly and doubly setiform serrate, apex long caudate . 6b. var. *chiukiangensis*

6a. *Carpinus viminea* var. *viminea*
雷公鹅耳枥(原变种) lei gong e er li (yuan bian zhong)

Carpinus fargesii Franchet; *C. laxiflora* (Siebold & Zuccarini) Blume var. *dauidii* Franchet; *C. laxiflora* var. *macrostachya* Oliver ex Hu; *C. tehchingensis* Hu.

Leaves regularly or irregularly doubly mucronate serrate, apex acute, acuminate, or caudate.

Subtropical broad-leaved forests; 400–900 m. Anhui, Fujian, N Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Xizang, Yunnan, Zhejiang [Bhutan, India, Kashmir, Myanmar, Nepal, Sikkim, Thailand, Vietnam].

6b. *Carpinus viminea* var. *chiukiangensis* Hu, Acta Phytotax. Sin. 9: 282. 1964.

贡山鹅耳枥 *gong shan e er li*

Leaves regularly and doubly setiform serrate, apex long caudate.

• Subtropical broad-leaved forests in valleys; ca. 2000 m. SE Xizang, NW Yunnan.

7. *Carpinus putoensis* W. C. Cheng, Contr. Biol. Lab. Chin. Assoc. Advancem. Sci., Sect. Bot. 8: 72. 1932.

普陀鹅耳枥 *pu tuo e er li*

Trees to 15 m tall; bark brown-gray. Branchlets brown, sparsely villous. Petiole 5–10 mm, sparsely pubescent; leaf blade elliptic or broadly elliptic, 5–10 × 3.5–5 cm, abaxially sparsely pubescent especially along midvein and lateral veins, bearded in axils of lateral veins, adaxially sparsely villous when young, base rounded or broadly cuneate, margin irregularly and doubly setiform serrate, apex acute or acuminate; lateral veins 11–14 on each side of midvein. Female inflorescence 3–8 × 4–5 cm; peduncle 1.5–3 cm, sparsely villous or glabrescent; bracts semiovate, 2.8–3 cm × ca. 8 mm, middle lobe semiovate, outer margin irregularly remotely serrate, without basal lobe, inner margin entire or subundulate, with ovate, inflexed basal lobe, apex rounded or obtuse; veins 3–5, reticulate veins prominent. Nutlet broadly ovoid, ca. 6 × 4 mm, glabrous, except villous at apex, sometimes with sparse glands, prominently ribbed. Fl. May–Jun, fr. Jul–Sep.

• Subtropical broad-leaved forests; 200–300 m. Zhejiang (Zhoushan Dao).

An endangered species, with only one individual known in the wild.

8. *Carpinus kweichowensis* Hu, Sinensia 2: 79. 1931.

贵州鹅耳枥 *gui zhou e er li*

Carpinus austroyunnanensis Hu.

Trees to 28 m tall; bark gray, smooth. Branchlets gray-brown, densely villous when young, glabrescent. Petiole 1.2–1.5 cm, densely yellow villous; leaf blade elliptic, narrowly elliptic, oblong, or narrowly oblong, 8–12 × 3.5–5.5 cm, abaxially sparsely pubescent along veins, bearded in axils of lateral veins, adaxially densely pubescent along midvein when young, base subrounded, rarely rounded-cuneate or subcordate, margin irregularly and doubly minutely serrate, apex acuminate or acute; lateral veins 10–16 on each side of midvein. Female inflorescence 8–15 × ca. 5 cm; peduncle ca. 2 cm, densely yellow villous; bracts semi-ovate-oblong or falcate-oblong, 2.8–3 × 0.9–1 cm, sparsely villous, outer margin remotely serrate, without basal lobe, inner margin entire, with ovate, flattened basal lobe ca. 3 mm; veins 3–5, reticulate veins prominent. Nutlet broadly ovoid, ca. 6 × 5 mm, densely pubescent, villous at apex, 8- or 9-ribbed. Fl. May–Jun, fr. Jul–Sep.

• Subtropical broad-leaved forests; 1100–1200 m. SW Guizhou (Zhenfeng Xian), SE Yunnan.

9. *Carpinus turczaninowii* Hance, J. Linn. Soc., Bot. 10: 203. 1869.

鹅耳枥 *e er li*

Carpinus chowii Hu; *C. tuczaninowii* var. *chungnanensis* P. C. Kuo.

Trees 10–15 m tall; bark dark gray. Branchlets gray-brown, slender, pubescent when young, glabrescent. Petiole 4–10 mm, sparsely pubescent; leaf blade ovate, broadly ovate, ovate-elliptic, or ovate-rhombic, rarely ovate-lanceolate, 2–6 × 1.3–4 cm, abaxially sparsely villous along veins, bearded in axils of lateral veins, adaxially glabrous or sparsely villous along midvein, base subrounded or broadly cuneate, rarely subcordate or cuneate, margin regularly or irregularly doubly serrate, rarely simply serrate, apex acute or acuminate; lateral veins 8–12 on each side of midvein. Female inflorescence 3–6 cm; bracts semiovate, semioblong, or broadly semiovate, 6–20 × 4–10 mm, sparsely pubescent, outer margin irregularly incised-dentate, sometimes lobulate, without basal lobe, inner margin entire or remotely minutely dentate, with ovate, inflexed basal lobe 2–3 mm, apex acute, acuminate, or obtuse; veins 5, reticulate veins prominent. Nutlet broadly ovoid, ca. 3 × 2 mm, glabrous except sparsely villous at apex, resinous glandular, prominently ribbed. Fl. May–Jul, fr. Jul–Sep.

