

43. MAIANTHEMUM F. H. Wiggers, *Prim. Fl. Holsat.* 14. 1780, nom. cons.

舞鹤草属 wu he cao shu

Chen Xinqi (陈心启 Chen Sing-chi); Shoichi Kawano¹

Oligobotrya Baker; *Polygonastrum* Moench; *Smilacina* Desfontaines; *Tovaria* Necker ex Baker (1875), not Ruiz & Pavón (1794); *Vagnera* Adanson.

Herbs perennial, rhizomatous. Stems erect, simple. Leaves alternate, sessile or petiolate, usually elliptic to ovate, sometimes basal leaf solitary and early withered. Inflorescence a terminal raceme or panicle. Flowers bisexual or sometimes unisexual (when plants dioecious), small. Perianth segments 4 or 6, in 2 whorls, free or proximally ± connate, rarely forming a long tube. Stamens 4 or 6, inserted at base of perianth segments or adnate to perianth tube; filaments filiform; anthers dorsifixed. Ovary 2- or 3-loculed; ovules 1 or 2 per locule. Style columnar, relatively short; stigma entire or 2- or 3-lobed. Fruit a berry, globose or subglobose. Seeds 1–3, globose to ovoid.

About 35 species: mainly in E Asia and North America, also in N Asia, Central America, and N Europe; 19 species (nine endemic) in China.

Wu Zhengyi (editor's note) believes that *Smilacina* would be better kept separate from *Maianthemum* on the basis of morphology and geographic distribution.

- 1a. Plants with a solitary, early-withered basal leaf, cauline leaves 2 or 3; perianth segments 4, in 2 whorls; stamens 4; ovary 2-loculed, ovules 2 per locule 1. *M. bifolium*
- 1b. Plants without basal leaf, cauline leaves more than 3; perianth segments 6; stamens 6; ovary 3-loculed, ovules 1 or 2 per locule.
- 2a. Rhizome (0.7–)1–2 cm thick.
- 3a. Ovary 3–4 × as long as style 2. *M. fuscum*
- 3b. Ovary shorter than or subequalling style.
- 4a. Inflorescence rachis glabrous 3. *M. tatsienense*
- 4b. Inflorescence rachis pubescent.
- 5a. Leaves basally cordate and clasping stem 8. *M. Forrestii*
- 5b. Leaves basally neither cordate nor clasping stem.
- 6a. Perianth funnelform.
- 7a. Perianth tube 6–10 mm, 2/3–3/4 as long as perianth 9. *M. henryi*
- 7b. Perianth tube 3–4 mm, nearly 1/2 as long as perianth 10. *M. szechuanicum*
- 6b. Perianth usually campanulate or rotate.
- 8a. Style 2–2.5 × as long as ovary 4. *M. oleraceum*
- 8b. Style nearly as long as ovary.
- 9a. Perianth tube 1–2 mm, segments connate proximally 7. *M. atropurpureum*
- 9b. Perianth tube indistinct, segments free to the base or connate for less than 2 mm.
- 10a. Panicle with only 1 or 2 branches at base; stigma 3-lobed 5. *M. purpureum*
- 10b. Panicle with 3 or more branches; stigma subentire 6. *M. japonicum*
- 2b. Rhizome 0.1–0.7 cm thick.
- 11a. Inflorescence a panicle.
- 12a. Inflorescence 2–2.5 cm; perianth segments ca. 2.3 mm; style ca. 1 mm (Sichuan) 11. *M. nanchuanense*
- 12b. Inflorescence 4–5 cm; perianth segments 3–4 mm; style ca. 0.5 mm (Taiwan) 12. *M. formosanum*
- 11b. Inflorescence a raceme.
- 13a. Flowers mostly in clusters of 2–4 13. *M. dahuricum*
- 13b. Flowers all solitary.
- 14a. Inflorescence rachis pubescent.
- 15a. Perianth segments violet, free to base 14. *M. fusciculiflorum*
- 15b. Perianth segments white or tinged violet, connate at base to form a tube 1–3 mm.
- 16a. Perianth segments forming a long tube 2.5–3 mm; style 2.5–3 mm 15. *M. lichiangense*
- 16b. Perianth segments forming a short tube 1–2 mm; style 0.5–1 mm 16. *M. tubiferum*
- 14b. Inflorescence rachis glabrous.
- 17a. Inner perianth segments obovate, margin ciliate 17. *M. gongshanense*
- 17b. Inner perianth segments oblong or narrowly lanceolate, margin not ciliate.
- 18a. Inner perianth segments oblong, 2–3 mm 18. *M. trifolium*
- 18b. Inner perianth segments narrowly lanceolate, 5–7 mm 19. *M. stenolobum*

