

42. **KNOXIA** Linnaeus, Sp. Pl. 1: 104. 1753.

红芽大戟属 hong ya da ji shu

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Annual or perennial herbs or subshrubs, unarmed. Raphides present. Leaves opposite or sometimes ternate, without domatia; stipules persistent or deciduous, interpetiolar and fused to petioles and/or shortly united around stem, 2–6-lobed or -setose, with apices of segments or setae usually glandular. Inflorescences terminal, thyrsiform, subcapitate, cymose, or often corymbiform with axes sometimes elongating and becoming racemiform with age, several to many flowered, pedunculate or sessile, bracteate. Flowers sessile or pedicellate, bisexual, distylous. Calyx limb 4-lobed; lobes sometimes unequal. Corolla white, pink, lilac, or violet, funnel-form, salverform, or tubular, with shape sometimes differing between long-styled and short-styled forms, lanate inside tube; lobes 4, valvate in bud. Stamens 4, inserted in corolla throat or near middle of corolla tube, included or exerted; filaments short; anthers dorsifixed. Ovary 2-celled, ovules 1 in each cell, pendulous, apical; stigma 2-lobed, exerted or included. Fruit schizocarpous, ovoid to ellipsoid, sometimes laterally compressed and/or didymous, dry, with calyx limb persistent; mericarps 2, ellipsoid, indehiscent, with 1 seed, early to tardily separating from base upward and falling together with or separately from a carpophore, with carpophore variously filiform and basal to comprising entire enlarged septum; seeds medium-sized, oblong-ellipsoid, compressed; testa thin; endosperm fleshy; cotyledons thin; radicle ascending.

Seven to nine species: tropical Asia and Oceania; two species in China.

Knoxia was revised by Bhattacharjee and Deb (J. Econ. Taxon. Bot. 6(1): 73–96. 1985), who recognized seven species. Then, it was reviewed anecdotally by Puff and Robbrecht (Bot. Jahrb. Syst. 110: 511–558. 1989), who circumscribed it differently and included nine species. The treatment by W. C. Ko (in FRPS 71(2): 3–7. 1999) differed markedly from these others; it did not cite these authors so presumably Ko had not seen their works. In particular, these other authors considered *K. sumatrensis* to be a wide-ranging, morphologically variable species and included as synonyms of var. *sumatrensis* two species that were separated by Ko, *K. corymbosa* and *K. mollis*. Because it was based on geographically broader studies of more literature and many more specimens from the type regions, Puff and Robbrecht's taxonomy is used here.

W. C. Ko (loc. cit.: 4) described the fruit as capsules and the seeds as having a thick stipe, but the fruit of *Knoxia* have more often been described within Rubiaceae as schizocarps with carpophores, as noted here.

- 1a. Herbs with rather large, fleshy, fusiform roots; leaves sessile or subsessile, blade lanceolate or oblong-lanceolate, 7–10 × 3–5 cm, with secondary veins 5–7 pairs; peduncles 3–12 cm; corolla tube 3–4 mm; fruit oblong-ellipsoid and somewhat didymous 1. *K. roxburghii*
- 1b. Herbs or subshrubs with slender fibrous roots; leaves subsessile to petiolate with petioles to 12 mm, blade elliptic-oblong, elliptic, or lanceolate, 3–12 × 0.8–3.5 cm, with secondary veins 6–9 pairs; peduncles 0.3–2 cm; corolla tube 1.5–2 mm; fruit ellipsoid 2. *K. sumatrensis*

1. ***Knoxia roxburghii*** (Sprengel) M. A. Rau, Bull. Bot. Surv. India 10(Suppl. 2): 40. 1969.

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Spermacoce roxburghii Sprengel, Syst. Veg. 1: 404. 1824; *Knoxia valerianoides* Thorel ex Pitard.

