

## 21. TRICHOSANTHES Linnaeus, Sp. Pl. 2: 1008. 1753.

栝楼属 *gua lou shu*

Huang Luqi (黄璐琦), Lu Anmin (路安民 *Lu An-ming*); Charles Jeffrey

*Anguina* Miller; *Cucumeroides* Gaertner; *Involucraria* Seringe.

Herbs, climbing, annual or perennial. Leaf blade simple, unlobed or palmately 3–7(–9)-lobed, rarely compound and 3–5-foliate, margin usually denticulate. Tendrils usually 2–5-fid, rarely simple. Plants dioecious, rarely monoecious; flowers usually white, rarely pink or red. Male flowers usually in racemes, rarely solitary, sometimes male peduncles in axillary pairs, one 1-flowered, caducous, other bearing a raceme; bracts variable in size and form, rarely absent; calyx tube cylindric, frequently dilated at apex; segments 5, entire, serrate, or lacinate; corolla segments 5, usually long fimbriate; stamens 3, inserted on calyx tube; filaments very short, free; anthers connate, two 2-celled, other 1-celled, cells conduplicate. Female flowers solitary, very rarely in racemes; calyx and corolla as in male flowers; ovary inferior, ovoid or fusiform, 1-loculed with 3 parietal placentas; ovules usually many, generally horizontal, half pendulous; style slender; stigmas 3, entire or bifid. Fruit globose, ovoid, or fusiform, fleshy, usually glabrous and smooth, many seeded, indehiscent. Seeds packed in pulp, 1-loculed, oblong or ovate, and compressed, or 3-loculed, turgid, with 2 lateral locules empty.

About 100 species: Asia and N Australia; 33 species (14 endemic, one introduced) in China.

- 1a. Seeds subquadrangular, obovate-triangular, oblong, or 4-angled, 3-loculed, turgid, surrounded by thick ridges.
  - 2a. Seeds 4-angled, with narrow middle ridge, 2 lateral locules broad; leaf blade abaxially glabrous or puberulent on veins ..... 33. *T. tetragonosperma*
  - 2b. Seeds subquadrangular, obovate-triangular, or oblong, 2 lateral locules narrow; leaf blade abaxially densely pubescent.
    - 3a. Leaves unlobed or irregularly shortly 3-lobed.
      - 4a. Leaf blade ovate, thinly membranous, unlobed; fruit ovoid, smooth, glabrous ..... 30. *T. baviensis*
      - 4b. Leaf blade broadly cordate, papery, unlobed or shortly 3-lobed; fruit ovoid-oblong or oblong, densely white villous ..... 31. *T. trichocarpa*
    - 3b. Leaves usually 3–7-lobed.
      - 5a. Bracts lanceolate or oblanceolate, ca. 1.6 × 0.5–0.6 cm, margin triangular-dentate; leaves adaxially glabrous or puberulent ..... 29. *T. pilosa*
      - 5b. Bracts linear-lanceolate, 2–3 mm, entire; leaves adaxially tomentose ..... 32. *T. cucumeroides*
- 1b. Seeds elliptic, ovate-elliptic, or oblong, 1-loculed, compressed or turgid.
  - 6a. Plants monoecious or dioecious; male flowers in racemes, bract very small, less than 5 mm; seed margin undulate-dentate.
    - 7a. Plants dioecious; bracts absent or ca. 5 mm; fruit cylindric, ca. 20 × 7 cm ..... 3. *T. dafangensis*
    - 7b. Plants monoecious; bracts 1–3 mm or very small or absent; fruit cylindric and 100–200 cm, or ovoid-oblong and 5–7 cm.
      - 8a. Bracts 1–3 mm; fruit cylindric, 100–200 × 3–4 cm; leaf lobes obovate ..... 1. *T. anguina*
      - 8b. Bracts absent or very small; fruit ovoid-oblong, 5–7 × 2.5–3.5 cm; leaf lobes rhombic or triangular ..... 2. *T. cucumerina*
  - 6b. Plants dioecious; male flowers solitary or in racemes or rarely in a panicle; bracts 1–6.5 cm or rarely ca. 5 mm; seed margin crenellate.
    - 9a. Leaves simple, leaf blade smooth on both surfaces; bract in male flower spreading, margin entire or sinuate-dentate.
      - 10a. Male racemes densely villous.
        - 11a. Leaves leathery, unlobed, leaf blade pubescent on veins ..... 13. *T. reticulineris*
        - 11b. Leaves papery, unlobed or 3–5-lobed.
          - 12a. Leaves unlobed; seeds subovate, 10–13 × 7–8 mm, margin undulate ..... 11. *T. kerrii*
          - 12b. Leaves 3–5-lobed or deeply lobed.
            - 13a. Leaf blade abaxially densely white sericeous; male flowers solitary, densely white sericeous ..... 12. *T. sericeifolia*
            - 13b. Leaf blade abaxially densely brownish villous; male raceme densely brownish villous ..... 20. *T. villosa*
        - 10b. Male racemes slightly hairy or villous, one peduncle 1-flowered, other bearing a raceme.
          - 14a. Leaves ovate or ovate-oblong, subleathery or leathery, unlobed or rarely 3-lobed.
            - 15a. Leaf blade papery, base cordate; fruit oblong, 7–10 × 6–7 cm ..... 10. *T. homophylla*
            - 15b. Leaf blade subleathery or leathery.

