

DIOSCOREACEAE

薯蓣科 shu yu ke

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Herbs twining or woody vines, rarely erect, small herbs. Rootstock rhizomatous or tuberous. Stem twining to left or right, pubescent or glabrous, sometimes prickly. Leaves alternate or opposite, petiolate, simple or palmately compound, basal veins 3–13, interstitial veins reticulate; leaflets of palmately compound leaves often ovate or lanceolate. Flowers usually unisexual (when plants dioecious, rarely monoecious), sometimes bisexual, solitary, clustered, or in cymules, these in a spike, raceme, or thyrses, these sometimes grouped into panicles. Male flowers: perianth lobes 6, in 2 whorls, basally connate or free; stamens 6, sometimes 3 reduced to staminodes or absent, inserted on perianth or receptacle; ovary rudimentary or absent. Female flowers: similar to male ones; staminodes 3, 6, or absent; ovary inferior, 3-loculed, ovules usually 2 per locule (more than 2 in a few small genera), placentation axile; styles 3, free. Fruit a capsule, berry, or samara. Seeds with a membranous wing or not; endosperm present; embryo small.

About nine genera and 650 species: widely distributed in tropical and temperate regions, especially in tropical America; one genus and 52 species (21 endemic, two introduced) in China.

Many of the names in Dioscoreaceae attributed to “Uline ex R. Knuth” and “Uline ex Diels” are invalid because they were only manuscript names listed in synonymy. Similarly, several mostly varietal names attributed to Prain and Burkill, in their two-part monograph of the Asian species of *Dioscorea* (Ann. Roy. Bot. Gard. (Calcutta) 14(1) 1936; 14(2) 1938), are also invalid because no Latin diagnoses were provided. Such names are not normally cited in the present account.

Ting Chih-tsun, Chang Mei-chen & Ling Ping-ping. 1985. Dioscoreaceae. *In*: Pei Chien & Ting Chih-tsun, eds., Fl. Reipubl. Popularis Sin. 16(1): 54–120.

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1. DIOSCOREA Linnaeus, Sp. Pl. 2: 1032. 1753.

薯蓣属 shu yu shu

Herbs twining. Rootstock rhizomatous or tuberous, variable in color, shape, chemical constituents, and depth in ground. Bulblets axillary or absent. Leaves alternate or opposite, petiolate, simple or palmately compound, basal veins 3–9. Flowers unisexual (plants dioecious, rarely monoecious), arranged spirally in axillary, usually elongate spikes or racemes, or in small cymules in \pm spikelike thyrses, these often several together, sometimes gathered into a terminal or axillary panicle by reduction of subtending leaves. Male flowers: stamens 6, 3 sometimes reduced to staminodes or absent. Female spikes 3.5–10 cm, few flowered. Female flowers: staminodes 3, 6, or absent. Capsule 3-winged, dehiscent apically at maturity. Seeds with a membranous wing.

More than 600 species: widely distributed in tropical and temperate regions; 52 species (21 endemic, two introduced) in China.

Dioscorea is a genus of great economic value, including important food plants. Several species are widely cultivated in many cultivars (including *Dioscorea alata*, *D. esculenta*, *D. japonica*, and *D. polystachya*), while other, wild species are valuable famine foods. Other species are sources of drugs both in traditional Chinese and Western medicine (notably *D. nipponica* and *D. zingiberensis*, which are major sources of steroid precursors).

Key to sections

- 1a. Stem twining to right; often at least some leaves opposite, always simple, though sometimes with enlarged basal lobes 8. *Enantiophyllum*
- 1b. Stem twining to left; leaves alternate, rarely \pm whorled toward base of stem, sometimes palmately compound or lobed.
 - 2a. Stem and leaves with T-shaped hairs 3. *Combilium*
 - 2b. Stem and leaves without T-shaped hairs.
 - 3a. Leaves nearly all palmately 3- or more foliolate (rarely with apical leaves simple); rootstock a tuber or group of tubers; seeds inserted near apex of capsule with wing pointing toward capsule base.
 - 4a. Leaflets often more than 3, pinnately veined with 1 midvein; male flowers with 3 stamens and 3 staminodes 6. *Botryosicyos*
 - 4b. Leaflets always 3, prominently palmately veined from base; male flowers with 6 stamens 7. *Lasiophyton*
 - 3b. Leaves mostly simple; if compound leaves present then rootstock a horizontally spreading rhizome, basal leaves sometimes simple, and seeds inserted near middle of capsule and winged all round.
 - 5a. Perianth lobes narrowly oblong; seeds inserted near apex of capsule with wing pointing toward capsule base; petiole base with a pair of stipulelike, blunt, fleshy swellings (shrinking considerably on drying) 5. *Opsophyton*
 - 5b. Perianth lobes usually elliptic to ovate; seeds inserted near base of capsule with wing pointing toward capsule apex, or inserted near middle and winged all round; petiole base without stipulelike swellings, though sometimes with small prickles at nodes.
 - 6a. Male flowers always solitary along inflorescence axis; capsule not reflexed, distinctly wider than long 2. *Stenocorea*
 - 6b. Male flowers in sessile clusters or pedunculate cymules at least toward base of inflorescence; capsule reflexed, about as long as to distinctly longer than wide.
 - 7a. Rootstock a horizontally spreading rhizome; leaf blade margin sometimes undulate to deeply lobed; male flowers usually in sessile clusters (in cymules in *D. nipponica* var. *rosthornii*); indumentum short and stiff when present; capsule always with straight wings; seeds usually inserted near middle of capsule and winged all round, rarely inserted near base with wing pointing toward capsule apex (and then leaf blade with distinctly toothed to 4- or more lobed margin) 1. *Stenophora*
 - 7b. Rootstock of vertical tubers; leaf blade margin always entire; male flowers usually in pedunculate cymules (sessile in *D. tentaculigera*); indumentum often softly pubescent when present (very shortly papillose in *D. tentaculigera*); capsule often with undulate wings; seeds inserted near base of capsule with wing pointing toward capsule apex 4. *Shannicorea*

1. *Dioscorea* sect. *Stenophora* Uline in Engler & Prantl, Nat. Pflanzenfam. 2(5): 84. 1897.

根状茎组 gen zhuang jing zu

Rootstock a horizontally spreading, perennial rhizome. Stem twining to left. Bulblets present or absent. Leaves alternate, usually simple, rarely 3-foliate; leaf blade glabrous or shortly stiffly hairy, margin entire to deeply palmately lobed. Male inflorescence a spike, raceme, or thyrse, sometimes branched, sometimes gathered into a terminal panicle by reduction of subtending leaves. Flowers usually in cymules of 2–4, solitary distally on inflorescence, sessile or pedicellate; bracts borne at base of pedicels; perianth lobes connate at base; stamens 6, sometimes 3 reduced to staminodes. Capsule reflexed at maturity, about as long as wide,

rarely longer than wide. Seeds inserted near middle of capsule and winged all round, rarely inserted near base with wing pointing toward capsule apex.

About 35 species: temperate Asia, extending into Malaysia and W to the Caucasus and Balkans, a few species in North America; 18 species (eight endemic) in China.

This section is characterized by the horizontally spreading rhizome, in contrast to the vertical tubers seen in the other sections.

Several species are of medicinal importance.

Key based on male flowering material

- 1a. Male flowers sessile.
 - 2a. Stamens 3 fertile and 3 sterile or reduced to filaments.
 - 3a. Leaf blade drying green, margin usually entire, sometimes toothed; anther connectives not fork-shaped at maturity 9. *D. gracillima*
 - 3b. Leaf blade drying black or nearly so, margin entire though often undulate; anther connectives fork-shaped at maturity 10. *D. collettii*
 - 2b. Stamens all fertile.
 - 4a. Leaf blade usually with short, stiff hairs or long papillae mainly along veins; anthers 3 introrse and 3 extrorse.
 - 5a. Leaf blade distinctly lobed or with strongly undulate margin, rarely margin only obscurely undulate, abaxially usually \pm uniformly minutely papillose-puberulent, hairs yellowish 1. *D. nipponica*
 - 5b. Leaf blade \pm 3-lobed, lateral lobes very short and broad, sometimes apically emarginate so leaf blade is \pm 5-lobed, abaxially often papillose-hispidulous along veins, hairs white 6. *D. deltoidea*
 - 4b. Leaf blade glabrous; anthers all similar.
 - 6a. Perianth purplish red; leaf blade always drying dark, often narrowly peltate.
 - 7a. Perianth lobes $1.2-1.5 \times 0.8-1$ mm; leaf blade triangular-ovate, usually \pm 3-lobed by enlargement of basal lobes 4. *D. zingiberensis*
 - 7b. Perianth lobes $0.8-1.2 \times 0.6-0.8$ mm; leaf blade broadly triangular-ovate, sometimes 3- to obscurely 5-lobed 5. *D. sinoparviflora*
 - 6b. Perianth orange or light yellow; leaf blade often drying greenish, not peltate.
 - 8a. Leaves often prickly on petiole and sometimes along main veins; stem with many prickles proximally 18. *D. birmanica*
 - 8b. Leaves not prickly; stem not prickly or inconspicuously prickly at nodes (more easily felt than seen).
 - 9a. Leaf blade membranous, margin entire to slightly undulate; nodes usually not prickly 7. *D. panthaica*
 - 9b. Leaf blade slightly leathery, margin entire to completely 3-foliolate; nodes often shortly prickly 8. *D. biformifolia*
 - 1b. Male flowers pedicellate.
 - 10a. Perianth purple; distal leaves usually 3-foliolate 17. *D. simulans*
 - 10b. Perianth orange, yellow, or green; leaves entire to deeply lobed, never compound.
 - 11a. Leaf blade drying dark gray to grayish brown or nearly black adaxially.
 - 12a. Leaf blade of basal leaves palmately bluntly 7-lobed, uniformly hispidulous, densely so abaxially; spikes to 7 cm, usually in axillary panicles to 20 cm 11. *D. futschauensis*
 - 12b. Leaf blade ovate to triangular-ovate or nearly triangular-sagittate, glabrous; spikes to 20 cm, sometimes gathered into large, terminal panicles.
 - 13a. Rhizomes to 5 cm thick; flowers in cymules of 2-6, rarely solitary, pedicels less than 1.5 mm; leaf blade membranous 15. *D. chingii*
 - 13b. Rhizomes to 1.5 cm thick; flowers solitary or paired, pedicels ca. 2.5 mm; leaf blade thinly leathery 14. *D. poilanei*
 - 11b. Leaf blade drying green or yellow-green adaxially.
 - 14a. Anther connectives alternately simple and forked; pedicels to 8 mm; petioles 3-12 cm.
 - 15a. Pedicels 1.5-8 mm; petioles 3-5 cm 13. *D. tenuipes*
 - 15b. Pedicels to 1.7 mm; petioles 5-12 cm 3. *D. tokoro*
 - 14b. Anther connectives all similar; pedicels to 3 mm; petioles 4.5-20 cm.
 - 16a. Perianth funnelform, lobes not spreading; leaf blade always entire 16. *D. banzhuana*
 - 16b. Perianth bowl-shaped to saucer-shaped, lobes spreading; leaf blade of basal leaves often undulate to distinctly lobed.
 - 17a. Rhizome 0.7-1.5 cm thick; pedicels 2-3 mm; leaf blade orbicular to broadly ovate, usually shortly 4-7-lobed or coarsely toothed 2. *D. althaeoides*
 - 17b. Rhizome (1.5-)2-5 cm thick; pedicels to 1.5 mm; leaf blade triangular or ovate-cordate to unequally 3-7-lobed, often very variable in shape.
 - 18a. Flowers usually in cymules or umbellules of 2-4(-7), solitary distally on inflorescence; stamens inserted at middle of perianth lobes; leaf blade

- drying yellowish green abaxially 1. *D. nipponica*
 18b. Flowers solitary or paired; stamens inserted at base of perianth; leaf blade
 drying grayish white abaxially 12. *D. spongiosa*

Key based on fruiting material

- 1a. Seeds inserted near base of capsule with wing pointing toward capsule apex, wing ca. 3 × as long as seed.
 2a. Leaf blade margin usually entire, rarely obscurely undulate 3. *D. tokoro*
 2b. Leaf blade margin deeply lobed to obscurely undulate.
 3a. Leaf blade abaxially glabrous or sparsely minutely hairy 1. *D. nipponica*
 3b. Leaf blade abaxially densely shortly pilose along veins 2. *D. althaeoides*
- 1b. Seeds inserted near middle of capsule, winged all round.
 4a. Capsule pruinose, drying blue-black; leaf blade drying blackish, often narrowly peltate.
 5a. Leaf blade triangular-ovate, usually ± 3-lobed by enlargement of basal lobes; capsule about as long
 as wide 4. *D. zingiberensis*
 5b. Leaf blade broadly triangular-ovate, sometimes 3- to obscurely 5-lobed; capsule longer than
 wide 5. *D. sinoparviflora*
- 4b. Capsule not pruinose, drying pale to dark brown; leaf blade never peltate.
 6a. At least some leaves 3-foliolate.
 7a. Leaves usually 3-foliolate, lateral leaflets subequaling middle leaflet 17. *D. simulans*
 7b. Leaves often entire, lateral leaflets ca. 1/2 as long as middle leaflet, often incompletely
 separated 8. *D. biformifolia*
- 6b. Leaves entire to deeply lobed, never compound.
 8a. Leaves often prickly on petiole and sometimes along main veins; stem with many prickles
 proximally 18. *D. birmanica*
 8b. Leaves not prickly; stem not prickly or inconspicuously prickly at nodes (more easily felt than seen).
 9a. Leaf blade slightly leathery, main veins often conspicuously pale; stem often shortly prickly at nodes.
 10a. Capsule 2.8–3.2 cm; leaves always simple 14. *D. poilanei*
 10b. Capsule ca. 1.5 cm; distal leaves often 3-lobed to ± 3-foliolate with small, lateral leaflets
 8. *D. biformifolia*
- 9b. Leaf blade membranous to papery, main veins not pale; stem not prickly.
 11a. Leaf blade usually distinctly lobed or toothed at margin, occasionally coarsely undulate,
 often abaxially papillose to hispidulous.
 12a. Leaf blade adaxially hairy 11. *D. futschauensis*
 12b. Leaf blade adaxially glabrous.
 13a. Capsule wings 1.5–1.6 cm wide; rhizome 2–5 cm thick, drying soft and spongy;
 basal leaf blades sometimes subequally 5–9-lobed or coarsely toothed 12. *D. spongiosa*
 13b. Capsule wings 0.8–1.4 cm wide; rhizome often less than 2 cm thick, drying
 ± solid; basal leaf blades ovate to unequally 3(or 5)-lobed.
 14a. Leaf blade papery, often abaxially hispid along veins; capsule wings
 (0.7–)1.2–1.4 cm wide 6. *D. deltoidea*
 14b. Leaf blade membranous, glabrous; capsule wings 0.8–1.2 cm wide 16. *D. banzhuana*
- 11b. Leaf blade entire to distinctly undulate at margin, occasionally obscurely 3-lobed.
 15a. Leaf blade drying green, margin sometimes toothed.
 16a. Leaf blade 5–10(–12) × 2.5–7 cm 9. *D. gracillima*
 16b. Leaf blade 10–18 × 6.5–11 cm 13. *D. tenuipes*
- 15b. Leaf blade drying dark brown or black, margin entire to slightly undulate.
 17a. Capsule yellowish brown, 2.4–2.7 cm; leaf blade drying dark brown 7. *D. panthaica*
 17b. Capsule brown to dark brown, 1.5–2.1 cm; leaf blade drying ± black.
 18a. Capsule wings 0.8–1.1 cm wide 10. *D. collettii*
 18b. Capsule wings 1–1.7 cm wide 15. *D. chingii*

1. *Dioscorea nipponica* Makino, Ill. Fl. Jap. 1(7): 2. 1891.