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1. *Maianthemum bifolium* (Linnaeus) F. W. Schmidt, Fl. Boem. Cent. 4: 55. 1794.

舞鹤草 wu he cao

Convallaria bifolia Linnaeus, Sp. Pl. 1: 316. 1753; *Smilacina bifolia* (Linnaeus) Desfontaines.

Plants 8–20(–25) cm tall. Rhizome sometimes forked, to 20 cm × 1–2 mm. Stem sometimes scattered papillose-pubescent. Basal leaf withered at anthesis; petiole to 10 cm. Cauline leaves usually 2, borne distally to apically on stem; petiole 1–2 cm, often papillose-pubescent; leaf blade deltoid-ovate, 3–8 (–10) × 1–5(–9) cm, abaxial veins puberulent, base cordate, margin minutely denticulate-papillose or puberulent. Raceme erect, 3–5 cm, 10–25-flowered; rachis papillose-pubescent; bracts minute. Flowers solitary or paired; pedicel ca. 5 mm, slender, articulate apically. Perianth white; segments oblong, 2–2.5 × 1.5–1.8 mm. Stamens 1.6–2.1 mm. Style ca. 1 mm. Berries red at maturity, 3–6 mm in diam. Seeds with yellow testa. Fl. May–Jul, fr. Aug–Sep. $2n = 28, 30, 36, 42, 54, 88$.

Forests, thickets, moist places, hillsides along streams; 500–2700 m. Gansu, Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Qinghai, Shaanxi, Shanxi, Sichuan, N Xinjiang [Japan, Korea, Mongolia, Russia; Europe, North America].

Maianthemum dilatatum (A. W. Wood) A. Nelson & J. F. Macbride (Bot. Gaz. 61: 30. 1916), from Japan, Mongolia, E Russia, and NW North America, probably occurs in China. In Russia and Japan, *M. dilatatum* is sympatric with *M. bifolium* and, in Japan, there occur intermediate forms which may have derived from hybridization between the two species (Kawano, pers. obs.). Such plants in the Russian Far East have been called *M. intermedium* Voroschilov (Izv. Glavn. Bot. Sada RSFSR 38, 50. 1960) and may also occur in China.

2. *Maianthemum fuscum* (Wallich) LaFrankie, Taxon 35: 588. 1986.

西南鹿药 xi nan lu yao

Smilacina fusca Wallich, Pl. Asiat. Rar. 3: 37. 1832; *S. bootanensis* Griffith; *S. finitima* (W. W. Smith) F. T. Wang & Tang; *S. fusca* var. *pilosa* H. Hara; *Tovaria finitima* W. W. Smith; *T. fusca* (Wallich) Baker.

Plants 25–50 cm tall. Rhizome creeping, tuberous-moniliform, ca. 1 cm thick, stout. Stem glabrous or distally pilose. Leaves 4–9; petiole 1–2.5 cm, glabrous or pilose; leaf blade oblong to ovate-lanceolate, 8–17 × 3–6.5 cm, base rounded or subcordate, margin sometimes ciliate, apex cuspidate-caudate. Inflorescence a panicle; rachis zigzagged or straight, sometimes with spreading, stiff hairs. Flowers solitary; pedicel 4–8(–13) mm. Perianth rose; segments nearly free, subelliptic, 3–4 × 2–3 mm. Filaments subdeltoid, ca. 1 mm, flat; anthers small. Ovary 1.5–2 mm, 3–4 × as long as style. Style very short. Berries red at maturity, 5–8 mm in diam., 1–3-seeded. Fl. May–Jul, fr. Sep–Nov. $2n = 28, 36, 54^*, 66, 72$.

