

19. SAUROMATUM Schott in Schott & Endlicher, Melet. Bot. 17. 1832.

斑龙芋属 ban long yu shu

Li Heng (李恒 Li Hen); Wilbert L. A. Hettterscheid

Herbs, seasonally dormant. Underground part a depressed-globose tuber. Leaves entire, sagittate-hastate, 3-lobed or -partite to pedatisect. Inflorescence simultaneous with or preceding leaves; peduncle short. Spathe divided into a connate or strongly convolute basal part with a ± strong apical constriction and a spreading lanceolate to ovate-triangular limb. Spadix as long as spathe, with 4 zones: a proximal female zone, an intermediate sterile zone with staminodes all over or only at base, a male zone, and a sessile or stipitate appendix. Female flowers 1-loculed with 1 or 2(or 3) orthotropous basal ovules. Proximal staminodes clavate, distal ones (when present) irregularly cristate or elongate aristate. Male flowers with 1–3 stamens opening by slits or pores; connective sometimes prolonged. Fruiting zone with spathe caducous or remaining; berries ovoid, 1(or 2)-seeded. Seeds with endosperm.

Eight species: Bhutan, Cambodia, China, India, Indonesia, Laos, Myanmar, Nepal, Thailand, Vietnam; seven species (two endemic) in China.

See the comment under *Typhonium* above.

- 1a. Sterile zone between male and female zones largely smooth and terete or grooved, except for proximal part carrying staminodes.
- 2a. Leaf and outside of spathe densely hirsute 5. *S. hirsutum*
- 2b. Leaf and outside of spathe glabrous.
- 3a. Spathe base fully closed (margins connate), limb inside with background off-white, almost entirely hidden by numerous strongly confluent, oval, deep maroon spots; leaves always pedate 7. *S. venosum*
- 3b. Spathe base convolute (margins overlapping), limb inside uniformly whitish green, or with purple stripes, or uniformly purple; leaves varying (often in one plant) from entire to pedate 2. *S. diversifolium*
- 1b. Sterile zone between male and female zones fully covered with staminodes, distally gradually becoming smaller.
- 4a. Leaves simple, cordate, at least 10 cm 4. *S. giganteum*
- 4b. Leaves pedate.
- 5a. Spathe base convolute 6. *S. horsfieldii*
- 5b. Spathe base fully closed, margins connate.
- 6a. Proximal staminodes gradually changing upward from clavate through irregularly short and curved to irregularly cristate or strongly reduced to almost absent; petiole often with 1 or a few intercalary bulbils near base 3. *S. gaoligongense*
- 6b. Intermediate staminodes absent between proximal (clavate) and distal (irregularly cristate) staminodes 1. *S. brevipes*

1. *Sauromatum brevipes* (J. D. Hooker) N. E. Brown, Gard. Chron., ser. 3, 34(2): 93. 1903.

短柄斑龙芋 duan bing ban long yu

Typhonium brevipes J. D. Hooker, Fl. Brit. India 6: 511. 1893.

Tuber globose, 1–1.5 cm in diam., producing numerous tiny, annual bulbils. Petiole pinkish or dull purplish red, 15–30 cm × ca. 2 mm; leaf blade green adaxially, 5–9-pedatifid; lobes ± fused at base; central lobe linear-lanceolate or narrowly elliptic, 6.5–25 × 1–5 cm, margin undulate, with or without a purple midrib; outermost lobes progressively smaller. Inflorescence(s) appearing alongside developing leaves; peduncle pale green, 2–2.5 cm. Spathe outside base ochre or yellow-brown with purple spots or faint pinkish spots, inside ± cream-colored or dark pink, closed, subglobose, 1.4–3.5 × 1.5–2.5 cm; limb inside ± cream-colored with a purple zone at apex, base partly closed, partly convolute, margins sinuous, distal part arching and twisting, outside and inside as spathe base, or grayish, lanceolate, 10–15 × 1.2–2 cm. Spadix as long as spathe; female zone subcylindric, ca. 6 mm; ovary green or ± cream-colored, depressed obovoid, 2-ovuled; sterile zone 4–6 mm, with a few staminodes at base, rest grooved-ridged and set with irregular,

pale purple warts; staminodes clavate, ca. 4 mm; male zone 3–5 mm; appendix pink to yellow, with or without a pinkish base, slender, filiform, 5–14 cm, 0.6–3 mm in diam. at base, apex obtuse. Fl. Jun.