- 16a. Leaf blade subleathery, unlobed, base rounded; fruit globose, ca. 7 cm in diam. .... 8. *T. smilacifolia*
- 16b. Leaf blade leathery, unlobed or shortly to deeply 2- or 3-lobed, base truncate; fruit oblong, 12–18 × 5–10 cm ..... 9. *T. truncata*
- 14b. Leaves ovate-cordate or orbicular-cordate, papery, 3–9-lobed to middle or nearly to base.
- 17a. Male flowers solitary, smaller than 3 cm in diam.; calyx tube narrowly campanulate ..... 7. *T. hylonoma*
- 17b. Male flowers in raceme; flowers larger than 3 cm in diam.; calyx tube narrowly funnellform or cylindric.
- 18a. Leaves usually 3–5(–7)-lobed.
- 19a. Bracts in male flowers ca. 3 cm, margin entire; calyx tube funnellform, ca. 3 cm, segments linear-lanceolate, 10–15 × 1.5–2.5 mm; leaves ovate-cordate ..... 4. *T. jinggangshanica*
- 19b. Bracts in male flowers less than 2.5 cm, margin sinuate-dentate; calyx tube cylindric, dilated at apex, 20–40 × ca. 10 mm; leaves suborbicular ..... 5. *T. kirilowii*
- 18b. Leaves deeply 3–7-lobed usually up to base.
- 20a. Leaf lobes rhombic; fruiting peduncle 12–16.5 cm ..... 6. *T. mianyangensis*
- 20b. Leaf lobes linear-lanceolate or oblanceolate; fruiting peduncle 4.5–8 cm ..... 14. *T. rosthornii*
- 9b. Leaves simple or 3–5-foliolate; leaf blade white punctate; bracts large, conspicuous, margin dentate.
- 21a. Leaves 3–5-foliolate; bracts rhombic-lanceolate.
- 22a. Leaflets remotely denticulate at margin ..... 27. *T. pedata*
- 22b. Leaflets entire at margin ..... 28. *T. quinquefolia*
- 21b. Leaves simple; bracts broadly ovate or oblong.
- 23a. Flowers red, pale red, or purple.
- 24a. Seeds ovoid, turgid ..... 22. *T. dunniana*
- 24b. Seeds oblong or oblong-ovate, compressed.
- 25a. Seeds oblong, truncate at both ends, ca. 18 mm; flowers purple; calyx tube ca. 2.5 cm, segments linear; fruit orange-yellow ..... 25. *T. rugatisemina*
- 25b. Seeds oblong-ovate, 10–15 mm; flowers pale red.
- 26a. Leaf blade deeply (3–)5(–7)-lobed; calyx tube 4–6 cm, segments ovate-lanceolate, denticulate; fruit red ..... 23. *T. rubriflos*
- 26b. Leaf blade shortly 5–7-lobed or lobed to middle; calyx tube ca. 4 cm, segments narrowly lanceolate, entire; fruit orange-red ..... 24. *T. subrosea*
- 23b. Flowers white.
- 27a. Bracts entire.
- 28a. Bracts ovate, 3.5–4.3 × ca. 2.5 cm, with 2 rows of brownish puncta beside main vein; calyx segments 2–3 cm, margin sharply 2- or 3-lobed; seeds triangular-ovate; leaves membranous, abaxially glabrous, adaxially punctate, petiole 5–11 cm ..... 18. *T. quinquangulata*
- 28b. Bracts oblong, ca. 4 × 1–1.5 cm; calyx segments ca. 1 cm, entire; seeds subquadrangular; leaves papery, hirsute, petiole 14–17 cm ..... 19. *T. cordata*
- 27b. Bract margin dentate or lacerate.
- 29a. Leaves leathery.
- 30a. Bracts suborbicular, margin lacerate; calyx segments narrowly ovate, margin laciniate; leaves suborbicular ..... 17. *T. lepiniana*
- 30b. Bracts obovate-oblong, margin dentate; calyx segments narrowly lanceolate, margin dentate; leaves ovate-cordate ..... 26. *T. tricuspida*
- 29b. Leaves membranous or papery.
- 31a. Leaves papery ..... 21. *T. laceribractea*
- 31b. Leaves membranous.
- 32a. Leaf blade suborbicular, deeply palmately 5–7-lobed; bract margin crenulate; calyx segments ca. 15 mm, entire ..... 15. *T. wallichiana*
- 32b. Leaf blade orbicular-cordate or broadly ovate-cordate, unlobed or irregularly 2- or 3(–5)-lobed; bract margin lobulate with linear-lanceolate lobes; calyx segments ca. 10 mm, entire or serrate ..... 16. *T. fissibractea*

*Trichosanthes cucumerina* Linnaeus var. *anguina* (Linnaeus) Haines.

Plants annual. Stems slender, branched, angular, puberulent. Petiole 3–7 cm; leaf blade suborbicular or orbicular-reniform, 8–16 × 6–18 cm, membranous, ± deeply 5 (rarely 3–7)-lobed; lobes usually obovate, abaxially densely puberulent, adaxially subglabrous, margin finely denticulate. Plant monoecious. Male raceme usually 8–15-flowered; peduncle 10–18 cm, puberulent; pedicel erect, 5–12 cm, minutely spreading bracteate, bracts 3(–5) mm; calyx tube subcylindric, slightly dilated at apex, 2.5–3 × 4–5 mm, puberulent; segments reflexed, ca. 2 mm. Female flowers solitary; peduncle up to 1 cm; ovary narrowly fusiform, ± villous. Fruit very long, cylindric, 100–200 × 3–4 cm, smooth, sometimes contorted. Seed oblong, 11–17 × 8–10 mm, finely rugulose, margin undulate. Fl. and fr. summer–autumn.

Cultivated in China [cultivated throughout the tropics].

The fruit is eaten as vegetable. The roots and seeds are used medicinally for treating diarrhea.

One of us (Jeffrey) treats this taxon as *Trichosanthes cucumerina* var. *anguina*.

## 2. *Trichosanthes cucumerina* Linnaeus, Sp. Pl. 2: 1008. 1753.

瓜叶栝楼 *gua ye gua lou*

*Trichosanthes brevibracteata* Kundu; *T. pachyrrhachis* Kundu.

Plants annual. Stems slender, profusely branched, ± pubescent. Leaf blade reniform or broadly ovate, (5–)7–10 × 8–11 cm, membranous, ± deeply 5–7-lobed; lobes triangular or rhombic. Plants monoecious. Male peduncles in pairs, earlier 1-flowered, later bearing a raceme; raceme few flowered; peduncle slender, 15–20 cm, puberulent; pedicel erect, 0.5–1.5 cm, puberulent; bracts absent or very small; calyx tube somewhat dilated at apex, 15–16 mm. Female flowers solitary or sometimes replacing earlier male flower; ovary oblong. Fruit ovoid-oblong, 5–7 × 2.5–3.5 cm, with 7–10 seeds. Seeds ovate-oblong, 9–12 × 5–6 mm, compressed, rugulose, margin thick with toothed projections from both surfaces. Fl and fr. autumn.  $2n = 22$ .

Forests or thickets along valleys, thickets on mountain slopes; 400–1600 m. Guangxi, S Yunnan [Bangladesh, India, Indonesia, Malaysia, Myanmar, Nepal, Pakistan, Sri Lanka; N Australia].

