

1. ZANTHOXYLUM Linnaeus, Sp. Pl. 1: 270. 1753.

花椒属 hua jiao shu

Zhang Dianxiang (张奠湘); Thomas G. Hartley

Shrubs sometimes scrambling, trees, or woody climbers, evergreen or deciduous, dioecious, rarely monoecious or polygamo-monoecious [or monoclinal], usually armed [or exclusively unarmed]. Leaves alternate, odd-pinnately 3- to many foliolate or sometimes digitately 3-foliolate (occasional leaves even-pinnate, 2-foliolate, or 1-foliolate). Inflorescences terminal, axillary, or basal to leaves, paniculate, thyriform, corymbiform, racemose, or umbelliform. Perianth in 2 series and differentiated with 4 or 5 sepals and 4 or 5 petals or grading to 1 series and undifferentiated with 5–9 tepals. Sepals distinct or basally connate. Petals valvate or imbricate in bud. Stamens distinct, 4 or 5 in plants with sepals and petals, 3–8(–10) in plants with tepals, rudimentary or lacking in female flowers. Disk flattened, pulvinate, or columnar. Gynoecium 1–5-carpelled, rudimentary or lacking in male flowers; ovaries basally connate, otherwise ± contiguous or distinct, 1-loculed; ovules 2 per locule. Styles in compound gynoecium apical or subapical, coherent or contiguous to spreading-ascending or recurved; stigmas capitate, coherent or distinct. Style in simple gynoecium off-centered, erect or variously curved or bent; stigma capitate to peltate. Fruit follicles 1–5, distinct or basally connate, apex often with a styler beak; abortive carpels, if any, often persistent. Seeds globose to ovoid, persistent in dehiscent fruit; seed coat with a thick or rarely ± thin inner layer of dense black sclerenchyma and spongy-fleshy outer layer bounded externally by a shiny black or reddish pellicle; endosperm copious or rarely scant; embryo straight or ± curved; cotyledons ± orbicular to broadly elliptic, flattened or rarely plano-convex; hypocotyl superior.

Two hundred or more species: pantropical and extending to temperate latitudes in E Asia and E North America; 41 species (25 endemic) in China.

- 1a. Perianth in 2 irregular series or 1 series, with 5–9 ± undifferentiated tepals; stamens in male flowers 4–8(–10).
- 2a. Gynoecium in female flowers 1(or 2)-carpelled and leaf rachises not winged but canaliculate with sides of channel rarely slightly spreading at apex of rachis 32. *Z. wutaiense*
- 2b. Gynoecium in female flowers 2–5-carpelled or if 1-carpelled then leaf rachises with wing to 6 mm wide on each side.
- 3a. Fruit follicles stipitate.
- 4a. Leaflet blades 0.7–1.3 cm wide 41. *Z. stipitatum*
- 4b. Leaflet blades usually at least 1.5 cm wide.
- 5a. Leaves 3–5(–11)-foliolate; follicles apically shortly beaked 29. *Z. dimorphophyllum*
- 5b. Leaves 5–15-foliolate; follicles not apically beaked 40. *Z. simulans*
- 3b. Fruit follicles not stipitate.
- 6a. Leaf rachises usually conspicuously winged.
- 7a. Wings of leaf rachis extending to as much as 3 mm on each side; secondary veins of leaflet blades evident, 10–28 on each side of midvein; anthers in male flowers reddish purple prior to anthesis; gynoecium in female flowers 2–5-carpelled 30. *Z. acanthopodium*
- 7b. Wings of leaf rachis extending to as much as 6 mm on each side; secondary veins of leaflet blades generally faint especially adaxially, 7–15 on each side of midvein; anthers in male flowers yellow prior to anthesis; gynoecium in female flowers 1–3-carpelled 31. *Z. armatum*
- 6b. Leaf rachises not conspicuously winged but sometimes with a distinct margin.
- 8a. Fruit follicles pubescent; branchlets covered with setiform prickles and compressed pseudostipular prickles decurrent along branchlet and forming a wing joining them between nodes 39. *Z. pteracanthum*
- 8b. Fruit follicles glabrous; branchlets without compressed pseudostipular prickles joined by a wing.
- 9a. Leaflet blades to 3 × 1.5 cm.
- 10a. Leaflet blades reddish brown to blackish brown when dry 37. *Z. piasezkii*
- 10b. Leaflet blades grayish green to yellowish green when dry 38. *Z. pilosulum*
- 9b. Leaflet blades usually larger than 3 × 1.5 cm.
- 11a. Leaf near inflorescence on fertile branchlet 3-foliolate, with terminal leaflet 4–6 cm wide 36. *Z. motuoense*
- 11b. Leaf near inflorescence on fertile branchlet more than 5-foliolate, with terminal leaflet less than 3.5 cm wide.
- 12a. Leaf rachises terete, glabrous 35. *Z. austrosinense*
- 12b. Leaf rachises with a distinct margin or pubescent.
- 13a. Leaflet blades abaxially flocculent along midvein and adaxially glabrous or both surfaces pubescent 33. *Z. bungeanum*
- 13b. Leaflet blades abaxially glabrous and adaxially hirsutulous to sparsely puberulent 34. *Z. undulatifolium*
- 1b. Perianth in 2 series, with 4 or 5 sepals and 4 or 5 petals; stamens in male flowers 4 or 5.

- 14a. Flowers 5-merous; trees or rarely shrubs.
- 15a. Shrubs; leaflet blades rarely wider than 2 cm, adaxially with trichomes and abaxially glabrous 28. *Z. schinifolium*
- 15b. Trees; leaflet blades wider than 2 cm, adaxially glabrous or both surfaces with trichomes.
- 16a. Fertile branchlets unarmed, with small pith; leaf rachises winged.
- 17a. Gynoecium in female flowers 2(or 3)-carpelled; leaflet blades asymmetric, oblique at base 23. *Z. avicennae*
- 17b. Gynoecium in female flowers 3(or 4)-carpelled; leaflet blades at base rounded to broadly cuneate, symmetric or asymmetric 24. *Z. micranthum*
- 16b. Fertile branchlets armed, with large pith; leaf rachises not winged.
- 18a. Leaflet blades glabrous.
- 19a. Leaflet blades dark green to light yellowish green when dry, abaxially glaucous 25. *Z. ailanthoides*
- 19b. Leaflet blades reddish brown to blackish brown, abaxially not glaucous 26. *Z. myriacanthum*
- 18b. Leaflet blades abaxially and/or adaxially with trichomes.
- 20a. Leaflet blades abaxially and adaxially with trichomes 26. *Z. myriacanthum*
- 20b. Leaflet blades abaxially with trichomes, otherwise glabrous.
- 21a. Leaflet blades abaxially with a soft woolly villous indumentum 27. *Z. molle*
- 21b. Leaflet blades abaxially pubescent 25. *Z. ailanthoides*
- 14b. Flowers 4-merous; woody climbers, shrubs, or rarely trees.
- 22a. Gynoecium in female flowers 2- or 3-carpelled and styles usually recurved; follicles stipitate 29. *Z. dimorphophyllum*
- 22b. Gynoecium in female flowers 1-carpelled or if 2–4-carpelled then styles usually erect to spreading-ascending; follicles not stipitate.
- 23a. Inflorescences terminal, cymose-corymbiform; pedicel at least 1 cm in fruit and purplish red like follicles.
- 24a. Fruit pedicel 1–1.5 cm, ca. 1 mm wide; leaflet blades with numerous oil glands, midvein adaxially impressed and puberulent, margin of blade serrulate 20. *Z. oxyphyllum*
- 24b. Fruit pedicel 1.5–4.5 cm, less than 1 mm wide; leaflet blades with inconspicuous oil glands, midvein adaxially ridged, plane, or impressed, margin of blade crenulate or entire toward base.
- 25a. Midvein on adaxial surface of leaflet blades ridged or plane toward apex, petiolules pubescent adaxially 21. *Z. stenophyllum*
- 25b. Midvein on adaxial surface of leaflet blades impressed, petiolules glabrous 22. *Z. esquirolii*
- 23b. Inflorescences axillary and terminal, thyriform; pedicel rarely to 1 cm in fruit and not purplish red.
- 26a. Fruit follicles with prickles and/or trichomes.
- 27a. Fruit follicles with prickles and trichomes 19. *Z. echinocarpum*
- 27b. Fruit follicles with trichomes, without prickles.
- 28a. Leaflets opposite; leaflet blades 7–19 × 5–8 cm 17. *Z. collinsiae*
- 28b. Leaflets alternate to opposite; leaflet blades 6–8 × 2.5–3.5 cm 18. *Z. liboense*
- 26b. Fruit follicles with neither prickles nor trichomes.
- 29a. Fruit follicles 1–1.5 cm; outer part of pericarp (exocarp and mesocarp) wider than endocarp 16. *Z. dissitum*
- 29b. Fruit follicles to 0.9 cm; outer part of pericarp not wider than endocarp.
- 30a. Leaflets opposite.
- 31a. Trees; leaflet blades asymmetric 3. *Z. integrifolium*
- 31b. Woody climbers or shrubs; leaflet blades symmetric.
- 32a. Leaflet blades abaxially without oil glands along secondary veins, apex retuse at tip; petiolules obsolete or to 5 mm 1. *Z. nitidum*
- 32b. Leaflet blades abaxially with oil glands along secondary veins, apex not retuse at tip; petiolules ca. 1 mm 2. *Z. xichouense*
- 30b. Leaflets alternate or partly opposite.
- 33a. Leaflet blades abaxially, leaf rachises, and inflorescences tomentulose 4. *Z. tomentellum*
- 33b. Leaflet blades abaxially, leaf rachises, and inflorescences glabrous or puberulent.
- 34a. Leaves with numerous oil glands which project outward when dry.
- 35a. Fruit follicles not apically beaked; leaflet blade oil glands light yellow to brown when dry, pellucid 5. *Z. glomeratum*
- 35b. Fruit follicles usually apically beaked; leaflet blade oil glands brown or blades blackish brown when dry.
- 36a. Leaves 3- or 7(or 9)-foliolate; leaflet blades at least 5 cm, lustrous when dry 6. *Z. macranthum*
- 36b. Leaves 7–51-foliolate; leaflet blades rarely to 5 cm, dull when dry.
- 37a. Leaves 7–15-foliolate; leaflet blades symmetric or subsymmetric, midvein adaxially impressed 7. *Z. rhombifoliolatum*
- 37b. Leaves 17–51-foliolate; leaflet blades asymmetric, midvein adaxially plane to ridged 13. *Z. multijugum*
- 34b. Leaves with few oil glands or oil glands inconspicuous.

