

77. TEPHROSIA Persoon, Syn. Pl. 2: 328. 1807, nom. cons.

灰毛豆属 *hui mao dou shu*

Wei Zhi (韦直); Les Pedley

Cracca Linnaeus.

Herbs, perennial or rarely annual, often suffrutescent, usually sericeous. Stipules caducous. Leaves imparipinnate; stipels absent; leaflet blades opposite, abaxially often sericeous, secondary veins to ca. 30 on each side of midvein and closely parallel, margin entire. Pseudoracemes terminal or axillary, sometimes opposite a leaf; bracts usually caducous. Bracteoles absent. Corolla white, cream-colored, or mauve, occasionally orange or red; standard reflexed, suborbicular, outside villous or sericeous. Stamens monadelphous; vexillary stamen somewhat distinct from other 9. Ovary sessile, with trichomes, with numerous ovules. Legume flat, occasionally inflated, dehiscent, apex often beaked; valves twisted. Seeds 5–16 per legume, oblong, ellipsoid, or occasionally globose; radicle folded.

More than 400 species: tropical and subtropical regions of the world; 11 species (one endemic, three introduced) in China.

- 1a. Flowers 1–2.5 cm; legume 5.5–13 cm × 5.5–14 mm.
 - 2a. Flowers 1–1.7 cm; legume 5.5–6 cm; leaflet blades obovate-elliptic, narrowly elliptic, linear-oblong-lanceolate, or oblong-oblong-lanceolate.
 - 3a. Inflorescences 3–7 cm, with congested flowers; corolla white; leaflet blades abaxially velutinous, secondary veins 15–20 on each side of midvein 4. *T. vestita*
 - 3b. Inflorescences to 25 cm, with scattered flowers; corolla red; leaflet blades abaxially silvery sericeous, secondary veins 9 or 10 on each side of midvein 5. *T. coccinea*
 - 2b. Flowers 2–2.5 cm; legume 8–13 cm; leaflet blades oblong-elliptic, lanceolate-elliptic, oblong, or oblong-lanceolate.
 - 4a. Pedicel 2–2.3 cm, densely rusty villous; legume 10–13 cm × ca. 14 mm, densely creamy villous 1. *T. vogelii*
 - 4b. Pedicel 0.5–1 cm, densely white villous or sericeous; legume 8–10 cm × 6–8.5 mm, brown tomentose or yellow sericeous.
 - 5a. Calyx teeth ca. 1 mm, apex rounded; leaflet blades 0.6–1.4 cm in width, oblong, secondary veins 30–50 on each side of midvein; pedicel ca. 10 mm, villous; corolla white, rarely yellow or pale pink; legume brown tomentose 2. *T. candida*
 - 5b. Calyx teeth ca. 5 mm, apex acute; leaflet blades 1.5–2 cm in width, oblong-lanceolate, secondary veins 20 on each side of midvein; pedicel ca. 5 mm, sericeous; corolla red; legume yellow sericeous 3. *T. kerrii*
- 1b. Flowers ca. 1 cm; legume 2–5 cm × 3.5–5(–6) mm.
 - 6a. Inflorescences 10–25 cm (but only ca. 2 cm in *T. purpurea* var. *glabra*), flowers scattered.
 - 7a. Calyx teeth ± equal; legume with sparse appressed trichomes, ca. 6-seeded 6. *T. purpurea*
 - 7b. Calyx teeth unequal, most abaxial tooth longer and narrow, other ones shorter and broad; legume densely brown tomentose, 7–9-seeded 7. *T. noctiflora*
 - 6b. Inflorescences 1–5 cm, flowers congested.
 - 8a. Legume with 7–14 seeds.
 - 9a. Inflorescences with 1–3 flowers; legume apex with curved or hooked beak 8. *T. pumila*
 - 9b. Inflorescences with 4–8 flowers; legume apex with a short straight beak 9. *T. luzonensis*
 - 8b. Legume with 5–7 seeds.
 - 10a. Leaves 13–17-foliolate; leaflet blades oblanceolate, abaxially sparsely pubescent, secondary veins ca. 9 on each side of midvein, mauve, conspicuous; legume slightly curved at tip, 3.5–4 cm 10. *T. ionophlebia*
 - 10b. Leaves 11- or 13-foliolate; leaflet blades obovate, both surfaces densely sericeous, secondary veins 5–8 on each side of midvein, almost inconspicuous; legume straight, 2–2.5 cm 11. *T. obovata*

