

138. PHYLLOLOBIUM Fischer in Sprengel, *Novi Provent.* 33. 1818.

膨果豆属 peng guo dou shu

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Perennial herbs with mostly well-developed stems, with basifixed hairs. Stipules free from petiole and from each other, very rarely shortly connate behind stem. Racemes several, with a distinct peduncle; bracts persistent. Bracteoles present or more rarely absent. Calyx campanulate. Standard wide, mostly suborbicular to transversely elliptic, with a very short claw, emarginate at apex; keel and wing petals not interlocking due to absence of bosses on keel and matching sockets on wings. Style with a brush of straight, rigid, short hairs just below glabrous stigma. Legumes 1-locular or incompletely to completely 2-locular.

Twenty-two species: mostly in China, a small number in the Himalayas and one in Tajikistan; 21 species (17 endemic) in China.

- 1a. Plants with slender stems up to 90 cm, at least in lower 1/2 with long, horizontally spreading lateral branches; hairs slender, 0.1–0.4 mm 8. *P. eutrichus*
- 1b. Stems mostly shorter, without horizontally spreading lateral branches, if sometimes as long as above, then with other kinds of hair.
 - 2a. Plants in all parts covered with bladderlike, scalelike hairs up to 0.1 mm 4. *P. chinense*
 - 2b. Plants at least at calyx with slender, longer, not bladderlike hairs.
 - 3a. Petals yellow, rarely with violet-tipped keel.
 - 4a. Plants 30–75 cm tall; calyx 7–12 mm, teeth 4–9 mm; keel as long as wings 5. *P. dolichochaete*
 - 4b. Plants 10–50 cm tall; calyx up to 10 mm, teeth up to 6 mm; keel longer than wings.
 - 5a. Leaflets in 7–13 pairs, 5–16 × 1–4 mm, distinctly more than 2 × as long as wide; peduncles 3–11 cm 9. *P. flavovirens*
 - 5b. Leaflets in 4–10 pairs, 5–10 × 2.5–5 mm, ca. 2 × as long as wide; peduncles 1.5–4 cm 2. *P. camptodontum*
 - 3b. Petals blue or violet, rarely yellow at base only.
 - 6a. Plants at least in part with spreading hairs.
 - 7a. Calyx 8–10 mm, white hairy, teeth 4.5–6 mm; standard 15–19 mm; legumes with a stipe ca. 5 mm, 25–30 mm, 2-locular 21. *P. turgidocarpum*
 - 7b. Calyx shorter, white and black hairy, teeth mostly shorter; standard 7–13 mm; legumes with a stipe up to 3 mm or sessile, up to 20 mm, 1-locular.
 - 8a. Leaflets 8–20 mm; bracts 8–10 mm; calyx 7–8 mm, with teeth 4–5 mm 12. *P. lineariauriferum*
 - 8b. Leaflets distinctly smaller; bracts at most up to 4 mm; calyx up to 6 mm with shorter teeth.
 - 9a. Stipules 2.5–4.5 mm; leaflets 3–15 mm; bracts 1.5–4 mm; bracteoles 0.5–2 mm; calyx teeth 1.5–4 mm; legumes 5–6.5 mm high and wide 20. *P. tribulifolium*
 - 9b. Stipules up to 2.5 mm; leaflets 2–6 mm; bracts up to 2 mm; bracteoles mostly absent, if present, then ca. 0.3 mm (in *P. milingense*); calyx teeth up to 2.5 mm; legumes either much higher than wide or much wider than high.
 - 10a. Stems with appressed hairs; leaflets loosely to rather densely hairy adaxially; bracts 1.5–2 mm; legumes 15–20 mm, 8–12 mm high, strongly compressed laterally, without beak 10. *P. heydei*
 - 10b. Stems with partly spreading hairs; leaflets glabrous to subglabrous adaxially; bracts 0.6–1 mm; legumes 10–15 mm, 2.5–3 mm high and 5–7 mm wide, with a short beak 13. *P. milingense*
 - 6b. Plants with appressed to ascending hairs only.
 - 11a. Leaflets on both surfaces loosely to densely hairy.
 - 12a. Stipules 2–3 mm; bracts 4–6 mm, with spreading hairs; calyx 7–8 mm, covered with spreading white and dark brown hairs 3. *P. chapmanianum*
 - 12b. Stipules 4–7 mm; bracts 6–10 mm, with appressed to ascending hairs; calyx 9–10 mm, covered with appressed to ascending white and shorter black hairs 11. *P. lasaense*
 - 11b. Leaflets adaxially glabrous or rarely sparsely hairy.
 - 13a. Standard up to 10 mm; bracts up to 2 mm; bracteoles absent.
 - 14a. Plants up to 50 cm tall; calyx 7–8 mm; legumes 25–30 mm 17. *P. siccanum*
 - 14b. Plants up to 30 cm tall; calyx up to 5.5 mm; legumes up to 13 mm.
 - 15a. Stem and peduncles loosely to rather densely hairy; leaflets narrowly elliptic, 3–11 × 1–2 mm, acute; keel as long as wings 15. *P. prodigiosum*
 - 15b. Stem and peduncles glabrous to sparsely hairy; leaflets elliptic, 4–9 × 1.5–4 mm, obtuse; keel distinctly longer than wings 16. *P. sanbilingense*
 - 13b. Standard at least 12 mm; bracts mostly distinctly longer.
 - 16a. Stem, rachises, and peduncles glabrous or sparsely hairy; leaflets 10–30 × 3.5–10 mm 14. *P. pastorium*
 - 16b. Stem, rachises, and peduncles loosely to rather densely hairy, sometimes only sparsely hairy; leaflets up to 12 mm.