Temperate forests; 500–2400 m. Beijing Shi (Jinshan), S Gansu, Henan, Jiangsu, S Liaoning, Shaanxi, Shandong [Japan, Korea].

The wood is very hard, dense, close grained, and fine textured, and is used for making agricultural tools and furniture.

10. *Carpinus kawakamii* Hayata, Icon. Pl. Formosan. 3: 175. 1913.

阿里山鹅耳枥 *a li shan e er li*

Carpinus hogoensis Hayata; *C. sekii* Yamamoto.

Trees; bark dark gray. Branchlets brown, glabrous or sparsely pubescent. Petiole 0.8–1.5 cm, sparsely pubescent; leaf blade ovate-lanceolate or oblong-lanceolate, 4–5 × 1.8–2.5 cm, abaxially sparsely villous along veins, adaxially sparsely pubescent when young, glabrescent, base subrounded or subcordate, sometimes unequal, margin regularly and doubly serrate, sometimes simply serrate distally, apex acuminate or caudate-acuminate; lateral veins 10–15 on each side of midvein. Female inflorescence 4–6 × 2–2.5 cm; peduncle ca. 1 cm, densely pubescent; bracts semiovate, 1.8–2 cm, densely pubescent adaxially, outer margin irregularly coarsely dentate, without basal lobe, inner margin subfalcate or straight, entire, with ovate, inflexed basal lobe ca. 3 mm, apex acuminate; veins 5, reticulate veins prominent. Nutlet broadly ovoid, ca. 3 mm, sparsely resinous glandular, densely villous at apex, 6-ribbed. Fl. May–Jan, fr. Jul–Aug.

• Sunny places within subtropical forests; 500–2000 m. Fujian (Liancheng Xian), Taiwan (Alishan).

11. *Carpinus tsaiana* Hu, Bull. Fan Mem. Inst. Biol., n.s., 1: 141. 1948.

宽苞鹅耳枥 *kuan bao e er li*

Carpinus sichourensis Hu.

Trees to 30 m tall; bark gray, dissected. Branchlets purplish red, glabrescent. Petiole ca. 1.5 cm, glabrous or sparsely villous; leaf blade elliptic, oblong, oblong-lanceolate, or ovate-lanceolate, 7–14 × 4.5–6 cm, abaxially sparsely villous along veins, bearded in axils of lateral veins, adaxially glabrous, densely glandular punctate, base cordate or obliquely cordate, margin irregularly and doubly minutely serrate, apex acuminate; lateral veins 14–16 on each side of midvein. Female inflorescence 10–14 cm; peduncle ca. 3 cm, glabrous; bracts broadly semiovate, 2.5–3 × 1.5–1.8 cm, sparsely villous, outer margin coarsely dentate-lobulate, without basal lobe, inner margin entire or remotely minutely serrate, with inflexed basal auricle, apex acute or acuminate; veins 5, reticulate veins obvious. Nutlet triangular-ovoid or broadly ovoid, 5–6 mm, densely pubescent, densely villous at apex, orange resinous glandular, prominently ribbed. Fl. May–Jun, fr. Jul–Sep.

• Subtropical forests; 1200–1500 m. SW Guizhou, SE Yunnan (Pingbian Miaozu Zizhixian).

12. *Carpinus chuniana* Hu, J. Arnold Arbor. 13: 334. 1932.

粤北鹅耳枥 yue bei e er li

Trees to 10 m tall; bark black-gray. Branchlets purplish brown, densely yellow villous when young, glabrescent. Petiole robust, 6–12 mm, densely yellow villous; leaf blade elliptic, oblong, or obovate-oblong, 7–11 × 5–5.5 cm, abaxially villous along veins, bearded in axils of lateral veins, adaxially densely villous along midvein when young, densely glandular punctate, base cordate, sometimes unequal, margin regularly or irregularly doubly minutely serrate, apex acute or acuminate; lateral veins 14–18 on each side of midvein. Female inflorescence 5–11 × ca. 2.5 cm; peduncle 1.5–2.5 cm, densely hirsute and pubescent; bracts broadly semiovate, 2–2.5 × ca. 1.3 cm, both surfaces densely villous along veins, outer margin irregularly dentate, without basal lobe, inner margin entire or remotely minutely serrate, with inflexed basal auricle, apex acute; veins 4 or 5, reticulate veins prominent. Nutlet broadly ovoid, ca. 4 × 3 mm, densely pubescent, sparsely brown resinous glandular, apex villous. Fl. May–Jun, fr. Jul–Aug.

• Subtropical forests on limestone mountain slopes or in valleys. N Guangdong (Lechang Xian), Guizhou (Fanjing Shan), SE Hubei.

13. *Carpinus minutiserrata* Hayata, Icon. Pl. Formosan. 3: 177. 1913.

