

3. FALLOPIA Adanson, Fam. Pl. 2: 277, 557. 1763.

首乌属 shou wu shu

Li Anjen (李安仁 Li An-ren); Chong-wook Park

Bilderdykia Dumortier; *Pleuropterus* Turczaninow.

Herbs annual, rarely subshrubs. Stems twining. Leaves simple, alternate, petiolate; leaf blade ovate or cordate, margin entire; ocrea tubular, apex oblique or truncate. Inflorescence racemose or paniculate. Flowers bisexual. Perianth persistent, 5-parted; outer 3 tepals larger, keeled or winged, rarely without keels or wings. Stamens 8. Styles very short; stigmas capitate. Achenes trigonous, ovoid.

Between seven and nine species (but ca. 20 if taken more broadly to include *Reynoutria*): widespread in N temperate zone; eight species (three endemic) in China.

- 1a. Annual herb; inflorescence a raceme.
 - 2a. Tepals outer 3 keeled or narrowly winged on abaxial surface, slightly accrescent in fruit 1. *F. convolvulus*
 - 2b. Tepals outer 3 winged on abaxial surface, accrescent in fruit.
 - 3a. Wings dentate; perianth (including wings) in fruit obovate; achenes minutely granular-striate, slightly shiny 2. *F. dentatoalata*
 - 3b. Wings entire; perianth (including wings) in fruit orbicular; achenes smooth, shiny 3. *F. dumetorum*
- 1b. Perennial herb or subshrub; inflorescence paniculate.
 - 4a. Subshrub; leaves clustered 4. *F. aubertii*
 - 4b. Perennial herb; leaf solitary or leaves alternate.
 - 5a. Leaves alternate; achenes 3.9–4.8 mm 8. *F. forbesii*
 - 5b. Leaf solitary; achenes to 3 mm.
 - 6a. Tepals: outer 3 winged on abaxial surface, accrescent in fruit 5. *F. multiflora*
 - 6b. Tepals not winged, not accrescent in fruit.
 - 7a. Stems glabrous, sparsely papillate; leaf ovate-triangular; tepals 3–4 mm 6. *F. denticulata*
 - 7b. Stems densely brown pilose and sparsely hirsute or glabrescent; leaf broadly cordate or broadly hastate-cordate; tepals 1.5–2 mm 7. *F. cynanchoides*

1. *Fallopia convolvulus* (Linnaeus) A. Löve, Taxon 19: 300. 1970.

蔓首乌 wan shou wu

Polygonum convolvulus Linnaeus, Sp. Pl. 1: 364. 1753; *Bilderdykia convolvulus* (Linnaeus) Dumortier; *Fagopyrum convolvulus* (Linnaeus) H. Gross; *Helxine convolvulus* (Linnaeus) Rafinesque; *Reynoutria convolvulus* (Linnaeus) Shinners; *Tiniaria convolvulus* (Linnaeus) Webb & Miquel.

Herbs annual. Stems twining, to 1–1.5 m, striate, papillate, branched at base. Petiole 1.5–5 cm; leaf blade small papillose abaxially, base cordate, margin entire, apex acuminate; ocrea short, membranous, oblique, not ciliate. Inflorescence axillary, racemose, interrupted; bracts narrowly ovate, apex acute, each 2–4-flowered. Pedicels longer than bracts, slender, margin white; tepals narrowly elliptic, unequal in size, outer 3 larger and keeled or narrowly winged on abaxial surface, slightly accrescent in fruit. Stamens 8. Styles 3, very short, stipitate. Achenes included in persistent perianth, black, opaque, ellipsoid, trigonous, 3–4 mm, finely granular. Fl. May–Aug, fr. Jun–Sep.

Thickets in valleys, stream banks; 100–3600 m. Anhui, Gansu, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Jiangsu, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, Xizang, Yunnan [Widely distributed: Afghanistan, Bhutan, India, Japan, Kazakhstan, Korea, Mongolia, Nepal, Pakistan,

Russia; Europe; introduced in North America].

2. *Fallopia dentatoalata* (F. Schmidt) Holub, Folia Geobot. Phytotax. 6: 176. 1971.

