

17. **MURRAYA** J. Koenig ex Linnaeus, Mant. Pl. 2: 554, 563. 1771 [“*Murraea*”], nom. cons.

九里香属 *jiu li xiang shu*

Zhang Dianxiang (张奠湘); Thomas G. Hartley

Bergera J. Koenig ex Linnaeus; *Camunium* Adanson.

Shrubs or trees, unarmed, without rust-colored villosulous indumentum on terminal and axillary bud or young inflorescences. Leaves alternate, odd-pinnate (occasional leaves even-pinnate or 1-foliolate). Inflorescences terminal or terminal and axillary, paniculate or reduced to cymes or few to several-flowered racemes. Flowers bisexual, ellipsoid to obovoid, or narrowly so or subcylindric in bud. Sepals 4 or 5, connate at base or to \pm half their length. Petals 4 or 5, imbricate in bud. Stamens (5–)8 or 10, distinct, alternately unequal in length; filaments linear or sublinear, \pm straight. Disk annular, pulvinate, or columnar. Gynoecium 2–5-loculed, syncarpous; radial walls of locules straight; ovules 1 or 2 per locule; style 3–7 \times as long as ovary, deciduous in fruit or sometimes basal portion persistent. Fruit a berry, with mucilaginous pulp and without pulp vesicles; endocarp fleshy. Seeds with membranous or fleshy seed coat; endosperm lacking; embryo straight; cotyledons elliptic, plano-convex, neither convolute nor folded; hypocotyl partly included between cotyledons.

About 12 species: E, S, and SE Asia, Australia, SW Pacific islands; nine species (five endemic) in China.

In a cladistic analysis of selected species of subfamily Aurantioideae based on plastid DNA sequences and phytochemical features, R. Samuel et al. (Pl. Biol. 3: 77–87. 2001) proposed that *Murraya* is heterogeneous and that plants of *M.* sect. *Bergera* (J. Koenig ex Linnaeus) But & Y. C. Kong (including species 4–9 in the present enumeration) are generically distinct from those of *M.* sect. *Murraya*. However, as they pointed out, it is not clear yet whether *Bergera* is distinct from *Clausena*.

- 1a. Petals 1–2 cm; seeds villous.
 - 2a. Leaf rachises winged 1. *M. alata*
 - 2b. Leaf rachises not winged.
 - 3a. Leaflet blades mostly suborbicular to ovate to elliptic, 1.5–6 cm wide 2. *M. paniculata*
 - 3b. Leaflet blades elliptic-obovate or obovate, 0.5–3 cm wide 3. *M. exotica*
- 1b. Petals not more than 0.8 cm; seeds glabrous.
 - 4a. Flowers 4(or 5)-merous; stamens 8(or 10).
 - 5a. Leaflet blades lanceolate, 0.8–2 cm wide, tertiary veins inconspicuous 4. *M. tetramera*
 - 5b. Leaflet blades ovate to elliptic or rarely lanceolate or obovate, 2–4 cm wide, tertiary veins adaxially slightly prominent 5. *M. euchrestifolia*
 - 4b. Flowers 5-merous; stamens 10.
 - 6a. Leaves 11–31-foliolate.
 - 7a. Leaflet blades 3–6 mm wide, apex rounded to obtuse 6. *M. microphylla*
 - 7b. Leaflet blades 5–20 mm wide, apex mucronate to acuminate 7. *M. koenigii*
 - 6b. Leaves 3–11-foliolate.
 - 8a. Leaflet blades pubescent abaxially 9. *M. kwangsiensis*
 - 8b. Leaflet blades glabrous.
 - 9a. Leaflet blades 5–6 \times 2–3 cm 8. *M. crenulata*
 - 9b. Leaflet blades 7–18 \times 4–10 cm 9. *M. kwangsiensis*

1. ***Murraya alata*** Drake, J. Bot. (Morot) 6: 276. 1892.

翼叶九里香 *yi ye jiu li xiang*

Murraya alata var. *hainanensis* Swingle.

Shrubs 1–2 m tall. Branches yellowish gray to grayish white. Leaves 5–9-foliolate; petiolules \pm short or leaflets sessile; leaflet blades obovate to obovate-elliptic, 1–3 \times 0.6–1.5 cm, margin crenulate or entire, apex rounded or rarely obtuse. Inflorescences axillary, cymose. Flowers 5-merous. Sepals 1.5–2 mm. Petals white, 10–15 \times 3–5 mm. Stamens 10. Ovary 2-loculed; ovules 1 per locule; style ca. 2 \times as long as ovary; stigma capitate. Fruit vermilion, ovoid to globose, ca. 1 cm in diam., 2–4-seeded. Fl. May–Jul, fr. Oct–Dec.

Thickets in sandy areas; near sea level. SW Guangdong (Leizhou

Bandao), SW Guangxi (Beihai), S Hainan [NE Vietnam].

2. ***Murraya paniculata*** (Linnaeus) Jack, Malayan Misc. 1: 31. 1820.