细齿鹅耳枥 xi chi e er li

Trees; bark dark gray. Branchlets purplish brown, glabrous. Petiole ca. 7 mm, glabrous or sparsely villous; leaf blade elliptic-lanceolate, oblong, or ovate-elliptic, 6–11 × ca. 2.5 cm, abaxially villous along veins, adaxially sparsely villous along midvein, base subcordate or subrounded, sometimes unequal, margin doubly and densely minutely serrate, apex acuminate; lateral veins 15–17 on each side of midvein. Female inflorescence 3–4 cm; peduncle ca. 1.5 cm, sparsely pubescent; bracts semiovate, 1.3–1.4 cm × 6–7 mm,

villous along veins, outer margin irregularly dentate, without basal lobe, inner margin entire or simply or doubly dentate, with inflexed basal auricle, apex acute; veins 4 or 5, reticulate veins prominent. Nutlet broadly ovoid, ca. 3 × 2 mm, glabrous except sparsely villous at apex, resinous glandular, 10-ribbed. Fl. May–Jun, fr. Jul–Sep.

• Forests on mountain slopes. Taiwan.

Included in the synonymy of *Carpinus kawakamii* by J. C. Liao in Fl. Taiwan, ed. 2.

14. *Carpinus shensiensis* Hu, Bull. Fan Mem. Inst. Biol., n.s., 1: 145. 1948.

陕西鹅耳枥 shan xi e er li

Trees to 15 m tall; bark dark gray. Branchlets purplish brown, densely pubescent when young. Petiole 0.7–1.7 cm, densely pubescent; leaf blade oblong or obovate-oblong, 6–9 × 3–4.5 cm, abaxially sparsely pubescent along veins, bearded in axils of lateral veins, adaxially glabrous, densely glandular punctate, base cordate, rarely subrounded, margin regularly and doubly minutely serrate, apex acuminate or acute; lateral veins 14–16 on each side of midvein. Female inflorescence 7–9 × 4–4.5 cm; peduncle 1.5–3 cm, densely pubescent intermixed with sparse, long hairs; bracts semiovate, 2.5–3 × 1–1.2 cm, villous along veins, outer margin irregularly dentate, without basal lobe, inner margin entire, with inflexed basal auricle, apex acuminate; veins 4 or 5, reticulate veins prominent. Nutlet broadly ovoid, ca. 4 × 3 mm, glabrous except villous at apex, with sparse, brown, resinous glands and prominent ribs. Fl. May–Jun, fr. Jul–Aug.

• Temperate broad-leaved forests; 800–1000 m. S Gansu, S Shaanxi (Nanwutai).

15. *Carpinus pubescens* Burkill in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 502. 1899.

云桂鹅耳枥 yun gui e er li

Carpinus austrosinensis Hu; *C. kweitingensis* Hu; *C. kweiyangensis* Hu; *C. lancilimba* Hu; *C. marlipoensis* Hu; *C. parva* Hu; *C. pilosinucula* Hu; *C. pinfaensis* Hu; *C. pingpienensis* Hu; *C. seemeniana* Diels; *C. tsiangiana* Hu; *C. tsoongiana* Hu; *C. tungtzeensis* Hu; *C. wangii* Hu & W. C. Cheng.

Trees to 17 m tall; bark brown-gray. Branchlets dark brown, sparsely villous or glabrescent. Petiole 4–15 mm, sparsely pubescent or subglabrous; leaf blade oblong, oblong-lanceolate, ovate-lanceolate, or ovate-elliptic, rarely ovate or elliptic, 5–10 × 2–3.5 cm, abaxially sparsely villous along veins, bearded in axils of lateral veins, adaxially glabrous, base subrounded-cuneate, subrounded, or subcordate, sometimes unequal, margin regularly and doubly minutely serrate, apex acuminate, rarely acute; lateral veins 12–14 on each side of midvein. Female inflorescence 5–7 × 1–2.5 cm; peduncle 2–3 cm, sparsely villous or glabrous; bracts semiovate, rarely broadly semiovate, 1–2.5 cm, sparsely villous along veins, outer margin irregularly dentate,

without basal lobe, inner margin entire, straight, or subfalcate, with inflexed basal auricle, apex obtuse or acute; veins 5, reticulate veins prominent. Nutlet broadly ovoid, 3–4 × 2–3 mm, densely pubescent, rarely glabrescent, villous at apex, sparsely resinous glandular, prominently ribbed. Fl. May–Jun, fr. Jul–Sep. Forests in valleys, thickets on mountain summits, on limestone; 450–2000 m. Guizhou, Shaanxi, S Sichuan, E Yunnan (Mile Xian) [N Vietnam].

The shape, size, and pubescence of the leaves and bracts is variable. The plants from Guizhou that were described as separate species by Hu appear to represent variants or abnormal suites of specimens, rather than distinct taxa.

16. *Carpinus firmifolia* (H. Winkler) Hu, Bull. Fan Mem. Inst. Biol., n.s., 1: 144. 1948.

厚叶鹅耳枥 *hou ye e er li*

Carpinus turczaninowii Hance var. *firmifolia* H. Winkler in Engler, Bot. Jahrb. Syst. 50(Suppl.): 505. 1914; *C. pubescens* Burkill var. *bigiehensis* Hu; *C. pubescens* var. *firmifolia* (H. Winkler) Hu ex P. C. Li. Trees to 10 m tall; bark dark gray. Branchlets black-gray, slender, densely yellow-brown villous when young, becoming sparsely pilose. Petiole ca. 5 mm, densely villous; leaf blade ovate, ovate-elliptic, or ovate-oblong, 2.7–5 × 1.5–2(–3.5) cm, leathery, abaxially sericeous-villous along veins, bearded in axils of lateral veins, adaxially villous along midvein, base subcordate or subrounded, margin regularly and doubly minutely serrate, apex acuminate; lateral veins 11 or 12 on each side of midvein, raised abaxially, impressed adaxially. Female inflorescence 4–5 × 1.5–2 cm; peduncle short, ca. 2 mm, densely villous; bracts semiovalate, 1.4–1.6 cm × 5–6 mm, sparsely villous, outer margin irregularly dentate, without basal lobe, inner margin entire, with inflexed basal auricle, apex acute; veins 5, reticulate veins prominent. Nutlet broadly ovoid, ca. 4 × 3 mm, glabrous except sparsely villous at apex, prominently ribbed. Fl. May–Jul, fr. Jul–Sep.