Forests, thickets; 1600–2800 m. S Xizang, NW Yunnan [Bhutan, NE India, Myanmar, Nepal, Sikkim].

3. *Maianthemum tatsienense* (Franchet) LaFrankie, Taxon 35: 589. 1986.

窄瓣鹿药 zhai ban lu yao

Tovaria tatsienensis Franchet, Bull. Soc. Bot. France 43: 47. 1896; *Smilacina paniculata* (Baker) F. T. Wang & Tang (1978), not M. Martens & Galeotti (1842); *S. tatsienensis* (Franchet) H. R. Wehrhahn; *S. tatsienensis* var. *paniculata* (Baker) F. T. Wang & Tang; *S. yunnanensis* (Franchet) Handel-Mazzetti; *Streptopus paniculatus* Baker; *Tovaria delavayi* Franchet; *T. yunnanensis* Franchet; *T. yunnanensis* var. *rigida* Franchet.

Plants 30–80 cm tall. Rhizome subtuberous or slightly moniliform, (2.5–)7–16 mm thick. Stem glabrous. Leaves 6–8, shortly petiolate; leaf blade ovate, oblong-lanceolate, or subelliptic, 2–7 × 2–7.5 cm. Inflorescence a panicle, sometimes a raceme, 2.5–11 cm, glabrous. Flowers solitary; pedicel 2–12 (–18) mm. Perianth greenish or sometimes tinged purple; segments connate at base, narrowly lanceolate, 2.5–5 × 0.6–1.2 mm. Filaments short, flat. Ovary globose, slightly longer than short style. Stigma deeply 3-lobed. Berries red at maturity, 6–7 mm in diam., 1–5-seeded. Fl. May–Jun, fr. Aug–Oct.

Forests, forest margins, grassy slopes; 1500–3500 m. Gansu, Guangxi, Guizhou, Hubei, Hunan, Sichuan, Yunnan [Bhutan, India, N Myanmar].

4. *Maianthemum oleraceum* (Baker) LaFrankie, Taxon 35: 589. 1986.

长柱鹿药 chang zhu lu yao

Tovaria oleracea Baker, J. Linn. Soc., Bot. 14: 569. 1875; *Maianthemum oleraceum* var. *acuminatum* (F. T. Wang & Tang) Noltie; *Smilacina crassifolia* Kawano; *S. mientienensis* F. T. Wang & Tang; *S. oleracea* (Baker) J. D. Hooker & Thomson; *S. oleracea* f. *acuminata* (F. T. Wang & Tang) H. Hara; *S. oleracea* var. *acuminata* F. T. Wang & Tang.

Plants 45–80 cm tall. Rhizome tuberous, 1–2 cm thick. Stem ± zigzagged, distally pubescent or glabrescent. Leaves 4–9; petiole 3–7 mm; leaf blade oblong-ovate, oblong-lanceolate, or broadly lanceolate, 12–21 × 2–6 cm, abaxially laxly pubescent. Inflorescence a panicle, 5–10 cm; rachis pubescent. Flowers solitary; pedicel 5–10 mm. Perianth white or deep purplish red; segments nearly free, obovate-oblong, 4–6 × 2–3.5 mm, usually minutely denticulate on distal margin. Filaments subulate, ca. 1.3 mm; anthers ca. 1 mm. Style 2–2.5 mm; stigma 3-lobed. Berries red at maturity, 6–7 mm in diam., 1–3-seeded. Fl. May–Jul, fr. Aug–Oct. $2n = 36$.

Forests; 2100–3300 m. Guizhou, Sichuan, SE Xizang, NW Yunnan [Bhutan, N India, Myanmar, Nepal, Sikkim].

5. *Maianthemum purpureum* (Wallich) LaFrankie, Taxon 35: 589. 1986.

紫花鹿药 zi hua lu yao

Smilacina purpurea Wallich, Pl. Asiat. Rar. 2: 38. 1831; *Jocaste purpurea* (Wallich) Kunth; *S. oligophylla* (Baker) J. D. Hooker; *S. pallida* Royle; *S. purpurea* f. *albiflora* (Wallich) H. Hara; *S. purpurea* var. *albiflora* Wallich; *S. purpurea* f. *oligophylla* (Baker) H. Hara; *S. zhongdianensis* H. Li & Y. Chen; *Tovaria oligophylla* Baker; *T. pallida* (Royle) Baker; *T. purpurea* (Wallich) Baker.