- 17a. Stem, rachises, and peduncles covered with hairs up to 0.15 mm and also with much shorter, minute, nearly globose hairs; calyx teeth 2.5–3 mm; legumes very shortly acuminate 7. *P. enneaphyllum*
- 17b. Stems without minute subglobose hairs; at least longer calyx teeth 3.5–6 mm; legumes with a beak 2–4 mm.
- 18a. Stipules 1–3 mm, lower ones completely embracing stem but free from each other; keel shorter than wings 6. *P. donianum*
- 18b. Stipules 3–5 mm, lower ones not or up to 1/2 embracing stem; keel longer than wings.
- 19a. Plants 20–40(–60) cm tall; racemes 2–7(–9)-flowered; petals violet or in lower part yellow 1. *P. balfourianum*
- 19b. Plants 10–25 cm tall; stipules not embracing stem, never reflexed; racemes 1–5-flowered; petals purple or purple-red and standard in middle with a white, purple-striate spot.
- 20a. Leaflets narrowly obovate, 2–3 mm wide; bracteoles 2–3(–4) mm; standard purple-red, ca. 16 mm, limb ca. 14 mm wide, transversely elliptic, in middle with a white, purple-striate spot 19. *P. tingriense*
- 20b. Leaflets widely obovate, 3.3–6 mm wide; bracteoles absent or up to 1 mm; standard purple, ca. 12 mm, limb ca. 8 mm wide, suborbicular 18. *P. sichuanense*

1. *Phyllobium balfourianum* (N. D. Simpson) M. L. Zhang & Podlech, Feddes Repert. 117: 44. 2006.

长小苞膨果豆 chang xiao bao peng guo dou

Astragalus balfourianus N. D. Simpson, Notes Roy. Bot. Gard. Edinburgh 8: 123. 1913; *A. minutebracteolatus* N. D. Simpson; *A. prattii* N. D. Simpson; *A. prattii* var. *multiflorus* K. T. Fu; *A. prattii* var. *pastorioides* K. T. Fu; *A. schneideri* Ulbrich.

Plants 20–40(–60) cm tall, with appressed hairs 0.1–0.4 mm. Stems several, (6–)20–55 cm, mostly glabrous at base, in lower part loosely and in upper part more densely white and black hairy. Leaves 2–6 cm; stipules 3–5 mm, sparsely to loosely hairy; petiole short, 0.1–1 cm, like rachis sparsely to rather densely hairy; leaflets in lower leaves mostly in 3–5 pairs, in upper leaves mostly in 5–10 pairs, 5–12(–16) × (2–)3–6 mm, abaxially subglabrous or loosely to rather densely white hairy, adaxially glabrous to very rarely sparsely appressed hairy. Racemes short, nearly capitate-umbellate, with 2–7(–9) flowers; peduncle 1–6.5 cm, loosely to rather densely predominantly black hairy; bracts 3–7 mm, sparsely hairy. Bracteoles 1–7 mm. Calyx 6–10 mm, covered loosely to rather densely with appressed, predominantly blackish hairs up to 0.3 mm; teeth 3.5–6 mm. Petals violet to purplish; standard 12.5–17.5 × 9–14 mm; wings 11–16 mm; keel 12.5–16 mm. Legumes with a stipe 2–3.5 mm, 16–18 mm, 6–7 mm high and wide, with a beak 2–4 mm, 1-locular, loosely covered with mostly dark brown appressed hairs 0.05–0.15 mm.

- 2600–4000 m. Gansu, Qinghai, Sichuan, Xizang, Yunnan.

2. *Phyllobium camptodontum* (Franchet) M. L. Zhang & Podlech, Feddes Repert. 117: 46. 2006.

弯齿膨果豆 wan chi peng guo dou

Astragalus camptodontus Franchet, Pl. Delavay. 160. 1889; *A. camptodontoides* N. D. Simpson; *A. camptodontus* var. *lichiangensis* (N. D. Simpson) K. T. Fu; *A. lichiangensis* N. D. Simpson; *A. rockii* C. Marquand & Airy Shaw.

Plants 25–50 cm tall, with exception of leaflets and calyx

covered with subappressed, bladderlike, minute, predominantly black hairs 0.05–0.2 mm. Stems slender, mostly glabrous at base, in middle part loosely and in upper part more densely hairy. Leaves 2–4.5 cm; stipules 2–5 mm, often reflexed, hairy mostly only at margins; petiole 0.3–0.5 cm, like rachis loosely to rather densely predominantly white hairy; leaflets in 4–10 pairs, 5–10 × 2.5–5 mm, abaxially loosely to rather densely covered with appressed white hairs 0.2–0.35 mm, adaxially glabrous. Racemes short, with 1–6 flowers; peduncle 1.5–4 cm, loosely hairy; bracts 1.5–5 mm, white ciliate. Bracteoles 1–4 mm. Calyx 6–8 mm, covered loosely to rather densely with appressed, mostly dark brown, slender hairs 0.1–0.2 mm; teeth 2.5–5.5 mm. Petals yellow with violet-tipped keel or violet-purple; standard 13–17 × 9–13 mm; wings 11–13 mm; keel 13–14.5 mm. Legumes with a stipe 2.5–3 mm, (13–)17–21 mm, 3.5–6 mm high and wide, with a beak 2–3 mm, 1-locular, glabrous.