• Forests on limestone mountain slopes; 1500–1600 m. C Guizhou (Guiyang Shi).

17. *Carpinus hupeana* Hu, Sunyatsenia 1: 118. 1933.

湖北鹅耳枥 *hu bei e er li*

Carpinus funiushanensis P. C. Kuo; *C. huana* W. C. Cheng; *C. longipes* Hu.

Trees to 18 m tall; bark gray. Branchlets dark purplish, glabrous. Petiole short, 0.7–1.5 cm, densely or sparsely villous; leaf blade ovate-lanceolate, ovate-elliptic, or narrowly elliptic, 6–10 × 2.4–4.5 cm, abaxially glandular punctate, sericeous-villous along veins, bearded in axils of lateral veins, adaxially sparsely villous, base rounded or subcordate, margin doubly dentate-serrate, apex acute or acuminate, sometimes subobtuse; lateral veins (11–)13–16 on each side of midvein. Female inflorescence 6–11 × 2–3 cm; peduncle 1.5–2 cm, densely villous; bracts semiovalate, 1–1.6 cm × 7–10 mm, sparsely villous along reticulate

veins, outer margin remotely serrate-dentate or incised-serrate, without basal lobe, inner margin entire, with inflexed basal auricle, apex obtuse or acute; veins 5. Nutlet broadly ovoid, ca. 5 × 4 mm, glabrous except villous at apex, prominently ribbed. Fl. May–Jun, fr. Jul–Aug.

• Subtropical forests; 700–1800 m. Anhui, S Henan, W Hubei, N Hunan, Jiangxi, Shaanxi, Zhejiang.

This species may easily be confused with *Carpinus fargesiana*, *C. pubescens*, and *C. turczaninowii*. However, it differs from *C. fargesiana* and *C. turczaninowii* in its larger leaves, from *C. pubescens* in its glabrous nutlet, and from all three species in its glandular-dotted abaxial leaf surface.

18. *Carpinus oblongifolia* (Hu) Hu & W. C. Cheng, Bull. Fan Mem. Inst. Biol., n.s., 1: 146. 1948.

宝华鹅耳枥 *bao hua e er li*

Carpinus turczaninowii Hance var. *oblongifolia* Hu, Sunyatsenia 1: 115. 1933.

Trees to 12 m tall; bark brown-gray. Branchlets dark purplish, densely yellow villous when young, glabrescent. Petiole 1–1.5 cm, slender, densely yellow villous; leaf blade obovate-oblong, 3.5–7 × 2.5–3.5 cm, adaxially sparsely villous especially along midvein, abaxially villous along veins, glandular punctate elsewhere, bearded in axils of lateral veins, base rounded or subcordate, margin irregularly and doubly serrate, apex acute or obtuse; lateral veins 12–14 on each side of midvein. Female inflorescence 6.5–7.5 × 2–2.5 cm; peduncle ca. 1.5 cm, densely yellow villous; bracts semiovalate, 1–1.5 cm × 6–8 mm, sparsely villous along reticulate veins, outer margin irregularly and obtusely serrate, without basal lobe, inner margin entire or remotely and obscurely serrate, with inflexed basal auricle, apex obtuse or acute; veins 4 or 5. Nutlet broadly ovoid, ca. 4 × 3 mm, glabrous except villous at apex, sparsely resinous glandular or not, ribbed. Fl. May–Jun, fr. Jul–Aug.

• Subtropical forests; ca. 400 m. Jiangsu (Baohua Shan, Nanjing Shi).

19. *Carpinus henryana* (H. Winkler) H. Winkler in Engler, Bot. Jahrb. Syst. 50(Suppl.): 507. 1914.

川鄂鹅耳枥 *chuan e e er li*

Carpinus tschonoskii Maximowicz var. *henryana* H. Winkler in Engler, Pflanzenr. IV. 61 (Heft 19): 36. 1904; *C. hupeana* Hu var. *henryana* (H. Winkler) P. C. Li.

Trees to 18 m tall; bark gray, fissured. Branchlets purplish brown, sericeous-villous, glabrescent. Petiole 1–1.7 cm, glabrous or sparsely sericeous-villous; leaf blade narrowly lanceolate, elliptic-lanceolate, or oblong-lanceolate, 5–8 × 2–3 cm, subleathery, abaxially sericeous-villous along veins, glandular punctate elsewhere, bearded in axils of lateral veins, adaxially sparsely sericeous-villous, base rounded or subcordate, sometimes unequal, margin subincurved simply dentate, apex acuminate or caudate-acuminate; lateral veins 14–16 on each side of midvein. Female inflorescence 6–7 ×

2–2.5 cm; peduncle ca. 2 cm, pubescent; bracts semiovate, villous along reticulate veins, outer margin irregularly and remotely serrate, without basal lobe, inner margin entire, with inflexed basal auricle, apex acute or acuminate; veins 4 or 5. Nutlet ovoid, ca. 4 × 3 mm, glabrous except sparsely villous at apex, ribbed. Fl. May–Jun, fr. Jul–Aug.