穿龙薯蓣 chuan long shu yu

Rhizome horizontal, many branched, cylindrical, more than 1.5 cm thick; cork layer persistent or readily detached. Stem twining to left, drying green or reddish brown, to 5 m, glabrescent. Leaves alternate, simple; petiole 10–20 cm; leaf blade shiny, drying yellowish green, broadly cordate to palmately unequally 3–7-lobed, very variable in shape, 7–15 × 4–13 cm, glabrous or sparsely minutely setose especially along veins, basal

veins 7 or 9, outermost ones often forked, base cordate, margin undulate to prominently bluntly toothed or lobed, apex acuminate. Male spike solitary, to 17 cm, rarely with occasional cymules expanded to form lateral branches. Male flowers: usually in cymules or umbellules of 2–4(–7), solitary distally on inflorescence, sessile or shortly pedicellate; bracts lanceolate, slightly shorter than perianth; bracteoles ± obsolete; perianth saucer-shaped, lobes obtuse at apex; stamens 6, inserted at middle of perianth lobes, anthers introrse. Female flowers: staminodes filiform; stigma 3-lobed. Capsule reflexed at

maturity, light brown, purplish speckled, ellipsoid-oblongate, 1.5–2 cm, base rounded, apex shallowly emarginate; wings 0.7–0.8 cm wide. Seeds inserted near base of capsule, sometimes only 1 fertile, winged all round but wing much wider toward capsule apex. Fl. Jun–Aug, fr. Aug–Oct.

Mixed forests, scrub forests, warm-temperature transitional areas; 100–1800 m. Anhui, Gansu, Guizhou, Hebei, Heilongjiang, Henan, Hubei, N Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, S Qinghai, Shaanxi, Shandong, Shanxi, NW Sichuan, N Zhejiang [Japan, Korea, Russia].

The rhizome is an important source of steroids for the drug industry.

- 1a. Rhizome with cork layer readily peeling or flaking off; stem slender; male flowers sessile 1a. subsp. *nipponica*
- 1b. Rhizome with cork layer persistent; stem robust; male flowers shortly pedicellate 1b. subsp. *rosthornii*

1a. *Dioscorea nipponica* subsp. *nipponica*

穿龙薯蓣(原亚种) chuan long shu yu (yuan ya zhong)

Dioscorea giraldii R. Knuth.

Rhizome with cork layer readily peeling or flaking off. Stem slender. Male flowers sessile.

Mixed forests, scrub forests; 100–1700 m. Anhui, Gansu, Hebei, Heilongjiang, Henan, N Jiangxi (Lu Shan), Jilin, Liaoning, Nei Mongol, Ningxia, S Qinghai, Shaanxi (N of Qin Ling), Shandong, Shanxi, NW Sichuan, N Zhejiang [Japan, Korea, Russia].

1b. *Dioscorea nipponica* subsp. *rosthornii* (Prain & Burkill) C. T. Ting in C. Pei et al., Acta Phytotax. Sin. 17(3): 70. 1979.

柴黄姜 chai huang jiang

Dioscorea nipponica var. *rosthornii* Prain & Burkill, J. Proc. Asiat. Soc. Bengal 10: 14. 1914; *D. nipponica* var. *jamesii* Prain & Burkill.

Rhizome with cork layer persistent. Stem robust. Male flowers pedicellate.

• Warm-temperature transitional areas; 1000–1800 m. S Gansu (Tianshui Shi), Guizhou, Hubei, S Shaanxi (S of Qin Ling).

2. *Dioscorea althaeoides* R. Knuth in Engler, Pflanzenr. 87(IV. 43): 180. 1924.

蜀葵叶薯蓣 shu kui ye shu yu

Dioscorea platanifolia Prain & Burkill.

Rhizome horizontal, little branched, cylindrical, 0.7–1.5 cm thick. Stem twining to left, sparsely hirsute, glabrescent. Leaves alternate, simple; petiole 5–12 cm; leaf blade drying greenish, orbicular to broadly ovate, usually 4–7-lobed or coarsely toothed, 10–17 × 10–13 cm, veins abaxially tomentose, basal veins 9 or 11, outermost ones sometimes pedately divided, base cordate with rounded sinus, margin undulate to distinctly coarsely toothed, apex acute to acuminate. Male spikes solitary or paired, sometimes branched, to 28 cm; axis puberulent. Male flowers: usually in lax cymules of 2–5; pedicel 2–3 mm; bract to 1 mm; bracteoles absent; perianth dull olive green, bowl-shaped, ca. 1.5 mm, lobes spreading; stamens 6, inserted at base of perianth,

filaments incurved, short. Female spikes solitary or 2 or 3 together, 40- or more flowered. Female flowers: bracts lanceolate; staminodes filiform or absent. Capsule straw-colored, shiny, ca. 2.5 cm, base gradually narrowed, apex slightly widened; wings ca. 0.7 cm wide. Seeds inserted near base of capsule, ca. 8 mm; wing pointing toward capsule apex. Fl. Jun–Aug, fr. Jul–Sep.

Mixed forests, mountain slopes, ravines, roadsides; 1400–3200 m. Guizhou, Sichuan, E Xizang (Bomi Xian, Qamdo Xian), Yunnan [Thailand].

3. *Dioscorea tokoro* Makino, Bot. Mag. (Tokyo) 3: 112. 1889.

山萆 shan bei xie

Dioscorea saidae R. Knuth; *D. wichurae* Uline ex R. Knuth; *D. yokusai* Prain & Burkill.

Rhizome horizontal, irregularly branched, subcylindrical, 0.7–1 cm thick; cork light brown, rough; roots borne on lower side of rhizome, fibrous. Stem twining to left, grooved, smooth. Leaves alternate, simple; petiole 5–12 cm; leaf blade drying greenish, cordate to ± triangular-cordate, (3–)5–14 × 5–10.5 cm, adaxially glabrous, abaxially sometimes papilliferous along veins, basal veins 7 or 9, base cordate with rounded sinus, margin entire or sometimes undulate to obscurely lobed, apex acuminate or caudate. Male spikes solitary or paired, often branched, lax, to 7 cm, sometimes in lax, axillary panicles. Male flowers: solitary or in cymules of 2(–4); pedicel to 1.7 mm; bract and bracteole 1; perianth saucer-shaped, 3.5–4 mm in diam., outer lobes oblong, ca. 1 mm wide, apex rounded, inner ones ca. 0.7 mm wide; stamens 6, inserted at base of perianth, filaments curved outward. Female spike solitary, rarely paired, sometimes branched. Capsule reflexed at maturity, light brown, glossy, oblong-ellipsoid, 1.8–2.2 cm, base rounded, apex emarginate to truncate; wings 0.6–0.7 cm wide. Seeds inserted near base of capsule, winged ± all round but wing much wider toward capsule apex. Fl. Jun–Aug, fr. Aug–Oct.

• Mixed forests, bamboo forests, usually along ravine sides; near sea level to 1000 m. S Anhui, Fujian, Guizhou, S Henan, Hubei, Hunan, Jiangsu, S Jiangxi, S Sichuan (Yibin Shi), Zhejiang.

4. *Dioscorea zingiberensis* C. H. Wright, J. Linn. Soc., Bot. 36: 93. 1903.

盾叶薯蓣 dun ye shu yu

Plants sometimes monoecious. Rhizome horizontal, sometimes irregularly branched, subcylindrical, 1–1.5 cm thick; cork dull brown, rough; transverse section yellow. Stem twining to left, glabrous, smooth. Leaves alternate, simple; petiole 2.5–6 cm; leaf blade adaxially green, often irregularly spotted, drying dark grayish brown, narrowly peltate, triangular-ovate, usually ± 3-lobed by enlargement of basal lobes, 4.5–10 × 4–8.5 cm, papery, glabrous, base cordate with broadly rounded sinus, apex rounded and cuspidate to acuminate; lateral lobes reflexed, rounded. Male spikes solitary or 2 or 3 together, 5–10 cm, very slender, often borne along specialized, paniclelike, lateral shoots with reduced leaves. Male flowers: solitary or in cymules of 2 or 3, sessile; bracts 3 or 4, brown, membranous; perianth purplish red, drying black, lobes spreading at anthesis, 1.2–1.5 × 0.8–1 mm; stamens 6, inserted at margin of receptacle, filaments extremely short. Female spike to 8 cm. Female flowers:

staminodes filiform. Capsule reflexed, long pedicellate, drying blue black, obovoid, 1.4–2 cm, about as long as wide, pruinose, base ± truncate, apex emarginate; wings 0.8–1.2 cm wide. Seeds inserted near middle of capsule, winged all round. Fl. May–Aug, fr. Sep–Oct.

• Mixed forests; 100–1800 m. Gansu, S Henan, Hubei, Hunan, S Shaanxi (S of Qin Ling), Sichuan, Yunnan.

The peltate attachment of most leaf blades is immediately diagnostic for this and the following species. It is the only Chinese species that has been recorded as being monoecious.

The rhizome is an extremely important source of diosgenin for the drug industry. It is also an important traditional medicine.

5. *Dioscorea sinoparviflora* C. T. Ting et al., *Novon* 10: 13. 2000.

小花盾叶薯蕷 xiao hua dun ye shu yu

Dioscorea parviflora C. T. Ting in C. Pei et al., *Acta Phytotax. Sin.* 17(3): 69. 1979, not Philippi (1864).

Rhizome horizontal, palmately or irregularly branched, cylindrical, 1–1.5 cm thick; cork yellow-brown, rough. Stem twining to left, glabrous. Leaves alternate, simple; petiole 2.5–5.5 cm; leaf blade drying grayish brown, sometimes narrowly peltate, broadly triangular-ovate, sometimes 3- to obscurely 5-lobed, 4.5–9 × 5–9.5 cm, leathery, glabrous, base deeply cordate (with rounded sinus) to subtruncate, apex acuminate. Male spikes solitary or 2 or 3 together, 5–7 cm. Male flowers often in cymes of 2 or 3, sessile; bracts 3 or 4, ovate or triangular-ovate, membranous; perianth purplish red, drying black, lobes ovate, 0.8–1.2 × 0.6–0.8 mm; stamens 6, inserted at margin of receptacle, filaments extremely short, anthers introrse. Female flowers: staminodes usually filiform. Capsule reflexed, long pedicellate, drying blue black, obovoid to oblong-ellipsoid, 2–2.8 cm, longer than wide, pruinose, base rounded, apex truncate to rounded; wings 0.8–1.1 cm wide. Seeds inserted near middle of capsule, winged all round. Fl. Mar–Aug, fr. Aug–Dec.

• Scrub forests, bamboo forests; 400–2000 m. Yunnan.

6. *Dioscorea deltoidea* Wallich ex Grisebach in Martius, *Fl. Bras.* 3(1): 43. 1842.

三角叶薯蕷 san jiao ye shu yu

Rhizome horizontal, ginger-shaped, 1.2–1.5 cm thick. Stem twining to left, drying light brown to purplish brown, grooved. Leaves alternate, simple; petiole 4–10(–15) cm; leaf blade drying gray-green, triangular or triangular-ovate, usually 3-lobed, 5–9 × 4–5.5 cm, adaxially glabrous, abaxially papillose-setulose along veins, basal veins 3–7, outermost ones much shorter, base shallowly cordate (with very broad sinus) to subtruncate, apex of middle lobe acuminate, apex of lateral lobes rounded. Male spike solitary, sometimes branched, 9–16 cm. Male flowers: solitary or paired, sessile; bracts broadly ovate, membranous, apex acute; perianth saucer-shaped, 3–3.5 mm in diam., lobes ovate, ca. 0.8 mm wide; stamens 6, inserted at base of perianth, anthers 3 introrse and 3 extrorse, connectives not fork-shaped. Female spike to 5 cm, 4–6-flowered. Female flowers: staminodes present. Capsule reflexed, brown at maturity, purplish brown spotted, globose or oblong-obovoid, (1.5–)1.8–2.2 cm, base rounded, apex

emarginate or rounded; wings (0.7–)1.2–1.4 cm wide. Seeds inserted near middle of capsule, ovate, winged all round. Fl. May–Jun, fr. Jun–Sep.

Broad-leaved forests, scrub forests; 2000–3100 m. Sichuan, Xizang, Yunnan [Bhutan, India, Myanmar, Nepal, Sikkim, Thailand, Vietnam].

Dioscorea deltoidea var. *orbiculata* Prain & Burkill (*Ann. Roy. Bot. Gard. (Calcutta)* 14: 25. 1936) was published for a Chinese collection with the capsule ± globose. However, the description lacked a Latin diagnosis so the name is invalid. Chinese material often differs from typical, Indian material by the distinctly 3-lobed leaves, but the separation is not very clear-cut and more detailed investigations should be undertaken to clarify the status of these plants.

7. *Dioscorea panthaica* Prain & Burkill, *J. Asiat. Soc. Bengal*, Pt. 2, Nat. Hist. 73(Suppl.): 6. 1904.

黄山药 huang shan yao

Dioscorea biserialis Prain & Burkill.

Rhizome horizontal, irregularly branched, cylindrical; roots sparse, fibrous. Stem twining to left, straw-colored, glabrous, smooth. Leaves alternate, simple; petiole 7–13 cm; leaf blade abaxially grayish white, drying dark brown, triangular-cordate, to 18 × 14 cm, glabrous, basal veins 7, conspicuously pale, base cordate or broadly so, margin entire or slightly undulate, apex acuminate. Male spikes solitary or 2 or 3 together, branched, to 10 cm, very slender. Male flowers: solitary or in cymes of 2 or 3, sessile; bracts boat-shaped; perianth yellowish green, funnelform, ca. 2 mm, lobes adaxially yellowish brown spotted, ovate; stamens 6, inserted at base of perianth, anthers dorsifixed. Female spike to 10 cm, few flowered. Female flowers: staminodes 6. Capsule reflexed, brownish yellow, densely purplish brown freckled, shiny, obovoid, 2.4–2.7 cm, base cuneate, apex shallowly emarginate to subtruncate; wings 0.9–1.2 cm wide. Seeds inserted near middle of capsule, winged all round. Fl. May–Jul, fr. Jul–Sep.

Scrub forests, mountain slopes; 1000–3500 m. W Guizhou, SW Hubei (Enshi Xian), NW Hunan, W Sichuan, Yunnan [Thailand].

The synonym *Dioscorea biserialis* has two syntypes: a fruiting specimen, *Forrest 10951*, which belongs to *D. panthaica*, and a male plant, *Maire s.n.*, which has not been seen by the present authors.

8. *Dioscorea biformifolia* C. Pei & C. T. Ting, *Acta Phytotax. Sin.* 14(1): 69. 1976.

异叶薯蕷 yi ye shu yu

Rhizome horizontal, irregularly branched, cylindrical; cork purplish black, rough. Stem twining to left, glabrous, smooth but inconspicuously shortly prickly near nodes. Leaves alternate, simple or sometimes 3-foliolate distally on stem; leaf blade of simple leaves drying dark grayish brown, lanceolate, 12–17 × 7–8 cm, slightly leathery, glabrous, basal veins 3, rarely to 9 (when outermost ones much shorter), base deeply cordate with narrow sinus and basal lobes sometimes overlapping, margin entire or slightly undulate, apex acuminate; middle lobe or leaflet lanceolate, 10–20 × 1.5–3 cm, lateral lobes or leaflets much smaller, oblique, rounded, or acuminate. Male spike to 9 cm, solitary along specialized, lateral shoots or in axillary panicles to more than 20 cm. Male flowers: solitary

or in dense clusters of 2–4, sessile; bracts rounded; perianth yellowish green, saucer-shaped, lobes ovate, ca. 1.5 × 1 mm, apex obtuse; stamens 6, inserted at base of perianth, filaments short. Female spike lax. Capsule reflexed, light brown, obovoid, ca. 1.5 cm, base rounded, apex truncate; wings ca. 0.8 cm wide. Seeds inserted near middle of capsule, winged all round. Fl. Apr–Jul, fr. Jul–Oct.

• Scrub forests, forest margins, mountain slopes; 600–1800 m. Yunnan.

9. *Dioscorea gracillima* Miquel, Ann. Mus. Bot. Lugduno-Batavi 3: 160. 1867.