- 2500–3800 m. Sichuan, Xizang, Yunnan.

3. *Phyllobium chapmanianum* (Wenninger) M. L. Zhang & Podlech, Feddes Repert. 117: 47. 2006.

蔓生膨果豆 man sheng peng guo dou

Astragalus chapmanianus Wenninger, Mitt. Bot. Staats-sammml. München 30: 108. 1992.

Plant hairs appressed to nearly spreading, white, in inflorescence predominantly dark brown. Stems 6.5–11 cm, slender, in lower parts glabrescent, in upper part rather densely white and dark brown hairy. Leaves 1–2.2 cm, sessile; stipules 2–3 mm, hairy; rachis hairy; leaflets in (2–)4–7 pairs, 4–6 × 2–3.5 mm, abaxially densely and adaxially loosely to densely covered with ± appressed hairs. Racemes 1–3-flowered; peduncle 0.8–1.5 cm, rather densely covered with ± appressed white and dark brownish hairs; bracts 4–6 mm, spreading hairy. Bracteoles 4–5 mm. Calyx 7–8 mm, rather densely covered with spreading, white and dark brown hairs; teeth ca. 4 mm. Petals violet; standard transversely elliptic, ca. 10 × 8.5 mm; wings 9.5–10 mm; keel ca. 9 mm. Ovary with a stipe ca. 0.5 mm, densely black brown and white hairy. Legumes unknown.

- 3500–4500 m. Xizang.

4. *Phyllobium chinense* Fischer in Sprengel, *Novi Provent.* 33. 1818.

背扁膨果豆 bei bian peng guo dou

Astragalus complanatus Bunge; *A. pratensis* Ulbrich.

Plants 30–90(–100) cm tall, covered with ± appressed, very short, scalelike, bladderlike hairs up to 0.1 mm. Stems in lower part glabrous, in upper part loosely to rather densely hairy. Leaves 4–11 cm; stipules 1–3 mm, obliquely inserted at stem and sometimes slightly clasping stem, sparsely to loosely hairy; petiole very short, rachis sparsely to loosely white hairy; leaflets in 4–10 pairs, 5–18 × 2.5–11 mm, abaxially sparsely to loosely hairy, adaxially glabrous. Racemes 4–9 cm, remotely 2–7-flowered; peduncle 4–9 cm, sparsely to loosely white hairy; bracts 1–2.5 mm, white and black hairy. Bracteoles 0.5–1 mm. Calyx 4–7 mm, loosely to densely white or black hairy; teeth 2–3.5 mm. Petals yellow to reddish; standard orbicular or transversely elliptic, 9–11 × 8–10.5 mm; wings 8–11 mm; keel 9–10 mm. Legumes with a stipe 1–1.5 mm, 30–44 mm, 4–8 mm high, with a straight beak 3–4 mm, 1-locular, loosely to rather densely covered with appressed white or black hairs.

- 1000–1700 m. Gansu, Hebei, Henan, Jiangsu, Jilin, Ningxia, Qinghai, Shaanxi, Shanxi, Sichuan.

5. *Phyllobium dolichochoete* (Diels) M. L. Zhang & Podlech, *Feddes Repert.* 117: 48. 2006.

芒齿膨果豆 mang chi peng guo dou

Astragalus dolichochoete Diels, *Notes Roy. Bot. Gard. Edinburgh* 5: 245. 1912; *A. albidoflavus* K. T. Fu.

Plants 30–75 cm tall, covered with appressed to ascending hairs 0.3–0.5 mm. Stems 10–25 mm in diam., sparsely to loosely covered in lower part with white hairs, in upper part with increasingly blackish brown hairs, and in inflorescence region only with black hairs. Leaves 3.5–11.5 cm; stipules 4–6 mm, glabrous or sparsely to loosely hairy, at margins more densely hairy; petiole very short, like rachis sparsely to loosely hairy; leaflets in (4 or) 5–12 pairs, 4–21.5 × 1.5–6 mm, abaxially sparsely to loosely hairy, adaxially glabrous. Racemes 1–2 cm, densely, later somewhat more loosely, 3–11-flowered; peduncle 4–15 cm, often curved, mostly with brownish black hairs, bracts 4–8 mm, nearly glabrous to loosely or at margins more densely black hairy. Bracteoles 0.5–4 mm. Calyx 7–12 mm, sparsely to loosely or densely mostly appressed black hairy; teeth 4–9 mm, often ± strongly curved. Petals greenish yellow to sulfur-yellow; standard 14–17 × 12–15 mm; wings 12–15 mm; keel 12–15 mm. Legumes with a stipe 2–3 mm, 16–22 mm, 3.5–4.5 mm high, with a beak 2–3 mm, 1-locular, glabrous or sparsely to loosely covered with white to blackish brown hairs.

- 2700–4300 m. Sichuan, Xizang, Yunnan.

6. *Phyllobium donianum* (Candolle) M. L. Zhang & Podlech, *Feddes Repert.* 117: 49. 2006.

亚东膨果豆 ya dong peng guo dou

Astragalus donianus Candolle, *Prodr.* 2: 283. 1825; *A. monanthus* K. T. Fu; *A. prattii* N. D. Simpson var. *uniflorus* E. Peter; *A. pycnorhizus* Wallich ex Benth; *A. yatungensis* C. C. Ni & P. C. Li.