Plants 25–60 cm tall. Rhizome usually moniliform, 1–1.5 cm thick. Stem pubescent distally. Leaves 5–9, subsessile or shortly petiolate; leaf blade oblong or ovate-oblong, 7–13 × 3–6.5 cm, pubescent along abaxial veins. Inflorescence usually a raceme, occasionally with 1 or 2 branches, 1.5–7 cm; rachis pubescent. Flowers solitary; pedicel 2–4 mm, pubescent. Perianth white or sometimes tinged purplish; segments free, ovate-elliptic or ovate, 4–5 × 2–3 mm. Filaments ca. 1.5 mm, dilated to base; anthers small. Style nearly as long as ovary; stigma 3-lobed. Berries red at maturity, 6–7 mm in diam., 1–4-seeded. Fl. Jun–Jul, fr. Sep. $2n = 36, 38^*$.

Forests, thickets; 3200–4000 m. E and S Xizang, NW Yunnan [Bhutan, NE India, Nepal, Sikkim].

6. *Maianthemum japonicum* (A. Gray) LaFrankie, Taxon 35: 588. 1986.

鹿药 lu yao

Smilacina japonica A. Gray in Perry, Jap. Exped. 2: 321. 1856; *S. hirta* Maximowicz; *S. japonica* var. *mandshurica* Maximowicz; *S. rossii* (Baker) Maximowicz; *Tovaria japonica* (A. Gray) Baker; *T. rossii* Baker.

Plants 30–60 cm tall. Rhizome creeping, subterete or submoniliform, 7–10 mm thick. Stem strigose distally. Leaves 4–9, shortly petiolate; leaf blade ovate-elliptic, elliptic, or oblong, 6–15 × 3–7 cm, both surfaces laxly pubescent or glabrescent. Inflorescence paniculate, with 3–5 branches, 3–6 cm, 10–25-flowered; rachis pubescent. Flowers solitary; pedicel 2–6 mm, pubescent. Perianth white; segments free or slightly connate at base, oblong or oblong-obovate, ca. 3 × 1.5 mm. Filaments filiform, 2–2.5 mm; anthers small. Style 0.5–1 mm, subequaling ovary; stigma subentire. Berries red at maturity, 5–6 mm in diam., 1- or 2-seeded. Fl. May–Jun, fr. Aug–Sep. $2n = 36^*$.

Forests, moist and shaded places, cliffs; 900–2000 m. Anhui, Fujian, Gansu, Guangxi, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Shaanxi, Shandong, Shanxi, Sichuan, Zhejiang [Japan, Korea, Russia].

7. *Maianthemum atropurpureum* (Franchet) LaFrankie, Taxon 35: 588. 1986.

高大鹿药 gao da lu yao

Tovaria atropurpurea Franchet, Bull. Soc. Bot. France 43: 45. 1896; *Maianthemum wardii* (W. W. Smith) H. Li; *Peliosanthes mairei* H. Léveillé; *Smilacina atropurpurea* (Franchet) F. T. Wang & Tang; *S. prattii* (Franchet) H. R. Wehrhahn; *S. robusta* (Franchet) F. T. Wang & Tang; *S. smithii* K. Krause; *S. wardii* (W. W. Smith) F. T. Wang & Tang; *T. prattii* Franchet; *T. prattii* var. *robusta* Franchet; *T. wardii* W. W. Smith.

Plants 30–60 cm tall. Rhizome creeping, moniliform, 1–1.5 cm thick. Stem ± zigzagged, hispidulous distally. Leaves 5–9; petiole 5–6 mm; leaf blade oblong or ovate-elliptic, 9–11 × 4.5–5.2 cm, both surfaces laxly hispidulous. Inflorescence a panicle, 3–20 cm; rachis pubescent. Flowers solitary; pedicel 2–3 mm, elongate in fruit. Perianth white to purplish red; segments connate proximally, forming a tube 1–2 mm, lobes ovate-lanceolate or oblong, 2–4 × 1.5–2.5 mm. Filaments flat, widened at base, ca. 0.5 mm; anthers small. Style 1–1.5 mm,

subequaling ovary; stigma 3-lobed. Berries 5–6 mm in diam., 1- or 2-seeded. Fl. May–Jun, fr. Aug–Sep.