纤细薯蓣 xian xi shu yu

Rhizome horizontal, irregular. Stem twining to left, glabrous. Leaves alternate, sometimes 3- or 4-whorled at stem base, simple; petiole 7–12 cm; leaf blade drying green or brownish, cordate, 10–18 × 6.5–11 cm, pruinose, glabrous, basal veins 7 or 9, base broadly cordate or subtruncate, margin entire or slightly undulate, apex acuminate. Male spike irregularly branched, laxly few flowered; rachis slender. Male flowers: solitary, rarely in cymes of 2 or 3 at inflorescence base, sessile; bracts ovate, membranous; bracteoles shorter and narrower than bracts; perianth saucer-shaped, lobes oblong-orbicular, 1.5–2 mm; stamens 3, anther connective ca. 1/2 as wide as anther; staminodes 3, inserted at margin of receptacle, clavate. Female spike solitary, laxly few flowered, to 7 cm. Female flowers: staminodes 6. Capsule reflexed, brown, oblong-ovoid, 2–2.2 cm, apex truncate; wings 1–1.1 cm wide. Seeds inserted near middle of capsule, ca. 1 cm in diam. (ca. 0.5 cm excluding wing), winged all round. Fl. May–Aug, fr. Jun–Oct.

Open forests, mountain slopes; 200–2200 m. S Anhui, N Fujian, SW Hubei, E Hunan, Jiangxi, Zhejiang [Japan].

Chinese collections of this species have entire leaves with little or no suggestion of an undulate margin, whereas Japanese collections have leaves with an undulate to obscurely bluntly lobed margin. The type is from Japan.

10. *Dioscorea collettii* J. D. Hooker, Fl. Brit. India 6: 290. 1892.

叉蕊薯蓣 cha rui shu yu

Rhizome horizontal, ginger-shaped, variable in length, ca. 2 cm thick; transverse section yellow; roots slender, fibrous. Stem twining to left, glabrous, sometimes densely and shortly yellow hairy. Leaves alternate, simple; petiole 4–7 cm; leaf blade drying blackish, triangular to ovate or ovate-lanceolate, 5–19(–22) × 3–13(–16) cm, usually membranous, abaxially sometimes hispidulous especially along veins, base cordate to subtruncate, margin subentire or slightly undulate, sometimes transparent, apex acuminate. Male spikes solitary or 2 or 3 together. Male flowers: solitary or in cymes of 2 or 3, sessile; bracts ovate-lanceolate; bracteoles ovate; perianth yellow, usually drying black, saucer-shaped; stamens 3, inserted in perianth tube, filaments short, anthers ovoid, connectives elongate at anthesis, fork-shaped; staminodes filiform. Female spike solitary, to 5 cm. Female flowers: staminodes present; ovary terete. Capsule reflexed, brown, shiny, broadly obovoid or ellipsoid, usually somewhat angular, 1.6–2.1 cm, apex truncate; wings 0.8–1.1 cm wide. Seeds inserted near middle of capsule, winged all round. Fl. May–Aug, fr. Jun–Oct.

Mixed forests, secondary *Quercus* forests, scrub forests, mountain slopes; 200–3200 m. S Anhui, Fujian, N Guangdong, NE Guangxi, Guizhou, S Henan, Hubei, Hunan, Jiangxi, W Sichuan, N Taiwan, Yunnan, Zhejiang [India, Laos, Myanmar, Thailand, Vietnam].

- 1a. Leaf blade not transparent at margin; anther connective often 1–2 × as wide as anther at anthesis; capsule broadly obovoid, apex truncate or rounded 10a. var. *collettii*
1b. Leaf blade transparent at margin; anther connective short, ca. 1/2 as wide as anther at anthesis; capsule broadly ellipsoid, apex rounded 10b. var. *hypoglauca*

10a. *Dioscorea collettii* var. *collettii*

叉蕊薯蓣(原变种) cha rui shu yu (yuan bian zhong)

Dioscorea gracillima Miquel var. *collettii* (J. D. Hooker) Uline ex Yamamoto; *D. hui* R. Knuth; *D. kelungensis* Hayata; *D. nigrescens* R. Knuth; *D. oenea* Prain & Burkill; *D. seniavinii* Prain & Burkill; *D. tashiroi* Hayata.

Leaf blade triangular-cordate or ovate-lanceolate, margin not transparent. Anther connective often 1–2 × as wide as anther at anthesis. Capsule broadly obovoid, apex truncate or rounded. Fl. May–Aug, fr. Jun–Oct.

Secondary *Quercus* forests, scrub forests; 1500–3200 m. S Anhui, Fujian, N Guangdong, NE Guangxi, Guizhou, S Henan, Hubei, Hunan, Jiangxi, W Sichuan, N Taiwan, Zhejiang [India, Myanmar].

10b. *Dioscorea collettii* var. *hypoglauca* (Palibin) C. T. Ting et al. in C. Pei & C. T. Ting, Fl. Reipubl. Popularis Sin. 16(1): 72. 1985.

粉背薯蓣 fen bei shu yu

Dioscorea hypoglauca Palibin, Bull. Herb. Boissier, sér. 2, 6: 21. 1906; *D. izuensis* Akahori; *D. kaoi* Tang S. Liu & T. C. Huang; *D. morsei* Prain & Burkill; *D. undulata* R. Knuth.

Leaf blade triangular or ovate, margin usually transparent. Anther connective short, ca. 1/2 as wide as anther at anthesis. Capsule broadly ellipsoid, apex rounded. Fl. May–Aug, fr. Jun–Oct.

• Mixed forests, mountain slopes; 200–1300 m. S Anhui, Fujian, N Guangdong, NE Guangxi, S Henan, Hubei, Hunan, Jiangxi, N Taiwan, Zhejiang.

11. *Dioscorea futschauensis* Uline ex R. Knuth in Engler, Pflanzenn. 87(IV. 43): 264. 1924.

福州薯蓣 fu zhou shu yu

Rhizome horizontal, irregularly cylindrical, 1–3.5 cm thick, hard, drying rich in starch; cork yellowish brown. Stem twining to left, glabrous. Leaves alternate, simple; petiole to 5 cm; leaf blade drying dark grayish, ovate-triangular, palmately bluntly 7-lobed basally on stem, to 10 × 11 cm, slightly leathery, uniformly hispidulous, densely so abaxially, reticulate veins prominent, base deeply cordate, margin entire or slightly undulate, apex acuminate. Male spikes to 7 cm, in axillary panicles to 20 cm. Male flowers: solitary or occasionally paired; pedicel 1–1.5 mm; bracts lanceolate; perianth yellow, turning orange, drying black, funnellform, lobes spreading at anthesis, oblong-ovate,

1.5–2 mm, apex rounded; stamens (3 or)6, inserted at base of perianth tube; staminodes sometimes present. Female spikes to 7 cm, few flowered. Female flowers: staminodes with sterile anthers or filaments only. Capsule dark brown, not shiny, broadly obovoid, 1.5–1.8 cm, base rounded, apex slightly emarginate to truncate; wings 1–1.2 cm wide. Seeds inserted near middle of capsule, 4–5 mm in diam. (excluding wing), winged all round. Fl. Jun–Jul, fr. Jul–Oct.

• Scrub forests, mountain slopes, ravines, roadsides; near sea level to 700 m. Fujian, N Guangdong, NE Guangxi (Quanzhou Xian), Hunan, S Zhejiang.

12. *Dioscorea spongiosa* J. Q. Xi et al., Acta Phytotax. Sin. 25: 52. 1987.

绵草 mian bei xie

Rhizome horizontal, much branched, cylindrical, 2–5 cm thick, soft, spongy; cork light yellow. Stem twining to left, glabrous. Leaves alternate, simple; petiole to 12 cm; leaf blade drying greenish, abaxially grayish white, triangular or ovate-cordate, sometimes palmately 5–9-lobed basally on stem, 11–14 × 7.5–12 cm, adaxially glabrous, abaxially densely minutely setulose to puberulent, basal veins 9 or 11, reticulate veins prominent, base cordate with rounded sinus, margin entire to distinctly toothed, apex and lobes acute to acuminate. Male spike branched or forming an axillary panicle, lax, to 15 cm, sometimes forming terminal panicles by reduction of apical leaves. Male flowers: solitary or paired; pedicel 0.5–1 mm; bracts lanceolate, ca. 1 mm; bracteole borne at base of pedicel, minute; perianth orange, tube 1–1.5 mm wide, lobes spreading at anthesis, oblong-lanceolate, 2–2.5 mm, apex rounded; stamens 6, inserted at base of perianth, erect, ca. 1/2 as long as perianth lobes. Female spikes 12–30 cm, sometimes branched. Female flowers: staminodes filiform. Capsule dark brown, ± shiny, 1.3–1.6 cm, base ± truncate, apex emarginate; wings 1.5–1.6 cm wide. Seeds inserted near middle of capsule, winged all round, middle part narrower. Fl. Jun–Aug, fr. Jul–Oct.

• Open forests, scrub forests; 400–800 m. Fujian, N Guangdong, E Guangxi, SW Hubei, Hunan, Jiangxi, Zhejiang.

This species has previously been included within *Dioscorea septemloba* Thunberg, from Japan, but it is now thought that *D. septemloba* should be restricted to Japanese material and the Chinese plants be treated as a distinct species, *D. spongiosa*.

An important traditional medicine.

13. *Dioscorea tenuipes* Franchet & Savatier, Enum. Pl. Jap. 2: 523. 1878.

细柄薯蕷 xi bing shu yu

Dioscorea maximowiczii Uline ex R. Knuth.

Rhizome horizontal, cylindrical, 0.6–1.5 cm thick, with obvious nodes and internodes. Stem twining to left, glabrous, smooth. Leaves alternate, simple; petiole 3–5 cm; leaf blade drying green, triangular, 5–10(–13) × 2.5–7(–11) cm, papery, glabrous, base broadly cordate, margin entire or slightly undulate, apex acuminate or caudate. Male spike solitary, rarely paired, 7–18 cm. Male flowers: solitary or paired; pedicel 1.5–8 mm; perianth pale yellow, saucer-shaped to slightly reflexed, lobes suboblanceolate, apex obtuse or rounded; stamens 6, in-

serted at base of perianth, anthers extrorse, 3 with forked connectives and 3 without. Female spikes to 8 cm, few flowered. Female flowers: staminodes filiform. Capsule pale yellow-brown, shiny, 2–2.5 cm, base rounded, apex truncate; wings 1.2–1.5 cm wide. Seeds inserted near middle of capsule, winged all round.

Forests; 800–1100 m. S Anhui, Fujian, N Guangdong, S Hunan, Jiangxi, Zhejiang [Japan].

14. *Dioscorea poilanei* Prain & Burkill, Bull. Misc. Inform. Kew 1933: 240. 1933.

吊罗薯蕷 diao luo shu yu

Rhizome horizontal, irregularly branched, cylindrical, to 1.5 cm thick, hard. Stem twining to left, glabrous, smooth except inconspicuously shortly prickly near nodes. Leaves alternate, simple; petiole 6–8 cm; leaf blade drying grayish brown, triangular-ovate or nearly triangular-sagittate, 10–12 × 6–10 cm, thinly leathery, glabrous, basal veins 3–7, outermost ones much shorter, reticulate veins prominent, base auriculate, apex acuminate. Male spikes solitary or 2–4 together, to 20 cm. Male flowers: solitary or paired; pedicel ca. 2.5 mm; perianth lobes ± reflexed, oblong or oblong-ovate, outer ones ca. 1 mm, wider than inner ones; stamens 6, inserted at margin of perianth tube, less than 0.8 mm. Female spikes similar to male ones. Capsule bronze, shiny, ovoid-globose, 2.8–3.2 cm, apex truncate; wings ca. 1.5 cm wide. Seeds inserted near middle of capsule, winged all round. Fl. Jun–Aug, fr. Aug–Oct.

Forests, scrub; near sea level to 200 m. Hainan [Cambodia, Laos, Malaysia, Thailand, Vietnam].

15. *Dioscorea chingii* Prain & Burkill, Bull. Misc. Inform. Kew 1931: 425. 1931.

山葛薯 shan ge shu

Rhizome horizontal, irregularly branched, cylindrical, to 5 cm thick; cork brown-black. Stem twining to left, glabrous, smooth. Leaves alternate, simple; petiole subequaling leaf blade; leaf blade drying blackish, ovate, narrower distally on stem, 7.5–20 × 4.5–11.5 cm, papery, glabrous, smooth, basal veins 7, reticulate veins raised, base cordate with acute sinus, margin entire or undulate, apex acuminate. Male spike solitary, rarely 2 or 3 together, lax, to 17 cm, often gathered into large, terminal panicles. Male flowers: in cymes of 2–6, rarely solitary, shortly pedicellate; perianth light yellow, lobes ovoid, ca. 2 mm, shorter than perianth tube; stamens 6, inserted at base of perianth, filaments reflexed. Female spikes to 20 cm; rachis very slender. Female flowers: staminodes 6, filiform. Capsule reflexed, brown to dark brown, (1.5–)2–2.5 cm, base and apex truncate; wings 1–1.7 cm wide. Seeds inserted near middle of capsule, winged all round. Fl. Apr–Jul, fr. Aug–Oct.

Scrub forests, mountain slopes; 1200–1800 m. Guangxi, Yunnan [Vietnam].

16. *Dioscorea banzhuana* C. Pei & C. T. Ting, Acta Phytotax. Sin. 14(1): 70. 1976.

板砖薯蕷 ban zhuān shu yu

Rhizome horizontal, irregularly branched, cylindrical, curved; cork dark brown. Stem twining to left, glabrous, smooth.

Leaves alternate, simple; petiole 4.5–10 cm; leaf blade drying greenish, palmately 3- or 5-lobed basally on stem, ovate-lanceolate distally on stem, 8–15 × 7–15 cm, ?glabrous, base deeply cordate to truncate, or rounded on distal leaves, margin entire, apex acuminate. Male spikes usually branched, to 7 cm, in diffuse, axillary panicles to 20 cm, panicles sometimes with leafy bracts. Male flowers: solitary or in cymules of 2–4, some flowers sterile; pedicel ca. 2 mm; bracts scalelike, to 1 mm; bracteole ± obsolete; perianth funnellform, ca. 2 mm, lobes not spreading at anthesis, ovoid; stamens 6, inserted at base of perianth. Female spikes to 20 cm; rachis very slender. Capsule reflexed, light brown, glossy, 1.5–1.8 cm, base truncate to rounded, apex truncate; wings 0.8–1.2 cm wide. Seeds inserted near middle of capsule, dark brown, winged all round. Fl. Aug–Oct, fr. Sep–Dec.

• Open forests, scrub forests, mountain slopes; 1400–1500 m. SE Yunnan (Mengzi Xian).

17. *Dioscorea simulans* Prain & Burkill, Bull. Misc. Inform. Kew 1931: 427. 1931.

马肠薯蓣 ma chang shu yu

Rhizome horizontal, irregularly branched, cylindrical; cork black-brown, rough. Stem twining to left, slender, hard, grooved, glabrous. Leaves alternate, simple to 3-foliolate, more divided distally on stem; leaf blade of simple leaves triangular or triangular-ovate, 5–16 × 1.5–5 cm, glabrous, smooth, reticulate veins prominent abaxially, base rounded, apex acute; middle leaflets of palmate leaves lanceolate, base attenuate, lateral leaflets ovate, smaller than middle ones, base slightly oblique. Male spikes solitary or 2–4 together, occasionally few branched, lax, 12–15 cm. Male flowers: solitary or in cymules of 2–4; perianth purple, lobes spreading at anthesis, long ovate; stamens 6, inserted at base of perianth, filaments short, anthers alternately larger and smaller. Female spikes 7–10 cm. Capsule dark-brown at maturity, shiny, obovoid, 1–1.5 cm, apex slightly emarginate

2. *Dioscorea* sect. *Stenocorea* Prain & Burkill, J. Proc. Asiat. Soc. Bengal 10: 40. 1914.

宽果薯蓣组 kuan guo shu yu zu

Rootstock of vertical tubers from a woody crown. Stem twining to left. Bulblets apparently absent. Leaves alternate, simple; leaf blade ± ovate, margin entire. Male inflorescence solitary, subspicate. Flowers solitary, subsessile or pedicellate; bracts borne at base of pedicels; perianth funnellform, lobes spreading; stamens 6, anthers introrse. Capsule not reflexed at maturity, often rather large, usually wider than long. Seeds inserted near middle of capsule, winged all round.

About seven species: Malaysia, extending into China, Indonesia, and Thailand; one species in China.