Plants creeping to prostrate. Stems 15–44 cm, in basal part glabrous to sparsely and in upper part loosely or more rarely rather densely covered with appressed white or white and black hairs 0.1–0.2 mm. Leaves 1.5–5 cm; stipules 1–3 mm, free or in front of petiole shortly connate, lower and middle ones 1/2 to completely embracing stem but not connate, at margins and often also elsewhere loosely hairy; petiole short, rachis loosely hairy like stem; leaflets in 4–8 pairs, 2–7(–9) × 1.5–4 mm, emarginate, abaxially at first rather densely appressed hairy, becoming loosely hairy with age, hairs ca. 0.3 mm, adaxially glabrous. Racemes short, 1–3(–5)-flowered; peduncle 1.5–6 cm, loosely white and black hairy; bracts 1–4 mm, sparsely hairy. Bracteoles 1–3 mm. Calyx 5.5–7.5 mm, loosely to rather densely covered with ± ascending white and black hairs 0.2–0.5 mm; teeth 2–4.5 mm. Petals blue-violet to purple or dark red; standard orbicular to transversely elliptic, 13–17 × 11–13.5(–15) mm; wings 12–16 mm; keel 12–15(–16) mm. Legumes with a stipe 2–3 mm, 15–30 mm, (5–)6–8(–9.5) mm high, with a beak 2–3 mm, 1-locular, at first densely, later loosely, shortly, white and blackish or only blackish hairy.

Xizang, Yunnan [Bhutan, India, Nepal].

7. *Phyllobium enneaphyllum* (P. C. Li) M. L. Zhang & Podlech, *Feddes Repert.* 117: 51. 2006.

九叶膨果豆 jiu ye peng guo dou

Astragalus enneaphyllum P. C. Li, *Acta Bot. Yunnan.* 11: 289. 1989.

Plants subappressed white hairy or in inflorescence also with a few black hairs. Stems prostrate, 40–60 cm, sparsely to loosely covered with hairs up to 0.15 mm and also with much shorter, minute, nearly globose hairs. Leaves 2–4.5 cm; stipules 1.5–3 mm, subglabrous; petiole short, rachis hairy like stem; leaflets in 3 or 4 pairs, 6–11 × 3–5.5 mm, abaxially loosely covered with hairs 0.3–0.5 mm, adaxially glabrous. Racemes loosely 2–4-flowered; peduncle 2.5–3.5 cm, hairy like stem; bracts 2–3 mm, white hairy. Bracteoles not always present, 1–2 mm. Calyx 6.5–7 mm, loosely covered with appressed white hairs up to 0.5 mm and with fewer and shorter black hairs; teeth 2.5–3 mm. Petals pale blue; standard widely obovate to sub-orbicular, ca. 12 × 7.5–8 mm; wings ca. 11 mm; keel ca. 12 mm. Legumes with a stipe ca. 3 mm, 25–28 mm, 2.5–3 mm high and 7–8 mm wide, very shortly acuminate, 1-locular, sparsely to loosely covered with subappressed white hairs 0.1–0.25 mm.

- Yunnan.

8. *Phyllobium eutrichus* (Handel-Mazzetti) M. L. Zhang & Podlech, *Feddes Repert.* 117: 51. 2006.

真毛膨果豆 zhen mao peng guo dou

Astragalus complanatus Bunge var. *eutrichus* Handel-Mazzetti, *Symb. Sin.* 7: 553. 1933; *A. complanatus* subsp. *eutrichus* (Handel-Mazzetti) Weninger.

Plants 30–90(–100) cm tall, covered with always thin, slender hairs 0.1–0.4 mm. Stems at least in lower 1/2 with ± horizontally spreading, long lateral branches, glabrous in lower part, in upper part and lateral branches loosely appressed white hairy, in upper part with some black hairs mixed in. Leaves 2–9 cm, subsessile; stipules 2–5 mm, sparsely hairy or subglabrous; rachis loosely appressed white hairy; leaflets in 5–8 pairs, 4–8 × 2–5 mm, abaxially loosely hairy, adaxially toward margins sparsely hairy or subglabrous, apex emarginate. Racemes 2–5 cm, remotely 2–7-flowered; peduncle 2.5–6 cm, sparsely white and black hairy; bracts 1.5–2.5 mm, white and black hairy. Bracteoles sometimes present, ca. 1 mm. Calyx 5–6 mm, sparsely to very sparsely white and black hairy; teeth 2–2.5 mm. Petal color unknown; standard widely elliptic to orbicular, 12–13 × ca. 7.5 mm; wings ca. 9 mm; keel 11–12 mm. Legumes (unripe) with a stipe ca. 3 mm, narrowly ellipsoid, narrowed at both ends, straight, with a beak ca. 2 mm, when young densely covered with appressed white hairs 0.2–0.3 mm.

- 2400–3000 m. Yunnan.

9. *Phyllobium flavovirens* (K. T. Fu) M. L. Zhang & Podlech, Feddes Repert. 117: 52. 2006.

黄绿膨果豆 huang lü peng guo dou

Astragalus flavovirens K. T. Fu, Bull. Bot. Res., Harbin 2(1): 122. 1982; *A. angustifoliolatus* K. T. Fu.