- 38a. Leaf rachises with straight prickles 5–10 mm 8. *Z. leiboicum*
 38b. Leaf rachises unarmed or with curved prickles rarely to 5 mm.
 39a. Fruit follicles 7–8 mm; margin of leaflet blades entire 9. *Z. laetum*
 39b. Fruit follicles 5–6 mm; margin of leaflet blades crenate at least near apex or rarely entire.
 40a. Pedicel of fruit and rachis of infructescences glabrous or sparsely puberulent 10. *Z. scandens*
 40b. Pedicel of fruit and rachis of infructescences puberulent or pubescent.
 41a. Leaflet blades abaxially pubescent at least on midvein toward base or secondary veins 11. *Z. kwangsiense*
 41b. Leaflet blades abaxially glabrous.
 42a. Fruit pedicel 7–10 mm; petiolules 4–10 mm, leaflet blade apices caudate 12. *Z. khasianum*
 42b. Fruit pedicel rarely more than 5 mm; petiolules 1–4 mm, leaflet blade apices acute, shortly acuminate, or shortly caudate.
 43a. Leaflet blades 2–5 × 0.7–2.5 cm, apex acute or shortly acuminate; inflorescences to 3 cm; innovations glaucous 14. *Z. calcicola*
 43b. Leaflet blades 6–10 × 2.5–4 cm, apex shortly caudate; inflorescences to 26 cm; innovations not glaucous 15. *Z. yuanjiangense*

1. *Zanthoxylum nitidum* (Roxburgh) Candolle, Prodr. 1: 727. 1824.

两面针 liang mian zhen

Shrubs, erect or scrambling, or sometimes woody climbers. Trunk winged. Stems, branchlets, and leaf rachises usually with prickles. Rachis of inflorescences and abaxial surface of leaflet blades glabrous or hirsutulous. Leaves (3 or) 5–11-foliolate; petiolules obsolete or to 5 mm; leaflet blades opposite, broadly ovate, subcordate, elliptic, narrowly elliptic, or rarely ovate, 3–12 × 1.5–6(–8) cm, leathery, secondary and tertiary veins abaxially ridged when dry, margin crenate at least toward apex or entire, apex acuminate to caudate with a retuse tip. Inflorescences axillary. Flowers 4-merous. Perianth in 2 series. Sepals ca. 1 mm wide, apically purplish green. Petals pale yellowish green, ovate-elliptic to oblong, ca. 3 mm. Stamens in male flowers 5–6 mm; mature anthers ellipsoid to globose. Petals in female flowers broader than those in male flowers. Gynoecium in female flowers 4-carpelled; carpels globose. Styles stout, coherent at anthesis; stigma capitate. Fruit pedicel 2–5 mm; follicles reddish brown, (5–)5.5–7 mm in diam., apex beaked. Fl. Mar–May, fr. Sep–Nov or May.

Below 800 m. Fujian, Guangdong, Guangxi, S and SE Guizhou, Hainan, S Hunan, Taiwan, Yunnan, S Zhejiang [India, Indonesia, Japan (Ryukyu Islands), Malaysia, Myanmar, Nepal, New Guinea, Philippines, Thailand, Vietnam; Australia, SW Pacific islands].

- 1a. Rachis of inflorescences and abaxial surface of leaflet blades glabrous 1a. var. *nitidum*
 1b. Rachis of inflorescences and abaxial surface of leaflet blades hirsutulous .. 1b. var. *tomentosum*

1a. *Zanthoxylum nitidum* var. *nitidum*

两面针(原变种) liang mian zhen (yuan bian zhong)

Fagara nitida Roxburgh, Fl. Ind. 1: 439. 1820; *F. hamiltoniana* (Wallich ex J. D. Hooker) Engler; *F. hirtella* (Ridley) Engler; *F. oblongifolia* Bakhuisen f.; *F. pendjaluensis* Bakhuisen f.; *F. torva* (F. Mueller) Engler; *F. warburgii* Perkins; *Zanthoxylum asperum* C. C. Huang var. *glabrum* C. C. Huang; *Z. hamiltonianum* Wallich ex J. D. Hooker; *Z. hirtellum* Ridley; *Z. torvum* F. Mueller.

Rachis of inflorescences and abaxial surface of leaflet blades glabrous. Petiolules 2–5 mm or leaflets subsessile; leaflet blades broadly ovate, subcordate, or narrowly elliptic, 1.5–6 cm wide, margin crenate or entire, apex caudate with a retuse tip. Fruit follicles 5.5–7 mm in diam. Fr. Sep–Nov.

Below 800 m. Fujian, Guangdong, Guangxi, S and SE Guizhou, Hainan, S Hunan, Taiwan, Yunnan, S Zhejiang [India, Indonesia, Japan (Ryukyu Islands), Malaysia, Myanmar, Nepal, New Guinea, Philippines, Thailand, Vietnam; Australia, SW Pacific islands].

1b. *Zanthoxylum nitidum* var. *tomentosum* C. C. Huang, Guihaia 7: 5. 1987.

毛叶两面针 mao ye liang mian zhen

Rachis of inflorescences and abaxial surface of leaflet blades hirsutulous. Petiolules 1–3 mm; leaflet blades elliptic or rarely ovate, 3–5(–8) cm wide, margin revolute and entire or apically crenate, apex acuminate. Fruit follicles ca. 5 mm in diam. Fr. May.

- Hillside thickets. E Guangxi (Pingnan).

2. *Zanthoxylum xichouense* C. C. Huang, Acta Phytotax. Sin. 16(2): 83. 1978.

西畴花椒 xi chou hua jiao

Woody climbers, glabrous except for inflorescence rachises. Branchlets dark reddish purple when young, unarmed or spinose. Leaves 3–7-foliolate; petiolules ca. 1 mm; leaflet blades opposite, elliptic to obovate, 5–10 × 3–5 cm, thin papery, oil glands inconspicuous, reticulate veinlets ridged when dry, base broadly cuneate, margin entire, apex acuminate. Infructescences axillary. Pedicel 4–7 mm in fruit. Fruit follicles crimson, globose, ca. 5.5 mm in diam., apex beaked; exocarp, mesocarp, and endocarp thin. Seeds 4–4.5 mm in diam. Fr. Oct.

- Forests; 1400–1500 m. SE Yunnan (Xichou).

3. *Zanthoxylum integrifolium* (Merrill) Merrill, Enum. Philipp. Fl. Pl. 2: 327. 1923.

兰屿花椒 lan yu hua jiao

Fagara integrifolia Merrill, Philipp. J. Sci. 1(Suppl. 1): 68.

1906.

Trees 13–20 m tall. Branchlets prickly. Leaves (13–)17–25-foliolate; rachis unarmed; petiolules 5–7 mm; leaflet blades opposite, oblong to obovate, 1.5–2 × 0.6–0.8 cm, papery, glabrous, adaxially lustrous when dry, oil glands inconspicuous, midvein adaxially impressed, secondary veins adaxially ridged, base oblique, margin entire, apex cuspidate with a blunt tip. Inflorescences terminal or axillary, to 25 cm. Flowers 4-merous. Perianth in 2 series. Petals white, ca. 3 mm. Male flowers: stamens 4; rudimentary gynoecium shortly conic. Female flowers 1-carpelled. Fruit pedicel 3–5 mm; follicle single, ca. 7 mm in diam. Seeds ca. 6 mm in diam.

Taiwan (Lan Yu) [Philippines].

4. *Zanthoxylum tomentellum* J. D. Hooker, Fl. Brit. India 1: 493. 1875.

毡毛花椒 zhan mao hua jiao

Fagara tomentella (J. D. Hooker) Handel-Mazzetti; *F. tomentella* var. *mekongensis* Handel-Mazzetti.

Woody climbers. Young branchlets, leaf rachises, petiolules, abaxial surface of leaflet blades, and rachis of infructescences grayish yellow to grayish brown tomentulose. Leaves 7–15-foliolate; petiolules to 5 mm, thick; leaflet blades alternate, ovate to elliptic, 4–8 × 2–4 cm, leathery, midvein adaxially plane or ridged, base obliquely rounded, margin entire or apically crenate, apex mucronate to cuspidate. Inflorescences axillary. Flowers 4-merous. Perianth in 2 series. Petals pale yellowish white. Male flowers: stamens 4, longer than petals; connective with an oil gland at apex; rudimentary gynoecium shorter than petals. Female flowers: carpels globose. Infructescences 3–12 cm. Fruit pedicel 2–5 mm, thick; follicles reddish brown, becoming brownish black when dry, 5–6 mm in diam., oil glands slightly protruding, apex beaked. Seeds ca. 5 mm in diam. Fl. Apr–May, fr. Sep–Oct. $2n = 72$.

Moist valleys; 2000–3000 m. NW and W Yunnan [Bhutan, NE India, Myanmar, Nepal].

5. *Zanthoxylum glomeratum* C. C. Huang, Acta Phytotax. Sin. 16(2): 82. 1978.

密果花椒 mi guo hua jiao

Shrubs. Branchlets and leaves glabrous, unarmed or with prickles. Leaves 5–9-foliolate; petiolules 4–8 mm; leaflet blades alternate, lanceolate, long elliptic, or rarely ovate, 6–12 × 2.5–5 cm, thickly papery, oil glands numerous, reticulate veinlets abaxially inconspicuous and adaxially ridged, margin entire, apex acuminate to caudate with a rounded to retuse tip. Inflorescences axillary, thyriform. Female inflorescences 2–6 cm. Flowers 4-merous. Pedicel 1–2 mm. Perianth in 2 series. Petals pale yellowish green, ovate-elliptic, ca. 3 mm. Infructescences globose to conic. Fruit pedicel 5–8 mm; follicles pale yellow to brownish yellow when dry, ca. 7 mm, oil glands impressed, apex not beaked. Seeds dark brown, ca. 6 mm in diam. Fl. Apr, fr. Sep.

• Upland forests and thickets; ca. 1500 m. Guangxi (Damiang

Shan), SE Guizhou (Rongjiang).

6. *Zanthoxylum macranthum* (Handel-Mazzetti) C. C. Huang, Acta Phytotax. Sin. 6: 70. 1957.

大花花椒 da hua hua jiao

Fagara macrantha Handel-Mazzetti, Sinensia 5: 17. 1934.

Woody climbers, unarmed or echinate on abaxial surface of leaf rachis. Branchlets dark gray, rugose. Leaves 3- or 7- (or 9)-foliolate; leaflet blades opposite, ovate, elliptic, or oblanceolate, 5–10 × 1.5–4 cm, thickly leathery, abaxially lustrous when dry, oil glands visible and slightly protruding when dry, midvein impressed and puberulent, base symmetric or rarely oblique, margin entire or crenate and becoming revolute. Inflorescences axillary, thyriform. Female flowers subsessile or with a pedicel to 1 mm, male flowers with a longer pedicel. Flowers 4-merous. Perianth in 2 series. Sepals purplish green. Petals pale yellowish green, broadly elliptic, ca. 3 mm. Male flowers: filaments ca. 4 mm; rudimentary gynoecium shortly club-shaped, apically 2-lobed. Female flowers: carpels 4. Infructescences 3–5 cm. Fruit pedicel 2–3 mm; follicles reddish brown, 5.6–6 mm in diam., with a flange, oil glands impressed, apex beaked. Seeds ca. 5 mm in diam. Fl. Apr–May, fr. Aug–Sep.