1. Tephrosia vogelii J. D. Hooker in Hooker, Niger Fl. 296. 1849.

西非灰毛豆 *xi fei hui mao dou*

Herbs, perennial, erect, many branched. Stems tomentose with short and long white and yellow trichomes, trichomes ca. 1.5 mm. Leaves 13–29-foliolate; rachis 10–25 cm, including petiole 1–3 cm; leaflet blades oblong-elliptic to lanceolate-elliptic, 3–7 × 0.9–1.8 cm, abaxially densely mixed white and yellow tomentose, adaxially appressed white sericeous, secondary veins 12–15 on each side of midvein. Pseudoracemes terminal

or axillary near apex of branchlets, 10–15 cm, rusty tomentose, long pedunculate. Pedicel 2–2.3 cm, rusty villous. Flowers ca. 2.5 cm. Calyx ca. 1.2 × 1 cm, brown tomentose; teeth oblong, ca. 1 cm, apex rounded but adaxial one narrowly acute. Corolla white or occasionally violet; standard orbicular, sericeous. Ovary sericeous, with numerous ovules. Legume linear, 10–13 cm × 12–14 mm, straight, yellowish white tomentose, rusty on suture, apex beaked. Seeds 12–16 per legume, black, broadly ovoid, ca. 7 × 4.5 mm, smooth. Fl. and fr. year-round. *2n* = 22.

Cultivated in S Guangdong, Hainan, and Taiwan [native to tropical Africa].

This species is grown as a green mulch.

2. *Tephrosia candida* Candolle, Prodr. 2: 249. 1825.

白灰毛豆 bai hui mao dou

Robinia candida (Candolle) Roxburgh.

Herbs, perennial, suffrutescent, 1–3.5 m tall. Stems ridged, grayish white tomentose, trichomes ca. 1 mm. Leaves 17–25-foliolate; rachis 15–25 cm, including petiole 1–3; leaflet blades oblong, 3–6 × 0.6–1.4 cm, abaxially densely sericeous, adaxially glabrous, secondary veins 30–50 on each side of midvein. Pseudoracemes terminal or lateral, 15–20 cm. Pedicel ca. 1 cm, densely white villous. Flowers ca. 2 cm. Calyx ca. 5 × 5 mm; teeth equal, ca. 1 mm, apex rounded. Corolla white, rarely yellow or pale pink; standard densely sericeous. Ovary tomentose, with numerous ovules. Legume linear, 8–10 cm × 7.5–8.5 mm, straight, brown tomentose with a mixture of long and short trichomes, apex truncate and with a straight ca. 1 cm beak. Seeds 10–15 per legume, olive-green with dark patches, ellipsoid, ca. 5 × 3.5 mm, smooth. Fl. Oct–Nov, fr. Dec. $2n = 22, 24$.

Cultivated or escaped, grasslands, open places, slopes. Fujian, Guangdong, Guangxi, Taiwan, Yunnan [native to India; widely cultivated and escaped elsewhere].

This species is grown as a green mulch.

3. *Tephrosia kerrii* J. R. Drummond & Craib, Bull. Misc. Inform. Kew 1912: 149. 1912.