Plants loosely caespitose, in vegetative parts covered with appressed white hairs 0.1–0.3 mm, in inflorescence mostly with dark brownish to blackish hairs. Stems 10–40(–60) cm, prostrate to ascending or erect, in lower part only with bractlike stipules without developed leaves, loosely hairy. Leaves 2–11 cm, nearly sessile; stipules 4–8 mm, loosely hairy or sparsely ciliate; rachis loosely hairy; leaflets in 7–13 pairs, 5–16 × 1–4(–7) mm, abaxially sparsely to loosely hairy, adaxially glabrous, mostly somewhat cucullate at apex, with a cusp up to 0.5 mm. Racemes short, densely 3–9-flowered; peduncle 3–11 cm, blackish brown hairy; bracts 5–6 mm, with blackish brown hairs. Bracteoles 1.5–4 mm. Calyx 7–9 mm, loosely covered with appressed black hairs 0.05–0.1 mm; teeth unequal, 2 upper 2–4 mm, 3 lower 4–6 mm. Petals yellowish, sometimes with purple tip; standard suborbicular, ca. 15 × 11 mm; wings ca. 12 mm; keel ca. 13 mm. Ovary with a stipe ca. 3 mm, linear, glabrous to white hairy. Legumes unknown.

- 2500–3000 m. Yunnan.

10. *Phyllobium heydei* (Baker) M. L. Zhang & Podlech, Feddes Repert. 117: 53. 2006.

毛柱膨果豆 mao zhu peng guo dou

Astragalus heydei Baker in J. D. Hooker, Fl. Brit. India 2: 118. 1876; *A. hendersonii* Baker; *A. heydei* var. *hendersonii* (Baker) H. Ohba, S. Akiyama & S. K. Wu.

Plants up to 12 cm tall, densely hairy. Stems in leafy part ca. 1 cm, sparsely to loosely covered with subappressed, flexuous, tangled, white hairs 0.1–0.2 mm. Leaves 1–2.5 cm; stipules 1–2.5 mm, shortly connate behind stem and mostly also in front of petiole, sparsely to loosely white hairy; petiole 0.2–0.6

cm, like rachis loosely to rather densely covered with subappressed to spreading, white hairs 0.2–0.4 mm; leaflets in 3–7 pairs, 2–5(–7) × 1–4 mm, both surfaces densely to rather densely covered with subappressed to ascending, partly flexuous, tangled, white hairs 0.5–0.7 mm. Racemes (1 or) 2–5-flowered; peduncle 1–4.5 cm, often curved, loosely hairy like stem in upper part; bracts 1.5–2 mm, hairy. Calyx 3–6 mm, densely to rather densely covered with ascending to spreading, flexuous, white hairs 0.5–0.7 mm, with very short, appressed, black hairs mixed in; teeth 1.5–2(–3) mm. Petals pink to pale violet; standard orbicular to transversely elliptic, 9–12 × 9–13 mm; wings 9–11 mm; keel 8–10 mm. Legumes subsessile, 15–20 mm, 8–12 mm high, compressed laterally, 1-locular, rather densely, later loosely, covered with short, appressed to ascending, white or black and white hairs.

- 3900–5800 m. Qinghai, Sichuan, Xinjiang, Xizang [India, Nepal].

11. *Phyllobium lasaense* (C. C. Ni & P. C. Li) M. L. Zhang & Podlech, Feddes Repert. 117: 54. 2006.

拉萨膨果豆 la sa peng guo dou

Astragalus lasaensis C. C. Ni & P. C. Li, Acta Phytotax. Sin. 17(2): 107. 1979.

Plants densely covered with appressed or nearly ascending hairs (0.3–)0.5–1 mm. Stems creeping, prostrate to ascending or erect, 15–30 cm, loosely to densely covered with subappressed, tangled, white and brownish black, partly very short hairs. Leaves 2.5–4 cm, nearly sessile; stipules 4–7 mm, densely white hairy; rachis densely hairy; leaflets in 4–9 pairs, 3–10 × 1.5–4 mm, abaxially densely and adaxially loosely silvery hairy. Racemes short, 2–7-flowered; peduncle 1.5–3 cm, rather densely white and black hairy; bracts 6–10 mm, white or white and black hairy. Bracteoles 4–5 mm. Calyx 9–10 mm, densely covered with tangled, subappressed to ascending, white hairs and with mostly distinctly shorter black hairs; teeth 4–5 mm. Petals purple to violet; standard orbicular to transversely elliptic, 10–12 × 8–11 mm; wings 10–11 mm; keel 8–10 mm. Legumes shortly stipitate, 6–10 mm, 3–4 mm high and wide, with a short beak, nearly fully 2-locular, loosely covered with appressed white and also some black hairs 0.1–0.2 mm.

- 4100–4700 m. Xizang.

12. *Phyllobium lineariauriferum* (P. C. Li) M. L. Zhang & Podlech, Feddes Repert. 117: 55. 2006 [*“lineariaurifer”*].

线耳膨果豆 xian er peng guo dou

Astragalus lineariaurifer P. C. Li, Acta Bot. Yunnan. 11: 292. 1989.