• Upland open forests and thickets; 500–3100 m. Chongqing (Nanchuan), Guizhou, SW Henan, W Hubei, Hunan, Sichuan (Emei Shan), S Yunnan (Xishuangbanna), SE Xizang.

7. *Zanthoxylum rhombifoliolatum* C. C. Huang, Acta Phytotax. Sin. 6: 67. 1957.

菱叶花椒 ling ye hua jiao

Shrubs 1–2 m tall, erect, glabrous. Branchlets and leaf rachises unarmed or prickly. Young branchlets purplish red. Leaves 7–15-foliolate; petiolules 1–5 mm; leaflet blades subopposite or alternate, rhombic, elliptic, or broadly ovate, 1.5–5 × 1–2.5 cm, leathery, oil glands numerous and slightly protruding when dry, midvein adaxially impressed, secondary veins 4–7 on each side of midvein, base oblique or symmetric and narrowly to broadly cuneate, margin crenate, apex mucronate to caudate. Inflorescences terminal or axillary, 4–10 cm. Flowers 4-merous. Perianth in 2 series. Sepals purplish green, ovate to broadly deltoid, ca. 0.3 mm. Petals 2–3 mm. Male flowers subsessile; rudimentary gynoecium shortly club-shaped, 2-cleft to entire. Fruit pedicel 1–3 mm; follicles red when mature, ca. 5 mm in diam., oil glands numerous and slightly protruding. Seeds ca. 4 mm in diam. Fl. May, fr. Sep.

• Upland open forests; 500–1000 m. Chongqing (Nanchuan, Zhongxian), Guizhou (Zheng'an).

8. *Zanthoxylum leiboicum* C. C. Huang, Acta Phytotax. Sin. 16(2): 82. 1978.

雷波花椒 lei bo hua jiao

Zanthoxylum calcicola C. C. Huang var. *macrocarpum* C. C. Huang.

Shrubs to 2 m tall, erect. Branchlets and leaf rachises

with prickles. Leaves 17–31-foliolate; petiolules 1–3 mm, puberulent; leaflet blades subopposite to alternate, broadly ovate to obovate with rounded or cuspidate apex, or ovate-obdeltoid with abrupt apex, 2–4 × 1.5–2.5 cm, thickly papery, oil glands inconspicuous, midvein impressed or apically plane, basally puberulent, margin apically crenulate. Inflorescences axillary, subracemously cymose, 4–10 cm. Fruit pedicel 1–3 mm; follicles dark blackish brown when dry, 0.5–1.5 cm in diam., rugulose, oil glands inconspicuous, apex beaked. Seeds ca. 5 mm in diam. Fr. Jul.

• Thickets on dry hill slopes, river valleys; 400–1500 m. SW Sichuan.

9. *Zanthoxylum laetum* Drake, J. Bot. (Morot) 6: 274. 1892.

拟蚬壳花椒 ni xian ke hua jiao

Zanthoxylum dissitoides C. C. Huang.

Woody climbers to 4 m tall. Trunk, branches, branchlets, and leaf rachises with prickles. Rachis of young leaves, petiolules, and midvein of leaflet blades puberulent. Leaves 5–13-foliolate; petiolules 2–6 mm; leaflet blades alternate, ovate, ovate-elliptic, or rarely oblong, 8–15 × 4–7 cm, adaxially lustrous, oil glands sparse, inconspicuous, and pellucid, midvein plane to adaxially impressed, secondary veins 9–14 on each side of midvein, base symmetric or rarely oblique, margin entire, apex acuminate. Inflorescences axillary. Flowers 4-merous. Pedicel ca. 4 mm. Perianth in 2 series. Sepals pale purplish green, narrowly ovate, to 1 mm. Petals yellowish green, broadly ovate, ca. 4 mm. Male flowers: filaments pale yellowish green, linear, 6–8 mm; rudimentary gynoecium terete, 4-lobed. Female flowers: staminodes shortly linear. Fruit pedicel 2–5 mm; follicles reddish brown with purplish red margin, 7–9 mm in diam., with a flange, oil glands impressed when dry, apex beaked. Seeds brownish black, subglobose, 6–7 mm in diam. Fl. Mar–May, fr. Sep–Dec.

Moist thickets and forests; 500–1300 m. Guangdong (Zhanjiang), SW Guangxi, Hainan, S Yunnan [N Vietnam].

10. *Zanthoxylum scandens* Blume, Bijdr. 249. 1825.

花椒萼 hua jiao le

Fagara chinensis Merrill; *F. cuspidata* (Champion ex Benth) Engler; *F. cyrtorhachia* Hayata; *F. laxifoliolata* Hayata; *F. leiorhachia* Hayata; *F. scandens* (Blume) Engler; *Zanthoxylum chinense* (Merrill) Chung; *Z. cuspidatum* Champion ex Benth; *Z. cyrtorhachium* (Hayata) C. C. Huang; *Z. laxifoliolatum* (Hayata) C. C. Huang; *Z. leiorhachium* (Hayata) C. C. Huang.

Shrubs or woody climbers. Trunks, branches, branchlets, and leaf rachises with prickles. Leaves 5–25-foliolate; leaflet blades alternate or opposite on distal part of leaf rachis, ovate, ovate-elliptic, or obliquely oblong, 4–10 × 1.5–4 cm, both surfaces black or blackish brown when dry, abaxially lustrous, oil glands inconspicuous, midvein impressed and glabrous or plane and puberulent, base oblique to subsymmetric and obtuse to broadly cuneate, margin entire or apically crenulate, apex mucronate, caudate, cuspidate, or long acuminate and with an

obtuse to retuse tip. Inflorescences terminal or axillary. Flowers 4-merous. Perianth in 2 series. Sepals pale purplish green, broadly ovate, ca. 0.5 mm. Petals pale yellowish green, 2–3 mm. Male flowers: stamens 4, 3–4 mm; connective with an oil gland at apex; rudimentary gynoecium subtended by pulvinate disk, 2–4-lobed. Female flowers: carpels 3 or 4; staminodes ligulate. Fruit follicles purplish red, grayish brown to black when dry, 4.5–5.5 mm in diam., oil glands slightly protruding, plane, or impressed, apex beaked. Seeds subglobose, 4–5 mm in diam. Fl. Mar–May, fr. Jul–Aug. $2n = 68$.

Lowland forests, open forests, thickets; near sea level to 1500 m. S Anhui, Chongqing, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [India, Indonesia, Japan (Ryukyu Islands), Malaysia, Myanmar].

11. *Zanthoxylum kwangsiense* (Handel-Mazzetti) Chun ex C. C. Huang, Acta Phytotax. Sin. 6: 71. 1957 [*“kwangsiensis”*].

广西花椒 guang xi hua jiao

Fagara kwangsiensis Handel-Mazzetti, Sinensia 3. 186. 1933.

Woody climbers. Young branchlets, leaf rachises, and inflorescences pubescent. Branchlets unarmed. Leaves 5–9-foliolate; leaflet blades subopposite or rarely alternate, lanceolate, ovate, or oblanceolate, 4–10 × 2–3 cm, papery, midvein abaxially pubescent and adaxially impressed and puberulent, base broadly cuneate, margin subentire or apically crenate, apex mucronate to caudate. Inflorescences axillary or terminal, thyriform, 2–15 cm. Fruit pedicel 5–10 mm; follicles ca. 5 mm, apex beaked. Seeds subglobose, ca. 4 mm in diam.

• Hillside thickets and open forests; 600–700 m. Chongqing (Fengjie, Wushan), N Guangxi, S Guizhou (Libo).

Hartley (J. Arnold Arbor. 47: 177. 1966) placed *Fagara kwangsiensis* in synonymy of *Zanthoxylum scandens*. *Zanthoxylum kwangsiense* was inadvertently omitted.

12. *Zanthoxylum khasianum* J. D. Hooker, Fl. Brit. India 1: 494. 1875.

云南花椒 yun nan hua jiao

Zanthoxylum yunnanense C. C. Huang.

Shrubs or trees, to 3 m tall. Branchlets gray, with prickles. Young branchlets, inflorescences, leaf rachises, and adaxial surface of leaflet blades with long grayish yellow trichomes. Leaves 5–13-foliolate; petiolules 4–10 mm, winged; leaflet blades alternate or rarely subopposite, ovate to elliptic, asymmetric, 3.5–9 × 2–4 cm, papery, midvein adaxially impressed, secondary veins 10–16 on each side of midvein, base cuneate, margin crenulate or apically crenulate-serrulate, apex caudate. Inflorescences terminal or axillary, thyriform; bracts minute. Flowers 4-merous. Perianth in 2 series. Sepals ovate, ca. 0.5 mm, margin ciliolate. Petals long elliptic, 2–3 mm. Female flowers: staminodes ca. 1 mm. Fruit pedicel 7–10 mm, villous; follicles oblique, 5–6 mm, apex beaked. Fl. May, fr. Jul–Aug.

Hillside thickets and open forests; 1500–2500 m. W Yunnan [India].

Hartley (J. Arnold Arbor. 47: 177. 1966) placed *Zanthoxylum khasianum* and *Z. yunnanense* in synonymy of *Z. scandens*.

13. *Zanthoxylum multijugum* Franchet, Pl. Delavay. 124. 1889.

多叶花椒 duo ye hua jiao

Fagara mengtzeana Hu; *F. multijuga* (Franchet) Hu; *Zanthoxylum multifoliolatum* Hemsley.

Woody climbers. Young branchlets pale reddish brown, glabrous. Stems, branches, and leaf rachises with prickles. Leaves 19–51-foliolate; leaflet blades subsessile, subopposite to alternate, lanceolate, elliptic, or ovate, asymmetric, 1.5–5 × 0.5–2 cm, oil glands numerous and pellucid, midvein puberulent when young and adaxially slightly ridged to plane, margin crenate, apex blunt, rounded, or mucronate with a blunt tip. Inflorescences axillary. Flowers 4(or 5)-merous. Perianth in 2 series. Sepals ovate, to 1 mm, apex blunt to rounded. Petals pale yellowish green, oblong, ca. 2 mm. Male flowers: stamens 4; anthers broadly ovate; connective with an oil gland at apex; rudimentary gynoecium long conic. Female flowers: pedicel 2–5 mm, to 1 cm in fruit. Fruit follicles brownish red, ca. 5 mm in diam., apex beaked. Seeds 4–4.5 mm in diam. Fl. May–Jun, fr. Oct–Nov.

• Hillside thickets and open forests; 1500–2200 m. Guizhou, C and N Yunnan.

14. *Zanthoxylum calcicola* C. C. Huang, Acta Phytotax. Sin. 6: 65. 1957.