Mountain grasslands; 1500–2700 m. S Xizang [Bangladesh, India (Sikkim), Nepal].

2. *Sauromatum diversifolium* (Wallich ex Schott) Cusimano & Hettterscheid, Taxon 59: 445. 2010.

高原犁头尖 gao yuan li tou jian

Typhonium diversifolium Wallich ex Schott, Aroideae, 13. 1855; *Heterostalis foliolosa* Schott; *T. alpinum* C. Y. Wu ex H. Li, Y. Xiao & X. L. Zeng; *T. austrotibeticum* H. Li; *T. diversifolium* var. *huegelianum* (Schott) Engler; *T. foliolosum* (Schott) Engler; *T. huegelianum* Schott.

Underground part a subglobose tuber, 1–1.5 cm high, 0.5–1.2 cm in diam., producing annual offsets. Petiole 10–30 cm; leaf blade simple and ovate-lanceolate, 2–22 × 1–25 cm, cuneate to hastate, 3–5-lobed or pedately 5–9-sect, lobes elliptic to linear. Inflorescence appearing just before or alongside leaves; peduncle 3–14 cm. Spathe base oblong-ovoid, 2–4 × 1–2 cm; limb outside green, sometimes flushed with purple or

purple all over, inside dark purple or greenish with dark purple veins and flushes, oblong-lanceolate, 4–13 × 2–5 cm, apex acuminate to shortly caudate. Spadix shorter than spathe, 4–12 cm; female zone cylindrical, 0.5–1.5 cm × 4–7 mm; ovary: basal half white, apical half purple, ellipsoid; stigma sessile, white; sterile zone 1–3 cm, base swollen and with long staminodes, rest fusiform, with verrucate staminodal structures; proximal staminodes clavate, with only apical part distinctly and abruptly swollen, basal part filiform, whitish with purple flushes, clavate part yellow with a purple tip or purple; staminodal structures consisting of narrowly elliptic, shallow ridges with verrucate-corrugate surface, white, pale purple, or violet; male zone cylindrical, 0.6–1.3 cm × 1.5–7 mm; appendix blackish purple, broadly to narrowly cylindrical, 1–7 cm × 2–8 mm, obtuse or subacute.

Open grasslands, meadows, alpine damp open ground; [ca. 2300 m in Bhutan] 3300–4000 m. W Sichuan, S Xizang (Gyirong), NC Yunnan (Dayao) [Bhutan, Cambodia, NE and NW India, Myanmar, Nepal].

3. *Sauromatum gaoligongense* Z. L. Wang & H. Li, Acta Bot. Yunnan., Suppl. 11: 61. 1999.

贡山斑龙芋 gong shan ban long yu

Typhonium gaoligongense (Z. L. Wang & H. Li) Hetterschaid & P. C. Boyce.