Plants 20–30 cm tall, with subappressed to spreading hairs 0.3–1 mm. Stems erect, often curved, loosely to rather densely covered with ascending to ± spreading mostly white hairs. Leaves 3–5 cm, subsessile; stipules 4–7 mm, loosely white hairy, at base also black hairy; rachis loosely covered with subappressed to spreading white and scattered black hairs; leaflets in 5 or 6 pairs, 8–20 × 2–5 mm, both surfaces loosely to rather densely subappressed hairy. Racemes loosely 4–6-flowered; peduncle 4–5 cm, loosely covered with ± spreading, mostly black hairs; bracts 8–10 mm, black hairy. Bracteoles ca. 2 mm. Calyx

7–8 mm, loosely to rather densely covered with ascending to ± spreading white and black hairs; teeth 4–5 mm. Petals ?bluish; standard widely ovate to suborbicular, 12–13 × 10–11 mm; wings 10.5–11 mm; keel 12–13 mm. Legumes (immature) with a stipe ca. 3 mm, narrowly ellipsoid, ca. 10 mm, 1-locular, densely covered with subappressed to ascending white hairs.

- Sichuan.

13. *Phyllobium milingense* (C. C. Ni & P. C. Li) M. L. Zhang & Podlech, Feddes Repert. 117: 56. 2006.

米林膨果豆 mi lin peng guo dou

Astragalus milingensis C. C. Ni & P. C. Li, Acta Phytotax. Sin. 17(2): 107. 1979; *A. milingensis* var. *heydeiodes* K. T. Fu.

Plants covered with mostly white hairs. Stems prostrate, 5–30 cm, often zigzaglike bent, in basal parts glabrous or sparsely hairy, in upper parts loosely to rather densely covered with appressed to spreading white or partly black and white hairs 0.2–0.3(–0.4) mm. Leaves 1–2.5 cm; stipules 1.5–2 mm, sparsely hairy; petiole 0.3–0.5 cm, like rachis loosely to rather densely hairy, hairs subappressed to spreading, white, sometimes also some black; leaflets in 3–6 pairs, 2–4 × 1–2 mm, abaxially densely to rather densely covered with ± appressed, short, white hairs, more rarely also with black hairs, adaxially glabrous or sometimes with a few appressed hairs toward base and margins. Racemes loosely 1–4-flowered; peduncle 1–2 cm, rather densely covered with mostly appressed, short, white hairs; bracts 0.6–1 mm, mostly white hairy. Bracteoles mostly absent, if present, less than 0.3 mm. Calyx 3–5 mm, rather densely covered with subappressed to ascending or even spreading, short, white hairs, sometimes also with black hairs; teeth 1.5–2.5 mm. Petals pink or purple to violet; standard orbicular, 7–10 × 6–8.5 mm; wings 7–8 mm; keel 7–8 mm. Legumes with a stipe ca. 1 mm, 10–15 mm, 2.5–3 mm high and 5–7 mm wide, with a short beak and often persistent style, 1-locular, rather densely covered with ascending white hairs 0.2–0.3 mm.

- 3000–4300 m. Gansu, Sichuan, Xizang.

14. *Phyllobium pastorium* (H. T. Tsai & T. T. Yu) M. L. Zhang & Podlech, Feddes Repert. 117: 57. 2006.

牧场膨果豆 mu chang peng guo dou

Astragalus pastorius H. T. Tsai & T. T. Yu, Bull. Fan Mem. Inst. Biol. 9: 264. 1940; *A. pastorius* var. *linearibracteatus* K. T. Fu; *A. tenchingensis* K. T. Fu.

Plants 25–40 cm tall, with appressed hairs 0.1–0.5 mm. Stems prostrate to ascending or erect, glabrous or sparsely to loosely or especially in upper part to rather densely covered with subappressed to ascending white and black hairs. Leaves 6–10 cm; stipules 4–7 × 3–5 mm, glabrous or with a few black hairs at margins; petiole 1–2 cm, glabrous or very sparsely furnished with short black hairs; leaflets in 2–5 pairs, 10–30 × 3.5–10 mm, abaxially sparsely to loosely covered with appressed white or black and white hairs 0.3–0.4 mm, adaxially glabrous or sparsely hairy. Racemes rather densely 4–8-flowered; peduncle (3–)4.5–10 cm, glabrous or sparsely to rather densely black

hairy; bracts 4–6 mm, black hairy. Bracteoles 1–2 mm. Calyx 5–7(–10) mm, densely to rather densely covered with appressed black hairs 0.1–0.3 mm; teeth 2–3(–5) mm. Petals blue; standard suborbicular, 12–13 × 9–10 mm; wings ca. 11 mm; keel ca. 11 mm. Legumes with a stipe ca. 4 mm, 15–25 mm, ca. 5 mm high and wide, with a straight beak 1–3 mm, 2-locular, sparsely to loosely furnished with appressed black hairs 0.05–0.15 mm.

- 3000–4000 m. Sichuan, Xizang, Yunnan.

15. *Phyllobium prodigiosum* (K. T. Fu) M. L. Zhang & Podlech, Feddes Repert. 117: 58. 2006.

奇异膨果豆 qi yi peng guo dou

Astragalus prodigiosus K. T. Fu, Bull. Bot. Res., Harbin 2(1): 121. 1982; *A. milingensis* C. C. Ni & P. C. Li var. *paucijugus* (K. T. Fu) K. T. Fu; *A. milingensis* var. *prodigiosus* (K. T. Fu) K. T. Fu; *A. prodigiosus* var. *paucijugus* K. T. Fu.