The roots, fruit, and seeds are used medicinally.

One of us (Jeffrey) treats this taxon as *Trichosanthes cucumerina* var. *cucumerina*.

## 3. *Trichosanthes dafangensis* N. G. Ye & S. J. Li, Acta Phytotax. Sin. 27: 153. 1989.

大方油栝楼 *da fang you gua lou*

Leaf blade abaxially pale green, adaxially deep green, cordate, 10–22 × 8–20 cm, membranous, ± deeply palmately 5–7-lobed; lobes elliptic-obovate, puberulent, margin distantly denticulate, apex acuminate. Male flowers solitary, fascicled, or in short racemes; peduncle ca. 5 cm; bracts absent or ca. 5 mm; calyx tube funnellform, ca. 1 cm; segments linear-lanceolate, ca.

1 cm; pistillodes 3, claviform, ca. 5 mm. Female flowers solitary; pedicel ca. 2 cm; calyx tube shortly tubular; ovary ca. 2.5 cm, villous; staminodes 3. Fruit cylindric, ca. 20 × 7 cm, with ca. 80 seeds. Seeds ovate, ca. 1 cm, compressed, verrucose, margin sulcate, crenellate.

• Mountain slopes, thickets; 1000–1800 m. Guizhou.

## 4. *Trichosanthes jinggangshanica* C. H. Yueh, Acta Phytotax. Sin. 18: 342. 1980.

井冈栝楼 *jing gang gua lou*

Stems slender, angular, puberulent. Petiole 3–8 cm, villous; leaf blade abaxially pale green, adaxially deep green, narrowly ovate-cordate to broadly ovate-cordate, 14–20 × 10–15 cm, papery, usually ± 3–5-lobed, rarely unlobed; middle lobe ovate-triangular or ovate-lanceolate, abaxially glabrous or villous on veins, adaxially villous. Male peduncles in axillary pairs, one 1-flowered, other bearing a raceme; peduncle 4–11 cm, villous; bracts ovate or orbicular-cordate, 2–2.5 × 1.5–4 cm, base rounded, margin entire, apex acuminate, shortly stipitate; calyx tube narrowly funnellform, ca. 3 cm; segments linear-lanceolate, 10–15 × 1.5–2.5 mm. Female flowers solitary; pedicel ca. 1.5 cm; calyx tube ellipsoidal, ca. 2 cm; ovary oblong. Fruiting peduncle ca. 6 cm; fruit oblong, 8–10 cm, smooth. Fl. Mar–Jul, fr. Nov.

• Forests, thickets; 700–1500 m. SW Jiangxi.

Locally, the roots and fruit are used medicinally as “tian hua fen” and “gua lou.”

## 5. *Trichosanthes kirilowii* Maximowicz, Mém. Acad. Imp. Sci. St.-Petersbourg Divers Savans 9 [Prim. Fl. Amur.]: 482. 1859.

栝楼 *gua lou*

*Trichosanthes obtusiloba* C. Y. Wu ex C. Y. Cheng & C. H. Yueh.

Petiole 2–6 cm, striate, villous; leaf blade adaxially deep green, suborbicular, 5–20 × 5–20 cm, papery, usually 3–5(–7)-lobed up to middle, rarely deeply so (nearly up to base) or unlobed; lobes rhombic-obovate or oblong, adaxially rough, margin sometimes remotely shortly lobed, apex obtuse. Male raceme solitary or with solitary flowers in axillary pairs; peduncle 10–20 cm, robust, grooved, slightly hairy, 5–8-flowered at apex; bracts obovate or broadly ovate, 1.5–2.5(–3) × 1–2 cm, margin sinuate-dentate, shortly puberulent, stipitate; calyx tube cylindric, dilated at apex, 2–4 × ca. 1 cm; segments lanceolate, 10–15 × 3–5 mm, entire. Female flowers solitary; pedicel ca. 7.5 cm, shortly puberulent; calyx tube cylindric, ca. 2.5 × 1.2 cm; ovary oblong, 1.2–2 × ca. 1 cm. Fruiting peduncle 4–11 cm; fruit brown-yellow or orange-yellow, oblong or globose, 7–10.5 cm. Seeds sandy beige, oblong-ovate, 11–16 × 7–12 mm, marginate. Fl. May–Aug, fr. Aug–Oct.  $2n = 88$ .

Open forests, shrublands, grasslands and fields beside villages; 200–1800 m. Gansu, Hebei, Henan, Jiangsu, Jiangxi, Shandong, Shanxi, Zhejiang [Japan, Korea].

This plant is the source of “tian hua fen” (the roots), “gua lou zi” (the seeds), and “gua lou pi” (the fruit rind), which are official source drugs in traditional Chinese medicine.

**6. *Trichosanthes mianyangensis*** C. H. Yueh & R. G. Liao, Bull. Bot. Res., Harbin 2(1): 115. 1992.

绵阳栝楼 mian yang gua lou

Stems densely shortly hairy and sparsely villous. Petiole 6–9 cm, punctate, puberulent; leaf blade orbicular-cordate, 11–17 × 10–15 cm, papery, shortly 3–5-lobed or 7–9-lobed up to middle; lobes rhombic, both surfaces shortly puberulent, margin irregularly crenate-dentate, apex acuminate. Female flowers solitary; pedicel 5–7 cm, slightly villous; calyx segments linear, 10–12 × 1–1.5 mm, entire; ovary oblong, 15–20 × 8–9 mm. Fruiting peduncle 12–16.5 cm; fruit oblong, 10.5–11.5 × ca. 8.5 cm. Seeds up to 1.9 cm, smooth. Fl. May–Aug, fr. Aug–Oct.  $2n = 88^*$ .

• ?About 1000 m. Hubei, Sichuan.

**7. *Trichosanthes hylonoma*** Handel-Mazzetti, Symb. Sin. 7: 1066. 1936.

湘桂栝楼 xiang gui gua lou

*Trichosanthes leishanensis* C. Y. Cheng & C. H. Yueh; *T. parviflora* C. Y. Wu ex S. K. Chen.

