

- 13b. Bracteoles slightly shorter than or as long as bracts; leaves lanceolate, linear, or oblong to oblong-linear, apex acuminate or obtuse.
- 14a. Fruit stalks reflexed when fruit mature; leaves usually 1-veined 8. *T. refractum*
- 14b. Fruit stalks not reflexed when fruit mature; leaves 3-veined.
- 15a. Stems ascending; perianth yellowish white, campanulate, 4–5 mm 9. *T. longifolium*
- 15b. Stems erect; perianth white, tubular, ca. 7 mm 12. *T. bomiense*

1. Thesium himalense Royle ex Edgeworth, Trans. Linn. Soc. London 20: 88. 1846.

露柱百蕊草 lu zhu bai rui cao

Herbs; rhizomes brownish, rather thick, divaricate. Stems green, procumbent, sparsely branched, slender, ca. 15–20 cm, striate. Leaves sparse, subsessile, linear, 25–30 × 1–1.5 mm, usually 1-veined, apex acute. Inflorescences racemelike, few flowered; bract usually inserted at or near tip of pedicel or, sometimes in proximal portion of plant, at base, linear, 15–25 mm; bracteoles 2, subulate or linear, 4.5–6 mm, usually longer than flowers; pedicel slender, 3–5 mm, finely striate. Perianth white interior, 3–4 mm; tube subcampanulate, ca. 2 mm; lobes oblong to ovate, ca. 1 mm, apex obtuse, strongly incurved, adaxially hairy. Stamens 5, not exerted. Ovary stalk ca. 0.6 mm. Style terete, 4–4.5 mm; stigma compressed capitate. Nutlet broadly ellipsoid, ca. 3.5 × 3 mm, with 10 or more inconspicuous, sometimes slightly impressed, longitudinal veins, often branched but lacking connecting veins; persistent perianth incurved and shrunken. Fl. Jun, fr. Aug–Sep.

Grassy slopes; 2900–3700 m. Sichuan, Yunnan [NW India, Nepal].

The status of this taxon and the Chinese material so named needs further study; it is said to differ from other species by the exerted style, but this is present neither in the type material nor in the Chinese material examined.

2. Thesium emodi Hendrych, Repert. Spec. Nov. Regni Veg. 70: 152. 1965.

藏南百蕊草 zang nan bai rui cao

Thesium dokertaense C. Y. Wu ex D. D. Tao.

Herbs perennial; rhizomes long, slender. Stems procumbent to ascending, usually unbranched or sparsely branched, slender, 5–15 cm, usually inconspicuously ridged. Leaves sparse, concolor, sometimes dirty greenish, sessile, oblong, ca. 10 × 1.5–2 mm, 1-veined, margin entire. Inflorescences racemelike, with solitary flowers; bracts inserted at pedicel base, connate ca. 1/4 length, leaflike, 10–15 mm; pedicel slender, 5–8 mm; bracteoles 2, narrowly oblong, 4–6 mm, longer than flower, margin very minutely serrulate, almost entire. Perianth with exterior greenish yellow or pale green, interior white, narrowly funnelliform to subtubular, 5.5–6.5 mm, tube campanulate, divided from middle to near base, lobes oblong, apex acute, becoming incurved after anthesis. Stamens 5, not exerted. Ovary stalk ca. 1.5 mm; stigma capitate, ca. 2 times as wide as style. Nutlet pale yellow, ellipsoid, ca. 3 mm, with longitudinal veins; persistent perianth subterete, ca. 2 mm.

Valleys, thickets; ca. 4200 m. Xizang, Yunnan [Bhutan, Nepal].

The distinction between this species and *Thesium tongolicum* is

very subtle, and it may prove best to combine the two species.

3. Thesium tongolicum Hendrych, Acta Horti Bot. Prag. 112. 1962.

藏东百蕊草 zang dong bai rui cao

Herbs perennial; rhizomes long, elongated. Stems procumbent, unbranched or sparsely branched, slender, 10–15 cm. Leaves sparse, linear, ca. 20 × 1 mm, 1-veined, margin entire, apex acute. Inflorescences racemelike, with few solitary flowers; bracts linear or narrowly linear, 8–15 mm, margin rugose; pedicel 3–5 mm; bracteoles 2, similar to bract in shape, 5–8 mm. Perianth 5-merous, green or greenish yellow, tubular, 5–7 mm, divided to middle, lobes oblong, apex slightly incurved. Ovary stalk ca. 1 mm. Nutlet ellipsoid, with raised longitudinal veins; persistent perianth terete, as long as or slightly longer than fruit. Fl. Apr, fr. Jun.