齿翅首乌 chi chi shou wu

Polygonum dentatoalatum F. Schmidt in Maximowicz, Mém. Acad. Imp. Sci. St.-Pétersbourg Divers Savans 9: 232. 1859; *Bilderdykia dentatoalata* (F. Schmidt) Kitagawa; *B. scandens* (Linnaeus) Greene var. *dentatoalata* (F. Schmidt) Nakai; *Fagopyrum scandens* (Linnaeus) H. Gross var. *dentatoalatum* (F. Schmidt) H. Gross; *P. scandens* Linnaeus var. *dentatoalatum* (F. Schmidt) Maximowicz ex Franchet & Savatier; *Tiniaria scandens* (Linnaeus) Nakai var. *dentatoalata* (F. Schmidt) Nakai ex T. Mori.

Herb annual. Stems twining, 1–2 m, striate, papillate; branches few. Petiole 2–4 cm, slender, papillate; leaf blade 3–6 × 2.5–4 cm, both surfaces glabrous, along veins minutely papillate, base cordate, margin entire, apex acuminate; ocrea brownish, 3–4 mm, membranous, oblique, not ciliate. Inflorescence axillary or terminal, racemose, leafy, lax, interrupted, 4–12 cm, usually longer than leaves; bracts funnel-shaped, 2–3 mm, membranous, oblique, apex acute, not ciliate, each 4- or 5-flowered. Pedicel short, elongated in fruit, articulate below middle. Perianth white or greenish, 5-parted; tepals unequal in size, accrescent in fruit, outer 3 much longer, winged on abaxial

surface; wings dentate, decurrent near base of pedicels. Perianth (including wings) in fruit obovate, 5–6 mm in diam. Stamens 8, included. Styles very short; stigmas capitate. Achenes included in persistent perianth, black, slightly shiny, ellipsoid, trigonous, 4–4.5 mm, minutely granular striate. Fl. Jun–Sep, fr. Jul–Oct.

Mixed forests in valleys, slopes; 200–2800 m. Anhui, Gansu, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Jiangsu, Jilin, Liaoning, Nei Mongol, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Yunnan [Japan, Korea, Russia (Far East)].

3. Fallopia dumetorum (Linnaeus) Holub, Folia Geobot. Phytotax. 6: 176. 1971.

篱首乌 li shou wu

Herbs annual. Stems twining, 70–150 cm, striate, papillate, glabrous, much branched. Petiole 1–3 cm, papillate; leaf blade ovate-cordate, 3–6 × 1.5–4 cm, both surfaces glabrous, along veins minutely papillate, base cordate or sagittate, margin entire, apex acuminate; ocrea short, 2–3 mm, membranous, oblique, apex acute, not ciliate. Inflorescence usually axillary, racemose, lax, few or many flowered; bracts 1.5–2 mm, membranous, each 1–6-flowered. Pedicel 3–4 mm, slender, articulate, elongate in fruit. Perianth greenish, 5-parted; tepals elliptic, 2–3 mm, unequal in size, outer 3 larger and winged in fruit; wings entire, slightly decurrent along pedicels. Perianth (including wings) in fruit orbicular, 4–4.5 mm in diam. Stamens 8, included. Styles very short; stigmas capitate. Achenes included in persistent perianth, black, shiny, ellipsoid, trigonous, 3–3.5 mm, smooth. Fl. Jun–Aug, fr. Jul–Sep.

Grassy slopes, thickets and mixed forests in valleys, mountain valleys, fields; 200–2400 m. Hebei, Heilongjiang, Jiangsu, Jilin, Liaoning, Nei Mongol, Shandong, Xinjiang [Bhutan, N India, Japan, Korea, Mongolia, Nepal, Pakistan, Russia; SW Asia, Europe].

- 1a. Flowers few; bracts each 1- or 2(or 3)-flowered 3c. var. *pauciflora*
- 1b. Flowers many; bracts each 3–6-flowered.
 - 2a. Wings continuous 3a. var. *dumetorum*
 - 2b. Wings interrupted 3b. var. *subalata*

3a. Fallopia dumetorum var. *dumetorum*

篱首乌(原变种) li shou wu (yuan bian zhong)

Polygonum dumetorum Linnaeus, Sp. Pl., ed. 2, 1: 522. 1762; *Bilderdykia dumetorum* (Linnaeus) Dumortier; *Fagopyrum dumetorum* (Linnaeus) Schreber; *Helxine dumetorum* (Linnaeus) Rafinesque; *P. scandens* Linnaeus var. *dumetorum* (Linnaeus) Gleason; *Reynoutria scandens* (Linnaeus) Shinnors; *Tiniaria dumetorum* (Linnaeus) Opiz.