• Temperate forests; 1600–2900 m. E Gansu, W Guizhou, Henan, W Hubei, S Shaanxi, E Sichuan, Yunnan.

20. *Carpinus stipulata* H. Winkler in Engler, Pflanzenr. IV. 61 (Heft 19): 35. 1904.

小叶鹅耳枥 *xiao ye e er li*

Carpinus hupeana Hu var. *simplicidentata* (Hu) P. C. Li; *C. simplicidentata* Hu; *C. turczaninowii* Hance var. *stipulata* (H. Winkler) H. Winkler.

Trees to 8 m tall; bark gray. Branchlets dark purplish, glabrous. Petiole ca. 1 cm, sparsely villous; leaf blade ovate, ovate-elliptic, or ovate-lanceolate, 2–3.5 × 1–3 cm, abaxially sericeous-villous along veins, bearded in axils of lateral veins, adaxially glabrous, base subrounded or subcordate, margin simply mucronate serrate, apex acuminate, rarely acute; lateral veins 11–13 on each side of midvein. Female inflorescence ca. 5 × 2 cm; peduncle ca. 1 cm, densely villous; bracts broadly semiovate, ca. 15 × 3 mm, sparsely villous, outer margin irregularly dentate, without basal lobe, inner margin entire, with inflexed basal auricle, apex acute; veins 4 or 5, reticulate veins prominent. Nutlet broadly ovoid, ca. 4 × 2.5 mm, glabrous except villous at apex, ribbed. Fl. May–Jun, fr. Jul–Aug.

• Temperate forests; 800–2100 m. E Gansu, W Hubei, S Shaanxi.

21. *Carpinus fargesiana* H. Winkler in Engler, Bot. Jahrb. Syst. 50(Suppl.): 507. 1914.

川陕鹅耳枥 *chuan shan e er li*

Trees to 20 m tall; bark gray. Branchlets dark brown, sparsely villous. Petiole slender, 6–10 mm, sparsely villous; leaf blade ovate-lanceolate, ovate-elliptic, elliptic, or oblong, rarely narrowly lanceolate or narrowly oblong, 2.5–7.5(–8) × 2–2.5 cm, abaxially villous along veins, bearded in axils of lateral veins, adaxially sparsely villous when young, glabrescent, base rounded or subcordate, margin irregularly and doubly mucronate serrate, apex acute or acuminate; lateral veins 12–16 on each side of midvein. Female inflorescence 4–7 × 2.5–3 cm; peduncle 1–1.5 cm, sparsely villous; bracts semiovate or broadly semiovate, 1.3–1.5 cm × 6–8 mm, villous along reticulate veins, outer margin irregularly dentate-serrate or lobulate-serrate, without basal lobe, inner margin entire, with inflexed basal auricle, apex acuminate; veins 5. Nutlet broadly ovoid, ca. 3 × 2.5 mm, glabrous except sparsely villous at apex, sometimes sparsely resinous glandular, ribbed. Fl. May–Jun, fr. Jul–Sep.

• Temperate forests in mountain valleys, streambanks; 1000–2600 m. S Gansu, W Henan, W Hubei, S Shaanxi, Sichuan.

- 1a. Leaves ovate-lanceolate, ovate-elliptic, elliptic, or oblong, 3.5–7.5 × 2–2.5 cm 21a. var. *fargesiana*
1b. Leaves narrowly lanceolate or narrowly oblong, 7–8 × 2–2.2 cm 21b. var. *hwai*

21a. *Carpinus fargesiana* var. *fargesiana*

川陕鹅耳枥(原变种) *chuan shan e er li* (*yuan bian zhong*)

Carpinus daginensis Hu.

Leaves ovate-lanceolate, ovate-elliptic, elliptic, or oblong, 3.5–7.5 × 2–2.5 cm.

• Temperate forests in mountain valleys, streambanks; 1000–2600 m. S Gansu, W Henan, W Hubei, S Shaanxi, Sichuan.

21b. *Carpinus fargesiana* var. *hwai* (Hu & W. C. Cheng) P. C. Li, Fl. Reipubl. Popularis Sin. 21: 82. 1979.

狭叶鹅耳枥 *xia ye e er li*

Carpinus hwai Hu & W. C. Cheng, Bull. Fan Mem. Inst. Biol., n.s., 1: 148. 1948.

Leaves narrowly lanceolate or narrowly oblong, 7–8 × 2–2.2 cm.

• Broad-leaved forests; ca. 1200 m. W Hubei (Lichuan Xian), E Sichuan (Wan Xian).

22. *Carpinus purpurinervis* Hu, Acta Phytotax. Sin. 9: 293. 1964.

紫脉鹅耳枥 *zi mai e er li*

Trees to 5 m tall; bark dark gray. Branchlets purplish brown, glabrous or nearly so. Petiole 5–7 mm, sparsely villous; leaf blade oblong-lanceolate, lanceolate, or narrowly lanceolate, 2–6 × 1–1.7 cm, abaxially sparsely villous along veins, adaxially glabrous, base subrounded or subcordate, margin irregularly (rarely doubly) mucronate serrate, apex acuminate; lateral veins 11–13 on each side of midvein, light purplish. Female inflorescence ca. 4 × 1.5 cm; peduncle ca. 2.5 cm, sparsely pubescent or glabrescent, light purplish; bracts semiovate, ca. 1.5 × 7 mm, subglabrous, outer margin irregularly dentate, without basal lobe, inner margin entire, with inflexed basal auricle, apex acuminate or subobtusate; veins 4 or 5, reticulate veins prominent. Nutlet broadly ovoid, ca. 4 × 3 mm, sparsely pubescent except villous at apex, sometimes resinous glandular, ribbed. Fl. May–Jun, fr. Jul–Sep.