Plants 5–10 cm tall, covered with appressed to subappressed, short, white hairs. Stems several, prostrate to ascending or erect, 2–10 cm, loosely to densely covered with hairs 0.05–0.2 mm. Leaves 2–3.5 cm, subsessile; stipules 1.5–3 mm, sparsely hairy; rachis hairy like stem; leaflets in 3–9 pairs, 3–11 × 1–2 mm, abaxially loosely covered with appressed hairs 0.3–0.5 mm, adaxially glabrous or with a few hairs only, especially toward margins. Racemes 1–1.5 cm, 3–5-flowered; peduncle 1–3 cm, rather densely hairy like stem; bracts ca. 1 mm, hairy. Calyx 4–5.5 mm, loosely covered with appressed white hairs 0.2–0.4 mm; teeth 2–2.5 mm. Petals violet; standard transversely ovate, 8–10 × 9–12 mm; wings 7–9 mm; keel 7–9 mm. Legumes shortly stipitate, ca. 12 mm, ca. 3 mm high and ca. 5 mm wide, with a slender, slightly curved beak ca. 4 mm, 1-locular, loosely covered with appressed white hairs 0.2–0.3 mm.

- 3300–3800 m. Sichuan, Xizang.

16. *Phyllobium sanbilingense* (H. T. Tsai & T. T. Yu) M. L. Zhang & Podlech, Feddes Repert. 117: 58. 2006.

乡城膨果豆 xiang cheng peng guo dou

Astragalus sanbilingensis H. T. Tsai & T. T. Yu, Bull. Fan Mem. Inst. Biol. 9: 265. 1940.

Plants ca. 30 cm tall, with only white, appressed, flattened hairs 0.02–0.3 mm. Stems glabrous to sparsely hairy. Leaves 2–3.5 cm, subsessile or petiole 0.4–0.6 cm, like rachis loosely hairy; stipules 2–2.5 mm, sparsely hairy at margins; leaflets in 7–9 pairs, 4–9 × 1.5–4 mm, abaxially loosely hairy, adaxially glabrous. Racemes loosely 2–5-flowered; peduncle 2–4 cm, sparsely hairy to glabrous; bracts ca. 2 mm, sparsely hairy. Calyx ca. 5 mm, loosely covered with appressed hairs 0.3–0.5 mm; teeth 2–2.5 mm. Petals purplish; standard orbicular, ca. 9 × 7–8 mm; wings ca. 7 mm; keel 8–8.5 mm. Legumes subsessile, 8–13 mm, ca. 2 mm high and ca. 4 mm wide, with a straight beak ca. 2 mm, 1-locular, loosely covered with short, appressed, white hairs.

- Sichuan, Yunnan.

17. *Phyllobium siccanum* (P. C. Li) M. L. Zhang & Podlech, Feddes Repert. 117: 59. 2006.

耐旱膨果豆 nai han peng guo dou

Astragalus siccanus P. C. Li, Acta Bot. Yunnan. 11: 291. 1989.

Plants 18–50 cm tall, with only white, short, ± appressed hairs up to 0.3 mm. Stem erect, sparsely to loosely covered with hairs 0.05–0.2 mm. Leaves 3–5 cm, subsessile; stipules 2–4 mm; rachis sparsely hairy; leaflets in 3–5 pairs, 4–7 × 2–4 mm, abaxially loosely hairy, adaxially glabrous. Racemes loosely 2- or 3-flowered; peduncle 3–9 cm, glabrous or sparsely hairy like stem; bracts 1.5–2 mm, sparsely hairy. Calyx 7–8 mm, loosely hairy; teeth 2–2.5 mm. Petals pink or purplish; standard transversely elliptic, ca. 10 × 10 mm; wings ca. 9 mm; keel ca. 8 mm. Legumes with a stipe ca. 3 mm, 25–30 mm, 4–5 mm high, with a beak 4–5 mm, 1-locular, loosely white hairy when young, soon glabrescent.

• Sichuan.

18. *Phyllobium sichuanense* Podlech, Feddes Repert. 120: 56. 2009.

四川膨果豆 si chuan peng guo dou

Plants ca. 15 cm tall. Stems 6–12 cm, branched at base, sparsely to loosely covered with appressed white and black hairs 0.2–0.3 mm. Leaves ca. 3 cm, subsessile; stipules 3–4 mm, free, subglabrous, sparsely ciliate; leaflets in 5–7 pairs, widely obovate, 5–9 × 3.3–6 mm, abaxially loosely covered with appressed hairs 0.4–0.5 mm, adaxially glabrous. Racemes short, 4- or 5-flowered; peduncle 2–3 cm, predominantly black hairy; bracts 3–4 mm, narrowly triangular, black hairy. Bracteoles absent or up to 1 mm. Calyx 7–8 mm, rather densely covered with subappressed black hairs 0.1–0.3 mm, with some white hairs mixed in; teeth ca. 4 mm. Petals purple; standard ca. 12 mm, limb ca. 8 mm wide, suborbicular; wings ca. 10 mm, limbs narrowly oblong, ca. 6 × 1.5 mm; keel ca. 12 mm. Legumes (unripe), with a stipe 2–3 mm, at least 10 mm, densely covered with appressed white and black hairs.

• Sichuan (Dêgê).

19. *Phyllobium tingriense* (C. C. Ni & P. C. Li) M. L. Zhang & Podlech, Feddes Repert. 117: 59. 2006.