Flowers many; bracts each 3–6-flowered. Wings continuous. Fl. Jun–Aug, fr. Jul–Sep.

Grassy slopes, thickets in valleys; 200–2400 m. Hebei, Heilongjiang, Jiangsu, Jilin, Liaoning, Nei Mongol, Shandong, Xinjiang [Bhutan, N India, Japan, Korea, Mongolia, Nepal, Pakistan, Russia; SW Asia, Europe].

3b. Fallopia dumetorum var. *subalata* Borodina, Rast. Tsentral. Azii 9: 120. 1989.

略翅首乌 lue chi shou wu

Wings interrupted.

- Mountain valleys, fields. Xinjiang.

3c. Fallopia dumetorum var. *pauciflora* (Maximowicz) A. J. Li, Fl. Reipubl. Popularis Sin. 25(1): 100. 1998.

疏花篱首乌 shu hua li shou wu

Polygonum pauciflorum Maximowicz, Ind. Sem. Hort. Petrop. 3. 1866; *Bilderdykia pauciflora* (Maximowicz) Nakai; *Fagopyrum pauciflorum* (Maximowicz) H. Gross; *Fallopia pauciflora* (Maximowicz) Kitagawa; *P. convolvulus* var. *pauciflorum* (Maximowicz) V. N. Voroschilov; *Tiniaria pauciflora* (Maximowicz) Nakai ex T. Mori.

Flowers few; bracts each 1- or 2(or 3)-flowered. Fl. Jun–Jul, fr. Jul–Aug.

- Mixed forests in valleys, thickets; 400–1000 m. Hebei, Heilongjiang, Shandong.

One of us (Park) notes that this appears to be a poorly developed form of the typical variety that is often found in harsh environments, and that it can hardly be considered a variety.

4. Fallopia aubertii (L. Henry) Holub, Folia Geobot. Phytotax. 6: 176. 1971.

木藤首乌 mu teng shou wu

Polygonum aubertii L. Henry, Rev. Hort. 79: 82. 1907; *Bilderdykia aubertii* (L. Henry) Moldenke; *Reynoutria aubertii* (L. Henry) Moldenke; *Tiniaria aubertii* (L. Henry) Hedberg ex Janchen.

Subshrubs. Stems twining, gray-brown, 1–4 m, glabrous. Leaves clustered, rarely solitary; petiole 1.5–2.5 cm; leaf blade narrowly ovate or ovate, 2.5–5 × 1.5–3 cm, both surfaces subleathery, glabrous, base subcordate, margin entire, apex acute; ocrea brown, membranous, oblique, dehiscent. Inflorescence axillary or terminal, paniculate, few branched; peduncle papillate; bracts membranous, apex acute, each 3–6-flowered. Pedicel 3–4 mm, slender, base articulate. Perianth greenish or white, 5-parted; tepals elliptic, outer 3 larger, accrescent and winged on abaxial surface in fruit; wings decurrent below to pedicels; fruiting perianth obovate, 4–5 mm in diam. Stamens 8; filaments dilated below middle, base pubescent. Styles 3, very short; stigmas capitate. Achenes included in persistent perianth, black, slightly shiny, ovoid, trigonous, 3.5–4 mm, densely minutely granular. Fl. Jul–Aug, fr. Aug–Sep.

- Slopes, thickets in valleys; 900–3200 m. Gansu, Guizhou, Henan, Hubei, ?Hunan, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shanxi, Sichuan, Xizang, Yunnan.

One of us (Park) notes that this could be conspecific with *Fallopia baldschuanica* (Regel) Holub (see Bailey & Stace, Pl. Syst. Evol. 180: 29–52. 1992).