• Sparse forests or thickets on limestone; 600–1000 m. Guangxi (Du'an Yaozu Zizhixian), Guizhou (Dushan Xian, Xingyi Xian).

23. *Carpinus hebestroma* Yamamoto, Suppl. Icon. Pl. Formos. 5: 14. 1932.

太鲁阁鹅耳枥 *tai lu ge e er li*

Trees to 8 m tall; bark dark gray. Branchlets purplish brown, slender, pubescent. Petiole slender, 7–10 mm, pubescent; leaf blade lanceolate or ovate-lanceolate, 5–5.5 × 1.4–1.5(–1.8) cm, subglabrous, base subrounded, margin irregularly and simply serrate, apex acuminate; lateral veins 11 or 12 on each side of midvein. Female inflorescence 3–3.5 × ca. 1.5 cm; peduncle 1.5–2 cm, pubescent; bracts broadly semiovate, 7–10 × ca. 5 mm, sparsely pubescent along reticulate veins, outer margin

incised-dentate, without basal lobe, inner margin entire, with inflexed basal auricle, apex obtuse; veins 4 or 5. Nutlet ovoid, ca. 2.5×1.5 mm, densely pubescent, villous at apex, sparsely resinous glandular, ribbed. Fl. May–Jul, fr. Jul–Sep.

• Forests on mountain slopes; 1000–1500 m. E Taiwan (Hualian Xian).

24. *Carpinus microphylla* Z. C. Chen ex Y. S. Wang & J. P. Huang, *Guihaia* 5: 15. 1985.

田阳鹅耳枥 *tian yang e er li*

Shrubs to 3 m tall; bark gray. Branchlets gray-brown, densely yellow-brown villous. Petiole 1–1.2 cm, densely villous; leaf blade ovate-lanceolate, 0.9–1.3 \times 0.7–1.2 cm, subleathery, both surfaces villous along midvein, base subrounded, margin irregularly and doubly serrate, apex acuminate; lateral veins 7–11 on each side of midvein, raised abaxially, impressed adaxially. Female inflorescence 2–3.3 \times 1–1.2 cm; peduncle 0.5–1.5 cm, densely yellow-brown villous; bracts broadly semiovate, (0.7–)1.1–1.3 cm \times 4–6 mm, both surfaces sparsely villous along reticulate veins, outer margin minutely serrate, without basal lobe, inner margin entire or simply or doubly serrate distally, with inflexed basal auricle, apex acute; veins 3 or 4. Nutlet ovoid, ca. 2.5×2 mm, sparsely pubescent, densely villous at apex, ribbed. Fl. May–Jun, fr. Jul–Aug.

• Thickets; ca. 2500 m. W Guangxi (Tianyang Xian).

25. *Carpinus monbeigiana* Handel-Mazzetti, *Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl.* 61: 162. 1924.

云南鹅耳枥 *yun nan e er li*

Carpinus likiangensis Hu; *C. monbeigiana* Handel-Mazzetti var. *weisiensis* Hu.

Trees to 16 m tall; bark gray. Branchlets dark gray-brown, densely pubescent when young, glabrescent. Petiole ca. 1 cm, densely yellow pubescent; leaf blade oblong-lanceolate, ovate-lanceolate, or elliptic-lanceolate, rarely elliptic, 5–10 \times 2.5–4 cm, abaxially sericeous-villous along veins, glabrous elsewhere, bearded in axils of lateral veins, adaxially densely villous along midvein, base rounded, subcordate, or rounded-cuneate, margin irregularly and doubly setiform mucronate serrate, apex acute, acuminate, or caudate-acuminate; lateral veins 14–18 on each side of midvein. Female inflorescence 5–8 \times 2–2.5 cm; peduncle 1.5–2 cm, densely yellow hirsute; bracts semiovate, 1.6–2 cm \times 6–8 mm, abaxially densely yellow hirsute along reticulate veins, outer margin coarsely dentate, without basal lobe, inner margin entire, with inflexed basal auricle, apex acute or obtuse; veins 5. Nutlet broadly ovoid, 3–4 mm, sparsely pubescent, villous at apex, densely brown or orange resinous glandular, prominently ribbed. Fl. May–Jun, fr. Jul–Aug.

• Subtropical broad-leaved forests on mountain slopes, sometimes on limestone; 1700–2800 m. Xizang, C and NW Yunnan.

26. *Carpinus tschonoskii* Maximowicz, *Bull. Acad. Imp. Sci. Saint-Petersbourg* 27: 534. 1881.

昌化鹅耳枥 *chang hua e er li*

Carpinus falcatisbracteata Hu; *C. mianningensis* Yi; *C. obovatifolia* Hu; *C. paohsingensis* Hu; *C. tschonoskii* var. *falcatisbracteata* (Hu) P. C. Li.