19. *Dioscorea garrettii* Prain & Burkill, Bull. Misc. Inform. Kew 1936: 493. 1936.

宽果薯蓣 kuan guo shu yu

Rootstock unknown. Stem twining to left, ca. 2 mm thick at anthesis, glabrous. Leaves alternate, simple; petiole to 4 cm; leaf blade drying green adaxially, grayish abaxially, narrowly ovate to oblong-lanceolate, to 12 × 6 cm, membranous, glabrous, basal veins (5 or)7, outermost ones poorly developed, base cordate with broadly rounded sinus, apex acuminate. Male spike solitary, to 20 cm, slender. Male flowers: solitary, subsessile; pedicel to 0.5 mm; bract ± lanceolate, ca. 1 mm; bracteole

or truncate; wings 0.5–1 cm wide. Seeds inserted near middle of capsule, winged all round. Fl. May–Aug, fr. Jul–Oct.

• Scrub forests, rocky mountain slopes. N Guangdong, Guangxi, S Hunan.

18. *Dioscorea birmanica* Prain & Burkill, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 73: 185. 1904.

独龙薯蓣 du long shu yu

Rhizome horizontal, irregularly branched, bulky; cork cracked, tessellated; transverse section pink; bases of old roots becoming hard and ± thornlike. Stem twining to left, faintly grooved, glabrous, or pubescent to puberulent and glabrescent, abundantly prickly proximally, prickly only at nodes distally, smooth apically. Leaves alternate, simple; petiole 4.5–9 cm, often with recurved prickles; leaf blade ovate or broadly so, to 15 × 16 cm, glabrous or pubescent along main veins abaxially, main veins sometimes prickly, basal veins 7–11, base cordate with narrow or broad sinus and rounded auricles. Male spike produced before leaves on new stem, solitary, lax, 35–45 cm. Male flowers: in cymules to 1 cm, subsessile; bracts brown, lanceolate, ca. 1.5 mm; bracteoles absent; perianth narrowly campanulate, proximally villous, lobes erect, oblong-lanceolate, ca. 2.5 mm, apex rounded; stamens 6, inserted in throat of perianth tube, slightly shorter than perianth, filaments longer than anthers. Female spikes 20–30 cm. Female flowers: staminodes minute. Capsule reflexed, yellow-brown, oblong-obovoid, angular in outline, 2–3 cm, densely puberulent, glabrescent, base truncate to rounded, apex retuse to rounded; wings 1–1.5 cm wide. Seeds inserted near middle of capsule, winged all round.

About 400 m. NW Yunnan (Gongshan Drung-Nu Zu Zizhixian) [Myanmar, Thailand].

The present authors have not seen any Chinese material of this species.

borne on pedicel, ovate, 0.5–0.75 mm; perianth saucer-shaped, outer lobes ovate, ca. 1.5 mm, apex recurved, subacute, inner ones more rounded at apex than outer; stamens 6, inserted at margin of receptacle, filaments mostly erect, sharply incurved at apex, anthers nearly as wide as long. Female spike solitary, pendent, to 7 cm. Capsules 3 or 4, not reflexed, light brown, ca. 3 cm, glabrous, base truncate to broadly cuneate, attenuate into pedicel, apex shallowly emarginate; wings to 2.6 cm wide. Seeds inserted near middle of capsule, winged all round. Fl. Aug, fr. (immature) Oct.

1300–1400 m. Yunnan [Thailand].

This species is known from only a single collection within China.

3. *Dioscorea* sect. *Combilium* Prain & Burkill, J. Proc. Asiat. Soc. Bengal 10: 19. 1914.

丁字形毛组 ding zi xing mao zu

Rootstock of ovoid-globose tubers borne on stalks from a rhizome. Stem twining to left, with T-shaped hairs. Bulblets absent. Leaves alternate, simple; leaf blade ± ovate, with T-shaped hairs, margin entire. Male inflorescence usually solitary, a spike or raceme. Flowers usually solitary, sometimes in dense umbellules; perianth saucer-shaped; stamens 6. Capsule reflexed at maturity, longer than wide. Seeds inserted at middle of capsule, winged all round.

One species: India, Malaysia, Papua New Guinea, Thailand; long cultivated in tropical Asia; one species (introduced) in China.

20. *Dioscorea esculenta* (Loureiro) Burkill, Gard. Bull. Straits Settlement. 1: 396. 1917.

甘薯 gan shu

Tubers usually 4–10, produced from apical branches of rhizome; cork light yellow, smooth; thorny roots present or absent. Stem twining to left, with T-shaped, soft hairs, proximally prickly, distally so only at nodes. Leaves alternate, simple; petiole 5–8 cm; leaf blade broadly cordate, to 15 × 17 cm, with T-shaped hairs especially abaxially, basal veins 9–13, base cordate, apex acute. Male spike solitary, dense, ca. 15 cm. Male flowers: usually solitary, rarely in cymules of 2–4, sessile or subsessile; bract ovate; perianth shallowly cupular, puberulent, outer lobes broadly lanceolate, ca. 1.8 mm, inner ones slightly shorter than outer; stamens 6, inserted in perianth tube, slightly shorter than perianth lobes. Female spike solitary, pendent, to 40 cm. Capsule very seldom maturing, ca. 3 cm, base truncate, apex slightly emarginate; wings ca. 1.2 cm wide. Seeds inserted near middle of capsule, winged all round. Fl. early summer.

Cultivated. S Guangxi, Hainan, Taiwan [native to India, Malaysia, Papua New Guinea, and Thailand; long cultivated in tropical Asia].

Known to have been cultivated in S China for at least 1700 years. The thornless forms are probably selections from an original, thorny form.

1a. Plants without thorny roots 20a. var. *esculenta*

1b. Plants with thorny roots protecting crown of rootstock 20a. var. *spinosa*

20a. *Dioscorea esculenta* var. *esculenta*

甘薯(原变种) gan shu (yuan bian zhong)

Oncus esculentus Loureiro, Fl. Cochinch. 1: 194. 1790; *Dioscorea esculenta* var. *fasciculata* (Roxburgh) R. Knuth; *D. fasciculata* Roxburgh.

Plants without thorny roots.

Cultivated. S Guangxi (Bobai Xian, Hepu Xian), Hainan (Ledong Xian) [probably native to Indo-China and S China, but long cultivated in tropical Asia].

20b. *Dioscorea esculenta* var. *spinosa* (Roxburgh ex Prain & Burkill) R. Knuth in Engler, Pflanzenr. 87(IV. 43): 189. 1924.

有刺甘薯 you ci gan shu

Dioscorea aculeata Linnaeus var. *spinosa* Roxburgh ex Prain & Burkill, J. Proc. Asiat. Soc. Bengal 10: 20. 1914.

Plants with thorny roots protecting crown of rootstock.

Cultivated. Hainan, Taiwan [native to India, Malaysia, Papua New Guinea, and Thailand].

Wu Zhengyi (editor's note) believes that var. *spinosa* may be the wild form of this long-cultivated species.

4. *Dioscorea* sect. *Shannicorea* Prain & Burkill, J. Proc. Asiat. Soc. Bengal 10: 7. 1914.

顶生翅组 ding sheng chi zu

Rootstock of vertical, annual to biennial tubers. Stem twining to left, often pubescent. Bulblets absent. Leaves alternate, simple; leaf blade reniform to ovate, papery, margin entire. Male inflorescence a spikelike thyrs. Flowers in cymules, pedicellate; perianth campanulate, cupular, or saucer-shaped, lobes connate at base; stamens 6, inserted at base of perianth lobes or in throat of tube, anthers dorsifixed, introrse. Female inflorescences solitary or 2 or more together. Capsule usually reflexed at maturity, longer than wide; wings often undulate. Seeds inserted near base of capsule; wing pointing toward capsule apex.

About eight species: Cambodia, China, Laos, Myanmar, Thailand, Vietnam; seven species (four endemic) in China.

1a. Leaf blade thinly papery; male flowers in sessile clusters, minutely papillose-puberulent; perianth saucer-shaped 21. *D. tentaculigera*

1b. Leaf blade papery; male flowers in stalked cymules, pubescent, sometimes glabrescent; perianth campanulate or cupular.

2a. Leaf blade as wide as or wider than long.

3a. Leaf blade glabrous or sparsely pubescent abaxially; capsule glabrous 24. *D. subcalva*

3b. Leaf blade densely softly hairy abaxially; capsule pubescent.

4a. Leaf blade reniform- or broadly cordate, apex shortly acuminate; infructescence 9–27 cm;

capsule reflexed, wings obviously undulate 22. *D. yunnanensis*

4b. Leaf blade orbicular- or ovate-cordate, apex acuminate or caudate-acuminate; infructescence to

only 3 cm, often shorter than mature capsules; capsule erect, wings entire to slightly undulate 23. *D. hemsleyi*

- 2b. Leaf blade longer than wide.
 5a. Plant sparsely pubescent 25. *D. nitens*
 5b. Plant densely pubescent, especially on leaf blade abaxially and inflorescence axis.
 6a. Leaf blade abaxially white pubescent; peduncle simple 26. *D. martini*
 6b. Leaf blade abaxially tawny pubescent; peduncle usually branched 27. *D. velutipes*

21. *Dioscorea tentaculigera* Prain & Burkill, J. Proc. Asiat. Soc. Bengal 10: 15. 1914.

卷须状薯蓣 *juan xu zhuang shu yu*

Tubers vertical, cylindrical. Stem twining to left, glabrous. Leaves alternate, simple; petiole 3–6 cm; leaf blade ovate-cordate, 6.5–10 × 5–9 cm, glabrous, smooth, veins sparsely and minutely puberulent abaxially, base cordate with rounded sinus, apex acute or acuminate, shortly pointed at tip. Male thyrses to 25 cm, densely and minutely hairy. Male flowers: in sessile, dense cymules of 3–6, sessile; bracts ovate, ca. 0.5 mm, apex acute; perianth saucer-shaped, ca. 0.35 mm, tube short, lobes incurved, broadly ovate, ca. 0.75 mm; stamens 6, inserted in perianth tube, filaments equaling perianth tube, anthers small, introrse. Infructescence ca. 9 cm. Capsule reflexed, light brown, ellipsoid, to 1.6 cm, base rounded, apex slightly emarginate; wings to 0.6 cm wide. Seeds inserted near middle of capsule, winged all round. Fl. Jul–Sep.

Forests in mountain ravines; 1300–1500 m. SW Yunnan [Myanmar, N Thailand].

22. *Dioscorea yunnanensis* Prain & Burkill, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 73: 186. 1904.

云南薯蓣 *yun nan shu yu*

Tubers vertical, cylindrical; transverse section white. Stem twining to left, grayish woolly pubescent, glabrescent. Leaves alternate, simple; petiole 4–11 cm; leaf blade reniform to orbicular, 7–15 × 10–18 cm, adaxially glabrescent, abaxially densely pubescent, basal veins 9, prominent, base shallowly to deeply cordate with narrow sinus, apex shortly acuminate. Male thyrses solitary, to at least 10 cm, grayish to tawny tomentose. Male flowers: in pedunculate, ± 1-sided, dense cymules of 3–5; perianth lobes ovate- or oblong-triangular, ca. 2 × 1 mm; stamens 6, inserted at base of perianth lobes, filaments nearly as long as anthers, anthers dorsifixed, introrse. Female spikes 9–27 cm. Capsule reflexed, oblong, 2.5–3 cm, densely pubescent, base cordate, apex emarginate; wings 0.8–2 cm wide, strongly undulate. Seeds inserted near base of capsule, sometimes only 1 fertile; wing pointing toward capsule apex. Fl. Jul–Aug, fr. Sep–Oct.

• Scrub forests, forest margins, mountain slopes; 1000–2800 m. Guizhou, Yunnan.

23. *Dioscorea hemsleyi* Prain & Burkill, J. Proc. Asiat. Soc. Bengal 4: 451. 1908.

粘山药 *nian shan yao*

Dioscorea mairei H. Léveillé (1913), not R. Knuth (1924); *D. praecox* Prain & Burkill.

Tubers vertical, cylindrical, mucilaginous. Stem twining to left, white or light brown woolly, glabrescent. Leaves alternate, simple; petiole 3–6 cm; leaf blade broadly cordate to ovate, 4–

8.5 × 5–10.5 cm, adaxially sparsely woolly, abaxially white woolly, ± glabrescent, basal veins 7 or 9 (or 11), base shallowly cordate, apex acuminate or caudate-acuminate. Male inflorescence not known with certainty, but apparently indistinguishable from that of *Dioscorea yunnanensis*. Female spikes sometimes produced with new leaves, to 3 cm; rachis often shorter than mature capsule. Female flower: bracts reddish brown dotted, lanceolate; perianth lobes ovate-triangular, ca. 1.2 mm; style 3-ribbed, base enlarged, stigma 3-fid, reflexed. Capsule erect, ovoid-oblong or oblong, 1.1–2 cm, densely pubescent; wings 0.8–1.3 cm wide, entire, rarely undulate. Seeds inserted near base of capsule; wing pointing toward capsule apex. Fl. Jul–Aug, fr. Sep–Oct.

Open scrub forests, mountain slopes; 1000–3000 m. Guangxi, Guizhou, Sichuan, Yunnan [Cambodia, Laos, Myanmar, Vietnam].

Dioscorea hemsleyi has an extremely distinctive, short infructescence, with the capsules ± erect and often longer than the rachis. It is otherwise very difficult to distinguish from *D. yunnanensis*, which is found in the same areas. It has not yet been possible to correlate any male material with the two species, and all male collections have been placed under *D. yunnanensis* in the present account. This problem will only be resolved by growing plants from seed of known origin.

24. *Dioscorea subcalva* Prain & Burkill, J. Proc. Asiat. Soc. Bengal 10: 18. 1914.

毛胶薯蓣 *mao jiao shu yu*

Tubers vertical, cylindrical; transverse section white; roots fibrous. Stem twining to left, woolly, glabrescent. Leaves alternate, simple; petiole 3–5 (–8) cm; leaf blade orbicular- or ovate-cordate, 4.5–11 × 4–13.5 cm, adaxially glabrous, abaxially sparsely woolly, sparsely pubescent, or glabrous, basal veins 7 or 9, base cordate with narrow sinus, apex acuminate or caudate. Male thyrses usually 2 or 3 together, 3–12 cm, sparsely pubescent or glabrous. Male flowers: in pedunculate cymules of 2–6; bract solitary, brown-red dotted, triangular-ovate or ovate, 1.5–2 mm, base clasping, apex acute; perianth lobes lanceolate, ca. 2.2 mm; stamens 6, filaments equaling or slightly longer than anthers, anthers dorsifixed, introrse. Female spikes 3–14 cm. Female flowers: bracts triangular-lanceolate, brown-red dotted, perianth lobes narrowly ovate or oblong, ca. 2 mm, apex slightly obtuse; style slightly enlarged basally, stigma 3-fid. Capsule reflexed or spreading, 1.5–3 cm, glabrous, smooth; wings 0.5–0.8 cm wide, sometimes slightly undulate. Seeds inserted near base of capsule; wing pointing toward capsule apex. Fl. Jul–Aug, fr. Sep–Oct.

• Scrub forests, forest margins, mountain valleys, slopes; 700–2600 m. Guangxi, Guizhou, Hunan, Sichuan, Yunnan.

- 1a. Leaf blade abaxially sparsely pubescent or glabrous; infructescence 3–8 cm 24a. var. *subcalva*
 1b. Leaf blade abaxially sparsely woolly; infructescence 8–14 cm 24b. var. *submollis*

24a. *Dioscorea subcalva* var. *subcalva*

毛胶薯蕷(原变种) mao jiao shu yu (yuan bian zhong)

Leaf blade abaxially sparsely pubescent or glabrous. Infructescence 3–8 cm.

• Scrub forests, forest margins, mountain valleys, slopes; 700–2600 m. Guangxi, Guizhou, Hunan, Sichuan, Yunnan.

24b. *Dioscorea subcalva* var. *submollis* (R. Knuth) C. T. Ting & P. P. Ling in C. Pei & C. T. Ting, Fl. Reipubl. Popularis Sin. 16(1): 85. 1985.

略毛薯蕷 lue mao shu yu

Dioscorea submollis R. Knuth in Engler, Pflanzenr. 87(IV. 43): 318. 1924.