5. Fallopia multiflora (Thunberg) Haraldson, Symb. Bot. Upsal. 22(2): 77. 1978.

何首乌 he shou wu

Herbs perennial. Root tuber black-brown, narrowly elliptic, large, ligneous. Stems twining, 2–4 cm, much branched,

striate, glabrous, ligneous at base. Petiole 1.5–3 cm; leaf blade ovate or narrowly ovate, 3–7 × 2–5 cm, both surfaces glabrous or abaxially papillate along veins, base cordate or subcordate, margin entire, apex acuminate; ocrea 3–5 mm, membranous, oblique, glabrous. Inflorescence terminal or axillary, paniculate, spreading, 10–20 cm; peduncle minutely papillate; bracts triangular-ovate, papillate, apex acute, each 2–4-flowered. Pedicel 2–3 mm, slender, articulate at base, elongate in fruit. Perianth white or greenish; tepals elliptic, unequal in size, outer 3 larger, accrescent and winged on abaxial surface in fruit; wings decurrent below to pedicels on abaxial surface in fruit; wings decurrent below to pedicels. Perianth (including wings) in fruit nearly orbicular, 6–7 mm in diam. Stamens 8; filaments dilated at base. Styles 3, very short; stigmas capitate. Achenes included in persistent perianth, black-brown, shiny, ovoid, trigonous, 2.5–3 mm, smooth. Fl. Jun–Oct, fr. Jul–Nov.

Mountain slopes, rock crevices, thickets in valleys; 200–3000 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, ?Hebei, ?Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Qinghai, Shaanxi, Shandong, Sichuan, Taiwan, Yunnan, Zhejiang [Japan].

- 1a. Leaf blade glabrous abaxially 5a. var. *multiflora*
- 1b. Leaf blade abaxially papillate along veins 5b. var. *ciliinervis*

5a. Fallopia multiflora var. multiflora

何首乌(原变种) he shou wu (yuan bian zhong)

Polygonum multiflorum Thunberg in Murray, Syst. Veg., ed. 14, 379. 1784; *Aconogonon hypoleucum* (Nakai ex Ohwi) Soják; *Bilderdykia multiflora* (Thunberg) Roberty & Vautier; *Fagopyrum multiflorum* (Thunberg) I. Grinzescu; *Fallopia multiflora* var. *hypoleuca* (Nakai ex Ohwi) Yonekura & H. Ohashi; *Helxine multiflora* (Thunberg) Rafinesque; *Pleuropterus cordatus* (Thunberg) Turczaninow; *P. multiflorum* (Thunberg) Nakai; *Polygonum hypoleucum* Nakai ex Ohwi; *P. multiflorum* var. *angulatum* S. Y. Liu; *P. multiflorum* var. *hypoleucum* (Nakai ex Ohwi) T. S. Liu et al.; *Reynoutria multiflora* (Thunberg) Moldenke.

Leaf blade glabrous abaxially. Fl. Jul–Oct, fr. Aug–Nov.

Mountain slopes, rock crevices, thickets in valleys; 200–3000 m. Anhui, Fujian, S Gansu, Guangdong, Guangxi, Guizhou, Hainan, ?Hebei, ?Heilongjiang, Hubei, Hunan, Jiangsu, Jiangxi, S Shaanxi, Shandong, Sichuan, Taiwan, Yunnan, Zhejiang [Japan].

One of us (Park) would prefer to treat *Polygonum multiflorum* var. *angulatum* and *Fallopia multiflora* var. *hypoleuca* as distinct varieties of *F. multiflora*.

5b. Fallopia multiflora var. ciliinervis (Nakai) Yonekura & H. Ohashi, J. Jap. Bot. 72: 158. 1997.

毛脉首乌 mao mai shou wu

Pleuropterus ciliinervis Nakai, Repert. Spec. Nov. Regni Veg. 13: 267. 1914; *Fallopia ciliinervis* (Nakai) K. Hammer; *Polygonum ciliinerve* (Nakai) Ohwi; *P. multiflorum* var. *ciliinerve* (Nakai) Steward; *Reynoutria ciliinervis* (Nakai) Moldenke.

Leaf blade abaxially papillate along veins. Fl. Jun–Sep, fr. Jul–Oct.