Tuber depressed globose, ca. 2 cm high, 2.5–3.5 cm in diam., producing several annual offsets. Petiole uniformly green or dark purple, to 40 cm, proximally often developing intercalary, irregular bulbils; leaf blade deeply 5–13-pedatifid; central lobe elliptic to obovate, to 12 × 5 cm; lateral lobes progressively smaller. Inflorescence appearing before leaves; peduncle largely subterranean, yellowish green with a few scattered purple spots, 4–5 cm × 3–6 mm. Spathe closed at base, outside purplish brown, inside whitish, base triangular-ovate, to 3 × 2.8 cm, tapering to constricted apex; limb strongly convolute at base, slightly arching, outside brownish purple with a few darker spots, inside pale purple, narrowly oblong, ca. 7 × 2.5 cm, apex long acuminate. Spadix shorter than spathe, ca. 6 cm; female zone cylindrical, ca. 4 × 5–6 mm; ovary obovoid, 1-loculed, 2-ovuled; sterile zone narrowly conic, ca. 3 cm, carrying staminodes in proximal half, these distally progressively shorter and finally disappearing, distally grooved, verruculose; staminodes clavate, distally changing to aristate and upcurved; male zone oblong, ca. 1 cm × 3 mm; male flowers purple, with 1 stamen, pores apical; appendix stipitate, clavate, ca. 1.6 cm, apex narrowly fusiform-conic, rugose.

• Broad-leaved evergreen forests, shaded ravines; ca. 2200 m. W Yunnan (Gaoligong Shan: Baoshan, Longling, Tengchong).

In all respects, this species is similar to *Typhonium horsfieldii* (*Sauromatum horsfieldii*) except for the closed spathe base.

4. *Sauromatum giganteum* (Engler) Cusimano & Hetterschaid, Taxon 59: 445. 2010.

独角莲 du jiao lian

Typhonium giganteum Engler, Bot. Jahrb. Syst. 4: 66. 1883; *T. giganteum* var. *giraldii* Baroni; *T. giraldii* (Baroni)

Engler; *T. stoliczkae* Engler.

Underground part a rhizome, 5–8 × 2–5 cm, producing numerous annual fusiform offsets. Petiole green, with or without numerous purple spots, 20–60 cm; leaf blade ovate, cordate to hastate, 15–45 × 9–25 cm, margin entire, apex acuminate. Inflorescence preceding or simultaneous with leaves; peduncle 13–17 cm. Spathe convolute at base, erect, oblong-ovate, 4–8 cm; limb erect or recurved, ovate, to 15 cm, margin sinuous, apex acuminate. Spadix sessile or nearly so, slightly shorter than spathe, to 14 cm; female zone cylindrical, 1–1.5 cm × ca. 8 mm; ovary: basal part whitish, apical part purple, cylindrical, apex truncate, 2-ovuled; stigma sessile, gray, disciform; sterile zone 2–3 cm, covered by distant staminodes of different types; proximal staminodes with clavate apical part, middle ones with subulate apical part, distal ones with apical part reduced to a stump; male zone ca. 2 cm × 8 mm; male flowers sessile; anthers ± cream-colored, with pinkish flushes, ovoid, opening by apical pore; appendix sessile, cylindrical, to 6 cm, ca. 5 mm in diam. at base, base slightly attenuate, apex obtuse. Fruiting zone elongate, naked, ca. 5 × 3 cm; berries crowded, violet-purple, keeled, apex acute. Fl. Jul.

• Grasslands, field sides, streamsides, grassy slopes; below 1500 m. Anhui, Gansu, Hebei, Henan, Jilin, Liaoning, Shandong, Shanxi, Sichuan, S Xizang; cultivated in Guangdong, Guangxi, Jilin, and Yunnan as a medicinal plant.

5. *Sauromatum hirsutum* (S. Y. Hu) Cusimano & Hetterschaid, Taxon 59: 445. 2010.

毛犁头尖 mao li tou jian

Arisaema hirsutum S. Y. Hu, Dansk Bot. Ark. 23: 454. 1968; *Typhonium hirsutum* (S. Y. Hu) J. Murata & Mayo.