Stems slender, with white lenticels. Petiole 3–9 cm; leaf blade broadly ovate or broadly cordate, 11–17 × 10–16 cm, papery, usually 3–5-lobed up to middle, sometimes irregularly 5–9-lobed; lobes oblong or rhombic-ovate, glabrous, margin remotely denticulate, apex acuminate. Male flowers solitary; pedicel setiform, 4–7 cm; calyx tube narrowly campanulate, 1.2–1.5 × ca. 0.4 cm, glabrous or remotely villous; segments erect or reflexed, linear, 6–7 mm. Female flowers unknown. Fruit orange-red, ovoid-oblong, ca. 9 × 5–6 cm, attenuate at both ends. Seeds brown, oblong, 1–1.3 × ca. 0.9 cm, base rounded, margin crenellate, apex truncate. Fl. May–Jun, fr. Sep–Oct.

• Thickets along valleys; 800–1000 m. NE Guangxi, SE Guizhou, S Hunan.

**8. *Trichosanthes smilacifolia*** C. Y. Wu ex C. H. Yueh & C. Y. Cheng, Acta Phytotax. Sin. 18: 347. 1980.

菝葜叶栝楼 ba qia ye gua lou

Petiole 2–3 cm; leaf blade abaxially pale green, adaxially deep green, ovate-oblong, 9–13 × 7–9 cm, subleathery, unlobed, both surfaces smooth, base rounded, margin reflexed, denticulate. Male flowers paniculate; peduncle 8–15 cm, slightly puberulent; bracts ovate-orbicular, ca. 1 × 0.8 cm, margin triangular-bidentate to middle, apex acuminate; calyx tube cylindrical, ca. 2 × 0.5 cm; segments ca. 7 mm, long acuminate. Female flowers unknown. Fruiting peduncle ca. 3 cm; fruit orange-yellow, globose, ca. 7 cm, smooth. Seeds brown, broadly oblong to suborbicular, ca. 1.8 × 1.5 cm, both surfaces densely rugose, margin undulate-crenate. Fl. autumn, fr. Nov–Dec.

• Evergreen broad-leaved forests; 600–1500 m. SE Xizang, S and SE Yunnan.

**9. *Trichosanthes truncata*** C. B. Clarke in J. D. Hooker, Fl. Brit. India 2: 608. 1879.

大子栝楼 da zi gua lou

*Trichosanthes crispisepala* C. Y. Wu ex S. K. Chen; *T. ovata* Cogniaux.

Stems robust, angular-striate, glabrous and punctate. Petiole 1.5–4(–6.5) cm; leaf blade ovate, narrowly ovate, or ovate-oblong, 7–12 × 4.5–9 cm, leathery, unlobed or shortly to deeply 2- or 3-lobed, both surfaces glabrous, base rounded or truncate, margin usually entire or rarely distantly denticulate, apex acuminate. Male raceme 8–20-flowered; peduncle 7–15 cm, striate, flowering at apex; bracts ovate, shortly stipitate, margin entire or more usually with a few teeth; calyx tube dilated at apex, 1.8–4 × ca. 1 cm, shortly tomentose; segments linear-lanceolate, 20–30 × 1–1.5 mm, entire. Female flowers solitary; ovary oblong, 1–2 × ca. 0.8 cm. Fruiting peduncle 4–5 cm; fruit oblong, 12–18 × 5–10 cm, glabrous. Seeds brown, oblong-obovate, 10–23 × 5–20 mm, base truncate, apex obtuse. Fl. Apr–May, fr. Jul–Aug.  $2n = 22$ .

Montane forests, thickets; 300–1000 m. Guangdong, Guangxi, S Yunnan [Bangladesh, Bhutan, India, Thailand, Vietnam].

**10. *Trichosanthes homophylla*** Hayata, Icon. Pl. Formosan. 10: 8. 1921.

芋叶栝楼 yu ye gua lou

*Trichosanthes mushaensis* Hayata.

Stems slender. Petiole 2–3 cm, hairy; leaf blade triangular-cordate, 6–10 × 4–6 cm, papery, unlobed, margin dentate, adaxially scabrous, apex acuminate or acute. Male raceme 5–10-flowered; peduncle 8–9 cm; pedicel ca. 3 mm; bracts obovate, 1–1.5 × 0.7–1.1 cm, margin irregularly crenate-dentate; calyx tube cylindrical, dilated at apex, ca. 3 × 0.8 mm; segments linear, ca. 6 mm. Female flowers unknown. Fruit oblong, 7–10 × 6–7 cm. Seeds elliptic, flattened. Fl. Aug.

Taiwan [Japan].

**11. *Trichosanthes kerrii*** Craib, Bull. Misc. Inform. Kew 1914: 7. 1914.

长果栝楼 chang guo gua lou

*Trichosanthes tomentosa* Chakravarty.

Stems robust, brownish hirsute. Petiole 2–5 cm, tomentose; leaf blade adaxially deep green, ovate-cordate, 10–20 × 7–17 cm, papery, unlobed, abaxially densely felty-tomentose, adaxially sparsely and shortly hirsute, margin entire or remotely and obscurely serrate, apex long acuminate. Male peduncle ca. 2.5 cm; pedicel ca. 8 mm, tomentose; bracts linear, ca. 1.5 × 0.25 cm; calyx tube cylindrical, 2–3.5 × ca. 0.8 cm; segments oblanceolate, ca. 1.8 × 0.45 cm, tomentose, apex acute. Female peduncle robust, 2.5–3.5 cm, tomentose, 1-flowered; calyx tube cylindrical, ca. 1 cm, tomentose; segments narrowly triangular, ca. 1 cm, apex long acuminate; ovary oblong, 1.5–2 × ca. 1 cm, densely and softly tomentose. Fruiting peduncle robust, 2.5–5.5 cm, tomentose; fruit oblong, 8–10 × 4.5–6.5 cm. Seeds subovate, compressed, 10–13 × 7–8 mm, 1-veined at middle, base rounded or truncate, margin undulate and serrate, apex obtuse.

Forests along valleys or beside streams; 700–1900 m. SW Guangxi, SW Yunnan [India, Laos, Thailand, N Vietnam].