石山花椒 shi shan hua jiao

Shrubs or woody climbers, 2–3 m tall. Branchlets and leaf rachises with prickles. Branchlets lenticellate, puberulent. Leaves 9–31-foliolate; petiolules, leaf rachises adaxially, and leaflet blades adaxially on midvein puberulent to pubescent; petiolules 1–3 mm; leaflet blades lanceolate, obliquely oblong, or rarely ovate, 2–5 × 0.7–2.5 cm, oil glands inconspicuous, midvein adaxially plane or basally impressed, secondary veins 9–12 on each side of midvein, base oblique and subrounded to broadly cuneate, margin subapically crenulate, apex acute or shortly acuminate, glandular retuse at tip. Inflorescences axillary. Flowers 4(or 5)-merous. Perianth in 2 series. Sepals 0.5–1 mm. Petals 2–3 mm. Infructescences paniculate, 3–6 cm. Fruit pedicel ca. 5 mm; follicles 5–6 mm, oil glands impressed when dry. Seeds 3.5–4.5 mm in diam. Fl. Mar–Apr, fr. Sep–Nov.

• Upland open forests; 500–1600 m. W Guangxi, SW Guizhou, SE Yunnan.

15. *Zanthoxylum yuanjiangense* C. C. Huang, Acta Phytotax. Sin. 16(2): 81. 1978.

元江花椒 yuan jiang hua jiao

Woody climbers. Branchlets with prickles. Leaf rachises, inflorescences, and adaxial surface of petiolules minutely puberulent but other parts glabrous. Leaves 7–15-foliolate; petiolules 2–4 mm; leaflet blades alternate to subopposite, elliptic, ovate, or rarely obovate, 6–10 × 2.5–4 cm, subleathery, oil glands inconspicuous on mature leaflets, midvein adaxially

impressed, secondary and tertiary veins ridged on both surfaces, base rounded to broadly cuneate, margin entire, apex shortly caudate. Inflorescences terminal or axillary, thyriform, to 26 cm. Flowers 4-merous. Perianth in 2 series. Sepals purplish green, broadly ovate, ca. 1 mm. Petals oblong, 3–4 mm. Stamens 4; connective with an oil gland at apex. Infructescences ca. 12 cm wide. Fruit follicles dark brownish black, ca. 6 mm in diam., oil glands inconspicuous, apex beaked. Seeds 5–5.5 mm in diam. Fl. May, fr. Nov.

• Upland thickets and moist secondary forests; 400–600 m. S Yunnan.

16. *Zanthoxylum dissitum* Hemsley, J. Linn. Soc., Bot. 23: 106. 1886.

蚬壳花椒 xian ke hua jiao

Woody climbers. Stem grayish white. Branchlets, leaf rachises, and midvein of leaflet blades with brownish red prickles. Leaves (3 or)5–9-foliolate; petiolules 3–10 mm; leaflet blades alternate to subopposite, symmetric or rarely oblique, to 20 × 1–8 cm, thickly papery to subleathery, glabrous, oil glands inconspicuous, midvein adaxially impressed, margin entire, repand, denticulate, or serrate, apex acuminate to caudate. Inflorescences axillary, to 10 cm; rachis pubescent. Flowers 4-merous. Perianth in 2 series. Sepals purplish green, broadly ovate, less than 1 mm. Petals pale yellowish green, broadly ovate, 4–5 mm. Male flowers: pedicel 1–3 mm; stamens 4; filaments 5–6 mm; rudimentary gynoecium 4-lobed. Female flowers without staminodes. Fruit follicles brown, densely pressed together in infructescence, 1–1.5 cm; outer part of pericarp (exocarp and mesocarp) extended beyond endocarp on each side of suture in dehiscent fruit, smooth. Seeds 8–10 mm in diam. Fl. Apr–May or Nov–Dec, fr. Sep–Nov.

• Upland thickets and open forests, forests; 300–2600 m. S Gansu, Guangdong, Guangxi, Guizhou, Hainan, SW Henan, Hubei, Hunan, S Shaanxi, Sichuan, Yunnan.

- 1a. Branchlets with congested straight spines 16c. var. *hispidum*
- 1b. Branchlets without congested straight spines.
 - 2a. Margin of leaflet blades acutely serrate 16d. var. *acutiserratum*
 - 2b. Margin of leaflet blades entire, repand, or denticulate.
 - 3a. Leaflet blades ca. 6 × as long as wide, margin entire 16a. var. *dissitum*
 - 3b. Leaflet blades 7–10 × as long as wide; margin repand or denticulate 16b. var. *lanciforme*

16a. *Zanthoxylum dissitum* var. *dissitum*

蚬壳花椒(原变种) xian ke hua jiao (yuan bian zhong)

Fagara dissita (Hemsley) Engler; *Zanthoxylum bodinieri* H. Léveillé.

Branchlets without congested straight spines. Leaflet blades narrowly elliptic, broadly elliptic, or subrounded, margin entire. Fl. Apr–May, fr. Sep–Oct.

• Upland thickets; 300–2600 m. S Gansu, Guangdong, Guangxi,

Guizhou, Hainan, SW Henan, Hubei, Hunan, S Shaanxi, Sichuan, Yunnan.

16b. *Zanthoxylum dissitum* var. *lanciforme* C. C. Huang, Acta Phytotax. Sin. 16(2): 82. 1978.

长叶蚬壳花椒 chang ye xian ke hua jiao

Leaflet blades narrowly linear-lanceolate, 10–20 × 1–2 cm, base attenuate, margin repand or denticulate, apex acuminate. Fl. Nov–Dec.

- Forests; ca. 1000 m. Guangxi (Damiao Shan), Guizhou.

16c. *Zanthoxylum dissitum* var. *hispidum* (Reeder & S. Y. Cheo) C. C. Huang, Acta Phytotax. Sin. 6: 78. 1957.

刺蚬壳花椒 ci xian ke hua jiao

Fagara dissita var. *hispidum* Reeder & S. Y. Cheo, J. Arnold Arbor. 32: 69. 1951.

Branchlets with congested straight spines. Inflorescence rachises with prickles. Fl. Apr–May, fr. Sep–Nov.

- Upland open forests; 1500–1800 m. C and SW Sichuan, NE Yunnan (Suijiang).

16d. *Zanthoxylum dissitum* var. *acutiserratum* C. C. Huang, Acta Phytotax. Sin. 16(2): 82. 1978.

针边蚬壳花椒 zhen bian xian ke hua jiao

Leaflet blades oblong, 6–10 × 2–3 cm, margin acutely serrate. Fl. Apr–May, fr. Aug–Sep.

- Upland open forests; ca. 2400 m. Sichuan (Ganluo).

17. *Zanthoxylum collinsiae* Craib, Bull. Misc. Inform. Kew 1926: 165. 1926 [*“collinsae”*].

糙叶花椒 cao ye hua jiao

Zanthoxylum asperum C. C. Huang; *Z. scabrum* Guil-laumin.

Woody climbers. Branchlets with prickles. Younger branchlets, leaf rachises, petiolules, and abaxial surface of leaflet blades villous. Leaves 5–9-foliolate; petiolules 2–4 mm; leaflet blades opposite, broadly ovate to ovate-elliptic, 7–19 × 5–8 cm, papery, black to blackish brown when dry, slightly lustrous, adaxially hirsutulous, midvein with prickles, secondary veins 8–12 on each side of midvein, base oblique and rounded to subcordate, margin entire to crenate, apex mucronate, caudate, or rarely acuminate and with a retuse tip and an oil gland. Inflorescences axillary, 3–5 cm. Flowers 4-merous. Pedicel puberulent. Perianth in 2 series. Sepals puberulent, ca. 1 mm. Petals ca. 3 mm. Male flowers: stamens 4; rudimentary gynoecium ca. 1.5 mm. Fruit pedicel 2–4 mm; follicles ca. 6 mm in diam., pubescent, oil glands impressed when dry. Seeds 4.5–5 mm in diam. Fl. Apr–May, fr. Sep–Oct.

Hillside open forests and thickets; 500–1000 m. NW Guangxi, SW Guizhou, S Yunnan [Laos, NE Thailand, N Vietnam].

Hartley (J. Arnold Arbor. 47: 181. 1966) placed *Zanthoxylum collinsiae*, *Z. asperum*, and *Z. scabrum* in the synonymy of *Z. nitidum*.

18. *Zanthoxylum liboense* C. C. Huang, Guihaia 7: 6. 1987.

荔波花椒 li bo hua jiao

Shrubs or woody climbers, to 1.5 m tall or long. Branchlets and leaf rachises with prickles. Older branchlets brownish black, rugulose, pubescent. Leaf rachises, inflorescences, and petiolules pubescent. Leaves 5–9-foliolate; petiolules 2–5 mm; leaflet blades subopposite to alternate, ovate to elliptic, 6–8 × 2.5–3.5 cm, subleathery, abaxially pubescent, midvein adaxially plane or apically impressed and puberulent, secondary veins 10–13 on each side of midvein, base rounded, margin entire, apex mucronate to acuminate. Inflorescences axillary, 3–4 cm. Fruit pedicel 6–10 mm; fruit 4-carpelled, usually only 2 or 3 carpels developing; follicles dark brownish black when dry, 7–8 mm in diam., pubescent when young but perhaps only on undeveloped carpels, oil glands inconspicuous, apex beaked. Seeds 5–6 mm in diam. Fr. Aug–Sep.

- Forests, thickets; 700–800 m. S Guizhou (Libo).

19. *Zanthoxylum echinocarpum* Hemsley, Ann. Bot. (Oxford) 9: 149. 1895.

刺壳花椒 ci ke hua jiao

Woody climbers. Young branchlets, leaf rachises, petiolules, and leaflet blades abaxially on midvein pubescent. Branchlets and leaves with prickles. Leaves (3 or)5–11-foliolate; petiolules 2–5 mm; leaflet blades alternate or opposite, ovate, ovate-elliptic, or long elliptic, 7–13 × 2.5–5 cm, thickly leathery, base rounded to cordate, margin entire or subentire. Inflorescences axillary or terminal. Flowers 4-merous. Perianth in 2 series. Sepals pale purplish green. Petals 2–3 mm. Male flowers: stamens 4. Female flowers: carpels (3 or)4(or 5). Fruit pedicel obsolete or to 3 mm; follicles with prickles to 1 cm. Seeds 6–8 mm in diam. Fl. Apr–May, fr. Oct–Dec.

- Forests, hillside open forests and thickets; 200–1800 m. N Guangdong, Guangxi, Guizhou, W Hubei, Hunan, Sichuan, SE Yunnan.

- 1a. Abaxial surface of leaflet blades glabrous except for pubescent midvein 19a. var. *echinocarpum*
- 1b. Abaxial surface of leaflet blades villous 19b. var. *tomentosum*

19a. *Zanthoxylum echinocarpum* var. *echinocarpum*

刺壳花椒(原变种) ci ke hua jiao (yuan bian zhong)

Fagara echinocarpa (Hemsley) Engler.

Leaflet blades abaxially glabrous except for pubescent midvein. Prickles of follicles pubescent.

- Forests; 200–1000 m. N Guangdong, Guangxi, Guizhou, W Hubei, Hunan, Sichuan, SE Yunnan.

19b. *Zanthoxylum echinocarpum* var. *tomentosum* C. C. Huang, Acta Phytotax. Sin. 16(2): 82. 1978.

毛刺壳花椒 mao ci ke hua jiao

Branchlets, leaf rachises, petioles, abaxial surface of leaflet blades, and inflorescence rachises villous. Prickles of

follicles pilose when mature.