Herbs, cormous, with single-celled hairs ca. 0.5 mm. Underground part a depressed-globose tuber, 1.5–2.5 cm in diam., producing numerous annual, subglobose, angulate offsets. Petiole 20–25 cm; leaf blade pedately 5–7-foliolate; leaflets almost sessile; central leaflet elliptic, 7–31 × 2.5–10 cm, apex acuminate; lateral leaflets elliptic, oblique at base, outermost one ca. 2/3 length of central one. Inflorescence appearing alongside first developing leaf; peduncle very short, 1–1.5 cm. Spathe hirsute outside, smooth inside; basal part convolute but lower ca. 1 cm with fused margin, ca. 4 × 2 cm, slightly constricted at apex; limb laterally incurved, lanceolate-ovate, 8–13 × 5–8 cm. Spadix shorter than spathe; female zone broadly cylindrical-conic, to 6.5 × 10 mm; ovary subcylindrical, 1-loculed, with 2 or 3 ovules; stigma white or ± cream-colored, disciform; sterile zone to 3.5 cm, proximal 0.5–1 cm densely covered with staminodes, rest naked, grooved; proximal staminodes pale pinkish purple or dark brownish purple, clavate, to 7 mm, apex obtuse; male zone 1–1.7 × ca. 0.8 cm; appendix sessile or subsessile, brown or grayish brown, narrowly conic, to 10.5 cm, to 6 mm in diam. at base, base truncate. Infructescence naked, globose, to 4 cm in diam. Berries with distinct angulate distal part, ca. 1 × 0.5 cm; style remnant sharply acute, ca. 1 mm. Fl. May, fr. Jul.

Secondary evergreen forests, tea plantations; 500–1100 m. S Yunnan [N Thailand].

6. *Sauromatum horsfieldii* Miquel, Fl. Ned. Ind. 3: 196. 1856.

西南犁头尖 xi nan li tou jian

Arisaema submonoicum Gagnepain; *Typhonium calcicola* C. Y. Wu ex H. Li, Y. Shiao & S. L. Tseng; *T. fallax* N. E. Brown; *T. hongyanense* Z. Y. Zhu; *T. horsfieldii* (Miquel) Steenis; *T. kerrii* Gagnepain; *T. kunmingense* H. Li; *T. kunmingense* var. *alatum* H. Li ex H. Peng & S. Z. He; *T. kunmingense* var. *cerebriforme* H. Li ex H. Peng & S. Z. He; *T. larsenii* S. Y. Hu; *T. omeiense* H. Li; *T. pedatum* Schott.

Underground part a subglobose to depressed-globose tuber, producing annual offsets. Petiole variable in color, uniform, striped, or spotted, ranging from green to purple, 35–60 cm; leaf blade abaxially pale to gray-green, sometimes with scattered reddish purple spots, adaxially mid- to dark rich velvety green, with or without reddish main vein or splashed with golden spots along main vein, pedatisect, 7–13-lobed; lobes elliptic to lanceolate, margin flat or sinuous, entire or occasionally crenate, apex acute. Peduncle 4.5–20 cm. Spathe convolute at base, outside pale or mid-green or dull mid- to dark brown, with or without a few reddish or blackish brown spots or stripes, inside white or whitish green, base ovoid, occasionally with 1 or a few shallow keels, apex \pm constricted; limb slightly arching, outside pale or mid-green, dirty greenish, or dirty pale brownish, with or without a few indistinct darker spots, inside whitish, pale green, with or without a few scattered blackish purple spots, ovate to oblong-ovate, cymbiform, 6–17 \times 4–6 cm, often keeled at midrib, apex acuminate to caudate. Spadix shorter than spathe; female zone cylindrical or slightly conic, 2.5–10 \times 4–8 mm; ovary ovoid to oblong-ovoid, 1-loculed, 1- or 2-ovuled; stigma very small, in a depression of apex of ovary or ringlike surrounding depression; sterile zone narrowly fusiform-conic, 2–6 cm, 3–7 mm in diam. at base, entirely covered by staminodes; proximal staminodes with rhombic, flat base and aristate to clavate process, latter strongly bent upward, white, clavate part yellowish white or occasionally dark red; subbasal staminodes exclusively aristate, strongly pointing upward parallel to spadix axis, \pm cream-colored; distal staminodes fused into vertical ridges with numerous irregular short processes, often arranged in ridges, white; male zone cylindrical, 6–10 \times 2–7 mm; male flowers white, distal ones often sterile and subclavate to spatulate or occasionally aristate; appendix sessile or more distinctly stipitate, cream-colored or more rarely grayish brown with purple spots, cylindrical or rarely fusiform, 1.5–4.5 cm \times 2–6 mm, slightly tapering to obtuse apex, smooth or strongly corrugate, base attenuate to stipe; stipe sometimes ridged-verrucate. Fruiting zone with spathe base remaining; berries pale green when mature, obovoid to ellipsoid, corrugate and shallowly grooved.