• High-elevation scree slopes. Qinghai, W Sichuan, Xizang.

This species may prove to be inseparable from *Thesium emodi*.

4. Thesium ramosoides Hendrych, Acta Horti Bot. Prag. 111. 1962.

滇西百蕊草 dian xi bai rui cao

Herbs perennial; rhizomes thick and long. Stems erect or ascending usually many branched, slender, 25–40 cm. Leaves dense, gray-green, sessile, linear, 20–50 × ca. 1.5 mm, 1-veined, apex acute. Inflorescences racemelike, lax, often branched, proximal part with 2–5-flowered branches; bracts inserted at tip of pedicel, narrowly linear, 10–25 mm; pedicel 4–9 mm, ascending or almost patent; bracteoles 2, narrowly linear, 5–10 mm, much shorter than bract. Perianth 5-merous, white, broadly campanulate, ca. 3.5 mm, divided to middle, lobes triangular-oblong, apex recurved, becoming incurved, clawlike. Stamens and style not exerted. Ovary stalk 0.8–1 mm. Nutlet ovoid to ellipsoid, ca. 3 mm, with raised longitudinal veins, shortly stalked; persistent perianth ca. 1 mm. Fl. May.

• Grassy slopes in *Pinus* forests; 2900–3700 m. Sichuan, Yunnan.

5. Thesium cathaicum Hendrych, Repert. Spec. Nov. Regni Veg. 70: 150. 1965.

华北百蕊草 hua bei bai rui cao

Herbs perennial; rhizomes rather slender, short. Stems erect or ascending, usually many branched, rather robust, 12–20 cm, glossy, ridged and furrowed. Leaves sessile, narrowly linear, (15–)20–25(–30) × ca. 0.6 mm, inconspicuously 1-veined, margin entire. Inflorescences racemelike, often branched, few flowered; bracts linear, 8–15 × ca. 0.6 mm, 1-veined; pedicel slender, 5–10 mm, upper ones shorter, patent, ridged, smooth; bracteoles 2, 4–5 mm. Perianth 4(or 5)-merous, interior white,

long funnellform, 5–8 mm, tube tubular, ca. 3 mm, divided to middle, lobes lanceolate-oblong, ca. 1 mm, incurved. Ovary ellipsoid, ca. 1 mm in diam., sessile. Style often exerted. Nutlet ellipsoid, ca. 3 mm, with raised reticulate veins; persistent perianth hypocateriform, patent apically, 4–5 mm. Fl. and fr. Jun–Jul.

- Grasslands; 300–2500 m. Hebei, Shandong, Shanxi.

6. *Thesium chinense* Turczaninow, Bull. Soc. Imp. Naturalistes Moscou 10: 157. 1837.

百蕊草 bai rui cao

Herbs perennial, ± farinose, glabrous. Stems fascicled, ascending, sparsely branched, slender and long, 15–40 cm, furrowed. Leaves linear, 15–35 × 0.5–1.5 mm, 1-veined, margin sometimes very sparsely papillate-ciliolate, apex acute or acuminate. Inflorescences racemelike, many flowered; bracts inserted at tip of pedicel, linear-lanceolate; pedicel to 3.5 mm, sometimes almost absent; bracteoles 2, linear, 2–6 mm, margin rugose. Perianth 5-merous, greenish white, 2.5–3 mm; tube tubular, lobes acute, apex incurved, adaxially inconspicuously hairy. Stamens not exerted. Ovary sessile. Style very short. Nutlet pale green, ellipsoid or subglobose, 2–2.5 mm, with prominent reticulate veins; persistent perianth subglobose, ca. 2 mm; stalk 3.5 mm. Fl. Apr–May, fr. Jun–Jul.

Wet ravines, slopes, grasslands, fields. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, Yunnan, Zhejiang [Japan, Korea, Mongolia].

This species may prove to be inseparable from *Thesium australe* R. Brown, which has been recorded from Indonesia east to Australia.

The plants have medicinal uses.

- 1a. Fruiting pedicel to 3.5 mm 6a. var. *chinense*
- 1b. Fruiting pedicel to 8 mm 6b. var. *longipedunculatum*

6a. *Thesium chinense* var. *chinense*

百蕊草(原变种) bai rui cao (yuan bian zhong)

Thesium decurrens Blume ex A. Candolle.

Fruiting pedicel to 3.5 mm.

Wet ravines, slopes, grasslands, fields. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, Yunnan, Zhejiang [Japan, Korea, Mongolia].