Trees to 25 m tall; bark dark gray. Branchlets brown, sparsely villous when young. Petiole 0.8–1.5 cm, pubescent; leaf blade elliptic, oblong, or ovate-lanceolate, 5–12 \times 2.5–5 cm, abaxially bearded in axils of lateral veins, both surfaces villous when young, becoming sparsely villous along veins, glabrescent elsewhere, base subrounded or subrounded-cuneate, margin doubly setiform serrate, apex acuminate or caudate-acuminate; lateral veins 14–16 on each side of midvein. Female inflorescence 6–10 \times 3–4 cm; peduncle 1–4 cm, sparsely villous; bracts (2.5–)3–3.5(–5) \times 0.8–1.2 cm, ovate-lanceolate or falcate-lanceolate, adaxially sparsely sericeous-villous along reticulate veins, outer margin remotely dentate, without basal lobe, inner margin entire, straight or falcate, with small, inflexed basal auricle, apex acute or acuminate; veins 4 or 5. Nutlet broadly ovoid, 4–5 \times 3–4 mm, glabrous except sparsely villous at apex, sometimes resinous glandular, prominently ribbed. Fl. May–Jun, fr. Jul–Aug.

Broad-leaved forests; 1100–2400 m. Anhui, Guangxi, Guizhou, W Henan, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Yunnan, Zhejiang [Japan, Korea].

27. *Carpinus polyneura* Franchet, *J. Bot. (Morot)* 13: 202. 1899.

多脉鹅耳枥 *duo mai e er li*

Carpinus handelii Rehder; *C. turczaninowii* Hance var. *polyneura* (Franchet) H. Winkler.

Trees to 15 m tall; bark gray. Branchlets dark purplish, slender, sparsely white pubescent or not. Petiole 5–10 mm, sparsely pubescent or glabrescent; leaf blade elliptic-lanceolate, oblong-lanceolate, or ovate-lanceolate, rarely elliptic or oblong, 4–8 \times 1.5–2.5 cm, abaxially densely villous along veins, bearded in axils of lateral veins, adaxially densely pubescent along midvein, sparsely villous elsewhere when young, base broadly cuneate or subrounded, margin doubly and regularly setiform serrate; lateral veins 16–20 on each side of midvein. Female inflorescence 3–6 \times 1–2 cm; peduncle ca. 2 cm, slender, sparsely pubescent; bracts broadly semiovate, 0.8–1.5 cm \times 4–6 mm, sparsely villous along reticulate veins, outer margin remotely dentate, without basal lobe, inner margin entire, with small, inflexed basal auricle, apex acute; veins 5. Nutlet broadly ovoid, 2–3 \times 1.5–2.5 mm, sparsely pubescent, villous at apex, ribbed. Fl. May–Jun, fr. Jul–Sep.

• Subtropical broad-leaved forests or thickets; 400–2300 m. Fujian, N Guangdong, Guizhou, Hubei, Hunan, Jiangxi, Shaanxi, NE Sichuan (Chengkou Xian), Zhejiang.

28. *Carpinus dayongina* K. W. Liu & Q. Z. Lin, Bull. Bot. Res., Harbin 6(2): 143. 1986.

大庸鹅耳枥 *da yong e er li*

Trees to 4 m tall; bark gray. Branchlets dark purplish, glabrous. Petiole 5–7 mm, pubescent; leaf blade lanceolate or ovate-lanceolate, 2.5–4.5 × 1–1.5 cm, abaxially villous along veins, glabrous elsewhere, adaxially villous when young, base broadly cuneate or subrounded, margin simply setiform serrate, apex long acuminate; lateral veins 18–20 on each side of midvein. Female inflorescence 1.4–2.5 × 1–1.2 cm; peduncle 1.4–2.1 cm, slender, pubescent; bracts semiovate, 5–8 × 3–4 mm, pubescent at base adaxially, outer margin remotely dentate, without basal lobe, inner margin entire, with inflexed basal auricle, apex acute; veins 4 or 5, reticulate veins prominent. Nutlet broadly ovoid, 2–3 × 1.5–2.5 mm, glabrous except sparsely villous at apex, prominently ribbed. Fl. Apr–May, fr. Jun–Aug.

• Subtropical broad-leaved forests; ca. 1100 m. Hunan (Dayong Xian).

29. *Carpinus sungpanensis* W. Y. Hsia, Contr. Inst. Bot. Natl. Acad. Peiping 2: 180. 1934.

松潘鹅耳枥 *song pan e er li*

Carpinus polyneura Franchet var. *sungpanensis* (W. Y. Hsia) P. C. Li.

Trees to 10 m tall; bark gray. Branchlets light brown, densely villous when young. Petiole 0.7–1.5 cm, slender, pubescent; leaf blade ovate or ovate-elliptic, 4–5 × 2–2.2 cm, abaxially villous along veins, adaxially glabrescent, base rounded, rarely subcordate, margin regularly and doubly setiform serrate, apex acuminate; lateral veins 12–15 on each side of midvein. Female inflorescence 4–6 × 1–3 cm; peduncle 2–2.5 cm, sparsely villous; bracts semiovate, 1–1.8 cm × 5–8 mm, glabrous, outer margin irregularly dentate-serrate, without basal lobe, inner margin entire or remotely minutely serrate distally, with small, inflexed basal auricle, apex acute; veins 4 or 5. Nutlet broadly ovoid, ca. 4 × 3 mm, glabrous except villous at apex, ribbed. Fl. Jun–Jul, fr. Jul–Sep.

• Temperate broad-leaved forests; 2000–2100 m. N Sichuan (Songpan Xian).