• Forests, moist and shaded places; 1400–3000 m. S Sichuan, N Yunnan.

8. *Maianthemum forrestii* (W. W. Smith) LaFrankie, Taxon 35: 588. 1986.

抱茎鹿药 bao jing lu yao

Tovaria forrestii W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 8: 209. 1914; *Smilacina forrestii* (W. W. Smith) Handel-Mazzetti.

Plants 50–80 cm tall. Stem glabrous. Leaves 6–9, sessile; leaf blade ovate-elliptic or narrowly elliptic, 11–17 × 3–8 cm, thinly papery, base cordate and clasping stem, apex long acuminate. Inflorescence a panicle or raceme, 8–15 cm, many flowered; rachis laxly pubescent. Flowers solitary; pedicel 3–6 mm, pubescent. Perianth yellow-green, tinged purple; segments basally connate, forming a short tube ca. 1 mm, lobes spreading, subovate or deltoid-lanceolate, 2–3 × 1.4–1.8 mm. Filaments ca. 0.5 mm; anthers small. Style ca. 0.8 mm, nearly as long as ovary. Fl. Jun–Jul.

• Forests; 2800–3200 m. NW Yunnan.

9. *Maianthemum henryi* (Baker) LaFrankie, Taxon 35: 588. 1986.

管花鹿药 guan hua lu yao

Oligobotrya henryi Baker, Hooker's Icon. Pl. 16: t. 1537. 1886; *O. henryi* var. *violacea* C. H. Wright; *O. limprichtii* Lingelsheim ex H. Limpricht; *Smilacina henryi* (Baker) H. Hara.

Plants 50–80 cm tall. Rhizome submoniliform, 1–2 cm thick. Stem hispidulous or hirsutulous distally, rarely glabrescent. Leaves 5–8, subsessile or shortly petiolate; leaf blade elliptic, ovate, or oblong, 9–22 × 3.5–11 cm, pubescent or glabrescent. Inflorescence a raceme, sometimes a panicle, 3–7(–17) cm; rachis pubescent. Flowers solitary; pedicel 1.5–5 mm, pubescent. Perianth yellowish green to white, funnelliform; segments connate except distally, forming a long tube, tube 6–10 mm, lobes spreading, 2–3 × 1.5–2 mm. Stamens short. Style 2–3 mm, slightly longer than ovary; stigma 3-lobed. Berries red at maturity, 7–9 mm in diam., 2–4-seeded. Fl. May–Jun, fr. Aug–Oct. $2n = 36^*$.

Forests, thickets, moist places along streams; 1300–4000 m. Gansu, Henan, Hubei, Hunan, Shaanxi, Shanxi, Sichuan, Xizang, Yunnan [N Myanmar, Vietnam].

10. *Maianthemum szechuanicum* (F. T. Wang & Tang) H. Li, Acta Bot. Yunnan., Suppl. 3: 9. 1990.

四川鹿药 si chuan lu yao

Oligobotrya szechuanica F. T. Wang & Tang, Bull. Fan Mem. Inst. Biol. 7: 289. 1937; *Maianthemum henryi* (Baker) LaFrankie var. *szechuanicum* (F. T. Wang & Tang) H. Li; *Smilacina henryi* (Baker) H. Hara var. *szechuanica* (F. T. Wang & Tang) F. T. Wang & Tang; *S. szechuanica* (F. T. Wang & Tang) H. Hara.

Plants 40–50 cm tall. Rhizome submoniliform, 0.7–1.5 cm thick. Stem hispidulous or hirsutulous distally. Leaves 5–8, sessile or shortly petiolate; leaf blade oblong, elliptic, or ovate, 6–11 × 3–5(–7.5) cm, pubescent or glabrescent. Inflorescence a raceme, sometimes a panicle, 3–8(–17) cm; rachis pubescent. Flowers solitary; pedicel 1.5–4 mm, pubescent. Perianth purplish to white, funnelform; segments connate proximally, forming a tube 3–4 mm, lobes oblong, 3–4 × 1.5–2 mm. Filaments 1–1.5 mm; anthers small. Style 3–4 mm, nearly 2 × as long as ovary; stigma slightly 3-lobed. Fl. May–Jul.