Erect herbs, 30–70 cm tall; root sometimes purple, rather enlarged, fleshy, fusiform; branches subquadrate, becoming channeled, puberulent or villosulous becoming glabrescent. Leaves sessile or subsessile, opposite or often ternate; blade drying papery, lanceolate or oblong-lanceolate, 7–10 × 3–5 cm, both surfaces glabrescent or usually hispidulous to pilosulous or strigillose at least on principal veins, base acute to rounded, apex obtuse to acuminate; secondary veins 5–7 pairs, usually indistinct; stipules persistent, shortly fused to petioles or united around stem, linear to narrowly triangular or sometimes shortly to deeply 2- or 3-lobed, 8–10 mm, villosulous to glabrescent, acute. Inflorescences congested-cymose to subcapitate, puberulent or villosulous to glabrescent, ebracteate; peduncles 3–12 cm; dense flower groups 1–1.5 × 1–2.5 cm, borne singly or 3–5 on cymose axes; pedicels 0.5–1 mm. Calyx glabrescent; ovary portion ellipsoid, ca. 0.5 mm; limb deeply lobed; lobes triangular, 0.1–0.5 mm, often unequal on an individual flower.

Corolla red, purplish red, or white, salverform or tubular, externally densely villosulous or glabrous; tube 3–4 mm; lobes triangular to ovate, ca. 1 mm. Schizocarps oblong-ellipsoid, somewhat didymous, laterally somewhat flattened, ca. 1.5 mm; mericarps separating from each other and carpophore; carpophore persistent, linear, ca. 1.3 mm.

Grasslands on mountain slopes. Fujian, Guangdong, Guangxi, Hainan, Yunnan, Zhejiang [Cambodia, India, Myanmar, Nepal, Thailand].

Bhattacharjee and Deb (J. Econ. Taxon. Bot. 6(1): 85. 1985) apparently included the Chinese plants within their circumscription of *Knoxia roxburghii* var. *brunonis* (Wallich ex G. Don) R. Bhattacharjee & Deb, which falls into *K. roxburghii* as circumscribed by Puff and Robbrecht (Bot. Jahrb. Syst. 110: 511–558. 1989). This name is based on *Spermacoce brunonis* Wallich ex G. Don (Gen. Hist. 3: 621. 1834). W. C. Ko (in FRPS 71(2): 4. 1999, as *K. valerianoides*) described the corollas of this species as salverform and densely pubescent externally; however, the corollas of Thai plants of this species are more tubular and are glabrous externally.

2. ***Knoxia sumatrensis*** (Retzius) Candolle, Prodr. 4: 569. 1830.

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Spermacoce sumatrensis Retzius, Observ. Bot. 4: 23. 1786;

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Knoxia corymbosa Willdenow; *K. mollis* Wight & Arnott.

Herbs or subshrubs, 20–90(–100) cm tall; roots slender, fibrous; branches terete to weakly quadrate, puberulent or villosulous to densely tomentulose. Leaves opposite, subsessile or petiolate with petiole to 12 mm, puberulent or villosulous to glabrescent; blade papery to membranous, elliptic, lanceolate, or elliptic-oblong, 3–12 × 0.8–3.5 cm, both surfaces hispid-pilousulous to villosulous or sometimes glabrescent adaxially, base acute to cuneate, apex acuminate to cuspidate; secondary veins 6–9 pairs; stipules persistent, shortly fused to petioles, deeply 3–5-lobed, 3–7 mm, villosulous to glabrescent, lobes sometimes setose. Inflorescences congested-cymose to corymbiform, sometimes trichotomous, 1–6 cm, densely strigillose to villosulous, ebracteate; peduncle 0.3–2 cm; pedicels 0.1–1 mm. Calyx puberulent or strigillose to glabrous; ovary portion ellipsoid, 0.5–0.8 mm; limb lobed essentially to base; lobes triangular, 0.1–0.3 mm, equal to subequal on an individual flower. Corolla white or purplish red, funnelform, outside glabrous; tube 1.5–2 mm; lobes triangular, ca. 1 mm. Schizocarps ovoid to ellipsoid, 2–3 mm, weakly 4–8-ribbed, strigillose or puberulent to glabrescent; mericarps coherent at dispersal; carpophore persistent, linear, ca. 2.5 mm. Fl. Jul–Aug, fr. Oct–Nov.

Thickets in open fields of low elevations. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Taiwan [India, Indonesia, Japan (Ryukyu Islands), Malaysia, Myanmar, Nepal, New Guinea, Philippines, Thailand, Vietnam; Australia].

W. C. Ko (in FRPS 71(2): 5. 1999) reported several unusual features for *Knoxia mollis* in China: calyx lobes ca. 1 mm, corolla bright green or rarely white, and corolla tube ca. 1 mm. These features have not been confirmed on any specimens studied for this treatment nor reported by other authors for *Knoxia* in SE Asia.

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