• Hillside open forests and thickets; 300–1800 m. NW Guangxi (Tian'e), SW Guizhou (Anlong), SE Yunnan.

20. *Zanthoxylum oxyphyllum* Edgeworth, Trans. Linn. Soc. London 20: 42. 1846.

尖叶花椒 jian ye hua jiao

Fagara oxyphylla (Edgeworth) Engler; *Zanthoxylum alpinum* C. C. Huang; *Z. taliense* C. C. Huang; *Z. tibetanum* C. C. Huang.

Shrubs or small trees. Branchlets and leaf rachises with prickles. Leaf rachises adaxially and midvein of leaflet blades adaxially pubescent. Old leaves subglabrous. Leaves 11–19-foliolate; petiolules to 2 mm; leaflet blades alternate or opposite, lanceolate or rarely ovate, 5–12 × 1.5–2.5 cm, abaxially gray when dry, oil glands numerous, midvein impressed adaxially, secondary veins anastomosing near margin, reticulate veinlets ridged when dry, base cuneate, margin serrulate, apex acuminate. Inflorescences terminal, cymose-corymbose, to 30-flowered. Perianth in 2 series. Sepals 4, purplish green. Petals ca. 3 mm. Male flowers: rudimentary gynoeceium 2–4-parted, lobes linear. Fruit pedicel 1–1.5 cm, 1–1.5 mm in diam.; follicles purplish red, 6–7 mm, oil glands impressed when dry, apex beaked. Seeds ca. 5 mm in diam. Fl. May–Jun, fr. Sep–Oct. $2n = 72$.

Open forests, forest margins; 1800–2900 m. S Xizang, W Yunnan [Bhutan, NE India, Myanmar, Nepal].

21. *Zanthoxylum stenophyllum* Hemsley, Ann. Bot. (Oxford) 9: 147. 1895.

狭叶花椒 xia ye hua jiao

Fagara stenophylla (Hemsley) Engler; *Zanthoxylum pashanense* N. Chao.

Shrubs or small trees. Stems and branches grayish white. Young branchlets pale purplish red. Branchlets and midvein of leaflet blades abaxially with prickles. Leaves 9–23-foliolate; petiolules 1–3 mm, adaxially pubescent; leaflet blades alternate, lanceolate and 2–11 × 1–4 cm, narrowly lanceolate and 2–3.5 × 0.4–0.7 cm, or ovate and 8–16 × 6–8 mm, oil glands inconspicuous, midvein adaxially ridged to plane and puberulent but glabrous in fruit, reticulate veinlets ridged on both surfaces, base cuneate to subrounded, margin crenulate, apex acuminate to mucronate. Inflorescences terminal, cymose-corymbiform, to 30-flowered. Flowers 4-merous. Perianth in 2 series. Sepals ca. 0.5 mm. Petals 2.5–3 mm. Male flowers: pedicel 2–5 mm; stamens 4; connective without an oil gland at apex; rudimentary gynoeceium disciform; styles coherent. Female flowers: pedicel 0.6–1.5 cm; staminodes absent. Fruit pedicel purplish red, 1–3 cm, glabrous; follicles pale purplish red to dark red, 4.5–5 cm in diam., oil glands impressed when dry, apex beaked. Seeds ca. 4 mm in diam. Fl. May–Jun, fr. Aug–Sep.

• Upland thickets; 700–2400 m. S Gansu (Chengxian, Huixian), W Henan, W Hubei, NE Hunan, SW Shaanxi, Sichuan.

22. *Zanthoxylum esquirolii* H. Léveillé, Repert. Spec. Nov.

Regni Veg. 13: 266. 1914.

贵州花椒 gui zhou hua jiao

Fagara chaffanjonii (H. Léveillé) Handel-Mazzetti; *F. esquirolii* (H. Léveillé) Handel-Mazzetti; *Zanthoxylum chaffanjonii* H. Léveillé.

Shrubs or small trees. Branchlets and leaf rachises with prickles. Branchlets pale purplish red and glaucous when dry. Leaves 5–13-foliolate; petiolules 3–6 mm; leaflet blades alternate, ovate, lanceolate, or rarely broadly ovate, 3–10 × 1.5–4.5 cm, oil glands inconspicuous, midvein adaxially impressed, base subrounded to broadly cuneate, margin crenulate or entire toward base, apex obliquely caudate with a retuse tip. Inflorescences terminal, cymose-corymbiform, to 30-flowered. Flowers 4-merous. Perianth in 2 series. Petals ca. 3 mm. Female flowers (3 or 4)-carpelled. Fruit pedicel to 4.5 mm, 0.5–1 mm in diam.; follicles purplish red, ca. 5 mm in diam., oil glands impressed, apex beaked. Seeds ca. 4 mm in diam. Fl. May–Jun, fr. Sep–Nov.

• Upland open forests and thickets; 700–3200 m. Guizhou, Sichuan, Yunnan.

23. *Zanthoxylum avicennae* (Lamarck) Candolle, Prodr. 1: 726. 1824.

箬椴花椒 le dang hua jiao

Fagara avicennae Lamarck, Encycl. 2: 445. 1788; *Zanthoxylum avicennae* var. *tonkinense* Pierre; *Z. avicennae* var. *touranense* Pierre; *Z. lentiscifolium* Champion ex Benth.

Trees to 15 m tall, deciduous. Branchlets and leaves glabrous, with prickles. Leaves 11–21-foliolate; rachis winged; leaflet blades opposite or rarely subopposite, obliquely ovate, rhomboidal, obovate, or falcate, 2.5–7 × 1–3 cm, oil glands visible on fresh leaves or inconspicuous, margin entire or apically crenate, apex mucronate to blunt. Inflorescences terminal, many flowered; rachis purplish red. Flowers 5-merous. Pedicel purplish red. Perianth in 2 series. Sepals green, broadly ovate. Petals yellowish white, ca. 2.5 mm. Male flowers: stamens 5; rudimentary gynoeceium disciform, 2-lobed. Female flowers: carpels 2(or 3); staminodes small. Fruit pedicel 3–6 mm; follicles pale purplish red, 4–5 mm in diam., oil glands numerous, large, and slightly protruding, apex not beaked. Seeds 3.5–4.5 mm in diam. Fl. Jun–Aug, fr. Oct–Dec.

Secondary forests in lowland flat areas, hillsides, valleys; 400–700 m. S Fujian, Guangdong, Guangxi, Hainan, S Yunnan [India, Indonesia, Malaysia, Philippines, Thailand, Vietnam].

24. *Zanthoxylum micranthum* Hemsley, Ann. Bot. (Oxford) 9: 147. 1895.

小花花椒 xiao hua hua jiao

Fagara biondii Pampanini; *F. micrantha* (Hemsley) Engler.

Trees to 15 m tall, deciduous. Branchlets glabrous, with prickles. Leaves 9–17-foliolate; petiolules 1.5–5 mm; leaflet blades opposite or on basal part of rachis subopposite, lanceolate, 5–8 × 1–3 cm, oil glands numerous, midvein impressed,

secondary veins 8–12 on each side of midvein, base symmetrically or obliquely rounded to broadly cuneate, margin crenate, apex acuminate. Inflorescences terminal, many flowered. Flowers 5-merous. Perianth in 2 series. Sepals broadly ovate, ca. 0.3 mm wide. Petals pale yellowish white, 1.5–2 mm. Male flowers: stamens 5, ca. 3 mm; rudimentary gynoecium disciform, 3-lobed or not divided. Female flowers 3(or 4)-carpelled. Fruit follicles pale purplish red but pale yellow to grayish brown when dry, ca. 5 mm in diam., oil glands small, apex not beaked. Seeds to 4 mm. Fl. Jul–Aug, fr. Oct–Nov.

• Hillside open forests; 300–1200 m. Guizhou, SW Henan, W Hubei, Hunan, Sichuan, Yunnan.

25. *Zanthoxylum ailanthoides* Siebold & Zuccarini, *Abh. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss.* 4(2): 138. 1845.

椿叶花椒 chun ye hua jiao

Trees to 15 m tall, deciduous. Branchlets and inflorescence rachises glabrous, with prickles. Leaves 11–27-foliolate; leaflet blades opposite, narrowly lanceolate but subovate basally on rachis, 7–18 × 2–6 cm, abaxially grayish green or glaucous, oil glands numerous, midvein adaxially impressed, secondary veins 11–16 on each side of midvein, base symmetrically or subobliquely rounded, margin crenate, apex acuminate. Inflorescences terminal, many flowered. Flowers 5-merous, subsessile. Perianth in 2 series. Sepals broadly triangular, ca. 0.8 mm. Petals pale yellowish white, ca. 2.5 mm. Male flowers: stamens 5; rudimentary gynoecium disciform, 2- or 3-lobed. Female flowers (3 or 4)-carpelled. Fruit pedicel 1–3 mm; follicles pale reddish brown but pale gray to brownish gray when dry, ca. 4.5 mm in diam., oil glands numerous, impressed when dry, apex not beaked. Seeds ca. 4 mm in diam. Fl. Aug–Sep, fr. Oct–Dec.

Upland thickets; 300–1500 m. Fujian, Guangdong, Guangxi, Guizhou, S Jiangxi, SE Sichuan, Taiwan, SE Yunnan, Zhejiang [Japan (including Bonin and Ryukyu Islands), Korea, Philippines].

- 1a. Leaflet blades glabrous on both surfaces 25a. var. *ailanthoides*
- 1b. Leaflet blades abaxially pubescent 25b. var. *pubescens*

25a. *Zanthoxylum ailanthoides* var. *ailanthoides*

椿叶花椒(原变种) chun ye hua jiao (yuan bian zhong)

Fagara ailanthoides (Siebold & Zuccarini) Engler; *F. boninshimae* G. Koidzumi; *F. emarginella* (Miquel) Engler; *F. hemsleyana* (Makino) Makino; *Zanthoxylum ailanthoides* var. *inermis* Rehder & E. H. Wilson; *Z. emarginellum* Miquel; *Z. hemsleyanum* Makino.

Leaflet blades glabrous on both surfaces, abaxially glaucous.

Upland thickets; 300–1500 m. Fujian, Guangdong, Guangxi, Guizhou, S Jiangxi, SE Sichuan, Taiwan, SE Yunnan, Zhejiang [Japan (including Bonin and Ryukyu Islands), Korea, Philippines].

Zanthoxylum hemsleyanum Makino was based on *Z. emarginellum* sensu Hemsley (1895), not Miquel (1867).

25b. *Zanthoxylum ailanthoides* var. *pubescens* Hatusima, *Acta Phytotax. Geobot.* 4: 210. 1935.

毛椿叶花椒 mao chun ye hua jiao

Leaf rachises and abaxial surface of leaflet blades pubescent.

• Taiwan.

This taxon is not recognized as a separate variety in Fl. Taiwan, ed. 2, 3: 537. 1993.

26. *Zanthoxylum myriacanthum* Wallich ex J. D. Hooker, *Fl. Brit. India* 1: 496. 1875.