Leaf blade abaxially sparsely woolly. Infructescence 8–14 cm.

• Scrub forests, forest margins, mountain valleys, slopes; 1800–2500 m. Guizhou, Yunnan.

25. *Dioscorea nitens* Prain & Burkill, J. Proc. Asiat. Soc. Bengal 10: 18. 1914.

光亮薯蕷 guang liang shu yu

Tubers cylindrical; transverse section white. Stem twining to left, sparsely pubescent or glabrous. Leaves alternate, simple; petiole 2–5.5 cm; leaf blade abaxially often drying pale gray, triangular-ovate to narrowly ovate, 6–13 × 3–10 cm, adaxially glabrous, abaxially sparsely pubescent, basal veins 7 or 9, base shallowly cordate with broad sinus, apex caudate-acuminate. Male thyrses solitary or 2–4 together, to 18 cm, pubescent. Male flowers: usually in cymules of 2–4; bracts ovate or lanceolate-ovate, apex acuminate; perianth sparsely brown dotted, abaxially sparsely pubescent, lobes lanceolate, ca. 1.5 mm; stamens 6, filaments longer than anthers, anthers dorsifixed, introrse. Female spikes 8–18 cm, sparsely pubescent. Female flowers: bracts ovate-lanceolate; perianth lobes narrowly ovate, ca. 1.5 mm, apex subacute; stigma 3-fid, reflexed. Capsule reflexed, oblong-obovoid or narrowly obovoid, ca. 2 cm, glabrescent, base cordate or rounded, apex emarginate; wings 0.5–0.8 cm wide, sometimes slightly undulate. Seeds inserted near base of capsule; wing pointing toward capsule apex. Fl. Jul–Sep, fr. Oct–Jan.

• Forests; 1100–2600 m. Yunnan.

26. *Dioscorea martini* Prain & Burkill, J. Proc. Asiat. Soc. Bengal 10: 18. 1914.

柔毛薯蕷 rou mao shu yu

Rootstock unknown. Stem twining to left, woolly. Leaves alternate, simple; petiole (2–)4–8 cm, hairy; leaf blade long cordate, 6.5–12 × 5–6(–12) cm, adaxially glabrous, smooth, abaxially hairy, basal veins 9 or 11, base deeply cordate with narrowly rounded sinus, apex acuminate or shortly caudate. Male thyrses often 2–4(or 5) together, 10–16(–20) cm, slender. Male flowers: in shortly pedunculate cymules of 2–5; bracts lanceolate; perianth lobes sometimes reddish brown spotted, ovate-triangular, abaxially sparsely hairy; stamens 6, filaments longer than anthers, anthers dorsifixed, introrse. Female spikes 17–25.5 cm, hairy. Female flowers: bracts lanceolate, apex acuminate; perianth lobes deltoid-ovate, ca. 1.8 mm; style enlarged basally, stigma 3-fid. Capsule reflexed, oblong, 2–3 cm, glabrous, base rounded, apex emarginate or truncate; wings 0.4–0.6 cm wide. Seeds inserted near base of capsule, wing pointing toward capsule apex. Fl. Jul–Aug, fr. Sep–Oct.

• Forest margins, valleys, river banks; 700–2400 m. Guizhou, Sichuan, Yunnan.

A collection from SW Yunnan (Cangyuan Va Zu Zizhixian), similar to *Dioscorea martini* but with unusually large fruits, was described as *D. nanlaensis* H. Li (Fl. Yunnan. 3: 739. 1983). Its status is uncertain and further collections are needed.

27. *Dioscorea velutipes* Prain & Burkill, J. Proc. Asiat. Soc. Bengal 10: 19. 1914.

毡毛薯蕷 zhan mao shu yu

Rootstock unknown. Stem twining to left, densely tawny pubescent, ± glabrescent. Leaves alternate, simple; petiole (3–)4–6(–10) cm; leaf blade triangular-cordate, 6–12 × 4–8 cm, adaxially glabrous, abaxially tawny pubescent, basal veins 7 or 9, outermost ones not reaching apex, base cordate with rounded sinus, apex acuminate. Male thyrses solitary or 2 or 3 together, to 13 cm, occasionally borne on specialized, short, axillary shoots, tawny pubescent. Male flowers: in dense cymules of 2–4(–6), rarely solitary; bracts reddish brown dotted, ovate or narrowly so, ca. 2 mm, apex acuminate or sharply so; perianth ± densely yellowish pubescent at base, lobes elliptic, 2–3 × 0.8–1 mm, very sparsely pubescent; stamens 6, filaments longer than anthers, anthers dorsifixed, introrse. Female spike solitary, to 20 cm. Female flowers: staminodes present, inserted on perianth lobes; style cylindrical, stigma 3-fid. Capsule reflexed, oblong, 1.8–2.3 cm, glabrescent, base rounded, apex emarginate; wings 0.5–0.7 cm wide, slightly wider apically, usually slightly undulate. Seeds inserted near base of capsule, wing pointing toward capsule apex. Fl. Jul–Sep, fr. Sep–Oct.

Forests, mountain slopes; 500–2400 m. Guizhou, Yunnan [Myanmar, N Thailand].

5. *Dioscorea* sect. *Opsophyton* Uline in Engler & Prantl, Nat. Pflanzenfam. 2(5): 84. 1897.

基生翅组 ji sheng chi zu

Rootstock of annual tubers; tubers solitary or paired, usually unstalked (in Asian species), poisonous (in wild species). Stem twining to left, glabrous, rarely hairy. Bulblets present. Leaves alternate, simple; leaf blade ± ovate, margin entire. Male inflorescences of spikes or racemes clustered or in panicles. Flowers with perianth lobes free; stamens 6. Capsule reflexed at maturity, longer than wide. Seeds inserted near apex of capsule; wing pointing toward capsule base.

Five or six species: E hemisphere; one species in China.

28. *Dioscorea bulbifera* Linnaeus, Sp. Pl. 2: 1033. 1753.

黄独 huang du

Helmia bulbifera (Linnaeus) Kunth.

Tubers usually solitary, renewed annually, ovoid or pear-shaped, 4–10 cm thick; cork black; roots fibrous. Stem twining to left, glabrous, smooth. Bulblets purplish brown with orbicular spots, globose or ovoid, variable in size, weight to 300 g. Leaves alternate, simple; petiole 2.5–5.5 cm; leaf blade broadly cordate, 8–15(–26) × 2–14(–26) cm, glabrous, margin entire or slightly undulate, apex caudate-acuminate. Male spikes usually clustered in leaf axils or along leafless, axillary shoots, drooping, sometimes branched. Male flowers: solitary, ± contiguous along rachis; bract and bracteole ovate; perianth purple, lobes lanceolate; stamens 6, inserted at base of perianth, filaments nearly as long as anthers. Female spikes often 2 or more together, similar to male ones, 20–30 cm. Female flowers: staminodes 6, ca. 1/4 as long as perianth lobes. Capsule reflexed or drooping, straw-colored, densely purplish dotted, oblong-glo-

bose, 1.5–3 cm, glabrous, base and apex rounded; wings 0.25–0.7 cm wide. Seeds inserted near apex of capsule, dark brown; wing pointing toward capsule base, oblong, 1.2–1.6 × ca. 0.5 cm. Fl. Jul–Oct, fr. Aug–Nov.

Mixed forest margins, river banks, valley sides; near sea level to 2300 m. S Anhui, Fujian, S Gansu, Guangdong, Guangxi, Guizhou, Hainan, S Henan, Hubei, Hunan, S Jiangsu, Jiangxi, S Shaanxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Bhutan, Cambodia, India, Japan, Korea, Myanmar, Thailand, Vietnam; Africa, Oceania].

Sterile, fresh material can easily be recognized by the pairs of distinctive, blunt, fleshy stipules at the insertion of the petiole. These shrivel on drying and are then easily missed. They should not be confused with the reduced but still sharp-tipped prickles found at the nodes of some other species. The name *Dioscorea sativa* Linnaeus has been incorrectly applied to Chinese plants of this species in the past.

Dioscorea bulbifera is used medicinally in China, but, unlike in Africa, it is not much used as a food plant.

6. *Dioscorea* sect. *Botryosicyos* (Hochstetter) Uline in Engler & Prantl, Nat. Pflanzenfam. 2(5): 84. 1897.

复叶组 fu ye zu

Botryosicyos Hochstetter, Flora 27(Bes. Beil. Bd. 1): 3. 1844.

Rootstock of perennial tubers irregular in shape. Stem twining to left. Bulblets present or absent. Leaves alternate, palmately 3–9-foliolate; leaflets ± orbicular to narrowly lanceolate, pinnately veined, margin entire; lateral leaflets similar to central one. Male inflorescences of spikes or racemes clustered or in panicles. Flowers solitary, pedicellate; bract and bracteole(s) borne on pedicel or at base of perianth, often forming an involucre around flower; perianth lobes connate at base; stamens usually 3, alternating with 3 staminodes. Female spike occasionally branched. Capsule reflexed at maturity, longer than wide. Seeds inserted near apex of capsule; wing pointing toward capsule base.

About 30 species: Africa, Asia, Europe; nine species (four endemic) in China.

Prain and Burkill treated the members of this section within *Dioscorea* sect. *Lasiophyton*, but the differences in leaflet venation, male bracts, stamen number, and chemistry justify the resurrection of *D.* sect. *Botryosicyos*.

1a. Stem not prickly.

2a. Bulblets black at maturity, globose, glabrous, smooth; leaf blade glabrous or sparsely hairy along

veins 29. *D. melanophyma*

2b. Bulblets not black at maturity, not globose, rough or with warty projections; leaf blade ± uniformly hairy.

3a. Stem hairs spreading; male flowers 2–3.5 × 2–3 mm; tubers ovoid, cork brown 30. *D. kamoensis*

3b. Stem hairs appressed; male flowers 1–2 × ca. 1.5 mm; tubers cylindrical, cork yellowish white 31. *D. delavayi*

1b. Stem and/or petioles prickly, particularly toward base of plant.

4a. Capsule 1.8–2.5 cm; leaf blade abaxially sparsely hairy or glabrous.

5a. Capsule not black at maturity; leaflets 3, suborbicular to broadly obovate; tubers with 3–10 or more branches, each end enlarged into an ovoid or ellipsoid tuber 32. *D. menglaensis*

5b. Capsule black at maturity; leaflets 3–7, obovate to oblanceolate; tubers simple, long ovoid 33. *D. pentaphylla*

4b. Capsule 3.5–7 cm; leaf blade abaxially hairy, sometimes densely so.

6a. Whole plant densely grayish white tomentose 34. *D. esquirolii*

6b. Whole plant white or brown pubescent.

7a. Leaflets ovate-elliptic, abaxially densely white pubescent 37. *D. xizangensis*

7b. Leaflets lanceolate, abaxially sparsely hairy, glabrescent.

8a. Leaflets leathery 35. *D. scortechinii*

8b. Leaflets ± herbaceous 36. *D. cumingii*

29. *Dioscorea melanophyma* Prain & Burkill, J. Proc. Asiat. Soc. Bengal 4: 452. 1908.

黑珠芽薯蓣 hei zhu ya shu yu

Dioscorea tenii R. Knuth.

Tubers ovoid or pear-shaped; roots slender, fibrous. Stem twining to left, glabrous. Bulblets present, black at maturity, 5–7 mm in diam., smooth. Leaves alternate, palmately 3- or 5(or 7)-foliolate, simple distally on stem; leaflets ovate-lanceolate to lanceolate or narrowly elliptic; middle leaflet larger than lateral

ones, 2.8–13 × 1–4 cm, glabrous or puberulent along veins, smooth, pinnately veined, margin entire or slightly undulate, apex acuminate. Male spike forming a panicle; axis puberulent. Male flowers: subsessile; bracts abaxially puberulent; perianth yellowish white, abaxially puberulent; stamens 3; staminodes 3. Female spikes solitary or paired. Capsule reflexed, ca. 1.5 cm, smooth, base and apex rounded; wings ca. 0.5 cm wide. Seeds inserted near apex of capsule; wing pointing toward capsule base, oblong. Fl. Aug–Oct, fr. Oct–Dec.

Open scrub forests, forest margins; 1300–2500 m. Guizhou, Sichuan, E Xizang (Bomi Xian), Yunnan [Nepal].

30. *Dioscorea kamoensis* Kunth, Enum. Pl. 5: 395. 1850.

毛芋头薯蓣 mao yu tou shu yu

Dioscorea bonatiana Prain & Burkill; *D. dissecta* R. Knuth; *D. fargesii* Franchet; *D. firma* R. Knuth; *D. kamoensis* var. *fargesii* Prain & Burkill; *D. kamoensis* var. *straminea* Prain & Burkill; *D. mairei* R. Knuth (1924), not H. Léveillé (1913); *D. mengtzeana* R. Knuth; *D. subfusca* R. Knuth.

Tubers usually subovoid; roots fibrous. Stem twining to left, brown puberulent when young, glabrescent. Bulblets present. Leaves alternate, palmately 3- or 5-foliolate; petiole 2–10 cm, very rarely softly prickly at base; leaflets paler abaxially than adaxially, obovate- or lanceolate-elliptic to elliptic, 2–14 × 1–5 cm, densely to sparsely puberulent, sometimes adaxially glabrescent, pinnately veined, base attenuate into indistinct petiolule, margin entire, apex long acuminate; lateral leaflets slightly smaller than middle one, oblique. Male spikes or racemes solitary or 2 or 3(–8) together, rarely branched, dense, to 7 cm, rarely forming axillary panicles to 8 cm; axis pale yellow to reddish spreading pubescent; peduncle densely brown or light yellow puberulent. Male flowers: solitary; pedicel 0.5–1.5 mm; bract and bracteole similar, triangular-ovate, 2–3.5 mm, exceeding perianth and forming an involucre around it, densely brown or light yellow puberulent, apex long acuminate; perianth lobes 1.5–2.5 mm, densely brown or light yellow appressed puberulent abaxially; stamens 3. Female spikes solitary or paired, rarely 3 together, to 24 cm. Capsule oblong to oblong-oblancheolate, 1.5–2(–2.4) cm, puberulent; wings 0.5–0.6 (–0.75) cm wide. Seeds inserted near apex of capsule; wing pointing toward capsule base. Fl. Jul–Sep, fr. Sep–Nov.

Secondary scrub forests, forest margins, valleys; 500–2900 m. Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, Xizang, Yunnan, S Zhejiang [Bhutan, Sikkim, Vietnam].

Precociously flowering material has been recognized as a distinct species, *Dioscorea ochroleuca* K. Y. Guan & D. F. Chamberlain (Edinburgh J. Bot. 49: 85. 1992), but the present authors prefer to follow Prain and Burkill, who treated such material as an unusual growth form of *D. kamoensis*. Material with deep red hairs was also recognized recently as a distinct species, *D. brevifolia* K. Y. Guan & D. F. Chamberlain (loc. cit.: 46), but, again, we prefer to include it within the very variable *D. kamoensis*, in which the indumentum color varies greatly. It should be noted that both names *D. ochroleuca* and *D. brevifolia* are invalid as they were based on the invalid names *D. kamoensis* var. *praecox* Prain & Burkill and *D. kamoensis* var. *brevifolia* Prain & Burkill, respectively, and thus lack validating diagnoses.

31. *Dioscorea delavayi* Franchet, Rev. Hort. 68: 541. 1896.

高山薯蓣 gao shan shu yu

Dioscorea burkillii R. Knuth; *D. engleriana* R. Knuth; *D. henryi* (Prain & Burkill) C. T. Ting; *D. kamoensis* Kunth var. *delavayi* (Franchet) Prain & Burkill; *D. kamoensis* var. *engleriana* (R. Knuth) Prain & Burkill; *D. kamoensis* var. *henryi* Prain & Burkill; *D. rotundifoliolata* R. Knuth.