**12. *Trichosanthes sericeifolia*** C. Y. Cheng & C. H. Yueh, *Acta Phytotax. Sin.* 18: 346. 1980.

丝毛栝楼 *si mao gua lou*

Stems angular-striate, sparsely sericeous. Petiole slender, 3.5–7 cm, white sericeous; leaf blade adaxially deep green, ovate-cordate, 8–17 × 6–10 cm, papery, deeply 3–5-lobed; middle lobes narrowly lanceolate or ovate-lanceolate, abaxially densely white sericeous, adaxially sparsely sericeous, margin denticulate, apex acuminate. Male flowers solitary; pedicel and flowering bud densely white sericeous; mature flowers unknown. Female flowers solitary; pedicel 1.5–2.5 cm, densely white sericeous; calyx tube tubular, ca. 1 × 0.4 cm, densely white sericeous; segments linear-lanceolate, ca. 5 × 2 mm, entire; ovary oblong, ca. 1.5 × 0.7 mm, densely white sericeous. Fruit unknown. Fl. Apr–Jul.

• Thickets on mountain slopes or beside rivers; 700–1500 m. W Guangxi, SW Guizhou, SE Yunnan.

**13. *Trichosanthes reticulineris*** C. Y. Wu ex S. K. Chen, *Bull. Bot. Res.*, Harbin 5(2): 114. 1985.

两广栝楼 *liang guang gua lou*

Stems moderately robust, grooved, striate, glabrous or pubescent at nodes. Petiole 4–6 cm, striate, densely pubescent; leaf blade ovate to broadly ovate-cordate, 1.5–2 × 1–1.8 cm, leathery, unlobed, both surfaces pubescent on veins, margin remotely denticulate, apex acuminate. Male flowers in racemes or narrow panicles, 5–6 cm; pedicels ca. 6 mm, densely chocolate-colored pubescent; bracts lanceolate, ca. 1.5 cm, densely chocolate-colored villous; calyx tube campanulate, ca. 1.5 × 1.5 cm, densely villous; segments triangular-ovate, ca. 1 × 0.6 cm. Female flowers solitary; pedicel stout, ca. 2 cm, densely villous; calyx tube ca. 1 × 0.7 cm; segments linear, ca. 1.2 × 0.2–0.3 cm, entire, densely villous; ovary ovoid, ca. 2.5 × 2 cm. Fruiting peduncle ca. 2.5 cm, stout, densely villous; fruit ovoid, ca. 6 × 5 cm, densely villous. Seeds pale brown, ovate, compressed, ca. 1.1 × 0.7 cm, base rounded, apex obtuse. Fl. May–Jun, fr. Jul–Aug.

• Forests of low elevations; 200–400 m. Guangdong, Guangxi.

**14. *Trichosanthes rosthornii*** Harms in Engler, *Bot. Jahrb. Syst.* 29: 603. 1901.

中华栝楼 *zhong hua gua lou*

Stems grooved, sparsely puberulent. Petiole 2.5–4 cm, striate, sparsely puberulent; leaf blade abaxially pale green, adaxially deep green, broadly ovate to suborbicular, (6–)8–12(–20) × (5–)7–11(–16) cm, papery, deeply 3–7-lobed, usually deeply 5-lobed nearly to base; lobes linear-lanceolate, lanceolate, or oblanceolate, abaxially glabrous, adaxially shortly hairy, margin denticulate, apex acuminate. Male raceme solitary or with one 1-flowered peduncle in axillary pairs; peduncle 8–10 cm; pedicels up to ca. 7 cm; bracts rhombic-obovate, 6–14 × 5–11 mm, puberulent, attenuate at base, margin irregularly sinuate-dentate; calyx tube narrowly cylindrical, dilated at apex, 2.5–3(–3.5) cm. Female flowers solitary; pedicel 5–8 cm, puberulent; calyx tube cylindrical, 20–25 × 5–8 mm; ovary oblong,

10–20 × 5–10 mm, puberulent. Fruiting peduncle 4.5–8 cm; fruit orange-yellow, globose or oblong, 8–16 × 7–10 cm, smooth, glabrous. Seeds brown, ovate-oblong, compressed, 1.5–2.2 × 0.8–1.4 cm, marginate. Fl. Jun–Aug, fr. Aug–Oct.

• Dense forests along valleys, thickets or grasslands on mountain slopes; 400–1900 m. S Anhui, N Guangdong, Guangxi, Guizhou, NE Jiangxi, Sichuan, Yunnan.

The roots and fruit are used medicinally as “tian hua fen” and “gua lou.”

1a. Leaf blade deeply 5-lobed ..... 14d. var. *huangshanensis*

1b. Leaf blade deeply 3–7-lobed.

2a. Tendrils 4–6-fid ..... 14c. var. *multicirrata*

2b. Tendrils 2- or 3-fid.

3a. Fruit 8–11 × 7–10 cm; seeds

1.5–1.8 × 0.8–0.9 cm ..... 14a. var. *rosthornii*

3b. Fruit 12–16 × 6.5–8.5 cm;

seeds 2–2.2 × 1.2–1.4 cm ..... 14b. var. *scabrella*

**14a. *Trichosanthes rosthornii* var. *rosthornii***

中华栝楼(原变种) *zhong hua gua lou* (yuan bian zhong)

*Trichosanthes crenulata* C. Y. Cheng & C. H. Yueh; *T. guizhouensis* C. Y. Cheng & C. H. Yueh; *T. stylopodifera* C. Y. Cheng & C. H. Yueh; *T. uniflora* K. S. Hao.

Leaf blade deeply 3–7-lobed. Fruit 8–11 × 7–10 cm. Seeds 1.5–1.8 × 0.8–0.9 cm.

• Guizhou, E Sichuan, Yunnan.

**14b. *Trichosanthes rosthornii* var. *scabrella*** (C. H. Yueh & D. F. Gao) S. K. Chen, *Fl. Reipubl. Popularis Sin.* 73(1): 244. 1986.

糙籽栝楼 *cao zi gua lou*

*Trichosanthes scabrella* C. H. Yueh & D. F. Gao in C. H. Yueh & C. Y. Cheng, *Acta Phytotax. Sin.* 18: 345. 1980.

Fruit large, 12–16 × 6.5–8.5 cm. Seeds 20–22 × 12–14 mm, both surfaces slightly rugose.

• W Sichuan.

**14c. *Trichosanthes rosthornii* var. *multicirrata*** (C. Y. Cheng & C. H. Yueh) S. K. Chen, *Fl. Reipubl. Popularis Sin.* 73(1): 244. 1986.