大叶臭花椒 da ye chou hua jiao

Trees to 15 m tall, deciduous. Branchlets toward apex and rachis of inflorescences with prickles. Leaves without prickles, 7–17-foliolate; leaflet blades opposite, broadly ovate, ovate-elliptic, or oblong, but suborbicular basally on rachis, 10–20 × 4–10 cm, both surfaces glabrous, oil glands numerous, large, turning red or blackish brown and slightly protruding when dry, midvein adaxially impressed, base symmetrically or obliquely rounded to broadly cuneate, margin crenulate-serrulate. Inflorescences terminal, to 35 × 30 cm, many flowered. Flowers 5-merous. Perianth in 2 series. Sepals broadly ovate, ca. 0.3 mm. Petals white, ca. 2.5 mm. Male flowers: stamens 5; rudimentary gynoecium disciform, 3-lobed. Female flowers: carpels (2 or 3)(or 4); staminodes small. Fruit follicles reddish brown, ca. 4.5 mm in diam., oil glands numerous, apex not beaked. Seeds ca. 4 mm in diam. Fl. Jun–Aug, fr. Sep–Nov.

Hillside forests, forests; 200–1500 m. Fujian, Guangdong, Guangxi, SE Guizhou, Hainan, S Hunan, Jiangxi, S Yunnan, S Zhejiang [Bhutan, India, Indonesia, Malaysia, Myanmar, Philippines, Vietnam].

- 1a. Petiolules, leaflet blades, leaf rachises, and inflorescences not villous 26a. var. *myriacanthum*
- 1b. Petiolules, leaflet blades, leaf rachises, and inflorescences villous 26b. var. *pubescens*

26a. *Zanthoxylum myriacanthum* var. *myriacanthum*

大叶臭花椒(原变种) da ye chou hua jiao (yuan bian zhong)

Euodia odorata H. Léveillé; *Fagara diabolica* (Elmer) Engler; *F. gigantea* Handel-Mazzetti; *F. myriacantha* (Wallich ex J. D. Hooker) Engler; *F. odorata* (H. Léveillé) Handel-Mazzetti; *F. rhetoides* (Drake) Reeder & S. Y. Cheo; *Zanthoxylum diabolicum* Elmer; *Z. giganteum* (Handel-Mazzetti) Rehder; *Z. odoratum* (H. Léveillé) H. Léveillé; *Z. rhetoides* Drake.

Leaf rachises, petiolules, leaflet blades, and inflorescence rachises not villous.

Hillside forests; 200–1500 m. Fujian, Guangdong, Guangxi, SE Guizhou, Hainan, S Hunan, Jiangxi, S Yunnan, S Zhejiang [Bhutan, India, Indonesia, Malaysia, Myanmar, Philippines, Vietnam].

26b. *Zanthoxylum myriacanthum* var. *pubescens* (C. C. Huang) C. C. Huang, *Guihaia* 11: 9. 1991.

毛大叶臭花椒 mao da ye chou hua jiao

Zanthoxylum rhetoides var. *pubescens* C. C. Huang, *Acta Phytotax. Sin.* 6: 48. 1957; *Z. utile* C. C. Huang.

Leaf rachises, petiolules, leaflet blades, and inflorescence rachises villous.

- Forests; ca. 1400 m. S Yunnan (Xishuangbanna).

27. *Zanthoxylum molle* Rehder, J. Arnold Arbor. 8: 150. 1927.
 朵花椒 duo hua jiao

Euodia mollicoma Hu & F. H. Chen; *Fagara mollis* (Rehder) Reeder & S. Y. Cheo.

Trees to 10 m tall, deciduous. Bark brownish black. Young branches and rachis of inflorescences with prickles. Young branches dark purplish red. Leaves (5–)13–19-foliolate; rachis pubescent; leaflet blades opposite, subsessile, broadly ovate, elliptic, or rarely suborbicular, 8–15 × 4–9 cm, thickly leathery, abaxially with soft grayish white to grayish yellow woolly-villous indumentum, oil glands inconspicuous, midvein adaxially impressed, secondary veins 11–17 on each side of midvein, base symmetrically or rarely obliquely rounded to subcordate, margin entire or crenulate, apex acute. Inflorescences terminal, many flowered. Flowers 5-merous. Pedicel pale purplish red, pubescent. Perianth in 2 series. Petals white, 2–3 mm. Male flowers: rudimentary gynoecium 3-lobed. Female flowers: carpels 3; staminodes small. Fruit follicles pale purplish red but pale yellow to grayish brown when dry, 4–5 mm in diam., oil glands numerous and impressed when dry, apex not beaked. Seeds 3.5–4 mm in diam. Fl. Jun–Aug, fr. Oct–Nov.

- Upland open forests and thickets; 100–900 m. Anhui, Guizhou, Henan, Hunan, Jiangxi, Yunnan, Zhejiang.

28. *Zanthoxylum schinifolium* Siebold & Zuccarini, Abh. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. 4(2): 137. 1845.

青花椒 qing hua jiao

Fagara pteropoda (Hayata) Y. C. Liu; *F. schinifolia* (Siebold & Zuccarini) Engler; *Zanthoxylum manschuricum* Bennett; *Z. pteropodum* Hayata.

Shrubs 1–2 m tall. Stems and branchlets with prickles. Young branchlets dark purplish red. Leaves 7–19-foliolate; petiolules obsolete or to 3 mm; leaflet blades opposite, or alternate toward base of rachis, broadly ovate, broadly ovate-rhombic, or lanceolate, 5–10(–70) × 4–6(–25) mm, papery, oil glands numerous or inconspicuous, midvein adaxially impressed, base symmetrically or sometimes obliquely rounded to broadly cuneate, margin serrate to subentire, apex mucronate to acuminate. Inflorescences terminal. Flowers 5-merous. Perianth in 2 series. Petals pale yellowish white, ca. 2 mm. Male flowers: rudimentary gynoecium 2- or 3-lobed. Female flowers: carpels 3(–5). Fruit follicles reddish brown but dark green to brownish black when dry, 4–5 mm in diam., oil glands small, apex not beaked. Seeds 3–4 mm in diam. Fl. Jul–Sep, fr. Sep–Dec.

Upland open forests and thickets; below 800 m. Anhui, Fujian, N Guangdong, N Guangxi, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Liaoning, Shandong, Taiwan, Zhejiang [Japan (including Ryukyu Islands), Korea].

29. *Zanthoxylum dimorphophyllum* Hemsley, Ann. Bot. (Ox-

ford) 9: 150. 1895.

异叶花椒 yi ye hua jiao

Trees to 10 m tall, deciduous. Branches grayish black, with few prickles or unarmed; young branchlets and shoots rust-colored pubescent or glabrous; axillary buds rust-colored villosulous. Leaves 3–5(–11)-foliolate; leaflet blades ovate, elliptic, or sometimes obovate, (2–)4–9(–20) × (1–)2–3.5(–7) cm, oil glands numerous, midvein adaxially plane or impressed and puberulent, reticulate veinlets slightly ridged when dry, base symmetric, margin crenate and with or without spines, apex blunt, rounded, mucronate, or acuminate, usually with a retuse tip. Inflorescences terminal; bracts rust-colored villosulous. Perianth in 2 series with 4 sepals and 4 petals or grading to 2 irregular series or 1 series with 7 or 8 ± undifferentiated 2–3 mm tepals; when differentiated, sepals 0.2–0.5 mm and petals ca. 1.5 mm. Male flowers: stamens 4–6; disk pulvinate; rudimentary gynoecium obsolete or 2- or 3-carpelled. Female flowers: staminodes 4 or 5; rudimentary anthers without pollen; gynoecium 2- or 3-carpelled; styles recurved. Fruit follicles purplish red, 6–8 mm in diam., sparsely pubescent when young, with sparse oil glands, stipitate, apex shortly beaked. Seeds 5–7 mm in diam. Fl. Apr–Jun, fr. Sep–Nov. $2n = 36, 68$.

Moist areas in upland forests, hillside open forests and thickets; 300–2400 m. S Gansu, N Guangdong, Guangxi, Guizhou, Hainan, SW Henan, W Hubei, Hunan, S Shaanxi, Sichuan, Taiwan, Yunnan [Thailand, Vietnam].

C. C. Huang (Fl. Reipubl. Popularis Sin. 43(2): 40. 1997) mistakenly placed *Zanthoxylum dimorphophyllum* in synonymy of *Z. ovalifolium* Wight, which ranges from India to NE Australia and is not known to occur in China.

- 1a. Margin of leaflet blades with spines 29c. var. *spinifolium*
- 1b. Margin of leaflet blades without spines.
 - 2a. Leaves 3- or 5-foliolate 29a. var. *dimorphophyllum*
 - 2b. Leaves (5 or)7–11-foliolate 29b. var. *multifoliolatum*

29a. *Zanthoxylum dimorphophyllum* var. *dimorphophyllum*

异叶花椒(原变种) yi ye hua jiao (yuan bian zhong)

Fagara dimorphophylla (Hemsley) Engler; *F. robiginosa* Reeder & S. Y. Cheo; *Zanthoxylum acanthopodium* Candolle var. *deminutum* (Rehder) Reeder & S. Y. Cheo; *Z. dimorphophyllum* var. *deminutum* Rehder; *Z. evoldifolium* Guillaumin; *Z. pistaciiflorum* Hayata; *Z. robiginosum* (Reeder & S. Y. Cheo) C. C. Huang.

Leaves 3- or 5-foliolate; margin of leaflet blades without spines.

Moist areas in upland forests; 300–2400 m. S Gansu, N Guangdong, Guangxi, Guizhou, Hainan, W Hubei, Hunan, S Shaanxi, Sichuan, Taiwan, Yunnan [Thailand, Vietnam].

29b. *Zanthoxylum dimorphophyllum* var. *multifoliolatum* C. C. Huang, Acta Phytotax. Sin. 16(2): 81. 1978.

多异叶花椒 duo yi ye hua jiao

Zanthoxylum ovalifolium Wight var. *multifoliolatum* (C. C. Huang) C. C. Huang.

Leaves (5 or)7–11-foliolate; margin of leaflet blades without spines.

- Hillside thickets. Yunnan (Kunming).

29c. *Zanthoxylum dimorphophyllum* var. *spinifolium* Rehder & E. H. Wilson in Sargent, Pl. Wilson. 2: 126. 1914.

刺异叶花椒 ci yi ye hua jiao

Zanthoxylum dissitum Hemsley var. *spinulosum* Z. M. Tan; *Z. ovalifolium* Wight var. *spinifolium* (Rehder & E. H. Wilson) C. C. Huang.

Leaves 3- or 5-foliolate; margin of leaflet blades with spines.

- Hillside open forests and thickets; 400–2100 m. Guizhou, SW Henan (Funiu Shan), W Hubei, Hunan, S Shaanxi (Qin Ling), Sichuan.

30. *Zanthoxylum acanthopodium* Candolle, Prodr. 1: 727. 1824.