银灰毛豆 yin hui mao dou

Herbs, perennial, to 3 m tall, densely yellow spreading villous. Stems erect, sturdy, ridged, apically branched. Leaves 11–17-foliolate; rachis 9–15 cm, including petiole ca. 5 mm; leaflet blades oblong-lanceolate, 5–8 × 1.5–2 cm, abaxially densely silvery sericeous, adaxially olive-green and glabrous, secondary veins 20 on each side of midvein and conspicuous, base obtuse to cuneate, apex acute and cuspidate. Pseudoracemes terminal, when immature cone-shaped and covered by bracts, elongated to ca. 10 cm at anthesis. Pedicel ca. 5 mm, densely white sericeous. Flowers ca. 2.2 cm. Calyx ca. 8 × 6 mm; teeth narrowly triangular, most abaxial one longest and ca. 5 mm, apex acute. Corolla red; standard obovate, yellow sericeous. Ovary sericeous, with numerous ovules. Legume linear, 8–10 cm × 6–8 mm, straight, spreading and slightly nodding, yellow sericeous, apex with a ca. 1 cm slightly ascending beak. Seeds 10–12 per legume but characters unknown. Fl. Oct, fr. Dec.

Moist places in valleys, open places, along trails; 700–1000 m. S Yunnan [Laos, Thailand, Vietnam].

4. *Tephrosia vestita* Vogel, Nov. Actorum Acad. Caes. Leop.-Carol. Nat. Cur. 19(Suppl. 1): 15. 1843.

黄灰毛豆 huang hui mao dou

Herbs, perennial, suffrutescent, 1–2 m tall, many branched, yellowish white velutinous. Stems zigzag ascending, ridged. Leaves 7–11(or 13)-foliolate; rachis ca. 10 cm, including petiole 1–1.5 cm; leaflet blades obovate-elliptic to narrowly elliptic, 2–4 × 1–1.8 cm, abaxially velutinous, adaxially rough and glabrous, secondary veins 15–20 on each side of midvein, base cu-

neate, apex rounded to retuse. Pseudoracemes terminal or opposite leaf near apex of branchlets, 3–7 cm, with congested flowers. Pedicel ca. 2 mm. Flowers ca. 1.7 cm, fragrant. Calyx ca. 3 × 4 mm. Corolla white; standard suborbicular, yellow velutinous. Ovary sericeous, with numerous ovules. Legume linear, 5.5–6 cm × ca. 5 mm, straight, flat, densely yellow velutinous, apex abruptly pointed and with a ca. 1 cm beak. Seeds 10–12 per legume, black, reniform, ca. 3 × 2.5 mm. Fl. Jun–Oct, fr. Jul–Nov.

Sparse woodlands, open places, grasslands. Guangdong, Guangxi, Hainan, Jiangxi [Cambodia, Indonesia, Laos, Malaysia, Papua New Guinea, Philippines, Thailand, Vietnam].

5. *Tephrosia coccinea* Wallich var. *stenophylla* Hosokawa, Trans. Nat. Hist. Soc. Formosa 32: 195. 1942.

狭叶红灰毛豆 xia ye hong hui mao dou

Herbs, perennial, suffrutescent, 40–50 cm tall, many branched. Stems woody, terete; young branchlets 4-sided, silvery or white appressed sericeous. Leaves subsessile, 5- or 7(or 9)-foliolate; rachis 6–10 cm; leaflet blades linear-oblongate to oblong-oblongate, 4–6 × ca. 1 cm with basal pair smallest and terminal one longest, abaxially silvery sericeous, secondary veins 9 or 10 on each side of midvein. Pseudoracemes terminal or opposite a leaf, ca. 25 cm, with scattered flowers. Pedicel 3–6 mm. Flowers ca. 1 cm. Calyx ca. 5 mm. Corolla red; standard orbicular, outside sericeous, inside glabrous. Ovary stipitate, sericeous, with 10–12 ovules. Legume linear, ca. 6 cm × 7–8 mm, flat, tomentose. Seeds 8–12 per legume, black, reniform, ca. 8 × 5 mm. Fl. and fr. Dec–Feb.

- Sandy fields in open areas. Hainan.

Tephrosia coccinea var. *coccinea* occurs in India, Laos, Myanmar, and Vietnam.

6. *Tephrosia purpurea* (Linnaeus) Persoon, Syn. Pl. 2: 329. 1807.