6b. *Thesium chinense* var. *longipedunculatum* Y. C. Chu, Fl. Pl. Herb. Chin. Bor.-Orient. 2: 107. 1959.

长梗百蕊草 chang geng bai rui cao

Fruiting pedicel to 8 mm.

- Grasslands. Guangdong, Heilongjiang, Jilin, Liaoning, Shanxi, Sichuan.

7. *Thesium arvense* Horvátovszky, Fl. Tyrnav. 1: 27. 1774.

田野百蕊草 tian ye bai rui cao

Herbs perennial. Stems erect or ascending, slender, 20–25 cm, furrowed and finely striate. Leaves abaxially pale green, adaxially green, subsessile, lanceolate, usually slightly falcate, 30–38 × ca. 4 mm, rather thick, 3-veined, base decurrent to form short petiole, margin entire, apex acute. Inflorescences racemelike, often branched, with 1 flower per axil, 5–6 cm; bracts inserted at top of pedicels, oblong or narrowly boat-shaped, 7–10(–12) × 1–2 mm, 1-veined, margin thickened; pedicel slender, reflexed when mature, 5–13 mm; bracteoles 2, subulate, 3–4 mm, 1-veined, margin sparsely or inconspicuously serrulate, incurved when mature. Perianth 5-merous, white or greenish white, campanulate, 4–5 mm in diam., tube 1.5–2 × ca. 2 mm, lobes triangular, ca. 2 × 1.2 mm, apex incurved. Stamens 5; anthers yellow. Ovary stalk ca. 1 mm. Style yellowish, ca. 1.5 mm; stigma yellow, capitate, slightly exerted when lobes incurved, usually not exerted. Nutlet ovoid or subglobose, ca. 3.5 × 2–2.2 mm, with conspicuous longitudinal veins; persistent perianth ca. 3 mm.

Shady grasslands; 1600–2300 m. Xinjiang [C Asia, C Europe].

8. *Thesium refractum* C. A. Meyer, Bull. Sci. Acad. Imp. Sci. Saint-Petersbourg 8: 340. 1841.

急折百蕊草 ji zhe bai rui cao

Herbs perennial; rhizomes straight, rather strong. Stems erect or ascending, 20–40 cm. Leaves sessile, lanceolate, 30–50 × 2–2.5 mm, rugose on both sides, usually 1-veined, base contracted but not decurrent, apex usually obtuse. Inflorescences racemelike, often branched, rachis zigzagged, especially near apex, with 1 flower per axil; bracts inserted at tip of pedicel, patent, leaflike, 6–8 mm; pedicel decumbent and gradually reflexed after flowering, slender, 5–7 mm, ridged; bracteoles 2, slightly shorter than or as long as bracts. Perianth 5-merous, white, 5–6 mm, tube tubular or broadly funnellform, lobes linear-lanceolate. Stamens 5, not exerted. Ovary stalk very short. Style terete, not exerted. Nutlet ellipsoid or ovoid, ca. 3 × 2–2.5 mm, with 5–10 inconspicuous longitudinal veins (or ridges), ridges sometimes forked; persistent perianth ca. 1.5 mm; fruit stalk to 1 cm, reflexed in mature fruit. Fl. Jul, fr. Sep.

Grassy marshlands, sandy slopes. Gansu, Heilongjiang, Hubei, Hunan, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shanxi, Sichuan, Xinjiang, Xizang, Yunnan [Japan, Korea, Kazakhstan, Kyrgyzstan, Mongolia, Russia].

9. *Thesium longifolium* Turczaninow, Bull. Soc. Imp. Naturalistes Moscou 25: 469. 1852.

长叶百蕊草 chang ye bai rui cao

Thesium longifolium var. *vlassovianum* A. Candolle; *T. vlassovianum* (A. Candolle) Trautvetter [not "*classovianum*"].

Herbs perennial. Stems caespitose, ascending, ca. 50 cm, with evident furrows. Leaves sessile, linear, 40–45 × ca. 2.5 mm, 3-veined, base attenuate, apex acuminate. Inflorescences racemelike, usually sparsely or not branched, with 1 flower per axil; bracts inserted at top of pedicel, linear, ca. 10 mm; pedicel 6–20 mm, finely striate; bracteoles 2, narrowly lanceolate, ca. 4.5 mm, margin rugose. Perianth 5-merous, yellowish white,

campanulate, 4–5 mm, lobes narrowly lanceolate, apex acute, incurved. Stamens 5, inserted on the base of lobes, not exerted. Ovary stalk ca. 0.5 mm. Style not exerted. Nutlet yellowish green, subglobose or ellipsoid, 3.5–4 mm, sometimes with forked longitudinal veins (or ridges); persistent perianth shorter than fruit; stalk not reflexed when fruit mature. Fl. and fr. Jun–Jul.