多卷须栝楼 *duo juan xu gua lou*

*Trichosanthes multicirrata* C. Y. Cheng & C. H. Yueh, *Acta Phytotax. Sin.* 12: 430. 1974; *T. damiaoshanensis* C. Y. Cheng & C. H. Yueh.

Leaf blade thick; lobes broad. Tendrils 4–6-fid, villous. Calyx tube ca. 2 × 1.3 cm, densely pubescent.

• Forests, thickets, grasslands; 600–1500 m. N Guangdong, Guangxi, Guizhou, Sichuan.

**14d. *Trichosanthes rosthornii* var. *huangshanensis*** S. K. Chen, *Bull. Bot. Res.*, Harbin 5(2): 116. 1985.

黄山栝楼 *huang shan gua lou*

Leaf blade deeply 5-lobed near to base; lobes further dis-

sected; lobules 1 or 2, linear.

- S Anhui, NE Jiangxi.

**15. *Trichosanthes wallichiana*** (Seringe) Wight, Madras J. Lit. Sci. 12: 52. 1840.

薄叶栝楼 bao ye gua lou

*Involucraria wallichiana* Seringe, Mém. Soc. Phys. Genève 3(1): 25. 1825; *Trichosanthes bracteata* (Lamarck) Voigt var. *scotanthus* (C. B. Clarke) Handel-Mazzetti; *T. grandibracteata* Kurz; *T. palmata* Roxburgh var. *scotanthus* C. B. Clarke.

Stems branched, angular-grooved, glabrous. Petiole robust, 6–10 cm, striate, puberulent; leaf blade suborbicular, 18–20 × 18–20 cm, membranous or papery, deeply (nearly to base) palmately 5–7-lobed; lobes oblong, abaxially glabrous or slightly hairy on veins, adaxially glandular punctate and very rough, margin denticulate or irregularly crenate-dentate, apex acute or acuminate. Male raceme 6–15-flowered at apex; peduncle stout, 10–20(–30) cm, grooved, puberulent; bracts broadly ovate, 2–3 cm, crenulate, slightly puberulent, multiveined; calyx tube ca. 5 × 1 cm; segments ca. 1.5 × 0.4 cm, entire. Female flowers solitary; ovary ovoid-oblong, glabrous. Fruit ovoid or oblong, 5–10 × ca. 7 cm, apex acute or subacute. Seeds brown, oblong, 1.5–1.8 × 0.8–1.2 cm. Fl. Jul–Sep, fr. Oct–Nov.

Forests along valleys; 900–2200 m. Xizang, S Yunnan [Bhutan, India, Nepal].

**16. *Trichosanthes fissibracteata*** C. Y. Wu ex C. Y. Cheng & C. H. Yueh, Acta Phytotax. Sin. 12: 438. 1974.

裂苞栝楼 lie bao gua lou

Petiole 6–10 cm, glabrous, striate; leaf blade adaxially pale green, orbicular-cordate or broadly ovate-cordate, 11–25 × 9.5–20 cm, membranous to papery, unlobed or irregularly shortly 2- or 3-lobed or deeply 2- or 3-lobed, rarely 5-lobed; lobes broadly triangular-ovate, rarely ovate-oblong, adaxially glabrous, with large disk glands at base, margin subentire or remotely minutely denticulate, apex acuminate. Male raceme 9–20 cm; peduncle glabrous or very shortly puberulent, 2–5-flowered at apex; bracts ovate, 2.5–3 × 1.5–2 cm, cucullate, margin lobulate with 1.5–2 cm linear-lanceolate lobes; calyx tube ca. 3.5 cm; segments lanceolate, ca. 10 × 3–4 mm, entire or serrate. Female flowers unknown. Fruit subglobose, ca. 6 cm. Seeds brown, oblong, 1.1–1.5 × 0.5–0.6 cm, base retuse, apex truncate or obtuse. Fl. Aug–Sep, fr. Nov.

- Dense forests along valleys, thickets on mountain slopes; 1100–1300(–1500) m. SW Guangxi, SE Yunnan.

**17. *Trichosanthes lepiniana*** (Naudin) Cogniaux in A. Candolle & C. Candolle, Monogr. Phan. 3: 377. 1881.

马干铃栝楼 ma gan ling gua lou

*Involucraria lepiniana* Naudin in Huber, Cat. 11. 1868.

Stem robust, branched, glabrous. Petiole 4–7 cm, striate, glabrous or glandular-punctate; leaf blade adaxially deep green, suborbicular, 9–17(–20) cm, shortly 3–5-lobed up to middle,

adaxially rough; lobe margin denticulate, apex acute or shortly acuminate. Male raceme 13–17 cm; peduncle robust, striate, glabrous; pedicels ca. 5 mm; bracts suborbicular, ca. 4 cm, cucullate, margin lacerate; calyx tube attenuate from apex toward base, ca. 7 cm, puberulent; segments narrowly ovate, ca. 1.5 × 0.4 cm, margin lacinate. Female flowers solitary; pedicel 2.5–3 cm, glabrous, striate; bracts ovate, ca. 1.5 × 1 cm, entire; calyx tube ca. 4 cm; ovary ovoid, ca. 1.5 × 1 cm, glabrous. Fruit red, ovoid, ca. 9 cm in diam., smooth. Seeds brown, broadly ovate, ca. 1.5 × 0.8–1 cm, base obtuse or attenuate, apex truncate. Fl. May–Jul, fr. Aug–Nov.

Evergreen broad-leaved forests along valleys, open forests and thickets on mountain slopes; 700–1200 m. SE Xizang, S and SE Yunnan [Bhutan, India].

De Wilde and Duyfjes (in Santisuk & Larsen, Fl. Thailand 9(4): 520. 2008) considered the Chinese material here treated as *Trichosanthes lepiniana* to represent a distinct species, *T. inthanonensis* Duyfjes & Priesapan (Thai Forest Bull., Bot. 32: 86. 2004, type from N Thailand; the type of *T. lepiniana* is from peninsular India).