刺花椒 ci hua jiao

Zanthoxylum acanthopodium var. *oligotrichum* Z. M. Tan; *Z. acanthopodium* var. *timbor* J. D. Hooker; *Z. acanthopodium* var. *villosum* C. C. Huang.

Shrubs, woody climbers, or trees to 6 m tall. Bark grayish black. Branchlets rust-colored pubescent to nearly glabrous, usually with prickles. Leaves 3–9-foliolate; rachis wings to 3 mm on each side; leaflet blades sessile, opposite, ovate-elliptic to lanceolate, 6–10 × 2–4 cm, papery, both surfaces glabrous to rust-colored pubescent, oil glands inconspicuous, secondary veins 10–28 on each side of midvein and evident, margin entire or crenate. Inflorescences axillary. Perianth in 2 irregular series or 1 series, with 6–8 ± undifferentiated tepals. Tepals pale yellowish green, narrowly lanceolate, ca. 1.5 mm. Male flowers: stamens 5 or 6; anthers reddish purple before anthesis; disk pulvinate; rudimentary carpels 2–5. Female flowers: rudimentary stamens lacking; carpels 2–5, sparsely hirsute to glabrous, abaxially often with a conspicuous oil gland; styles recurved. Fruit follicles usually purplish red, ca. 4 mm in diam., glabrous or sometimes with sparse trichomes, oil glands large and protruding. Seeds ca. 3 mm in diam. Fl. Apr–May, fr. Sep–Oct. *2n* = 64.

Upland open forests and thickets; 1400–3200 m. W Guangxi, Guizhou, Sichuan, Xizang, Yunnan [Bangladesh, Bhutan, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Thailand, Vietnam].

31. *Zanthoxylum armatum* Candolle, Prodr. 1: 727. 1824.

竹叶花椒 zhu ye hua jiao

Shrubs, woody climbers, or trees to 5 m tall, deciduous. Branchlets and leaflet blades abaxially on midvein usually with prickles. Young branchlets and inflorescence rachises glabrous

or rust-colored pubescent. Leaves 3–9(or 11)-foliolate; rachis glabrous or rust-colored pubescent, wings to 6 mm on each side; leaflet blades subsessile, opposite, lanceolate, ovate, or elliptic, 3–12 × 1–3 cm, base attenuate to broadly cuneate, secondary veins 7–15 on each side of midvein and generally faint, margin crenate or entire and often revolute when dry, apex acute to acuminate. Inflorescences terminal on short lateral branchlets and sometimes axillary, 1–7 cm, with less than 30 flowers. Perianth in 2 irregular series or 1 series, with 6–8 ± undifferentiated 0.3–1.5 mm tepals. Male flowers: stamens 4–6; anthers yellow prior to anthesis; connective apex with oil gland; disk pulvinate; rudimentary carpels lacking. Female flowers: carpels 2 or 3, abaxially often with a conspicuous oil gland; styles recurved; staminodes ligulate or lacking. Fruit follicles usually purplish red, 4–5 mm in diam., with a few protruding oil glands. Seeds blackish brown, 3–4 mm in diam. Fl. Apr–May, fr. Aug–Oct. *2n* = 66.

Found in many habitats; below 3100 m. Anhui, Fujian, S Gansu, Guangdong, Guangxi, Guizhou, S Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shandong, S Shanxi, Sichuan, N Taiwan, Xizang, Yunnan, Zhejiang [Bangladesh, Bhutan, India, Indonesia, Japan (including Ryukyu Islands), Kashmir, Korea, Laos, Myanmar, Nepal, Pakistan, Philippines, Thailand, Vietnam].

Ohba (Fl. Jap. 22c: 37. 2001) treats the plants from Japan and most of China as *Zanthoxylum armatum* var. *subtrifoliolatum* (Franchet) Kitamura.

- 1a. Young branchlets and inflorescence rachises glabrous or young branches sparsely pubescent 31a. var. *armatum*
- 1b. Young branchlets and inflorescence rachises rust-colored pubescent 31b. var. *ferrugineum*

31a. *Zanthoxylum armatum* var. *armatum*

竹叶花椒(原变种) zhu ye hua jiao (yuan bian zhong)

Zanthoxylum alatum Roxburgh; *Z. alatum* var. *planispinum* (Siebold & Zuccarini) Rehder & E. H. Wilson; *Z. alatum* var. *subtrifoliolatum* Franchet; *Z. arenosum* Reeder & S. Y. Cheo; *Z. armatum* var. *subtrifoliolatum* (Franchet) Kitamura; *Z. planispinum* Siebold & Zuccarini.

Young branchlet apices and inflorescence rachises glabrous, or young branches sparsely pubescent. Leaflet blades abaxially flocculent on midvein.

Found in many habitats; below 3100 m. Anhui, Fujian, S Gansu, N Guangdong, Guangxi, Guizhou, S Henan, Hubei, Hunan, Jiangsu, Jiangxi, S Shaanxi, Shandong, S Shanxi, Sichuan, N Taiwan, Xizang, Yunnan, Zhejiang [Bangladesh, Bhutan, India, Indonesia, Japan (including Ryukyu Islands), Kashmir, Korea, Laos, Myanmar, Nepal, Pakistan, Philippines, Thailand, Vietnam].

31b. *Zanthoxylum armatum* var. *ferrugineum* (Rehder & E. H. Wilson) C. C. Huang, Guihaia 7: 1. 1987.

毛竹叶花椒 mao zhu ye hua jiao

Zanthoxylum alatum f. *ferrugineum* Rehder & E. H. Wilson in Sargent, Pl. Wilson. 2: 215. 1914.

Young branchlet apices, inflorescence rachises, and some-

times leaf rachises rust-colored pubescent.

- Guangdong, Guangxi, Guizhou, Hunan, Shaanxi, Sichuan, Yunnan.

32. *Zanthoxylum wutaiense* I. S. Chen, Taiwan Sci. 26: 56. 1972.

屏东花椒 ping dong hua jiao

Shrubs. Branchlets with prickles or unarmed, glabrous. Leaves 5–13-foliolate; rachis canaliculate, sides of channel rarely slightly spreading apically; leaflet blades sessile, opposite, oblong to oblong-lanceolate, 2.5–10 × 0.6–2 cm, leathery, midvein narrowly ridged adaxially, secondary veins 7–16 on each side of midvein, base attenuate to cuneate, margin crenulate, apex acuminate at least in terminal blade. Inflorescences axillary, paniculate. Flowers yellow. Pedicel ca. 3 mm. Perianth in 2 irregular series or 1 series, with 5–8 ± undifferentiated tepals. Male flowers: stamens 5–8. Female flowers: pistil subtended by columnar disk, 1(or 2)-carpelled; carpel ovoid to ellipsoid, with a conspicuous lateral oil gland; style short; stigma capitate. Fruit follicle ovoid, ca. 5 mm in diam. Fl. Apr.

- Exposed slopes in secondary broad-leaved forests; 1300–1400 m. Taiwan (Pingdong).

33. *Zanthoxylum bungeanum* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 16: 212. 1871.

花椒 hua jiao

Trees 3–7 m tall, deciduous. Stems and branchlets with prickles; stem prickles with a flat base. Young branchlets pubescent. Leaves 5–13-foliolate; rachis marginate; leaflet blades sessile, opposite, ovate, elliptic, or rarely lanceolate, sometimes suborbicular near leaf rachis base, 2–7 × 1–4.5 cm, both surfaces pubescent or abaxial surface flocculent along midvein, midvein adaxially impressed, margin crenate. Inflorescences axillary but terminal on lateral branchlets; rachis and pedicel pubescent or glabrous. Perianth in 2 irregular series or 1 series, with 6–8 yellowish green ± undifferentiated tepals. Male flowers: stamens 5–8; rudimentary gynoeceium 2-lobed. Female flowers 2–5-carpelled. Fruit follicles purplish red, 4–5 mm in diam., pustulose glandular, apex shortly beaked or beak lacking. Seeds 3.5–4.5 mm. Fl. Apr–May, fr. Aug–Oct.

Found in many habitats; below 3200 m. Anhui, Fujian, Gansu, Guangxi, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Liaoning, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, SE Xinjiang, S and SE Xizang, Yunnan, Zhejiang [Bhutan].

The dried fruit follicles of *Zanthoxylum bungeanum* are used as a culinary spice and are particularly popular in Sichuan cuisine (Sichuan pepper). In Japan, *Z. piperitum* (Linnaeus) Candolle is sometimes similarly used.

- 1a. Leaflet blades pubescent on both surfaces or sometimes adaxial surface glabrous 33c. var. *pubescens*
- 1b. Leaflet blades flocculent along midvein abaxially, otherwise glabrous.
 - 2a. Leaflet blades with oil glands only

- at margin 33a. var. *bungeanum*
- 2b. Leaflet blades with scattered oil glands 33b. var. *punctatum*

33a. *Zanthoxylum bungeanum* var. *bungeanum*

花椒(原变种) hua jiao (yuan bian zhong)

Zanthoxylum bungei Hance; *Z. bungei* var. *imperfuratum* Franchet; *Z. fraxinoides* Hemsley; *Z. simulans* Hance var. *imperfuratum* (Franchet) Reeder & S. Y. Cheo.

Leaflet blades flocculent along midvein abaxially, otherwise glabrous, oil glands only at margin.

Found in many habitats; below 3200 m. Anhui, Fujian, Gansu, Guangxi, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Liaoning, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, SE Xinjiang, S and SE Xizang, Yunnan, Zhejiang [Bhutan].

33b. *Zanthoxylum bungeanum* var. *punctatum* C. C. Huang, Acta Phytotax. Sin. 16(2): 81. 1978.

油叶花椒 you ye hua jiao

Leaf rachises, infructescences, and follicles reddish brown when dry. Leaflet blades with oil glands conspicuous, scattered. Fr. Jul–Aug.

- Open forests; 2000–2500 m. W Sichuan.

33c. *Zanthoxylum bungeanum* var. *pubescens* C. C. Huang, Acta Phytotax. Sin. 6: 24. 1957.

毛叶花椒 mao ye hua jiao

Young branchlets, rachis of leaves and inflorescences, and both surfaces of leaflet blades pubescent, or sometimes leaflet blades adaxially glabrous. Fl. May–Jun, fr. Oct–Nov.

- 1700–3200 m. Gansu, Qinghai (Xunhua), S Shaanxi, NW and W Sichuan, Yunnan.

34. *Zanthoxylum undulatifolium* Hemsley, Ann. Bot. (Oxford) 9: 148. 1895.

浪叶花椒 lang ye hua jiao

Trees to 3 m tall. Young branchlets and leaf rachises rust-colored pubescent, with few prickles or unarmed. Leaves 3–5(–7)-foliolate; terminal leaflet with petiolule 6–10 mm, lateral leaflets subsessile; leaflet blades opposite, ovate to ovate-lanceolate, 3–8 × 1.5–3.5 cm, abaxially glabrous, adaxially sparsely puberulent, midvein adaxially plane, secondary veins 6–10 on each side of midvein, base broadly cuneate to rounded, margin undulate and crenulate, apex mucronate to acuminate. Inflorescences terminal, corymbose. Perianth in 2 irregular series or 1 series, with 5–8 ± undifferentiated tepals. Fruit pedicel reddish brown, 0.7–1.4 cm; follicles reddish brown, ca. 5 mm in diam., oil glands large and impressed, apex not beaked. Seeds ca. 4 mm in diam. Fl. Apr–May, fr. Aug–Oct.