千里香 *qian li xiang*

Chalcas paniculata Linnaeus, Mant. Pl. 1: 68. 1767; *C. exotica* (Linnaeus) Millspaugh; *Murraya omphalocarpa* Hayata; *M. paniculata* var. *exotica* (Linnaeus) C. C. Huang; *M. paniculata* var. *omphalocarpa* (Hayata) Tanaka.

Shrubs or trees, 1.8–12 m tall. Older branchlets grayish white to pale yellowish gray. Leaves 2–5-foliolate; petiolules less than 1 cm; leaflet blades mostly suborbicular to ovate to elliptic, 2–9 \times 1.5–6 cm, margin entire or crenulate, apex rounded to acuminate. Inflorescences terminal or terminal and

axillary. Flowers 5-merous, fragrant. Sepals ovate to lanceolate, to 2 mm, persistent in fruit. Petals white, narrowly elliptic to oblanceolate, to 2 cm. Stamens 10. Fruit orange to vermilion, narrowly ellipsoid or rarely ovoid, 1–2 × 0.5–1.4 cm. Seeds villous. Fl. Apr–Oct, fr. Apr–Feb. $2n = 18$.

Thickets, montane forests; near sea level to 1300 m. Fujian, Guangdong, Guangxi, S Guizhou, Hainan, S Hunan, Taiwan, Yunnan [Bhutan, Cambodia, India, Indonesia, Japan (Ryukyu Islands), Laos, Malaysia, Myanmar, Nepal, New Guinea, Pakistan, Philippines, Sri Lanka, Thailand, Vietnam; Australia, SW Pacific islands].

Murraya paniculata var. *omphalocarpa* was accepted by Chang (Fl. Taiwan, ed. 2, 3: 527. 1993).

3. *Murraya exotica* Linnaeus, Mant. Pl. 2: 563. 1771.

九里香 *jiu li xiang*

Chalcas exotica (Linnaeus) Millspaugh; *Murraya paniculata* (Linnaeus) Jack var. *exotica* (Linnaeus) C. C. Huang.

Trees to 8 m tall. Older branchlets grayish white to pale yellowish gray. Leaves 3–7-foliolate; petiolules rather short; leaflet blades elliptic-obovate or obovate, 1–6 × 0.5–3 cm, margin entire, apex rounded or obtuse. Inflorescences terminal or terminal and axillary. Flowers 5-merous, fragrant. Sepals ovate, ca. 1.5 mm. Petals white, oblong, 1–1.5 cm. Stamens 10. Fruit orange to vermilion, broadly ovoid, 8–12 × 6–10 mm. Seeds villous. Fl. Apr–Aug, fr. Sep–Dec. $2n = 18^*$.

• Thickets; near sea level. S Fujian, Guangdong, Guangxi, S Guizhou, Hainan, Taiwan.

This species is widespread in cultivation in tropical and subtropical areas.

4. *Murraya tetramera* C. C. Huang, Acta Phytotax. Sin. 8: 102. 1959.

四数九里香 *si shu jiu li xiang*

Trees 3–7 m tall. Leaves 5–11-foliolate; petiolules 2–4 mm; leaflet blades lanceolate, 2–5 × 0.8–2 cm, dark brownish black when dry, apex acuminate. Inflorescences paniculate. Flowers 4-merous. Sepals ovate, less than 1 mm, connate at base. Petals white, oblong, 4–5 mm. Stamens 8. Ovary ellipsoid, ca. 1 mm. Fruit reddish, globose, 1–1.2 cm in diam., with many oil glands, 1–3-seeded. Seed coat membranous, smooth. Fl. Mar–Apr, fr. Jul–Aug.

• Often on limestone mountains. W Guangxi (Bose, Debao), SE Yunnan.

5. *Murraya euchrestifolia* Hayata, Icon. Pl. Formos. 6: 11. 1916.

豆叶九里香 *dou ye jiu li xiang*

Chalcas euchrestifolia Tanaka; *Clausena euchrestifolia* (Hayata) Kanehira.

Shrubs or trees, 1.5–7 m tall. Leaves 5–9-foliolate; leaflet blades ovate to elliptic or rarely lanceolate or obovate, 5–8 × 2–4 cm, margin entire, apex mucronate to acuminate. Inflorescences paniculate. Flowers 4(or 5)-merous. Sepals pale yellowish green, ovate, 0.6–1.5 mm. Petals obovate-elliptic, 3–

5 mm. Stamens 8(or 10); anthers subglobose. Ovary pale yellowish green. Fruit red to dark red, globose, 1–1.5 cm in diam., 1- or 2-seeded. Seeds glabrous. Fl. Apr–Jul, fr. Sep–Dec.

• Well-drained forests and thickets; 500–1400 m. Guangdong (Fengkai, Nan'ao), Guangxi (Fangcheng), S and SW Guizhou (Wangmo, Xingyi), Hainan (Changjiang), Taiwan, Yunnan.