Tubers vertical, cylindrical. Stem twining to left, appressed puberulent when young, glabrescent. Leaves alternate, palmately 3- or 5-foliolate; leaflets obovate to narrowly elliptic, sparsely appressed puberulent, sometimes adaxially glabrescent; lateral leaflets usually obliquely ovate to obliquely ovate-elliptic, 2.5–16 × 1–10 cm, margin entire, apex acuminate or sharply so. Male spikes solitary or a few together, pendent, lax; rachis and pedicels puberulent. Male flowers: sessile; bracteoles sparsely puberulent or glabrescent; perianth lobes 1–2 × 1.5–2 mm, glabrous abaxially; stamens 3, inserted at base of outer perianth lobes; staminodes 3, large. Female spikes solitary of 2 or 3 together; peduncle and bracteoles puberulent. Female flowers: perianth abaxially and ovary puberulent. Capsule obovoid-oblong or oblong, (1–)1.2–1.7(–2) cm, sparsely pubescent; wings 0.4–0.6 cm wide. Seeds inserted near apex of capsule; wing pointing toward capsule base. Fl. Jun–Sep, fr. Aug–Nov.

• Secondary scrub forests, forest margins; 2000–3000 m. N Guizhou, W Sichuan, Yunnan.

32. *Dioscorea menglaensis* H. Li, Fl. Yunnan. 3: 744. 1983.

石山薯蓣 shi shan shu yu

Rhizome usually 3–10-branched, to 20 cm, each end enlarged into a globose or ellipsoid tuber ca. 5 cm in diam.; cork yellowish white; transverse section white. Stem twining to left, brown or white puberulent, glabrescent except at nodes, sparsely prickly. Leaves alternate, palmately 3-foliolate, simple distally on stem; middle leaflet lanceolate or subelliptic, 7–20 × 3–11 cm, pinnately veined, veins white pubescent, base cuneate, margin entire, apex acuminate; lateral leaflets ovate-elliptic, base obliquely cuneate, apex acute. Male spike branched, to 20 cm. Male flowers: sessile or subsessile; bract and bracteole broadly triangular-ovate, margin white pubescent abaxially; stamens 3. Capsule straw-colored at maturity, long ellipsoid, 2–3 cm, base slightly cordate, apex rounded; wings ca. 0.8 cm wide. Seeds inserted near apex of capsule; wing pointing toward capsule base. Fl. Sep–Oct, fr. Dec–Feb.

• Evergreen broad-leaved forests, scrub forests; 900–1500 m. W Yunnan.

This species includes material misidentified as *Dioscorea arachidna* Prain & Burkill in earlier accounts, including that in FRPS. True *D. arachidna*, though sharing the same distinctive rootstock, differs from *D. menglaensis* in its much narrower leaflets and lack of prickles, and much more closely resembles members of the *D. kamoensis* complex.

33. *Dioscorea pentaphylla* Linnaeus, Sp. Pl. 2: 1032. 1753.

五叶薯蓣 wu ye shu yu

Dioscorea changjiangensis F. W. Xing & Z. X. Li; *D. codonopsidifolia* Kamikoti.

Tubers irregular, usually long ovoid; transverse section white when fresh, becoming brown; roots fibrous. Stem twining to left, sparsely puberulent, glabrescent, prickly. Bulblets present. Leaves alternate, palmately 3–7-foliolate; petiole 5–11 cm, densely reddish brown pubescent; leaflets ovate to lanceolate, 6.5–24 × 1.5–9 cm, adaxially glabrous, abaxially appressed pubescent, sometimes glabrescent, pinnately veined, base attenuate into a ± tomentose petiolule, margin entire, apex acute. Male spikes in axillary panicles to 50 cm, often with long, lateral branches; axis brown pubescent. Male flowers: sessile or subsessile; bract and bracteole reniform, forming an involucrel around perianth, sparsely hairy, apex cuspidate; stamens 3. Female spikes simple or branched, brown puberulent. Female flowers: bracts, perianth, and ovary hairy. Capsule black at maturity, long ellipsoid, 2–2.5 cm, thinly leathery, sparsely hairy; wings 0.5–0.6 cm wide. Seeds inserted near apex of capsule; wing pointing toward capsule base. Fl. Aug–Oct, fr. Nov–Feb.

Scrub forests, forest margins; 500–1500 m. S Fujian, Guangdong, Guangxi, S Hunan, S Jiangxi, Taiwan, SE Xizang (Médog Xian), Yunnan [Bangladesh, India, Indonesia, Japan (Okinawa), Laos, Malaysia, Myanmar, Nepal, New Guinea, Philippines, Vietnam; Africa, Australia, Pacific Islands].

Dioscorea pentaphylla is an extremely widespread and variable species, such that Prain and Burkill recognized a total of 16 varieties in their revision of Asian species of *Dioscorea*. Synonyms based on material from outside China are not listed here. *Dioscorea changjiangensis* was recently described from an apparently distinctive collection from Hainan, but, when this is considered within the total range of variation shown by the species, we believe that it has to be included within *D. pentaphylla*. *Dioscorea codonopsidifolia*, known only from the type collection from N Taiwan, is also included here for similar reasons. Most Chinese material has a reddish brown indumentum but this is not constant for the species throughout its range.

34. *Dioscorea esquirolii* Prain & Burkill, Bull. Misc. Inform. Kew 1931: 426. 1931.

七叶薯蓣 *qi ye shu yu*

Plants grayish white tomentose throughout except leaf blade adaxially. Rootstock unknown. Stem twining to left, prickly. Leaves alternate, palmately 3- or 5(or 7)-foliolate; petiole to 15 cm, sometimes prickly; middle leaflet broadly oblanceolate or lanceolate-elliptic; 7–23 × 3–8.5 cm, adaxially glabrescent, abaxially fawn tomentose, base cuneate into petiolule to 8 mm, margin entire or undulate, apex caudate-acuminate; lateral leaflets ovate-elliptic to obliquely lanceolate. Male spikes to 2.5 cm, in axillary panicles to more than 40 cm with long, lateral branches, most parts densely pale brown tomentose. Male flowers: pedicel ca. 0.5 mm; outer perianth lobes triangular-ovate, inner ones suboblong; stamens 3, inserted at base of outer perianth lobes; staminodes 3. Female spikes up to 4 together, 20–50 cm. Capsule oblong-obovoid, 3.5–4(–5) cm; wings 1–1.5 cm wide. Seeds inserted near apex of capsule; wing pointing toward capsule base. Fl. Oct–Feb, fr. Dec–Apr.

• Forests, mountain slopes; 600–1500 m. C and W Guangxi, S Guizhou (Luodian Xian), NW and SE Yunnan (Funing Xian, Jianchuan Xian).

35. *Dioscorea scortechinii* Prain & Burkill var. **parviflora**

Prain & Burkill, Bull. Misc. Inform. Kew 1936: 494. 1936.

小花刺薯蓣 *xiao hua ci shu yu*

Tubers branched; cork brown; transverse section light brown. Stem twining to left, brown (when young) hispidulous, sparsely prickly. Leaves alternate, palmately 3–7-foliolate; petiole sometimes softly prickly; middle leaflet lanceolate or long elliptic, 5–15(–25) × 2–5(–7.5) cm, leathery, hispidulous, margin entire or undulate, apex caudate-acuminate; lateral leaflets obliquely long elliptic-ovate to obliquely lanceolate, smaller than middle leaflet. Inflorescence axis, peduncle, pedicels, and bracts of both sexes all densely hispidulous. Male inflorescence racemose. Male flowers: pedicel ca. 0.5 mm; bract and bracteoles broadly ovate or long acuminate, forming an involucrel around perianth; outer perianth lobes ovate, inner ones suboblong; stamens 3, inserted at base of outer perianth lobes; staminodes spatulate, longer than stamens. Female spikes simple. Capsule oblong, 3.5–5 cm, densely fawn woolly, hairs readily rubbed off, base truncate, apex subtruncate to rounded; wings 1–1.5 cm wide. Seeds inserted near apex of capsule; wing pointing toward capsule base. Fl. Jun–Sep, fr. Oct–Jan.

Forests; 200–1300 m. Hainan, ?Yunnan [?Thailand, Vietnam].

The material from Yunnan and Thailand has not been seen by the present authors and may belong to *Dioscorea scortechinii* var. *scortechinii*, which is recorded from Malaysia and differs mainly in its larger flowers.

36. *Dioscorea cumingii* Prain & Burkill, J. Proc. Asiat. Soc. Bengal 4: 449. 1908.

吕宋薯蓣 *lu song shu yu*

Dioscorea cumingii var. *inaequifolia* (Elmer ex Prain & Burkill) Burkill; *D. cumingii* var. *polyphylla* (R. Knuth) Burkill; *D. heptaphylla* Sasaki; *D. inaequifolia* Elmer ex Prain & Burkill; *D. polyphylla* R. Knuth.

Rootstock unknown. Stem twining to left, minutely yellow puberulent, prickly. Leaves alternate, palmately (3 or)5- or 7(or 9)-foliolate; petiole 7–9 cm; middle leaflet lanceolate, 8–12.5 (–18) × 3–4.2 cm, ± herbaceous, puberulent, glabrescent except along veins, pinnately veined, base attenuate into indistinct petiolule, margin entire, apex caudate-acuminate; lateral leaflets obliquely elliptic, 6.5–9 × 2.3–3.2 cm, usually ± 2-veined from near base. Male spikes to 1.5 cm, in axillary panicles to 50 cm with 2 levels of branching, most parts densely gray tomentose. Male flowers: solitary; pedicel to 0.6 mm; bract and bracteoles forming involucrel around perianth, bract cordate, ca. 1.5 mm, longer than perianth, bracteoles ovate, equaling perianth, tomentose, apex caudate; perianth drying dark, glabrescent, outer lobes oblong-ovate, to 2 mm, inner ones slightly smaller than outer; stamens 3; staminodes longer than stamens. Female spike solitary, 16–30 cm. Capsule oblong, 4–5 cm, puberulent when young, glabrescent, base cuneate, apex rounded; wings 0.9–1.3 cm wide. Seeds inserted near apex of capsule; wing pointing toward capsule base, ca. 0.9 × 0.5 cm. Fl. Apr, fr. Aug–Feb.

Taiwan (Lan Yu opposite SE coast), ?Yunnan [Indonesia, Philippines].

No material from Yunnan has been seen by the present authors, and the record from there requires confirmation, especially because

there are no other records from the Asian mainland.

37. *Dioscorea xizangensis* C. T. Ting in C. T. Ting & M. C. Chang, Acta Phytotax. Sin. 20: 205. 1982.

藏刺薯蕷 zang ci shu yu

Rootstock unknown. Stem twining to left, terete, brown hairy, sparsely prickly. Leaves alternate; palmately 5-foliolate; petiole 12–17 cm, grooved; middle leaflet elliptic, ca. 20 × 10 cm, adaxially glabrescent, abaxially long white pubescent, base narrowly cuneate into hairy petiolule 1–2 cm, margin entire,

7. *Dioscorea* sect. *Lasiophyton* Uline in Engler & Prantl, Nat. Pflanzenfam. 2(5): 84. 1897.

白薯蕷组 bai shu liang zu

Rootstock of perennial tubers variable in shape. Stem twining to left. Bulblets present or absent. Leaves alternate, palmately 3-foliolate; leaflets ± ovate, palmately veined, margin entire; lateral leaflets oblique. Male inflorescences of spikes or racemes arranged in panicles. Flowers solitary; bract and bracteole(s) borne on or at base of pedicel; perianth lobes connate at base; stamens 6, all fertile. Capsule reflexed, longer than wide. Seeds inserted near apex of capsule; wing pointing toward capsule base.

About five species: mainly in Africa, also in Asia and Europe; one species in China.

Most members of this section in the sense of Prain and Burkill have been transferred to *Dioscorea* sect. *Botrysosicyos*. The remaining species, *D. hispida*, is the only Chinese *Dioscorea* to produce alkaloids.

38. *Dioscorea hispida* Dennstedt, Schluss. Hort. Malab. 15, 33. 1818.

白薯蕷 bai shu liang

Dioscorea daemona Roxburgh; *D. hispida* var. *daemona* (Roxburgh) Prain & Burkill; *D. mollissima* Blume.

Tubers brown, ovoid or irregularly shaped, variable in size, poisonous; transverse section white. Stem twining to left, to 30 cm, terete, stout, pubescent when young, glabrescent, prickly. Leaves alternate, palmately 3-foliolate; petiole to 30 cm, hairy; middle leaflet ± ovate to elliptic, 6–12(–17.5) × 4–12 cm, adaxially sparsely hispid, glabrescent, abaxially hispid, palmately veined, apex acuminate; lateral leaflets ovate-ellip-

8. *Dioscorea* sect. *Enantiophyllum* Uline in Engler & Prantl, Nat. Pflanzenfam. 2(5): 87. 1897.

周生翅组 zhou sheng chi zu

Rootstock of vertical, usually annual tubers (renewed each year). Stem twining to right. Bulblets present or absent. Leaves opposite or alternate, simple; leaf blade broadly ovate to narrowly oblong, margin entire. Male inflorescences spikes, solitary or clustered, or grouped into axillary or terminal panicles. Flowers solitary, sessile; perianth lobes free, incurved; stamens 6, rarely 3 reduced to staminodes, anthers introrse. Female spike sometimes branched. Capsule not reflexed at maturity, usually wider than long. Seeds inserted near middle of capsule, winged all round.

About 120 species or more: mainly in tropical Africa and Asia, none common to both continents; 14 species (five endemic, one introduced) in China.

1a. Stem narrowly winged, wings usually 4, sometimes more basally 51. *D. alata*

1b. Stem terete or with 4–8 low, longitudinal ridges.

2a. Stem hairy when young; leaf blade sparsely hairy, apex caudate and hardened, ± sharply pointed 52. *D. decipiens*

2b. Stem glabrous; leaf blade glabrous, apex not hardened.

3a. Leaf blade with sides concave due to enlargement of basal lobes, sometimes ± 3-lobed.

4a. Leaf blade often drying gray-green, often distinctly 3-lobed, less than 3 × as long as wide, ± papery; male inflorescences pendent, rachis clearly zigzagged 41. *D. polystachya*

4b. Leaf blade drying brownish, often sagittate or hastate, sometimes more than 3 × as long as wide, often membranous; male inflorescences ± erect, rachis straight.

5a. Leaf blade broadly ovate to linear, not pruinose abaxially, reticulate veins not very prominent ... 42. *D. japonica*

5b. Leaf blade lanceolate to linear, pruinose abaxially when fresh, reticulate veins slender but prominent 43. *D. linearicordata*

apex shortly acuminate, subcuspidate; lateral leaflets obliquely ovate-elliptic, smaller than middle one. Male inflorescence not seen. Female spikes sometimes branched, 7–25(–35) cm. Capsule brown or black at maturity, oblong, 4–6 cm, sparsely brown or white pilose, base slightly cordate or truncate, apex truncate; wings 1–1.2 cm wide. Seeds inserted near apex of capsule; wing pointing toward capsule base. Fr. Sep–Oct.

• Broad-leaved forests, mountain slopes; ca. 1200 m. SE Xizang (Mêdog Xian).

tic or nearly broadly oblong, oblique, smaller than middle leaflet, margin entire. Male spikes in axillary panicles to 50 cm with 2 levels of branching, most parts densely tomentose. Male flowers: in dense clusters; perianth ca. 1 mm, outer lobes smaller and thinner than inner ones; stamens 6. Female spike solitary, to 40 cm. Capsule long ellipsoid, 3.5–7 cm, leathery, densely pubescent; wings 1.2–1.5 cm wide. Seeds inserted near apex of capsule; wing pointing toward capsule base. Fl. Apr–May, fr. Jul–Sep.

Scrub forests, forest margins; near sea level to 1500 m. Fujian, Guangdong, Guangxi, E Xizang (Bomi Xian, Qamdo Xian), Yunnan [Bhutan, India, Indonesia, Sikkim, Thailand].