Grassy marshlands; 1200–2000 m. Heilongjiang, Hubei, Hunan, Jiangxi, Jilin, Liaoning, Nei Mongol, Qinghai, Shandong, Shanxi, Sichuan, Xizang, Yunnan [Mongolia, Russia].

10. *Thesium jarmilae* Hendrych, Acta Horti Bot. Prag. 110. 1962.

大果百蕊草 da guo bai rui cao

Herbs perennial; rhizomes short and thick. Stems procumbent, unbranched or sparsely branched, rather thick, 15–20 cm. Leaves often oblong to oblong-linear, ca. 20 × 1.5–2 mm, 1-veined, apex acute. Inflorescences racemelike, few flowered, with 1 flower per axil; bracts inserted on middle and basal part of pedicels, oblong-linear, 15–25 mm; pedicel ascending or patent, 5–15 mm; bracteoles 2, similar to bracts in shape, 5–8 mm. Perianth 5-merous, broadly campanulate, 4–5(–6) mm, lobes triangular, to 1/3 as long as perianth, apex incurved. Stamens and style not exerted. Ovary stalk ca. 2 mm. Nutlet subglobose, 5–6 mm in diam., with conspicuous longitudinal veins (ridges); persistent perianth nearly as long as or slightly longer than fruit. Fl. Jun.

• Sunny slopes, marshlands in valleys; ca. 3700 m. Xizang.

11. *Thesium longiflorum* Handel-Mazzetti, Symb. Sin. 7: 157. 1929.

长花百蕊草 chang hua bai rui cao

Thesium himalense var. *pachyrhizum* J. D. Hooker.

Herbs perennial; rhizomes slender, 8–13 cm, 2–2.5 mm thick, sparsely scaly. Stems patent and ascending, often branched at base, to 15 cm, striate. Leaves dense, linear or sometimes lanceolate, 7–17 × 1–2.5 mm, 3-veined, margin rugose. Inflorescences racemelike, often branched, with 1 flower per axil; bracts inserted at base of pedicels and adnate to peduncles, linear-lanceolate, ca. 25 × 2 mm, 1-veined; pedicel usually slender, 11–13 mm; bracteoles 2, linear, 6–7 mm, usually incurved. Perianth yellowish white, 6–10 mm, tube tubular, usually divided to middle, lobes oblong-linear, to 5.5 mm, apex acute, incurved. Stamens and style not exerted. Ovary stalk ca. 2 mm. Nutlet globose, 4.5 mm in diam., with 10 longitudinal veins, usually with ± parallel lateral veins; persistent perianth longer than fruit; fruiting pedicel 13–15 mm. Fl. Jun–Jul, fr. Aug–Sep.

• Sunny grassy slopes, dry open forests; 2600–4100 m. Qinghai, Sichuan, Xizang, Yunnan.

12. *Thesium bomiense* C. Y. Wu ex D. D. Tao in C. Y. Wu, Fl. Xizang. 1: 572. 1983.

波密百蕊草 bo mi bai rui cao

Herbs perennial; rootstock slender, vertical. Stems solitary, erect, many branched, 20–40 cm, conspicuously striate.

Leaves linear, 20–50 × 2–4.5 mm, 3-veined, base and apex acuminate. Inflorescences racemelike, usually with few or no branches, 1 flower per axil; bracts inserted at top of pedicel, leaflike, 7–10 mm; bracteoles 2, filiform, ca. 6 mm. Perianth 5-merous, white, tubular, ca. 7 mm, lobes inflexed, margins membranous. Stamens 5, inserted at upper part of perianth tube. Ovary stalked. Style ca. 7 mm, exerted; stigma capitate. Nutlet subglobose, mature fruit unknown; fruit stalk not reflexed.

• 2800–4000 m. Xizang.

13. *Thesium orgadophilum* P. C. Tam, Bull. Bot. Res., Harbin 1(3): 72. 1981.