6. *Murraya microphylla* (Merrill & Chun) Swingle, J. Wash. Acad. Sci. 32: 26. 1942.

小叶九里香 *xiao ye jiu li xiang*

Clausena microphylla Merrill & Chun, Sunyatsenia 2: 251. 1935.

Shrubs or small trees. Leaves 11–21-foliolate; petiolules extremely short; leaflet blades suborbicular to ovate to elliptic, 3–20 × 3–6 mm, glabrous, base usually inequilateral, margin crenate, apex rounded to obtuse. Inflorescences terminal, 10–30-flowered. Flowers 5-merous. Sepals ovate-elliptic, ca. 1 mm, persistent in fruit. Petals in bud 4–5 mm. Fruit ellipsoid to ovoid-ellipsoid, to 1 cm. Fl. Apr–May and Jul–Oct, fr. Nov–Dec.

• Thickets in sandy areas. Guangdong, Hainan.

7. *Murraya koenigii* (Linnaeus) Sprengel, Syst. Veg. 2: 315. 1817.

调料九里香 *tiao liao jiu li xiang*

Bergera koenigii Linnaeus, Mant. Pl. 2: 555, 563. 1771; *Chalcas koenigii* (Linnaeus) Kurz.

Shrubs or trees, to 4 m tall. Leaves 17–31-foliolate; leaflet blades ovate, 2–5 × 0.5–2 cm, base obtuse to rounded and oblique, margin entire or crenulate. Inflorescences terminal, paniculate, many flowered. Flowers 5-merous, ellipsoid in bud. Sepals ovate, less than 1 mm. Petals white, oblanceolate to oblong, 5–7 mm. Stamens 10. Stigma capitate. Fruit bluish black, ovoid to oblong, 1–1.5 cm, 1- or 2-seeded. Seed coat membranous. Fl. Mar–Apr, fr. Jul–Aug.

Moist forests; 500–1600 m. Guangdong, S Hainan, S Yunnan (Xishuangbanna) [Bhutan, India, Laos, Nepal, Pakistan, Sri Lanka, Thailand, Vietnam].

8. *Murraya crenulata* (Turczaninow) Oliver, J. Linn. Soc., Bot. 5(Suppl. 2): 29. 1861.

兰屿九里香 *lan yu jiu li xiang*

Glycosmis crenulata Turczaninow, Byull. Moskovsk. Obsch. Isp. Prir., Otd. Biol. 30: 250. 1858; *Chalcas crenulata* (Turczaninow) Tanaka.

Small trees. Branchlets and leaves glabrous. Leaves 7–11-foliolate; petiolules ca. 3 mm; leaflet blades ovate-elliptic, 5–6 × 2–3 cm, base obtuse and oblique, apex acuminate. Inflorescences terminal, ca. 8 cm. Flowers 5-merous. Sepals suborbicular. Petals oblong, ca. 6 mm. Stamens 10. Ovary ca. 1.5 mm; style ca. 2.5 mm, stout, basal portion often persistent in fruit. Fruit broadly ovoid to subglobose, ca. 6 mm.

Fl. China 11: 85–87. 2008.

Taiwan (Lan Yu) [Indonesia, New Guinea, Philippines; SW Pacific islands].

9. *Murraya kwangsiensis* (C. C. Huang) C. C. Huang, *Acta Phytotax. Sin.* 16(2): 85. 1988.

广西九里香 *guang xi jiu li xiang*

Trees 1–2 m tall. Leaves 3–11-foliolate; petiolules 2–3 mm; leaflet blades alternate, ovate-oblong, 7–18 × 3–10 cm, leathery, both surfaces glabrous or abaxially pubescent, margin crenulate, apex obtuse to rounded. Flowers 5-merous, ellipsoid in bud. Sepals broadly ovate, ca. 1 mm. Petals ca. 4 mm. Stamens 10. Fruit globose, ca. 1 cm in diam. Fl. May, fr. Oct.

• Forests and thickets in valleys; 200–800 m. SW and W Guangxi, SE Yunnan.

1a. Leaflet blades abaxially pubescent

..... 9a. var. *kwangsiensis*

1b. Leaflet blades glabrous 9b. var. *macrophylla*

9a. *Murraya kwangsiensis* var. *kwangsiensis*

广西九里香(原变种) *guang xi jiu li xiang* (*yuan bian zhong*)

Clausena kwangsiensis C. C. Huang, *Acta Phytotax. Sin.* 8: 90. 1959.

Leaflet blades 3–10 × 2.5–6.5 cm, abaxially pubescent.

• Forests and thickets in valleys; 200–800 m. SW and W Guangxi, SE Yunnan.

9b. *Murraya kwangsiensis* var. *macrophylla* C. C. Huang, *Acta Phytotax. Sin.* 16(2): 85. 1978.

大叶九里香 *da ye jiu li xiang*

Leaflet blades 7–18 × 4–10 cm, glabrous. Fruit red.

• Valley forests. SW Guangxi.

Fl. China 11: 85–87. 2008.