灰毛豆 hui mao dou

Herbs, perennial, 30–60(–150) cm tall, many branched, puberulent, densely spreading villous, or glabrescent. Stems nearly erect to spreading, with a woody base, ridged. Leaves 9–17(–21)-foliolate; rachis 7–15 cm, including petiole ca. 1 cm; leaflet blades oblong-elliptic, oblanceolate-elliptic, or obovate-elliptic, 1.5–3.5(–4.5) × 0.4–1.5 cm, secondary veins 7–12 on each side of midvein, base narrowly rounded, apex obtuse, truncate, or retuse and cuspidate. Pseudoracemes terminal, opposite to a leaf or axillary near apex of branchlets, ca. 2 or 10–15 cm. Pedicel 2–4 mm, slender, slightly elongate in fruit. Flowers ca. 8 mm. Calyx 2–4 × ca. 3 mm; teeth equal. Corolla mauve; standard orbicular, white puberulent. Ovary with trichomes, with 5–8 ovules. Legume linear, 3–5 cm × 3.5–4(–6) mm, with sparse appressed trichomes, apically slightly curved. Seeds ca. 6 per legume, grayish brown, ellipsoid, ca. 3 × 1.5 mm, with or without spots, smooth or rough. Fl. Mar–Oct, fr. Sep–Dec.

Open places, slopes, sandy grasslands by oceans, grasslands by river margins; near sea level to 700 m. Fujian, Guangdong, Guangxi, Hainan, Sichuan, Taiwan, Yunnan [Cambodia, India, Indonesia, Laos, Malaysia, Nepal, Sri Lanka, Thailand, Vietnam].

- 1a. Plants glabrescent; inflorescences ca. 2 cm; legume ca. 3 cm × 3.5 mm, glabrous 6b. var. *glabra*
- 1b. Plants ± pubescent or densely spreading villous; inflorescences 10–15 cm; legume 4–5 cm × 4(–6) mm, with trichomes.
- 2a. Plants puberulent; stipules ca. 4 mm; leaflet blades abaxially appressed pubescent, adaxially glabrous; seeds grayish brown, spotted, smooth 6a. var. *purpurea*
- 2b. Plants densely spreading villous; stipules ca. 12 mm; leaflet blades with both surfaces villous but abaxially more densely so especially on midvein and margin; seeds rough, without spots 6c. var. *yunnanensis*

6a. *Tephrosia purpurea* var. *purpurea*

灰毛豆(原变种) hui mao dou (yuan bian zhong)

Cracca purpurea Linnaeus, Sp. Pl. 2: 752. 1753; *Galega purpurea* (Linnaeus) Linnaeus; *Glycyrrhiza mairei* H. Léveillé.

Plants ± pubescent. Stipules ca. 4 mm. Leaflet blades oblong-elliptic to oblanceolate-elliptic, 1.5–3.5 × 0.4–1.4 cm, abaxially appressed pubescent, adaxially glabrous. Racemes ca. 10 cm, slender. Legume 4–5 cm × 4(–6) mm, with trichomes. Seeds grayish brown, spotted, smooth. $2n = 22, 44$.

Open places, slopes. Fujian, Guangdong, Guangxi, Hainan, Taiwan, Yunnan [Cambodia, India, Laos, Malaysia, Nepal, Sri Lanka, Vietnam].

6b. *Tephrosia purpurea* var. *glabra* Hosokawa, J. Soc. Trop. Agric. 4: 200. 1932.

秃净灰毛豆 tu jing hui mao dou

Herbs suffrutescent, glabrescent. Leaves 13-foliolate. Racemes ca. 2 cm, shorter than subtending leaf. Legume ca. 3 cm × 3.5 mm, glabrous.

- Sandy grasslands by oceans; near sea level. S Taiwan.

6c. *Tephrosia purpurea* var. *yunnanensis* Z. Wei, Acta Phytotax. Sin. 27: 76. 1989.