• Thickets in valleys, mountain slopes; 200–2700 m. Gansu, Guizhou, Henan, Hubei, ?Hunan, Jilin, Liaoning, Qinghai, Shaanxi, Sichuan, Yunnan.

One of us (Park) would prefer to treat this taxon as the distinct species *Fallopia ciliinervis*.

6. Fallopia denticulata (C. C. Huang) J. Holub, Preslia 70(2): 104. 1998.

酱头 jiang tou

Polygonum denticulatum C. C. Huang, Acta Bot. Yunnan. 6: 288. 1984.

Herbs perennial. Rhizomes nearly globose, large, to 20 cm in diam. Stems twining, 2–5 cm, striate, glabrous, sparsely papillate, slightly ligneous at base, much branched; branchlets slender, angulate, minutely papillate. Petiole 2–6 cm, sparsely minutely papillate; leaf blade ovate or ovate-triangular, 4–11 × 3–6 cm, both surfaces glabrous, minutely papillate along veins, base broadly cordate, margin repand or subentire, apex acuminate; ocrea purplish, 4–6 mm, membranous, oblique, apex acute. Inflorescence axillary or terminal, paniculate, lax, 10–15 cm; bracts funnel-shaped, ca. 2 mm, glabrous, each 1- or 2-flowered. Perianth white, 5-parted; tepals narrowly elliptic, 3–4 mm. Stamens 8, included. Styles 3, connate to below middle; stigmas capitate. Achenes included in persistent perianth, ovoid, trigonous. Fl. Jun–Aug, fr. Jul–Sep.

• Thickets in valleys; ca. 2500 m. ?Guizhou, ?Xizang, Yunnan (Gengma).

This species is used medicinally.

7. Fallopia cynanchoides (Hemsley) Haraldson, Symb. Bot. Upsal. 22(2): 78. 1978.

牛皮消首乌 niu pi xiao shou wu

Herbs perennial. Stems twining, terete, 1–1.5 cm, densely brown pubescent and sparsely retrorsely hirsute. Petiole 3–5 cm, densely brown pubescent and sparsely retrorsely hirsute; leaf blade broadly cordate or broadly hastate-cordate, 5–10 × 3–8 cm, abaxially densely brown villous or strigillose along veins, adaxially sparsely strigillose or glabrescent, base deeply cordate; basal lobes rounded or acute at apex, margin entire, long ciliate, apex acuminate; ocrea membranous, densely pilose, apex acute, oblique. Inflorescence axillary or terminal, paniculate, 10–15 cm, densely pubescent and sparsely retrorsely hirsute; bracts ovate, 1–1.5 mm, pubescent, apex acuminate, each 2–4-flowered. Pedicel 2–2.5 mm, articulate above middle, sparsely pubescent. Perianth greenish, 5-parted; tepals broadly elliptic, 1.5–2 mm; tepals broadly elliptic, 1.5–2 mm. Stamens 8, included; filaments dilated at base. Styles 3, connate at base; stigmas capitate, densely papillate. Achenes included in persistent perianth, black, shiny, ovoid, trigonous, 2–2.5 mm. Fl. Jul–Sep, fr. Aug–Oct.

• Forests in valleys and on mountain slopes, forest margins; 1100–3000 m. S Gansu, Guizhou, Hubei, Hunan, S Shaanxi, Sichuan, Xizang, Yunnan.

- 1a. Leaves abaxially densely brown villous, adaxially sparsely strigillose 7a. var. *cynanchoides*
1b. Leaves abaxially strigillose along veins, adaxially sparsely strigillose or glabrescent 7b. var. *glabriuscula*

7a. Fallopiia cynanchoides var. **cynanchoides**

牛皮消首乌(原变种) niu pi xiao shou wu (yuan bian zhong)

Polygonum cynanchoides Hemsley, J. Linn. Soc., Bot. 26: 338. 1891; *Fagopyrum cynanchoides* (Hemsley) H. Gross.

Leaves abaxially densely brown villous, adaxially sparsely strigillose adaxially. Fl. Aug–Sep, fr. Sep–Oct.

• Thickets in valleys, forests on mountain slopes; 1100–2400 m. S Gansu, Guizhou, Hubei, Hunan, S Shaanxi, Sichuan, Yunnan.