30. *Carpinus tsunyiiensis* Hu, Acta Phytotax. Sin. 9: 296. 1964.

遵义鹅耳枥 *zun yi e er li*

Carpinus polyneura Franchet var. *tsunyiiensis* (Hu) P. C. Li.

Trees to 7 m tall; bark gray. Branchlets brown, densely villous when young. Petiole slender, 4–9 mm, glabrous or sparsely pubescent; leaf blade elliptic or elliptic-oblong, 5–9 × 3.4–4 cm, abaxially densely villous along veins, adaxially glabrous, base rounded or rounded-cuneate, margin irregularly and doubly setiform serrate,

apex caudate-acuminate; lateral veins 15 or 16 on each side of midvein. Female inflorescence 4.5–6 × 1–2 cm; peduncle ca. 2 cm, subglabrous; bracts semiovate, 1.2–1.5 cm × 5–7 mm, glabrous or nearly so, apex acute, outer margin remotely dentate, without basal lobe, inner margin entire with small, inflexed basal auricle; veins 4 or 5, reticulate veins prominent. Nutlet broadly ovoid, ca. 4 × 3 mm, glabrous except villous at apex, ribbed. Fl. May–Jul, fr. Jul–Sep.

• Mixed forests; 900–1100 m. Guizhou (Zunyi Shi).

31. *Carpinus mollicoma* Hu, Bull. Fan Mem. Inst. Biol., n.s., 1: 216. 1948.

软毛鹅耳枥 *ruan mao e er li*

Trees to 10 m tall; bark dark gray. Branchlets dark brown, densely light rust-colored villous. Petiole 3–8 mm, densely rust-colored villous; leaf blade oblong-lanceolate or elliptic-lanceolate, 5–6.5 × 2–2.5 cm, abaxially densely white or light rust-colored appressed villous, adaxially villous especially along midvein, base rounded or rounded-cuneate, margin irregularly or rarely doubly recurved setiform serrate, apex acuminate or caudate-acuminate; lateral veins 14–17 on each side of midvein. Female inflorescence 2.5–3 × 1–1.5 cm; peduncle 1–2 cm, densely white or rust-colored villous; bracts semiovate, ca. 1.5 cm × 5 mm, densely soft villous along reticulate veins on both surfaces, apex acuminate, outer margin remotely dentate, without basal lobe, inner margin entire, with small, inflexed basal auricle; veins 4 or 5. Nutlet broadly ovoid, ca. 4 × 3 mm, densely villous, prominently ribbed. Fl. May–Jun, fr. Jul–Sep.

• Mixed forests on mountain slopes, sometimes on limestone; 1400–2900 m. Sichuan (Emei Shan), E Xizang (Bomi Xian), SE Yunnan (Malipo Xian).

32. *Carpinus omeiensis* Hu & Fang in Hu, Acta Phytotax. Sin. 9: 296. 1964.

峨眉鹅耳枥 *e mei e er li*

Trees to 7 m tall; bark gray. Branchlets dark brown, glabrescent. Petiole 5–8 mm, densely light yellow villous; leaf blade elliptic or ovate-elliptic, 6–8 × 2.5–3.5 cm, abaxially appressed villous and bearded in axils of lateral veins, adaxially glabrescent, base rounded or broadly cuneate, margin simply setiform serrate, apex acuminate or caudate-acuminate; lateral veins 12–16 on each side of midvein. Female inflorescence 6–8 × 1.5–2 cm; peduncle 2–3 cm, densely villous, glabrescent; bracts semiovate, 1.5–1.6 cm × 4–5 mm, sparsely villous along reticulate veins, apex acuminate, outer margin remotely dentate, without basal lobe, inner margin entire, with small basal auricle; veins 4 or 5. Nutlet broadly ovoid, ca. 4 × 3 mm, densely pubescent, villous at apex, prominently ribbed. Fl. May–Jun, fr. Jul–Aug.

• Broad-leaved forests; 1000–1900 m. Guizhou (Dejiang Xian), Sichuan (Emei Shan, Junlian Xian).

33. *Carpinus rupestris* A. Camus, Bull. Soc. Bot. France 76: 966. 1929.

岩生鹅耳枥 *yan sheng e er li*

Trees 2–4 m tall; bark dark gray. Branches gray-black, glabrous; branchlets gray, densely white or brown villous. Petiole 1–3 mm, densely white or brown villous; leaf blade lanceolate or oblong-lanceolate, 4–5 × 1.5–2 cm, subleathery, abaxially densely white or brown villous, adaxially glabrous except sparsely villous along midvein, base subrounded or broadly cuneate, margin minutely simply setiform serrate, apex acuminate; lateral veins 14–17 on each side of midvein, raised abaxially, impressed adaxially. Female inflorescence 2–3 × 1–1.2 cm; peduncle ca. 1 cm, densely villous; bracts semiovate or semirounded, 9–10 × 3–5 mm, abaxially pubescent intermixed with long hairs along reticulate veins, adaxially pubescent, outer margin remotely minutely serrate, without basal lobe, inner margin entire, with small, inflexed basal auricle, apex acuminate; veins 5. Nutlet ovoid, ca. 3 mm, densely villous, ribbed. Fl. May–Jun, fr. Jun–Aug.

• Thickets on stony hills; 1100–1700 m. W Guangxi, SW Guizhou (Xingyi Xian), SE Yunnan.

Flora of China 4: 289–300. 1999.