Evergreen, bamboo, or secondary forests, grasslands, between rocks; 100–3100 m. Guangxi, Guizhou, Sichuan, NE, SE, and W Yunnan [Cambodia, Indonesia, Laos, Myanmar, Thailand, Vietnam].

7. *Sauromatum venosum* (Aiton) Kunth, Enum. Pl. 3: 281. 1841.

斑龙芋 ban long yu

Arum venosum Aiton, Hortus Kew. 3: 315. 1789; *Arisaema venosum* (Aiton) Blume; *A. guttatum* Wallich (1831), not Salisbury (1796); *Desmesia venosa* (Aiton) Rafinesque; *Jaimenostia fernandopoana* Guinea & Gómez Moreno; *Sauromatum abyssinicum* Schott; *S. angolense* N. E. Brown; *S. guttatum* Schott; *S. guttatum* var. *pulchrum* (Miquel) Engler; *S. guttatum* var. *simlense* (Schott) Engler; *S. guttatum* var. *venosum* (Aiton) Engler; *S. nubicum* Schott; *S. nubicum* var. *angolense* (N. E. Brown) Engler; *S. pulchrum* Miquel; *S. punctatum* K. Koch; *S. simlense* Schott; *Typhonium venosum* (Aiton) Hettterscheid & P. C. Boyce.

Tuber depressed globose, to ca. 9 cm high and ca. 15 cm in diam., producing numerous annual offsets, these globose or depressed globose. Petiole yellowish green, with rounded purplish brown spots, 20–100 cm; leaf blade 9–11-pedatifid; central lobe oblong or oblong-elliptic to oblanceolate, 10–40 \times 4–20 cm, acuminate; lateral leaflets elliptic, gradually smaller toward distal end of rachis. Inflorescence appearing before leaves; peduncle greenish white, with or without a few brown spots, 3–7 cm, sometimes elongating during fruiting. Spathe base outside dull dark violet, inside rich reddish purple, ellipsoid, 5–10 \times 2–4 cm; limb convolute at base, ca. 10 cm, distally outside as base but slightly darker and with a few violet longitudinal stripes, inside background color yellowish, almost entirely covered by numerous orbicular to elliptic, confluent dark purple spots, lanceolate, 30–70 \times 8–10 cm, apex acuminate. Spadix slightly shorter than or as long as spathe; female zone subcylindrical, 2–2.5 \times 1–1.5 cm; ovary violet or pale purple, obovoid, 2–4-ovuled; sterile zone 8–8.5 cm, proximal 2–2.5 cm sparsely covered with long staminodes, distally grooved and with a few distant conic projections, proximally whitish, distally pale brownish violet; staminodes yellow, clavate, 4–10 mm; male zone 1–2 \times 1–1.5 cm; stamens yellow; appendix at first erect, finally recurved, pale brown to pale violet or lead-colored, terete, to 30 cm, ca. 1 cm in diam. at base, obtuse. Fruiting zone globose or subcylindrical, naked, to ca. 9 cm in diam.; berries crowded, bright purple, cylindrical, 5–10 \times 2–4 mm, angulate, apex truncate. Fl. Apr–May, fr. Jul.

Primary evergreen forests, meadows by rivers, secondary thickets, path sides; 1300–2000 m. Xizang, Yunnan [Bhutan, NE and NW India, Myanmar, Nepal; Africa].

Fl. China 23: 36–39. 2010.