- 3b. Leaf blade with convex sides, basal lobes not enlarged.
- 6a. Plants with fruits.
- 7a. Capsule obovoid, oblong-obovoid, or ellipsoid, longer than wide; leaf blade suborbicular or ovate.
- 8a. Capsule obovoid or oblong-obovoid, apex concave; leaf blade orbicular 39. *D. aspersa*
- 8b. Capsule ellipsoid, apex rounded; leaf blade suborbicular to ovate 40. *D. bicolor*
- 7b. Capsule oblate or conical-globose, wider than long.
- 9a. Leaf blade ovate-lanceolate or oblong to linear, 0.7–3(–4) cm wide, abaxially greenish white or pruinose.
- 10a. Stem often prickly basally; leaf blade leathery, usually with prominent, closely spaced, reticulate veins; capsule 1.8–3.5 cm, wings 1.2–2.7 cm wide; tuber transverse section drying purplish red 45. *D. cirrhosa*
- 10b. Stem not prickly; leaf blade thinly papery; capsule 1.5–2 cm, wings 1–1.5 cm wide; tuber transverse section drying pale.
- 11a. Leaf blade lanceolate to linear, 5–15 cm, base sagittate to cordate 43. *D. linearicordata*
- 11b. Leaf blade oblong or obovate-oblong to ovate-lanceolate, 2–7(–9) cm, base rounded 44. *D. benthamii*
- 9b. Leaf blade not shaped as above except sometimes distally on stem, (1–)3–22 cm wide; if leaf blade shaped similarly to above then abaxially neither greenish white nor pruinose.
- 12a. Stem often 4–8-ridged; stem, petioles, and main leaf veins often drying reddish brown abaxially, leaf veins sometimes with longitudinal, whitish zone adaxially 49. *D. persimilis*
- 12b. Stem terete; stem, petioles, and main leaf veins drying greenish or whitish abaxially, leaf veins without whitish zone adaxially.
- 13a. Tuber cork deciduous; leaf blade drying blackish, usually ovate or long elliptic-ovate to lanceolate, base cordate to truncate or rounded, rarely sagittate or hastate 47. *D. glabra*
- 13b. Tuber cork persistent.
- 14a. Leaf blade usually elliptic-ovate to broadly lanceolate, 1.5–8(–13) cm wide ... 48. *D. fordii*
- 14b. Leaf blade orbicular to ovate or narrowly elliptic-ovate, 4–22 cm wide.
- 15a. Leaf blade orbicular to broadly ovate, base cordate to deeply so with narrow sinus, basal lobes rounded 46. *D. wallichii*
- 15b. Leaf blade ovate to narrowly elliptic-ovate, base sagittate or hastate to shallowly cordate, basal lobes bluntly angular 50. *D. exalata*
- 6b. Plants with male flowers.
- 16a. Male spikes in axils of normal leaves, sometimes leaves progressively reduced to bracts distally on stem to form a terminal panicle.
- 17a. Male inflorescence axis distinctly zigzagged; leaf blade base rounded, apex usually with distinct, darker acumen; inflorescence spreading 44. *D. benthamii*
- 17b. Male inflorescence axis straight or nearly so; leaf blade base sagittate or hastate to cordate (sometimes subtruncate or rounded and then inflorescence often ± erect), apex without distinct acumen.
- 18a. Leaf blade lanceolate to linear, more than 4 × as long as wide, abaxially pruinose 43. *D. linearicordata*
- 18b. Leaf blade orbicular or oblong to ovate-lanceolate, less than 3 × as long as wide, abaxially not pruinose.
- 19a. Male flowers cuneate at base; buds ellipsoid; leaf blade drying dark brown, orbicular 39. *D. aspersa*
- 19b. Male flowers truncate at base, pressed to inflorescence axis; buds ± cylindrical or conical; leaf blade drying yellowish green to light brown, suborbicular to lanceolate.
- 20a. Flower buds conical; leaf blade suborbicular to broadly ovate 40. *D. bicolor*
- 20b. Flower buds ± cylindrical; leaf blade broadly ovate basally on stem, usually triangular-lanceolate to linear distally on stem 42. *D. japonica*
- 16b. Male spikes in specialized, lateral panicles, with bracts sharply differentiated from normal leaves.
- 21a. Male inflorescence axis distinctly zigzagged; basal lobes of leaf blade often distinctly angular.
- 22a. Leaf blade veins often drying whitish adaxially, tinged reddish abaxially 49. *D. persimilis*
- 22b. Leaf blade veins not drying whitish adaxially, pale abaxially.
- 23a. Inner perianth lobes obovate 48. *D. fordii*
- 23b. Inner perianth lobes spatulate 50. *D. exalata*
- 21b. Male inflorescence axis straight.
- 24a. Leaf blade greenish white abaxially when fresh, sometimes drying brown, base

- always rounded; tuber flesh drying purple-red, bark persistent 45. *D. cirrhosa*
- 24b. Leaf blade only slightly paler abaxially than adaxially, base rounded (when tuber bark deciduous) to sagittate or hastate; tuber flesh never purple-red.
- 25a. Tuber bark deciduous; leaf base cordate to truncate or rounded, rarely sagittate or hastate; stem prickly basally 47. *D. glabra*
- 25b. Tuber bark persistent; leaf base sagittate or hastate to cordate; stem not prickly 46. *D. wallichii*

39. *Dioscorea aspersa* Prain & Burkill, J. Proc. Asiat. Soc. Bengal 4: 447. 1908.

丽叶薯蓣 *li ye shu yu*

Dioscorea pulvereae Prain & Burkill.

Tubers cylindrical; transverse section white. Stem twining to right, glabrous. Leaves opposite basally on stem, alternate distally on stem, simple; petiole 3.5–18 cm; leaf blade drying dark brown, suborbicular, 6–16 × 5–16 cm, papery, glabrous, basal veins 7 or 9, base cordate to deeply so, margin entire, apex acute to caudate. Male spikes solitary or 2 or 3 together, 5–14 cm; rachis straight. Male flowers: perianth white, greenish white, or yellow, 2–3 mm, outer lobes broadly ovate, fleshy, inner ones smaller than outer; stamens 6, anthers nearly as long as filaments. Female spike solitary. Female flowers: perianth lobes ovate. Capsule not reflexed, obovoid or long obovoid, 2.5–3.5 cm, pruinose, base usually oblique, apex emarginate; wings 1–1.5 cm wide. Seeds inserted near middle of capsule, winged all round. Fl. Jun–Jul, fr. Jul–Nov.

- Forests, mountain slopes; 1600–2100 m. W Guizhou, E Yunnan.

40. *Dioscorea bicolor* Prain & Burkill, J. Proc. Asiat. Soc. Bengal 4: 449. 1908.

尖头果薯蓣 *jian tou guo shu yu*

Rootstock unknown. Stem twining to right, slender, glabrous. Leaves opposite or alternate, simple; petiole 4–9 cm; leaf blade orbicular or ovate, 4–13 × 3.5–11 cm, glabrous, basal veins 7 or 9, base cordate to broadly so, margin entire, apex acute to acuminate. Male spikes solitary or 2 or 3 together, 4–12 cm; rachis straight. Male flowers: outer perianth lobes purplish brown dotted, orbicular, ca. 2 mm, apex obtuse, inner ones obovate-orbicular, smaller than outer; stamens 6, anthers nearly as long as filaments. Female spike solitary. Female flowers: outer perianth lobes ovate; staminodes small. Capsule not reflexed, ellipsoid, ca. 2.5 cm, apex not emarginate; wings ca. 0.8 cm wide. Seeds inserted near middle of capsule, winged all round. Fl. Aug–Sep, fr. Aug–Oct.

- Herb communities, mountain valleys; 1600–2100 m. SW Sichuan, N Yunnan.

41. *Dioscorea polystachya* Turczaninow, Bull. Soc. Imp. Naturalistes Moscou 10(7): 158. 1837.

薯蓣 *shu yu*

Dioscorea batatas Decaisne; *D. decaisneana* Carrière; *D. doryphora* Hance; *D. potaninii* Prain & Burkill; *D. rosthornii* Diels; *D. swinhoei* Rolfe.

Tubers vertical, cylindrical, to 1 m; transverse section white. Stem twining to right, often purplish red, glabrous. Bulblets

present in leaf axils. Leaves alternate basally on stem, mostly opposite distally on stem, rarely in whorls of 3, simple; petiole 2–3 cm; leaf blade often drying grayish or greenish, ovate-triangular to sagittate, usually 3-lobed, relatively wide and ± entire on juvenile leaves, 3–7(–16) × 2–7(–14) cm, papery to thinly leathery, glabrous, basal veins 5 plus 1 or 2 pairs restricted to basal lobes, base shallowly (rarely to deeply) cordate to subtruncate, apex acuminate; lateral lobes auriculate, subrectangular to oblong, rounded. Male spikes 2–8 together, erect, 2–8 cm, rarely paniculate; rachis obviously zigzagged. Male flowers: sessile; bracts triangular-ovate, ca. 1 mm; perianth yellow with purplish brown dots, outer lobes broadly ovate, 1.3–2 × 0.8–1.2 mm, concave, inner ones ovate, smaller than outer; stamens 6. Female spikes solitary or 2 or 3 together. Capsule not reflexed, oblate or globose, (1.2–)1.7–2 cm, pruinose; wings 0.7–1.5 cm wide. Seeds inserted near middle of capsule, winged all round. Fl. Jun–Sep, fr. Jul–Nov.

Forests, scrub forests, herb communities, mountain slopes, along rivers, roadsides, also commonly cultivated; 100–2500 m. Anhui (S of Huai He), Fujian, E Gansu, N Guangdong, Guangxi, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, S Shaanxi, Shandong, Sichuan, Taiwan, N Yunnan, Zhejiang [Japan, Korea].

The name *Dioscorea opposita* Thunberg (Fl. Jap. 151. 1784) has been widely used in the sense of *D. polystachya*, which is an earlier name for *D. batatas*. It was based on a misidentification of Japanese material as the strictly Indian species *D. oppositifolia* Linnaeus, which was cited as a synonym in the protologue, thus rendering *D. opposita* nomenclaturally superfluous and an illegitimate name.

An important food crop.

42. *Dioscorea japonica* Thunberg in Murray, Syst. Veg., ed. 14, 889. 1784.

日本薯蓣 *ri ben shu yu*

Tubers vertical, long cylindrical, to 3 cm in diam.; cork yellowish brown; transverse section white or yellowish white. Stem twining to right, green, sometimes light purplish red. Bulblets often present. Leaves alternate basally on stem, opposite distally on stem, simple; petiole 1.5–4(–6) cm; leaf blade drying yellowish green to light brownish, broadly ovate basally on stem, usually triangular-lanceolate to linear distally on stem, 3–12(–19) × 1–6(–18) cm, membranous or papery, glabrous, basal veins 5–9, base sagittate or hastate to cordate or ± truncate, margin entire, apex acute to long acuminate. Male spikes 3–5 together, rarely solitary, ± erect or ascending, 2–8 cm; rachis straight, occasionally slightly zigzagged at apex. Male flowers: perianth greenish white or light yellow, lobes purple spotted, ovate or ovate-elliptic, to 2 × 1.5 mm, inner ones smaller than outer; stamens 6. Female spikes solitary or 2 or 3 together, 6–20 cm. Female flowers: staminodes 6. Capsule not reflexed,

pale brown with darker, linear freckles, oblate, 1.5–2(–2.5) cm, base truncate, apex emarginate; wings 0.7–1.5(–2) cm wide, margin dark. Seeds inserted near middle of capsule, D-shaped, ca. 1.9 cm (ca. 0.7 cm excluding wing), winged all round. Fl. May–Oct, fr. Jul–Nov.

Mixed forests and margins, scrub forests, herb communities, mountain slopes, valleys, along rivers and streams, roadsides; 100–1200 m. Anhui, Fujian, Guangdong, Guangxi, E and S Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan, Zhejiang [Japan, Korea].

- 1a. Stem, petiole, leaf blade veins abaxially, and base of female peduncle minutely puberulent when young 42c. var. *pilifera*
1b. Plants glabrous throughout.
2a. Leaf blade triangular-lanceolate or lanceolate to long elliptic, (1–)2–5(–18) cm wide 42a. var. *japonica*
2b. Leaf blade lanceolate to linear, 0.7–1.5(–3) cm wide 42b. var. *oldhamii*

42a. *Dioscorea japonica* var. *japonica*

日本薯蕷(原变种) ri ben shu yu (yuan bian zhong)

Dioscorea belophylloides Prain & Burkill; *D. japonica* var. *pseudojaponica* (Hayata) Yamamoto; *D. japonica* var. *tenuixan* Prain & Burkill; *D. kiangsiensis* R. Knuth; *D. pseudojaponica* Hayata.

Plants glabrous throughout. Petiole 2–4(–6) cm; leaf blade triangular-lanceolate or lanceolate to long elliptic, 3–11(–19) × (1–)2–5(–18) cm, membranous, basal veins 5–9, base sagittate or hastate to cordate, apex acuminate.

Mixed forests, herb communities, mountain slopes, valleys, along streams, roadsides; 100–1200 m. Anhui (S of Huai He), Fujian, Guangdong, Guangxi, S Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan, Zhejiang [Japan, Korea].

42b. *Dioscorea japonica* var. *oldhamii* Uline ex R. Knuth in Engler, Pflanzenz. 87(IV. 43): 263. 1924.

细叶日本薯蕷 xi ye ri ben shu yu

Plants glabrous throughout. Bulblets apparently not formed. Petiole 1.5–3 cm; leaf blade lanceolate to linear, 6–12 × 0.7–1.5(–3) cm, membranous, basal veins 7, base hastate to cordate or subtruncate, apex acute. Fl. Jun, fr. Sep.

• Scrub forests, mountain valleys, along rivers, roadsides. Guangdong, Guangxi, Taiwan.

42c. *Dioscorea japonica* var. *pilifera* C. T. Ting & M. C. Chang, Acta Phytotax. Sin. 20: 206. 1982.

毛藤日本薯蕷 mao teng ri ben shu yu

Stem, petiole, leaf blade veins abaxially, and base of female peduncle minutely puberulent when young. Fl. Aug–Sep.

• Scrub forests, mixed forest margins, mountain slopes, valleys, along streams, roadsides; 300–1100 m. S Anhui, Fujian, NE Guangxi, E Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Zhejiang.

43. *Dioscorea linearicordata* Prain & Burkill, Bull. Misc. Inform. Kew 1925: 61. 1925.

柳叶薯蕷 liu ye shu yu

Tubers vertical, cylindrical; cork yellowish brown; transverse section white. Stem twining to right, slender, glabrous. Bulblets present. Leaves alternate basally on stem, opposite distally on stem, simple; leaf blade lanceolate to linear, 5–15 × 0.8–2.5 cm, papery, abaxially pruinose, glabrous, basal veins 5 or 7, base sagittate or slightly cordate to rounded, margin entire, apex acuminate. Male spikes solitary or a few together, 2–5 cm; rachis straight or slightly zigzagged. Male flowers: outer perianth lobes broadly ovate, ca. 1 mm, inner ones obovate, smaller than outer. Female flowers: staminodes present. Capsule sometimes initially reflexed but later not, pale brown, dark speckled, oblate, 1.5–2 cm, base truncate, apex emarginate; wings 1–1.5 cm wide. Seeds inserted near middle of capsule, winged all round. Fl. Jun, fr. Jul.

• Open forests, scrub forests, mountain slopes; 400–800 m. Guangdong, E Guangxi, Hunan.

44. *Dioscorea benthamii* Prain & Burkill, J. Proc. Asiat. Soc. Bengal 4: 448. 1908.

大青薯 da qing shu

Dioscorea tarokoensis Hayata.

Rootstock unknown. Stem twining to right, slender, glabrous. Leaves usually opposite, simple; petiole 0.5–2 cm; leaf blade abaxially whitish, obovate-oblong or oblong to ovate-lanceolate, wider in juvenile leaves, 2–7(–9) × 0.7–4 cm, papery, glabrous, basal veins 3 or 5(or 7), base rounded, margin entire, apex acute to acuminate, usually appearing rather withered. Male spikes solitary or 2 or 3 together, 2–3 cm, or in short, axillary panicles; rachis obviously zigzagged. Male flowers: sessile; bracts purplish brown dotted, triangular-ovate, apex long acuminate; perianth lobes purplish brown dotted, outer ones orbicular or broadly ovate; stamens 6. Female spikes usually solitary or paired, 3–10 cm. Female flowers: bracts ovate, apex acuminate; outer perianth lobes broadly ovate; staminodes 6. Capsule not reflexed, oblate, ca. 1.5 cm, glabrous; wings 1.2(–1.5) cm wide. Seeds inserted near middle of capsule, winged all round. Fl. May–Jun, fr. Jul–Sep.