• Alpine coniferous forests, hillsides, river banks; 2000–3600 m. W Sichuan, NE Yunnan.

11. *Maianthemum nanchuanense* H. Li & J. L. Huang, Bull. Bot. Res., Harbin 10(3): 51. 1990.

南川鹿药 nan chuan lu yao

Smilacina nanchuanensis (H. Li & J. L. Huang) S. Yun Liang.

Plants 12–22 cm tall. Rhizome creeping, terete, ca. 3 mm thick, slender. Stem yellow-brown hirsute distally. Leaves 3 or 4; petiole 3–4 mm; leaf blade ovate or oblong-ovate, 4.5–7 × 3.2–4.3 cm, abaxially strigose, base rounded or somewhat cordate, margin ciliate. Inflorescence a panicle, 2–2.5 cm; rachis densely hirsute. Flowers solitary; pedicel 3–4 mm, hirsute. Perianth white; segments free, spreading, ca. 2.3 × 0.7–1 mm. Filaments ca. 1.7 mm, slightly flat. Ovary white, ca. 1 mm. Style subequalling ovary; stigma slightly 3-lobed. Fl. May–Jun.

• Forests, hillsides along ravines; 1700–2100 m. SE Sichuan (Nanchuan Xian).

12. *Maianthemum formosanum* (Hayata) LaFrankie, Taxon 35: 588. 1986.

台湾鹿药 tai wan lu yao

Smilacina formosana Hayata, Icon. Pl. Formos. 9: 141. 1920; *S. nokomonticola* Yamamoto.

Plants 15–35 cm tall. Rhizome creeping, subterete, 2–7 mm thick, sometimes with swollen nodes. Stem hirsute distally, ± zigzagged. Leaves subsessile or shortly petiolate; leaf blade oblong, oblong-ovate, or lanceolate, 3.5–12 × 2–5 cm, papery, sometimes slightly pubescent on veins. Inflorescence usually a panicle, 4–5 cm; rachis hirsute. Flowers solitary; pedicel ca. 2 mm, hirsute. Perianth white; segments ± connate at base, oblong or oblanceolate, 3–4 × 1–2 mm. Filaments 1.5–2 mm; anthers small. Style very short, ca. 0.5 mm, ca. 1/2 as long as ovary; stigma slightly 3-lobed. Fl. Jun–Aug. $2n = 36^*$.

• Forests, wet shaded places; 2000–3700 m. Taiwan.

13. *Maianthemum dahuricum* (Turczaninow ex Fischer & C. A. Meyer) LaFrankie, Taxon 35: 588. 1986.

兴安鹿药 xing an lu yao

Smilacina dahurica Turczaninow ex Fischer & C. A. Meyer, Index Sem. Hort. Petrop. 1: 38. 1835; *Asteranthemum dahuricum* (Turczaninow ex Fischer & C. A. Meyer) Kunth; *Tovaria dahurica* (Turczaninow ex Fischer & C. A. Meyer) Baker; *Vagnera dahurica* (Turczaninow ex Fischer & C. A.

Meyer) Makino.

Plants 30–60 cm tall. Rhizome creeping, 1–2.5 mm thick, slender. Stem glabrous or shortly pubescent distally. Leaves 6–12, sessile; leaf blade oblong-ovate or oblong, 6–13 × 2–4 cm, abaxially densely pubescent. Inflorescence a raceme, 3–4 cm; rachis shortly pubescent. Flowers in clusters of 2–4, very rarely solitary; pedicel 3–5 mm, pubescent. Perianth white; segments ± connate at base, obovate-oblong or oblong, 2–4 × 1–1.5 mm. Filaments 1.5–3 mm; anthers small. Style ca. 1 mm, shorter than ovary; stigma slightly 3-lobed. Berries red or purplish red at maturity, 6–7 mm in diam., 1- or 2-seeded. Fl. Jun, fr. Aug. $2n = 36^*$.