**18. *Trichosanthes quinquangulata*** A. Gray, U.S. Expl. Exped., Phan. 645. 1854.

五角栝楼 wu jiao gua lou

Petiole 5–11 cm, striate, punctate; leaf blade adaxially deep green, quinquangular or broadly ovate, 13–22 × 12–20 cm, membranous, shortly 5-lobed or up to middle; lobes broadly triangular or ovate-triangular, abaxially glabrous, adaxially glandular punctate and rough, margin denticulate, apex long acuminate. Plants monoecious. Male raceme 17–30 cm; peduncle glabrous, striate, 8–10-flowered; bracts ovate, 3.5–4.3 × ca. 2.5 cm, with 2 rows of brownish puncta beside main vein, entire, apex long acuminate; calyx segments linear-lanceolate, 2–3 × 0.2–0.3 cm, margin sharply 2- or 3-lobed, apex long acuminate. Female flowers not seen. Fruiting peduncle 2–3 cm, glabrous; fruit red, globose, 5–7 cm, glabrous. Seeds brown, triangular-ovate, 1–1.2 × 0.4–0.5 cm, base attenuate, apex triangular. Fl. Jun–Oct, fr. Sep–Oct.

Low-elevation thickets, roadsides; 500–900 m. Taiwan, S Yunnan [Indonesia, Malaysia, Myanmar, New Guinea, Philippines, Thailand, Vietnam].

**19. *Trichosanthes cordata*** Roxburgh, Fl. Ind., ed. 1832, 3: 703. 1832.

心叶栝楼 xin ye gua lou

*Involucraria cordata* (Roxburgh) M. Roemer; *Trichosanthes microsiphon* Kurz.

Stem robust, angular, grooved, glabrous or sparsely puberulent. Petiole 14–17 cm, striate, sparsely puberulent; leaf blade broadly ovate-cordate, 8–22 × 7–23 cm, papery, unlobed or rarely angular-sublobate, both surfaces scattered shortly hirsute, margin minutely denticulate, apex acute or shortly acuminate. Male raceme 4–8-flowered; peduncle 12–20 cm, stout, striate, sparsely puberulent; pedicels 1–2 mm, thick; bracts oblong, ca. 4 × 1–1.5 cm, entire, shortly hirsute; calyx tube attenuate from apex toward base, ca. 4.5 × 0.7 cm; segments erect or

flexuous, linear-lanceolate, ca. 1.5 cm. Female flower solitary; pedicel ca. 1 cm; ovary oblong, slightly puberulent. Fruit red, globose, smooth. Seeds subquadrangular, 1–1.2 × 0.4–0.5 cm. Fl. Jul–Aug, fr. Aug.

Evergreen broad-leaved forests; ca. 1000 m. SE Xizang [Bhutan, India, Laos, Malaysia, Myanmar, Nepal, Singapore].

**20. *Trichosanthes villosa*** Blume, Bijdr. 934. 1826.

密毛栝楼 mi mao gua lou

Stems robust, long, densely brownish villous; petiole 10–12 cm, densely brownish villous; leaf blade adaxially deep green, broadly ovate, 11–18 × 11–17 cm, papery, unlobed or tricuspidate, abaxially densely villous-hirsute, adaxially densely and shortly brownish villous, margin denticulate, apex acuminate. Male raceme 10–20 cm, 15–20-flowered; peduncle densely brownish villous; bracts oblong, 3–5 × 2–4 cm, both surfaces brownish villous, margin irregularly dentate; calyx tube 2.5–3 × 0.6–1.2 cm, densely brownish villous; segments linear-lanceolate, ca. 2 × 0.3–0.4 cm, both surfaces villous, margin entire, apex long acuminate. Female flowers solitary; pedicel ca. 1.5 cm, densely long villous; calyx tube cylindrical, ca. 1.5 × 0.7 cm; ovary oblong, ca. 1.5 × 1 cm, densely villous. Fruit brown-red, subglobose, 8–13 cm. Seeds oblong or obovate-triangular, 1.7–2.8 × 1–1.7 cm, 1-veined at middle, base obtuse, apex truncate. Fl. Dec–next Jul, fr. Sep–Nov.

Thickets or open forests on mountain slopes; 300–1000 m. S and SW Guangxi, S Yunnan [Indonesia, Laos, Malaysia, Philippines, Vietnam].

**21. *Trichosanthes laceribractea*** Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 117. 1911.

长萼栝楼 chang e gua lou

*Trichosanthes hupehensis* C. Y. Cheng & C. H. Yueh; *T. koshunensis* Hayata; *T. punctata* Hayata; *T. schizostroma* Hayata; *T. shikokiana* Makino; *T. sinopunctata* C. Y. Cheng & C. H. Yueh.

Stems angular, grooved, subglabrous. Petiole 1.5–9 cm, striate, hispidulous or white punctate; leaf blade abaxially pale green, adaxially deep green, suborbicular or broadly ovate, 5–16(–19) × 4–15(–18) cm, papery, 3–7-lobed shortly or nearly to base; lobes triangular, ovate, or rhombic-obovate, abaxially hispidulous on veins, adaxially densely hispidulous or white punctate, margin remotely mucronate-serrate, apex acuminate. Male peduncle robust, 10–23 cm, puberulent or sparsely hispidulous; bracts broadly ovate, 2.5–4 × 2.5–4 cm, cucullate, margin lacerate; calyx tube narrowly tubular, ca. 5 cm; segments erect, ovate, 1–1.3 × ca. 0.7 cm, margin lacinate, apex acuminate. Female flowers solitary; pedicel 1.5–2 cm, puberulent; calyx tube cylindrical, ca. 4 × 5 cm; segments linear, 1–1.3 cm, entire; ovary ovoid, ca. 1 × 0.7 cm, smooth. Fruit globose to ovoid-globose, 5–8 cm in diam. Seeds oblong, 1–1.4 × 0.5–0.8 cm, both ends rounded or truncate. Fl. Jul–Aug, fr. Sep–Oct. 2n = 22\*.

• Dense forests along valleys; 200–1100 m. Guangdong, Guangxi, Hubei, Jiangxi, Sichuan, Taiwan.

**22. *Trichosanthes dunniana*** H. Léveillé, Repert. Spec. Nov. Regni Veg. 10: 148. 1911.

糙点栝楼 cao dian gua lou

*Trichosanthes prazeri* Kundu; *T. rubriflos* Thorel ex Cayla f. *macrosperma* C. Y. Cheng & C. H. Yueh; *T. tridentata* C. Y. Cheng & C. H. Yueh.