• Scrub forests, mountain slopes, valleys, along rivers, roadsides; 300–900 m. W Fujian, Guangdong, Guangxi, Taiwan.

45. *Dioscorea cirrhosa* Loureiro, Fl. Cochinch. 2: 625. 1790.

薯蓣 shu liang

Tubers globose, ovoid, gourd-shaped, oblong, or cylindrical; cork dark brown; transverse section light brown or red, drying purplish black. Stem twining to right, branched, green, to 20 m, glabrous, prickly at base. Leaves alternate basally on stem, opposite distally on stem, simple; petiole 2–6 cm; leaf blade adaxially dark green, abaxially whitish, ovate to linear, 5–20 × 0.6–14 cm, leathery or subleathery, glabrous, basal veins 3 or 5, reticulate veins prominent, base rounded, sometimes triangular lobed, margin entire, apex acute or acuminate. Male spikes 2–10 cm, in axillary panicles 2–14 cm or longer; rachis straight. Male flowers: outer perianth lobes ovate or broadly so, ca. 2 mm, inner ones obovate; stamens 6, slightly shorter than perianth lobes. Female spike solitary, to 12 cm. Capsule not reflex-

ed, oblate, 1.8–3.5 cm, base emarginate, attenuate into pedicel ca. 7 mm, apex emarginate; wings 1.2–2.7 cm wide. Seeds inserted near middle of capsule, 1.8–2.4 cm in diam. (ca. 0.6 cm excluding wing), winged all round, Fl. Apr–Jun, fr. Jul–Jan.

Mixed forests, broad-leaved forests, scrub forests, mountain slopes, valleys, along rivers, roadsides; near sea level to 1500 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, S Jiangxi, S and W Sichuan, Taiwan, SE Xizang, Yunnan, S Zhejiang [Thailand, Vietnam].

The tubers have a very high tannin content and are used to dye and preserve fabrics.

- 1a. Tubers usually globose, ovoid, gourd-shaped, or oblong, to 20 cm in diam., transverse section red, drying purplish black; leaf blade ovate to elliptic-lanceolate or narrowly lanceolate, (1–)2–14 cm wide 45a. var. *cirrrosa*
- 1b. Tubers cylindrical, transverse section light brown; leaf blade broadly lanceolate to oblong-lanceolate or linear, 0.6–4 cm wide 45b. var. *cylindrica*

45a. *Dioscorea cirrhosa* var. *cirrrosa*

薯蓣(原变种) shu liang (yuan bian zhong)

Dioscorea angusta R. Knuth; ?*D. formosana* R. Knuth; *D. matsudae* Hayata; *D. rhipogonoides* Oliver (1889), not Hayata (1906).

Tubers usually globose, ovoid, gourd-shaped, or oblong, to 20 cm in diam.; transverse section red, drying purplish black. Leaf blade ovate to elliptic-lanceolate or narrowly lanceolate, 5–20 × (1–)2–14 cm.

Mixed forests, broad-leaved forests, scrub forests, mountain slopes, along rivers, roadsides; 300–1500 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, S Jiangxi, S and W Sichuan, Taiwan, SE Xizang (Médog Xian), Yunnan, S Zhejiang [Thailand, Vietnam].

Material from Taiwan is somewhat distinct in that most collections tend to dry greenish and the leaf blade has less prominent tertiary venation. They have been regarded as a distinct species, *Dioscorea matsudae*, but there is no clear-cut distinction between this and typical *D. cirrhosa* var. *cirrrosa*, and so the former has been treated as a synonym of the latter. The affinities of *D. formosana* are not clear. The type collections (B, destroyed) were originally identified as a variety of *D. rhipogonoides* (var. *aculeata* Uline, nom. nud.), which is a synonym of *D. cirrhosa* var. *cirrrosa*. Prain and Burkill examined this material and noted that it was too poor to name though probably not *D. cirrhosa*. The protologue described a prominently prickly stem, a feature relatively unusual in *D.* sect. *Enantiophyllum*, so it is possible that at least part of the material might have belonged elsewhere.

45b. *Dioscorea cirrhosa* var. *cylindrica* C. T. Ting & M. C. Chang, Acta Phytotax. Sin. 20: 206. 1982.

异块茎薯蓣 yi kuai jing shu liang

Tubers cylindrical; transverse section light brown. Leaf blade broadly lanceolate to oblong-lanceolate or linear, 5–14 × 0.6–4 cm.

• Forests, open scrub forests, mountain slopes, valleys; near sea level to 500 m. Hainan.

46. *Dioscorea wallichii* J. D. Hooker, Fl. Brit. India 6: 295.

1892.

盈江薯蓣 ying jiang shu yu

Tubers palmately branched, cylindrical. Stem twining to right, stout, glabrous. Leaves opposite or alternate, simple; petiole 4–12 cm; leaf blade orbicular or ovate, 6–18 × 6–22 cm, glabrous, basal veins 7–11, base cordate to deeply so with narrow sinus and basal lobes rounded, margin entire, apex acute or shortly acuminate. Male spike 2–5 cm, in delicate, axillary panicles 4–10 cm; rachis straight. Male flowers: bracts triangular-ovate; perianth purplish red dotted, outer lobes elliptic-ovate, inner ones broadly obovate; stamens 6; staminodes large, subglobose. Female spikes simple or branched. Female flowers: perianth lobes fleshy, outer ones ovate, inner ones broadly ovate. Capsule (immature) not reflexed, drying blackish, oblate, 2–2.7 cm, glabrous, base truncate, apex emarginate to truncate; wings 1.7–2 cm wide. Seeds inserted near middle of capsule, winged all round. Fl. Dec.

Forests, mountain slopes; 900–1300 m. W Yunnan (Yingjiang Xian) [Bangladesh, India, Malaysia, Myanmar, Thailand].

47. *Dioscorea glabra* Roxburgh, Fl. Ind., ed. 1832, 3: 804. 1832.

光叶薯蓣 guang ye shu yu

Dioscorea glabra var. *longifolia* Prain & Burkill; *D. hongkongense* Uline ex R. Knuth; *D. nummularia* Roxburgh (1832), not Lamarck (1789).

Tubers cylindrical, developed from short, thick rhizome; cork deciduous; transverse section white, drying light yellow. Stem twining to right, glabrous, prickly at base. Leaves alternate basally on stem, opposite distally on stem, simple; leaf blade drying blackish, usually ovate or long elliptic-ovate to lanceolate, 5–17(–24) × 0.5–10(–13) cm, glabrous, basal veins 5–9, base cordate to truncate or rounded, rarely sagittate or hastate, apex acuminate or caudate. Male spikes solitary or 2–4 together, 1–2.5 cm, usually in narrow, axillary panicles to 14 cm; rachis straight. Male flowers: outer perianth lobes orbicular, ca. 1 mm, inner ones obovate, smaller but thicker than outer; stamens 6, inflexed. Female spikes solitary or paired, to 25 cm. Capsule not reflexed, oblate, 1.5–2.5 cm; wings 1.2–2.2 cm wide. Seeds inserted near middle of capsule, winged all round. Fl. Sep–Dec, fr. Dec–Jan.

Evergreen broad-leaved forests, scrub forests, mountain slopes, valley sides, roadsides; 200–1500 m. W Guangxi, S Yunnan [Bhutan, Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Thailand, Vietnam].

48. *Dioscorea fordii* Prain & Burkill, J. Proc. Asiat. Soc. Bengal 4: 450. 1908.

山薯 shan shu

Dioscorea hainanensis Prain & Burkill, Bull. Misc. Inform. Kew 1936: 494. 1936.

Tubers vertical, cylindrical; cork drying brown, persistent; transverse section white. Stem twining to right, glabrous, prickly at base. Leaves alternate basally on stem, opposite distally on stem, simple; leaf blade elliptic-ovate to broadly lanceolate, 4–

14(-17) × 1.5-8(-13) cm, papery, glabrous, basal veins 5 or 7, outermost ones near margin, base sagittate or hastate to deeply cordate or rounded with basal lobes slightly spreading, apex acuminate or caudate. Male spikes 2-4 together, 1.5-3 cm, in axillary panicles to 40 cm; rachis zigzagged. Male flowers: outer perianth lobes broadly ovate, 1.5-2 mm, inner ones obovate, narrower but thicker than outer; stamens 6. Female spike often solitary, to 25 cm in fruit. Capsule not reflexed, oblate, 1.5-3 cm; wings 1-2.2 cm wide. Seeds inserted near middle of capsule, winged all round. Fl. Oct-Jan, fr. Dec-Jan.

• Mixed forests, mountain slopes, valleys, along rivers, roadsides; near sea level to 1200 m. Fujian, Guangdong, Guangxi, S Hunan, S Zhejiang.

49. *Dioscorea persimilis* Prain & Burkill, J. Proc. Asiatic Soc. Bengal 4: 454. 1908.

褐苞薯蕷 he bao shu yu

Tubers vertical, cylindrical; cork yellowish brown; transverse section white. Stem twining to right, drying reddish brown, 0.1-0.6 cm thick, slender, hard, glabrous, often 4-8-ridged. Bulblets present. Leaves alternate basally on stem, opposite distally on stem, simple; leaf blade drying reddish brown, orbicular, ovate, or triangular to narrowly elliptic-ovate, 4-15 × 2-13 cm, papery, glabrous, basal veins 7 or 9, reticulate veins prominent, base sagittate or hastate or deeply or broadly cordate, margin entire, apex acute, acuminate, or caudate. Male spikes 2-4 together, 1-4 cm, usually in slender, axillary panicles to 40 cm; rachis obviously zigzagged. Male flowers: bracts purplish brown spotted, ovate, ca. 1/2 as long as perianth, apex acuminate; outer perianth lobes brown spotted, broadly ovate, ca. 1.2 × 0.7 mm, apex rounded; stamens 6. Female spikes solitary or paired. Female flowers: outer perianth lobes ovate; staminodes small. Capsule not reflexed, oblate, 1.5-2.5 cm; wings 1.2-2 cm wide. Seeds inserted near middle of capsule, winged all round. Fl. Jul-Dec, fr. Sep-Jan.

Mixed forests, scrub forests, mountain slopes, valleys, roadsides; 100-2000 m. Fujian, Guangdong, Guangxi, S Guizhou, Hunan, S Yunnan [Vietnam].

- 1a. Plants glabrous throughout 49a. var. *persimilis*
1b. Stem, petiole, leaf blade veins abaxially,
and peduncle pubescent 49b. var. *pubescens*

49a. *Dioscorea persimilis* var. *persimilis*

褐苞薯蕷(原变种) he bao shu yu (yuan bian zhong)

Plants glabrous throughout. Fl. Jul-Jun, fr. Sep-Jan.

Mixed forests, scrub forests, mountain slopes, valleys, roadsides; 100-2000 m. Fujian, Guangdong, Guangxi, S Guizhou, Hunan, S Yunnan [Vietnam].

49b. *Dioscorea persimilis* var. *pubescens* C. T. Ting & M. C. Chang, Acta Phytotax. Sin. 20: 205. 1982.

毛褐苞薯蕷 mao he bao shu yu

Stem, petiole, leaf blade veins abaxially, and peduncle pubescent. Fl. Dec, fr. Dec-Jan.

• Forests, mountain slopes; 500-1000 m. SW Guangxi (Longzhou Xian), S Yunnan.

50. *Dioscorea exalata* C. T. Ting & M. C. Chang, Acta Phytotax. Sin. 20: 208. 1982.

无翅参薯 wu chi shen shu

Tubers ovoid or cylindrical; cork drying brown; transverse section white. Stem twining to right, green or purplish red, glabrous. Leaves alternate basally on stem, opposite distally on stem, simple; leaf blade abaxially purplish red along veins, ovate to long elliptic-ovate, 6-16 × 4-14 cm, glabrous, basal veins 7 or 9, base sagittate or hastate to cordate with basal lobes bluntly angular, apex acute, acuminate, or caudate. Male spikes solitary or a few together, 2-3 cm, borne along paniclelike, lateral branches to 30 cm; rachis obviously zigzagged. Male flowers: sessile; outer perianth lobes elliptic-ovate, apex obtuse, inner ones spatulate; stamens 6. Female spikes solitary or paired. Female flowers: outer perianth lobes broadly ovate, inner ones elliptic. Capsule not reflexed, oblate, 1.5-2.5 cm; wings 1.7-2.3 cm wide. Seeds inserted near middle of capsule, winged all round.

Mixed forests, broad-leaved forests, bamboo forests, mountain slopes, valleys, roadsides; 1000-2400 m. Guangdong, Guangxi, Guizhou, Sichuan, Yunnan [Thailand, Vietnam].

51. *Dioscorea alata* Linnaeus, Sp. Pl. 2: 1033. 1753.

参薯 shen shu

Dioscorea alata var. *purpurea* (Roxburgh) A. Pouchet; *D. purpurea* Roxburgh.

Tubers variable, usually globose or conical (when cork brown or purplish black and transverse section purplish white), or oblate or cylindrical, much branched (when cork brown or grayish yellow and transverse section white). Stem twining to right, glabrous, ridged, with 4 narrow, membranous wings, prickly at base. Bulblets present, variable in shape. Leaves alternate basally on stem, opposite distally on stem, simple; petiole green or purplish red, 4-15 cm; leaf blade green or purplish red, ovate, 6-15(-20) × 4-13 cm, papery, glabrous, base sagittate to deeply cordate, apex shortly acuminate or caudate. Male spikes solitary or a few together, 1.5-4 cm, sometimes forming a panicle; rachis obviously zigzagged. Male flowers: outer perianth lobes broadly ovate, 1.5-2 mm; stamens 6. Female spikes solitary or 2 or 3 together. Female flowers: staminodes 6. Capsule not reflexed, oblate, sometimes obcordate, 1.5-2.5 cm; wings 1.2-2.2 cm wide. Seeds inserted near middle of capsule, winged all round. Fl. Nov-Jan, fr. Dec-Jan.

Cultivated. Guangdong, Hubei [probably originated in cultivation in SE Asia; now cultivated pantropically].

52. *Dioscorea decipiens* J. D. Hooker, Fl. Brit. India 6: 293. 1892.

多毛叶薯蕷 duo mao ye shu yu

Tubers vertical, cylindrical; cork brown, drying wrinkled; transverse section white or light yellow, drying slightly purplish brown. Stem twining to right, densely puberulent, glabrescent, rarely glabrous. Leaves alternate basally on stem, opposite distally on stem, simple; petiole 1-6 cm; leaf blade ovate to elliptic-ovate or ovate-lanceolate, 5-17(-20) × 3-10(-14) cm, base slightly cordate to rounded, margin entire, apex obtuse, sharply

acuminate, or caudate. Male spikes solitary or 2 or 3 together, ca. 2 cm, in axillary panicles 6–30 cm; main axis sometimes to 2 mm thick, densely and shortly pubescent; rachis straight. Male flowers: perianth greenish white, glabrous, outer lobes broadly ovate, ca. 1.2 mm, inner ones elliptic-ovate; stamens 3; staminodes 3. Female spikes to 20 cm, puberulent. Female flowers: staminodes 6. Capsule not reflexed, oblate, 1–2 cm; wings 0.7–1.7 cm wide. Seeds inserted near middle of capsule, winged all round. Fl. Sep–Jan, fr. Dec–Jan.

Evergreen broad-leaved forests, scrub, mountain slopes; 500–2200 m. Yunnan [Laos, Myanmar, Thailand].

- 1a. Stem and leaves puberulent when young 52a. var. *decipiens*
1b. Stem and leaves glabrous 52b. var. *glabrescens*

52a. *Dioscorea decipiens* var. *decipiens*

多毛叶薯蓣(原变种) duo mao ye shu yu (yuan bian zhong)

Stem and leaves puberulent when young.

Evergreen broad-leaved forests, scrub, mountain slopes; 500–2200 m. Yunnan [Laos, Myanmar, Thailand].

52b. *Dioscorea decipiens* var. *glabrescens* C. T. Ting & M. C. Chang, Acta Phytotax. Sin. 20: 206. 1982.

滇薯 dian shu

Stem and leaves glabrous.

• Forests, mountain slopes; 1100–1500 m. W Yunnan (Lincang Xian).