Forests; 400–1000 m. Heilongjiang, Jilin, ?Liaoning, ?Nei Mongol [Korea, Russia].

14. *Maianthemum fusciculiflorum* (Kawano) S. C. Chen & Kawano, Novon 10: 113. 2000.

褐花鹿药 he hua lu yao

Smilacina fusciculiflora Kawano, J. Jap. Bot. 41: 354. 1966; *Maianthemum dulongense* H. Li.

Plants 3–20 cm tall. Rhizome creeping, moniliform, 3–4 cm × 4–8 mm. Stems sometimes 2–4-crowded, purplish, puberulent. Leaves 4–6, subsessile; leaf blade ovate, 2.5–3.6(–6) × 1–2(–3.5) cm, base cordate, apex acute. Inflorescence a raceme, 5–6 cm, 3–15-flowered; rachis pubescent. Flowers solitary; pedicel 2–4 mm, pubescent. Perianth violet; segments scarcely connate at base, outer ones broadly ovate, ca. 3 × 2.5 mm, inner ones oblong, ca. 1 mm wide. Filaments ca. 1 mm; anthers ca. 1 mm. Style very short; stigma 3-lobed. Fl. Jul.

Forests, thicket meadows; 2200–3600 m. SE Xizang, NW Yunnan [Myanmar].

15. *Maianthemum lichiangense* (W. W. Smith) LaFrankie, Taxon 35: 589. 1986.

丽江鹿药 li jiang lu yao

Tovaria lichiangensis W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 8: 209. 1914; *Smilacina lichiangensis* (W. W. Smith) W. W. Smith.

Plants 7–20 cm tall. Rhizome subterete, 1–1.5 mm thick, slender. Stem hirsute distally. Leaves 2–4; petiole 3–10(–14) mm; leaf blade ovate, broadly ovate, or oblong-ovate, 2.5–3.5 × 1.6–3.3 cm, both surfaces hispidulous or glabrescent, base obtuse or subcordate. Inflorescence usually a raceme, 1–2(–5) cm, 2–4-flowered; rachis papillose-pubescent. Flowers solitary, fragrant; pedicel 2–3 mm. Perianth white; segments connate proximally, forming a tube 2.5–3 mm, lobes spreading, suboblong, 4–5 × 2.5–3 mm. Filaments deltoid-lanceolate, 1.5–2 mm. Style 2.5–3 mm, longer than ovary; stigma 3-lobed. Berries red at maturity, 5–6 mm in diam., 1- or 2-seeded. Fl. Jun–Jul, fr. Sep–Oct.

• Forests, thickets; 2800–3500 m. S Gansu, ?S Shaanxi (Qin Ling), Sichuan, NW Yunnan.

16. *Maianthemum tubiferum* (Batalin) LaFrankie, Taxon 35: 589. 1986.

合瓣鹿药 he ban lu yao

Smilacina tubifera Batalin, Trudy Imp. S.-Peterburgsk. Bot. Sada 13: 104. 1893; *S. fargesii* (Franchet) Diels; *S. souliei* (Franchet) F. T. Wang & Tang; *Tovaria fargesii* Franchet; *T. prattii* Franchet var. *quadrifolia* Franchet; *T. souliei* Franchet; *T. tubifera* (Batalin) C. H. Wright.

Plants 10–30 cm tall. Rhizome subterete, 1(–6) mm thick, usually slender. Stem hispidulous distally. Leaves 2–5, subsessile or shortly petiolate; leaf blade ovate or oblong-ovate, 3–3.5(–9) × 2.5–4.5 cm, both surfaces laxly pubescent or glabrescent, base truncate or subcordate. Inflorescence a raceme, 1–4(–7) cm, 2- or 3(–10)-flowered; rachis pubescent. Flowers solitary; pedicel 1–2(–4) mm. Perianth white or sometimes tinged purple; segments connate proximally, forming a short tube 1–2 mm, lobes oblong, 2.5–3(–5) × 2–2.5 mm. Filaments very short. Style 0.5–1 mm, subequaling ovary. Berries 6–7 mm in diam., 2- or 3-seeded. Fl. May–Jul, fr. Sep.