云南灰毛豆 yun nan hui mao dou

Plants densely spreading villous. Stipules ca. 1.2 cm. Leaflet blades obovate-elliptic, 1.5–2(–4.5) × 0.6–1.5 cm, both surfaces villous but abaxially more densely so especially on midvein and margin. Racemes 10–15 cm. Legume 4–5 cm × 4(–6) mm, with trichomes. Seeds rough, without spots.

- Grasslands by river margins; ca. 700 m. Sichuan, Yunnan.

7. *Tephrosia noctiflora* Bojer ex Baker, Fl. Trop. Afr. 2: 112. 1871.

长序灰毛豆 chang xu hui mao dou

Tephrosia hookeriana Wight & Arnott var. *amoena* Prain.

Herbs, perennial, suffrutescent, 0.5–1.5 m tall. Stems terete, with dense spreading trichomes. Stipules narrowly tri-

angular, 6–11 mm, persistent, apex acuminate. Leaves 15–25-foliolate; rachis 7–11 cm, including petiole 0.7–1.3 cm; leaflet blades oblong-oblanceolate, 2.2–3.2 × 0.5–0.8 cm with terminal one slightly larger than others, abaxially densely appressed sericeous, adaxially glabrous, secondary veins 9–11 on each side of midvein, base cuneate, apex rounded to retuse and cuspidate. Pseudoracemes terminal, 15–25 cm, rigid and straight, with scattered flowers. Pedicel 2–4 mm. Flowers ca. 1 cm. Calyx ca. 5 × 5 mm, densely brown pubescent; teeth unequal, most abaxial one 4–6 mm and narrow, other ones short and broad. Corolla yellow, violet, or white; standard orbicular, brown sericeous. Ovary sericeous, with numerous ovules. Legume linear, 4.5–5 cm × ca. 5 mm, straight, densely brown pubescent, apex ascending curved. Seeds 7–9 per legume, black, reniform, ca. 4 × 2.5 mm, usually transversely rugose. Fl. and fr. Nov–Jan. $2n = 22$.

Introduced and escaped in ravines near shorelines, coastal grasslands; below 100–700 m. Guangdong, Taiwan, Yunnan [native to tropical Africa].

8. *Tephrosia pumila* (Lamarck) Persoon, Syn. Pl. 2: 330. 1807.

矮灰毛豆 ai hui mao dou

Galega pumila Lamarck, Encycl. 2: 599. 1788.

Herbs, annual or perennial, procumbent or straggling, 20–30 cm tall. Stems thin and hard, ridged, densely spreading strigose. Stipules 3–4 mm. Leaves 7(–13)-foliolate; rachis 2–4 cm, including petiole 3–10 mm; leaflet blades narrowly obovate to oblanceolate, 1.2–2 × 0.4–0.8 cm, abaxially strigose, adaxially appressed pubescent, secondary veins 6 or 7 on each side of midvein and obscure, base cuneate, apex truncate to obtuse and cuspidate. Pseudoracemes terminal or opposite a leaf, ca. 2 cm, strigose, with 1–3 flowers. Pedicel 2.5–4 mm. Flowers ca. 6 mm. Calyx ca. 3 × 2 mm. Corolla white, yellow, or rarely pale pink; standard orbicular, pilose. Ovary with trichomes, with numerous ovules. Legume linear, 3.5–4 cm × ca. 4 mm, shortly strigose, apex slightly ascending curved and with a beak; style remnant sharply reflexed. Seeds 8–14 per legume, brown, oblong-rhomboid, ca. 4 × 3 mm, mottled. Fl. and fr. year-round. $2n = 22, 44$.

Sunny places on slopes or trailsides; ca. 500 m. Guangdong [tropical Africa, Asia, and N Australia].

9. *Tephrosia luzonensis* Vogel, Nov. Actorum Acad. Caes. Leop.-Carol. Nat. Cur. 19(Suppl. 1): 15. 1843.