草地百蕊草 cao di bai rui cao

Herbs perennial; rhizomes terete, ca. 5 mm thick. Stems ascending, slender, 3–5 cm, furrowed, base yellowish white. Leaves dense, oblong-lanceolate, 15–18 × 2.5–3 mm, both surfaces deep green, 3-veined, base gradually narrowed and decurrent, apex acute. Inflorescences racemelike, with few or no branches, 1 flower per axil; bracts at base of pedicels, oblong-lanceolate, sometimes leaflike, ca. 10 mm, 1-veined; pedicel filiform; bracteoles 2, leaflike, ca. 3.5 mm. Perianth 5-merous, ovoid, 4–5 × ca. 3 mm, usually divided to middle, lobes linear, ca. 3 mm, apex obtuse, incurved. Stamens 5, ca. 2 mm; filaments short and flat. Ovary stalk thick and short, ca. 1.5 mm. Style terete, ca. 3.5 mm; stigma pale yellow, capitate. Fruit not seen. Fl. May.

• Grassy alpine marshlands; ca. 4000 m. Xizang.

The type collection, from Nyalam Xian, is of an immature plant; fruiting material is needed to assess the relationships of this taxon.

14. *Thesium remotebracteatum* C. Y. Wu & D. D. Tao, Acta Phytotax. Sin. 26: 320. 1988.

远苞百蕊草 yuan bao bai rui cao

Herbs perennial; rhizomes slender, erect. Stems few to several, erect or ascending, sparsely branched, slender, furrowed. Leaves sessile, linear, 15–20 × ca. 2 mm, 1-veined, apex acute. Inflorescences racemelike, often branched, few flowered; bracts at the base of pedicels, leaflike, 25–40 mm; pedicel 25–40 mm; bracteoles 2, leaflike, 1/4–1/2 as long as bracts, margin smooth or papillose. Perianth 5-merous, tubular, 4–5 × ca. 2 mm, lobes triangular-lanceolate, 3–4 mm, incurved, glabrous.

Stamens 5, ca. 2.5 mm, not exerted. Style ca. 1.5 mm; stigma yellow, capitate. Mature nutlet not seen. Fl. Jun.

- About 2800 m. Yunnan.

15. *Thesium brevibracteatum* P. C. Tam, Bull. Bot. Res., Harbin 1(3): 73. 1981.

短苞百蕊草 duan bao bai rui cao

Herbs subshrublike; rootstock yellowish brown, ± conic, ca. 8 cm, tip ca. 10 mm thick. Stems usually erect, partly ascending, rigid, slender, to 30 cm, 4-ribbed, furrowed. Leaves sparse, sessile, linear, ca. 25 mm, 1-veined, margin minutely denticulate, apex acute. Inflorescences racemelike, many flowered; bracts narrowly linear, 5–7 mm; pedicel ca. 5 mm, finely striate; bracteoles 2, subulate, ca. 3 mm, curved. Perianth 5-merous, white, funnellform, ca. 8 mm, sometimes longer, tube tubular, ca. 3 mm, lobes narrowly oblong, ca. 4 mm, apex acute, incurved. Stamens ca. 2 mm. Ovary stalk 0.8–1 mm. Style 2.5 mm, not exerted. Nutlet ovoid, 3–3.5 × 2.5–3 mm, with 10, nearly parallel or obliquely lateral veins, not reticulate; persistent perianth funnellform, ca. 4 mm, longer than fruit; stalk 5–6 mm. Fl. and fr. Aug–Sep.

- Sunny dunes. Nei Mongol.

16. *Thesium psilotoides* Hance, J. Bot. 6: 48. 1868.

白云百蕊草 bai yun bai rui cao

Herbs dwarf; rhizomes short, woody. Stems erect, branched at middle (branches rebranched), slender, 15–25 cm. Leaves sessile, scale-like, 1–1.5 mm, decurrent along stems to form ridges, 1-veined. Inflorescences cymose, fasciculate, 1–3-flowered; bracts scale-like, ca. 1.5 mm; bracteoles 4, scale-like, shorter than perianth, bracts and bracteoles forming an involucre around base of perianth. Perianth 5-merous, slightly dirty yellow, broadly campanulate, ca. 1.5 mm, tube divided to middle, ca. 1 mm, lobes triangular, margin inflexed. Stamens 5, on basal 1/3 of lobes; filaments short. Ovary sessile. Style erect, slightly shorter than stamens; stigma ± globose. Nutlet ovoid, ca. 2 × 2 mm, with ridges and inconspicuous reticulate veins, gradually narrowed to base; persistent perianth arched, adnate, slightly umbulate, short. Fl. May, fr. Aug.

Open grasslands under *Pinus* forests; 200–1300 m. Guangdong, [Cambodia, Indonesia, Philippines, Thailand].