• Moist places in forests; 2500–3000 m. Gansu, Hubei, Qinghai, Shaanxi, Sichuan.

17. *Maianthemum gongshanense* (S. Yun Liang) H. Li, Acta Bot. Yunnan., Suppl. 3: 10. 1990.

贡山鹿药 gong shan lu yao

Smilacina gongshanensis S. Yun Liang in F. T. Wang et al., Acta Bot. Yunnan. 5: 261. 1983.

Plants 5–20 cm tall. Rhizome 1.5–2 mm thick, slender. Stem white pubescent distally. Leaves 2, shortly petiolate; leaf blade ovate or oblong-ovate, 2–5 × 1.5–3 cm, both surfaces laxly pubescent, base rounded or subcordate. Inflorescence a raceme, 1–3 cm, 1–4-flowered, glabrous. Flowers solitary; pedicel 5–10 mm. Perianth brownish; segments slightly connate at base, outer ones oblong, ca. 3 × 1.5–2 mm, inner ones obovate, 4–4.5 × 3–3.5 mm. Filaments 0.5–0.8 mm, flat, basally connate; anthers 0.5–0.8 mm. Style short; stigma 3-parted. Fl. Jul.

• Alpine meadows, thickets; 3400–3600 m. NW Yunnan (Gongshan Drung-Nu Zu Zizhixian).

18. *Maianthemum trifolium* (Linnaeus) Sloboda, Rostlinnict-ví, 192. 1852.

三叶鹿药 san ye lu yao

Convallaria trifolia Linnaeus, Sp. Pl. 1: 316. 1753; *Asteranthemum trifolium* (Linnaeus) Kunth; *Smilacina trifolia* (Linnaeus) Desfontaines; *Tovaria trifolia* (Linnaeus) Necker ex Baker; *Vagnera trifolia* (Linnaeus) Morong.

Plants 10–20 cm tall. Rhizome 2–2.5 mm thick, slender. Stem glabrous. Leaves usually 3; petiole short, ± clasping stem; leaf blade oblong or narrowly elliptic, 6–13 × 1.5–3.5 cm, papery, glabrous. Inflorescence a raceme, (2–)3.5–6 cm, 4–7-flowered, glabrous. Flowers solitary; pedicel 4–6 mm. Perianth white; segments slightly connate at base, oblong, 2–3 × 1.5–2 mm. Filaments filiform, 2–2.5 mm; anthers small. Style ca. 1 mm, subequaling ovary; stigma slightly 3-lobed. Fl. Jun, fr. Aug. $2n = 36$.

Forests; 400–700 m. Heilongjiang, Jilin, ?Nei Mongol [N Korea, Russia; North America].

19. *Maianthemum stenolobum* (Franchet) S. C. Chen & Ka-

wano, Novon 10: 113. 2000.

少叶鹿药 shao ye lu yao

Tovaria stenoloba Franchet, Bull. Soc. Bot. France 43: 47. 1896; *Maianthemum tatsienense* (Franchet) LaFrankie var. *stenolobum* (Franchet) H. Li; *Smilacina paniculata* (Baker) F. T. Wang & Tang var. *stenoloba* (Franchet) F. T. Wang & Tang; *S. stenoloba* (Franchet) Diels; *S. tatsienensis* (Franchet) H. R. Wehrhahn f. *stenoloba* (Franchet) H. Hara; *S. tatsienensis* var. *stenoloba* (Franchet) D. M. Liu.

Plants 10–15 cm tall. Rhizome 2–3 mm thick, slender. Stem glabrous. Leaves 3–5; petiole (1–)2–5 mm; leaf blade ovate or ovate-elliptic, 3–4.5 × 1.8–2.6 cm. Inflorescence usually a raceme, 1.5–4 cm, 3–11-flowered, glabrous. Flowers solitary; pedicel 2–3 mm. Perianth green; segments connate at base, narrowly lanceolate, 5–7 × ca. 1 mm. Filaments flat, ca. 1 mm; anthers small. Style very short; stigma 3-parted. Berries 4–5 mm in diam. Fl. May–Jun, fr. Jul.

• Forests, grassy slopes, hillsides along ravines; 2000–3000 m. S Gansu, W Hubei, E Sichuan.