西沙灰毛豆 xi sha hui mao dou

Herbs, annual, 10–15(–100) cm tall, many branched, white spreading pilose. Stems erect, procumbent, or ascendant, base slightly woody. Stipules ca. 4 mm. Leaves (5–)9–13(–21)-foliolate; rachis 5–10 cm, including petiole ca. 1 cm; leaflet blades narrowly oblong to oblanceolate, 1–3 × 0.3–0.7 cm, abaxially densely gray pubescent, adaxially appressed puberulent, secondary veins 10 on each side of midvein, base cuneate, apex rounded or retuse and cuspidate. Pseudoracemes axillary, with 4–8 flowers gathered on apical half of rachis. Pedicel 3–4 mm. Flowers ca. 7 mm. Corolla pale red flushed with purple. Legume linear, 2.5–3.5 cm × ca. 4 mm, slightly curved, strigose,

apex with a straight beak. Seeds 7–12 per legume, black, subglobose, ca. 2 mm. Fl. and fr. year-round.

Open sandy seashores; near sea level. Guangdong (Xisha Qundao: Yongxing Dao) [Indonesia, Philippines, Thailand].

10. *Tephrosia ionophlebia* Hayata, Icon. Pl. Formosan. 9: 21. 1920.

台湾灰毛豆 tai wan hui mao dou

Herbs, perennial, suffrutescent. Stems erect or ascendant, appressed yellow puberulent. Stipules 3–6 mm, abaxially strigose, apex acuminate. Leaves 13–17(–21)-foliolate, sometimes with axillary cataphylls; rachis 6–8 cm, including petiole 1–1.5 mm; leaflet blades oblong-ob lanceolate, 15–18 × ca. 5 mm with largest at middle of rachis, abaxially sparsely strigose, adaxially glabrescent, secondary veins ca. 9 on each side of midvein, reticulate veins clearly marked and purplish red especially abaxially, base broadly cuneate, apex rounded to retuse and cuspidate. Pseudoracemes terminal or opposite a leaf, 2–5 cm, straight, strigose, elongated in fruit. Pedicel ca. 4 mm, slender. Flowers ca. 1 cm. Calyx ca. 5 × 3 mm. Corolla red; standard broadly orbicular, outside pubescent. Ovary linear, with numerous ovules. Legume linear, 3.5–4 cm × ca. 4 mm, strigose, apically slightly curved. Seeds 5–7 per legume, pale brown, ellipsoid, ca. 3 × 1.5 mm, scabrous. Fl. and fr. Sep–Dec.

• Open places or wastelands. Taiwan.

This species was treated as *Tephrosia purpurea* in Fl. Taiwan (ed. 2, 3: 371. 1993).

11. *Tephrosia obovata* Merrill, Philipp. J. Sci., C, 5: 69. 1910.

卵叶灰毛豆 luan ye hui mao dou

Herbs, perennial, small. Stems straggling, appressed pubescent, base woody. Stipules subulate, 2–4 mm. Leaves (9 or) 11- or 13-foliolate; rachis ca. 5 cm, including petiole ca. 1.5 cm; leaflet blades obovate, ca. 1.4 × 0.6 cm, both surfaces appressed sericeous but abaxially especially dense, secondary veins 5–8 on each side of midvein and obscure, base rounded-cuneate, apex emarginate and cuspidate. Pseudoracemes terminal or axillary, short. Flowers ca. 1 cm. Calyx campanulate, ca. 3 mm. Corolla red; standard orbicular, outside pubescent. Ovary with trichomes. Legume linear, 2–2.5 cm × ca. 4 mm, straight, densely velutinous. Seeds 6 or 7 per legume, pale brown, ellipsoid, ca. 2.5 × 2.2 mm. Fl. and fr. Mar–Aug.

Sandy or rocky areas; near sea level. Taiwan [Philippines].

The report (FRPS 40: 222. 1994) of *Tephrosia filipes* Benth from Taiwan is most likely a misidentification of this species and is based on a single specimen from the Hengchun peninsula of S Taiwan in the Herbarium of the Shanghai Museum of Natural History (SHM) collected at “Ma-lan-bi” on cliffs.