定日膨果豆 ding ri peng guo dou

Astragalus tingriensis C. C. Ni & P. C. Li, Acta Phytotax. Sin. 18: 367. 1980.

Plants 10–25 cm tall. Stems prostrate to ascending, sparsely to loosely covered in basal parts with appressed to ascending, tangled, white hairs 0.2–0.5 mm, in upper part with much shorter black hairs. Leaves 2–4.5 cm, subsessile; stipules 3–4.5 mm, sparsely white hairy; rachis sparsely to loosely covered with subappressed to spreading white and black hairs 0.1–0.3 mm; leaflets in (3–)5–8 pairs, 4–8 × 2–3 mm, abaxially and at margins rather densely covered with subappressed, ± rigid, white hairs 0.2–0.3 mm, adaxially glabrous. Racemes 1–4-flowered; peduncle 2–9 cm, sparsely to loosely and below raceme often densely hairy like stem in upper part; bracts 3–5 mm, white or black hairy. Bracteoles 2–3(–4) mm, hairy. Calyx 5–6 mm, densely covered with subappressed to ascending white hairs 0.5–0.8 mm and with black hairs 0.1–0.3 mm; teeth 2–3

mm. Petals purple-red, standard in middle with a white, purplish-striate spot; standard 15–16 × 11–12 mm, limb wider than long, with a claw ca. 4 mm; wings ca. 13 mm; keel 14–15 mm. Legumes (unripe) with a stipe ca. 5 mm, at least 10 mm, ca. 3 mm high, compressed laterally, with a beak 2–2.5 mm; valves densely covered with appressed white hairs 0.1–0.2 mm.

Xizang [Nepal].

20. *Phyllobium tribulifolium* (Benth. ex Bunge) M. L. Zhang & Podlech, Feddes Repert. 117: 60. 2006.

蒺藜叶膨果豆 ji li ye peng guo dou

Astragalus tribulifolius Benth. ex Bunge, Mém. Acad. Imp. Sci. Saint Pétersbourg, Sér. 7, 11(16): 4. 1868; *A. chingianus* P. C. Li (1989), not E. Peter (1937); *A. tanguticus* Batalin; *A. tanguticus* f. *albiflorus* (K. T. Fu) K. T. Fu; *A. tanguticus* var. *albiflorus* K. T. Fu; *A. tribulifolius* var. *pauciflorus* C. Marquand & Airy Shaw.

Plants covered with white hairs, in inflorescence with mostly blackish hairs. Stems 6–20 cm, prostrate to ascending or erect, loosely, in upper part rather densely covered with spreading or sometimes partly appressed white or white and brownish hairs 0.2–0.3 mm. Leaves 1–5 cm, subsessile; stipules (1.5–)2.5–4.5(–5.5) mm, lower ones triangular, often semiamplexicaul, upper ones narrowly triangular, all sparsely to loosely hairy; rachis loosely to rather densely hairy; leaflets in (3 or)4–9(or 10) pairs, 3–15 × 2–5 mm, abaxially to densely and adaxially sparsely to loosely covered with subappressed to ascending hairs up to 0.5 mm, or adaxially glabrous. Racemes short, (1 or)2–10-flowered; peduncle 1–6 cm, rather densely hairy; bracts 1.5–4(–5) mm, hairy. Bracteoles 0.5–2 mm or sometimes absent. Calyx (3–)4–6(–7) mm, loosely to rather densely hairy; teeth (1–)1.5–4 mm. Petals violet, purple, or pinkish; standard orbicular to transversely elliptic, 8–12 × 8–12 mm; wings 7–9 mm; keel 7.5–11 mm. Legumes with a stipe 2–2.5 mm, 9–17 mm, 5–6.5 mm high and wide, with a beak 1–2 mm, 1-locular, loosely to rather densely covered with short, spreading or appressed, white, or white and blackish or only blackish hairs.

Dry open scrub-covered and rocky slopes; 2700–5500 m. Gansu, Qinghai, Sichuan, Xizang, Yunnan [India, Nepal, Pakistan].

21. *Phyllobium turgidocarpum* (K. T. Fu) M. L. Zhang & Podlech, Feddes Repert. 117: 62. 2006.

膨果豆 peng guo dou

Astragalus turgidocarpus K. T. Fu, Bull. Bot. Res., Harbin 2(1): 127. 1982.

Plants up to 30 cm tall, covered with only white hairs 0.02–0.3 mm. Stems 15–40 cm, diffusely prostrate to ascending, in basal part glabrous, in upper part sparsely to loosely spreading hairy. Leaves 3–5.5 cm; stipules 3–4 mm, ciliate; petiole 0.3–1 cm, with rachis hairy like stem; leaflets in 5–7 pairs, 5–9 × 2.5–5 mm, abaxially loosely covered with tangled subappressed hairs, adaxially glabrous. Racemes 2–4-flowered; peduncle 3–7 cm, hairy like stem; bracts ca. 4 mm, ciliate. Bracteoles 0.3–1 mm. Calyx 8–10 mm, sparsely to loosely hairy; teeth 4.5–6 mm. Petals purple; standard suborbicular, 15–19 × 10–13 mm; wings ca. 12 mm; keel 14–15 mm. Legumes

GALEGEAE

with a stipe ca. 5 mm, 25–30 mm, ca. 5 mm high and wide,
with a slender beak, 2-locular, loosely hairy.

- 900–2100 m. Gansu, Sichuan.

GALEGEAE