7b. Fallopiia cynanchoides var. **glabriuscula** (A. J. Li) A. J. Li, Fl. Reipubl. Popularis Sin. 25(1): 104. 1998.

光叶薯头 guang ye jiang tou

Polygonum cynanchoides Hemsley var. *glabriusculum* A. J. Li in C. Y. Wu, Fl. Xizang. 1: 608. 1983.

Leaves abaxially strigillose along veins, adaxially sparsely strigillose or glabrescent. Fl. Jul–Aug, fr. Aug–Sep.

• Forest margins, forests in valleys; 2400–3000 m. Sichuan, Xizang.

8. Fallopiia forbesii (Hance) Yonekura & H. Ohashi, J. Jap. Bot. 72: 158. 1997.

华蔓首乌 hua wan shou wu

Polygonum forbesii Hance, J. Bot. 21: 100. 1883; *P. Reynoutria* Makino var. *ellipticum* Koidzumi; *P. yunnanense* H. Léveillé; *Reynoutria elliptica* (Koidzumi) Migo ex Nakai; *R. forbesii* (Hance) T. Yamazaki; *R. yunnanensis* (H. Léveillé) Nakai ex Migo.

Herbs perennial, 1–2.5 m tall. Rhizomes well-developed, thick, ca. 1.6 cm in diam., lignified. Stems erect, robust, mostly branched above middle, 0.6–2.1 cm in diam., sparsely pubescent with conic unicellular trichomes, rarely together with 1–4-celled filiform trichomes. Leaves alternate; petiole 0.5–1.8 cm, circular in cross section, with extrafloral nectaries abaxially; ocrea completely surrounding stem, brown, cylindric, 0.5–1.5 cm, scarios, sparsely pubescent with conic unicellular trichomes, peltate multicellular glandular trichomes and 1–4-celled filiform trichomes, apex truncate; leaf blade orbicular to nearly so, 6.6–11.5 × 5.1–9.4 cm, both surfaces sparsely pubescent with peltate multicellular glandular trichomes, mid-vein and main veins sparsely pubescent with cornical unicellular trichomes, base rounded, margin entire, apex abruptly acuminate to cuspidate. Inflorescence terminal or axillary, simple or branched, 2–6.2 cm, pubescent with conic unicellular trichomes, 1–4-celled filiform trichomes and peltate multicellular glandular trichomes, panicle-like, consisting of a series of fascicles of 2–6 spirally arranged pedicellate flowers; each flower fascicle subtended by a bract (ocrea); bracts funnel-form, 1.2–1.9 × 1–2 mm, scarios. Flowers functionally unisexual, rarely bisexual, 0.4–1.1 mm, each with bracteoles;

bracteoles paired, scarios, fused at base; pedicels 2–3 mm, jointed above middle. Perianth petaloid, white to greenish white, 5-cleft; tepals 5, 3 outer ones keeled, 1.5–2.5 × 1–1.9 mm, with wings developed along main vascular bundle, wings ca. 0.2 wide. Stamens 8, inserted at base of perianth in 2

whorls, outer stamens 3–3.4 mm, inner stamens 3.6–4 mm. Style 1, 0.3–0.5 mm, deeply 3-cleft; stigmas fimbriate. Achenes enclosed in persistent perianth, dark brown, shiny, trigonous, obovate to orbicular, 3.9–4.8 × 2.1–2.9 mm, smooth; perianth wings narrowly tapering to articulated pedicel-joint in fruit. $2n = 66, 88$.

Anhui, Guangdong, Guangxi, Jiangxi, Shandong, Yunnan, Zhejiang [Korea].

The major characteristics that distinguish *Fallopia forbesii* from other, related species are the following: leaves orbicular to suborbicular, short, rounded at base, abruptly acuminate to cuspidate at apex; achenes relatively large (3.9–4.8 × 2.1–2.9 mm); perianth wings narrowly tapering to the articulated pedicel joint in fruit.

One of us (Li) believes that *Fallopia forbesii* is conspecific with *Reynoutria japonica* (see Lauener, Notes Roy. Bot. Gard. Edinburgh 40: 202. 1982).