- Forests, thickets; 1600–3200 m. W Hubei, S Shaanxi, E Sichuan, NE Yunnan.

35. *Zanthoxylum austrosinense* C. C. Huang, Acta Phytotax. Sin. 6: 53. 1957.

岭南花椒 ling nan hua jiao

Shrubs or trees, rarely to 3 m tall, dioecious or rarely polygamo-monoecious, all parts glabrous. Branchlets blackish brown, unarmed. Leaves 5–11-foliolate; rachis terete; lateral leaflets opposite, sessile or subsessile; terminal leaflet with petiolule 1–3 mm; leaflet blades ovate to lanceolate, 6–11 × 3–5 cm, oil glands clear but dark reddish brown to blackish brown when dry, midvein adaxially impressed or plane, secondary veins 11–15 on each side of midvein, base rounded to subcordate or oblique, margin serrulate, apex acuminate. Inflorescences terminal, usually on lateral branchlets, to 30-flowered. Pedicel 5–8 mm. Perianth in 2 irregular series or 1 series, with 7–9 ± undifferentiated tepals. Tepals basally pale yellowish green and apically dark purplish red, lanceolate to oblanceolate, ca. 1.5 mm. Bisexual flowers: stamens 3 or 4; carpels 4. Male flowers: stamens 6–8. Female flowers: carpels 3 or 4; styles recurved; stigmas capitate. Fruit pedicel dark purplish red, 1–2 cm; follicles dark purplish red, ca. 5 mm in diam., with sparse protruding oil glands, apex subrounded or shortly beaked. Seeds ca. 4 × 3–4 mm. Fl. Mar–Apr, fr. Aug–Sep.

• Hillside open forests and thickets, upland thickets; 300–1700 m. S Anhui, Fujian, N Guangdong, NE Guangxi, SW Hubei, Hunan, Jiangxi, Zhejiang.

- 1a. Leaflet blades dark reddish brown to blackish brown when dry, glabrous 35a. var. *austrosinense*
- 1b. Leaflet blades dark grayish green when dry, adaxially hirsutulous 35b. var. *pubescens*

35a. *Zanthoxylum austrosinense* var. *austrosinense*

岭南花椒(原变种) ling nan hua jiao (yuan bian zhong)

Zanthoxylum austrosinense var. *stenophyllum* C. C. Huang.

Leaflet blades dark reddish brown to blackish brown when dry, glabrous.

• Hillside open forests and thickets; 300–900 m. S Anhui, Fujian, N Guangdong, NE Guangxi, SW Hubei, Hunan, Jiangxi, Zhejiang.

35b. *Zanthoxylum austrosinense* var. *pubescens* C. C. Huang, Acta Phytotax. Sin. 16(2): 82. 1978.

毛叶岭南花椒 mao ye ling nan hua jiao

Leaflet blades dark grayish green when dry, adaxially hirsutulous.

• Upland thickets; ca. 1700 m. Hunan (Sangzhi).

36. *Zanthoxylum motuoense* C. C. Huang, Acta Phytotax. Sin. 16(2): 83. 1978.

墨脱花椒 mo tuo hua jiao

Trees to 15 m tall, deciduous. Branchlets with prickles near leaf scars. Leaves 3- or 5-foliolate; rachis not winged, unarmed, with trichomes; leaflet blades broadly obovate to broadly elliptic, 3–6 × 2–4 cm but terminal one to 9 × 6 cm, both surfaces pubescent, oil glands inconspicuous, base subrounded to cuneate, margin crenulate, apex subrounded or rarely acuminate. Inflorescences paniculate, 4–8 cm. Fruit pedicel with short trichomes; follicles elliptic, ca. 4.5 mm in

diam., with large protruding oil glands. Seeds ca. 4 mm in diam. Fr. Sep–Oct.

• Upland thickets; ca. 1100 m. SE Xizang (Médog).

37. *Zanthoxylum piasezkii* Maximowicz, Trudy Imp. S.-Peterburgsk. Bot. Sada 11: 93. 1889.

川陕花椒 chuan shan hua jiao

Shrubs or trees, 1–3 m tall, all parts glabrous. Stems and branches with brownish red prickles. Leaves 7–17-foliolate; rachis marginate; leaflet blades sessile, orbicular, broadly elliptic, or obovate-rhombic, 3–25 × 3–8 mm, thickly leathery, pale brown to blackish brown when dry, midvein impressed, secondary veins inconspicuous, base symmetric or slightly oblique, margin apically crenate. Inflorescences terminal. Perianth in 2 irregular series or 1 series, with 6–8 ± undifferentiated tepals. Tepals broadly deltoid, ca. 1.5 mm or longer. Male flowers: pedicel 5–8 mm; stamens 5 or 6; connective blackish brown when dry, with oil gland on tip; rudimentary gynoeceum projecting outward and cushion-shaped. Female flowers: carpels 2 or 3(or 4); styles recurved. Fruit follicles purplish red, 4–5 mm in diam., with a few protruding oil glands. Seeds 3–4 mm in diam. Fl. May, fr. Jun–Jul.

• 1700–2500 m. S Gansu, W Henan, S Shaanxi, Sichuan.

38. *Zanthoxylum pilosulum* Rehder & E. H. Wilson in Sargent, Pl. Wilson. 2: 123. 1914.

微柔毛花椒 wei rou mao hua jiao

Shrubs 1–2 m tall. Branchlets with prickles, puberulent when young. Leaves (5 or)7–11-foliolate; leaflet blades sessile, ovate to ovate-elliptic, 0.5–3 × 0.4–1.5 cm but terminal one to 5 × 2.5 cm, thinly papery, grayish green when dry, oil glands inconspicuous, base symmetric, margin irregularly and remotely crenulate, apex mucronate to acuminate. Inflorescences terminal; rachis with short trichomes. Perianth in 2 irregular series or 1 series, with 5–8 ± undifferentiated tepals. Male flowers: tepals lanceolate, 1.2–1.5 mm; stamens 5 or 6. Female flowers: carpels (2–)4. Fruit follicles purplish red, 4–5 mm in diam., with sparse protruding small oil glands. Fl. Apr–May, fr. Jul–Aug.

• 2500–3100 m. S Gansu, S Shaanxi, NE and W Sichuan, Yunnan.

39. *Zanthoxylum pteracanthum* Rehder & E. H. Wilson in Sargent, Pl. Wilson. 2: 123. 1914.

翼刺花椒 yi ci hua jiao

Shrubs or trees, 2–3 m tall. Branchlets grayish green, glabrous, densely covered with setiform prickles and strongly compressed pseudostipular decurrent prickles forming a wing which joins them between nodes. Leaves 7–13-foliolate; rachis marginate, glabrous; leaflet blades subsessile, opposite or sub-opposite, lanceolate to ovate-oblong, 2–4 × 0.8–1.5 cm, oil glands inconspicuous, base slightly oblique and subrounded to broadly cuneate, margin apically crenulate, apex acuminate with a mucronate, obtuse, or emarginate tip. Inflorescences terminal; rachis base with prickles. Fruit pedicel 5–8 mm;

developed follicles 1–3 with carpels in female flowers at least 3, ca. 5 mm, pubescent. Seeds 3–4 mm.

- Upland thickets; ca. 1000 m. W Hubei (Xingshan).

40. *Zanthoxylum simulans* Hance, Ann. Sci. Nat., Bot., sér. 5, 5: 208. 1866.

野花椒 ye hua jiao

Fagara podocarpa (Hemsley) Engler; *F. setosa* (Hemsley) Engler; *Zanthoxylum acanthophyllum* Hayata; *Z. argyi* H. Léveillé; *Z. bungei* Hance var. *inermis* Franchet; *Z. podocarpum* Hemsley; *Z. setosum* Hemsley; *Z. simulans* var. *podocarpum* (Hemsley) C. C. Huang.

Shrubs or small trees. Stems and branchlets with prickles. Young branchlets and leaflet blades abaxially on midvein pubescent, sometimes also secondary veins pubescent, sometimes all parts glabrous. Leaves 5–15-foliolate; rachis winged; leaflet blades sessile or at base of leaf rachis with a short petiolule, opposite, ovate, ovate-elliptic, or lanceolate, 2.5–7 × 1.5–4 cm, adaxially with spines, oil glands numerous, translucent, and slightly protruding when dry, midvein impressed, base slightly oblique, margin crenate, apex acute to mucronate or with a retuse tip. Inflorescences terminal, 1–5 cm. Perianth in 2 irregular series or 1 series, with 5–8 ± undifferentiated tepals. Tepals pale yellowish green, narrowly lanceolate, broadly ovate, or subdeltoïd, ca. 2 mm. Male flowers: stamens 5–8(–10); filaments pale green; connective with an oil gland at apex; rudimentary gynoeceium pale green. Female flowers: carpels 2 or 3; styles recurved. Fruit follicles reddish brown, ca. 5 mm in diam., base attenuate into a 1–2 mm stipe, oil glands numerous and slightly protruding. Seeds 4–4.5 mm. Fl. Mar–May, fr. Jul–Sep. $2n = ca. 132^*$.

- Plains or upland forests. Anhui, Fujian, Gansu, N Guangdong, NE Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Qinghai, Shaanxi, Shandong, Taiwan, Zhejiang.

41. *Zanthoxylum stipitatum* C. C. Huang, Guihaia 7: 2. 1987.

梗花椒 geng hua jiao

Shrubs or trees, 1–3 m tall, glabrous except for leaflet blades. Prickles to 1.5 cm. Branchlets blackish brown when dry. Leaves 7–17-foliolate; leaflet blades subsessile or with petiolule to 2 mm, opposite, lanceolate to ovate but suborbicular at base of leaf rachis, 1–5 × 0.7–1.3 cm, papery, abaxially purplish red when young, turning grayish green when mature, and reddish brown to dark blackish red when dry, oil glands sparse and protruding on both surfaces when dry, midvein abaxially rust-colored flocculent and adaxially impressed, margin serrulate. Inflorescences terminal. Perianth in 2 irregular series or 1 series, with 6–8 ± undifferentiated tepals. Tepals usually lanceolate, 2–3 mm. Male flowers: stamens 5–8; connective with oil gland at tip. Female flowers: carpels 3 or 4; styles recurved. Rachis of infructescences purplish red. Fruit pedicel purplish red, 5–8(–10) mm; follicles purplish red, ca. 5 × 4 mm, base attenuate into a 1–3 mm stipe, oil glands slightly protruding when dry. Seeds ca. 4 × 3.5 mm. Fl. Apr–May, fr. Jul–Aug.

- Forests; 100–800 m. NW Fujian, N Guangdong, NE Guangxi, S Hunan.