Stem moderately robust, grooved, punctate. Petiole slender, 4–5 cm, punctate; leaf blade abaxially pale green, adaxially green, suborbicular, 10–15 cm, papery, deeply palmately 5–7-lobed; lobes elliptic-obovate, abaxially glabrous, glandular punctate on veins, adaxially glandular punctate, narrowed toward base, cuspidate. Male racemes 8–10 cm; peduncle stout, striate, densely pubescent or punctate, 5–10-flowered; bracts brown, broadly ovate, ca. 5 × 4 cm, abaxially punctate, margin deeply serrate; calyx tube ca. 5 cm; segments pale red. Female flowers unknown. Fruit oblong, ca. 8 × 6 cm, smooth, apex acute. Seeds ovoid, turgid, ca. 1.2 × 0.8 cm. Fl. Jul–Sep, fr. Oct–Nov.

Dense forests along valleys or thickets; 900–1900 m. Guangxi, Guizhou, Sichuan, Yunnan [Laos, Myanmar, N Thailand].

**23. *Trichosanthes rubriflos*** Thorel ex Cayla, Bull. Mus. Natl. Hist. Nat. 14: 170. 1908.

红花栝楼 hong hua gua lou

*Trichosanthes majuscula* (C. B. Clarke) Kundu; *T. multiloba* Miquel var. *majuscula* C. B. Clarke; *T. pubera* Blume subsp. *rubriflos* (Thorel ex Cayla) Duyfjes & Pruesapan.

Stems robust, branched, grooved, pubescent. Petiole 5–12(–18) cm, striate, pubescent; leaf blade adaxially deep green, broadly ovate or suborbicular, 7–20 cm, deeply palmately 3–7-lobed; lobes broadly ovate, oblong or lanceolate, abaxially pubescent, adaxially hispidulous or glandular punctate, margin denticulate or irregularly serrate, apex acuminate. Male raceme 10–20 cm; peduncle grooved, puberulent, (6–)11–14-flowered; bracts red, broadly ovate or obovate-rhombic, 2.5–4 × ca. 3 cm, puberulent, margin lacerate; calyx tube red, 4–6 cm; segments linear-lanceolate, 1.2–1.6 × 0.3–0.5 cm, margin entire or rarely denticulate, apex acuminate; corolla red or pale red. Female flowers solitary; pedicel ca. 2 cm, densely pubescent; calyx tube ca. 3 cm; ovary ovoid, ca. 2 × 1 cm. Fruiting peduncle robust, ca. 3 cm, striate, pubescent; fruit red, broadly ovoid or globose, 7–9.5 × 5.5–8 cm, smooth, apex acute. Seeds yellow-brown, oblong, ca. 1.2 × 0.4–0.5 cm, base truncate, apex attenuate. Fl. May–Nov, fr. Aug–Dec.

Dense forests along valleys, open forests or thickets on mountain slopes; (100–)400–1600 m. Guangdong, Guangxi, Guizhou, Xizang, Yunnan [Cambodia, NE India, Laos, Myanmar, Thailand, Vietnam].

**24. *Trichosanthes subrosea*** C. Y. Cheng & C. H. Yueh, Acta Phytotax. Sin. 18: 349. 1980.

粉花栝楼 fen hua gua lou

Stem glabrous, grooved. Petiole 4–6.5(–8) cm, striate, glabrous; leaf blade abaxially pale green, adaxially deep green, quinqueangular-cordate or suborbicular, 11–15 cm, thinly pa-

perly, shortly 5–7-lobed or to middle; central lobe triangular or subrhombic, abaxially glabrous, adaxially hispidulous or glandular-punctate, margin triangular-dentate, apex long acute. Male peduncles occasionally in pairs, one early 1-flowered and other bearing a raceme; pedicel ca. 8 cm, striate, glabrous; bract ovate, 2.5–3 cm, cucullate, glabrous, subentire, apex obtuse; calyx segments narrowly lanceolate, 1.5–2 cm, entire; corolla pale red. Female flowers unknown. Fruiting peduncle stout, 2–2.5 cm; fruit orange-red, subglobose, 7–9 × 5–7.5 cm, smooth. Seeds oblong, base truncate, apex triangular. Fl. Jul–Aug, fr. Aug–Sep.

Forests; ca. 1700 m. S Guangxi, SW Yunnan [Myanmar].

**25. *Trichosanthes rugatisemina*** C. Y. Cheng & C. H. Yueh, *Acta Phytotax. Sin.* 12: 440. 1974.

皱籽栝楼 zhou zi gua lou

Stem grooved, densely villous. Petiole 3.5–5.5 cm, densely villous; leaf blade suborbicular, 10–15 cm, papery, 3–5-lobed up to middle; lobes ovate or obovate-elliptic, both surfaces pubescent, margin triangular-denticulate, apex acuminate. Male racemes 3–6 cm, densely brown villous, 3–5-flowered at apex; bracts ovate, 2.5–3.5 × 2–3 cm, cucullate, apex acuminate; calyx tube ca. 2.5 cm; segments ovate, ca. 15 mm, margin dentate; corolla red. Female flowers solitary; calyx tube cylindrical, ca. 3 cm; segments linear, pubescent; ovary oblong, ca. 1.5 × 0.5 cm. Fruiting peduncle ca. 2 cm; fruit orange-yellow, ovoid, 8–9.5 × 5–6 cm, attenuate at apex. Seeds gray-green, ovate-oblong, ca. 1.5 × 0.7 cm, both ends truncate.

• Thickets. SE and SW Yunnan.

**26. *Trichosanthes tricuspidata*** Loureiro, *Fl. Cochinch.* 2: 589. 1790.

三尖栝楼 san jian gua lou

*Modecca bracteata* Lamarck; *Trichosanthes bracteata* (Lamarck) Voigt.

Stems robust, branched, angular-striate, grooved, glabrous. Petiole ca. 5 cm, striate, glabrous, punctate; leaf blade adaxially deep green, broadly ovate-cordate, 12–13 × 12–13 cm, thinly leathery, shortly 3-lobed; lobes ovate-triangular, abaxially glabrous, adaxially hispidulous or punctate, margin undulate-denticulate, apex acute or shortly acuminate. Male raceme 12–15 cm; peduncle stout, striate and grooved, glabrous; pedicel short; bracts obovate-oblong, ca. 4 × 2–2.5 cm, cucullate, both surfaces white squamose or pubescent, margin dentate, apex obtuse; calyx tube narrowly funnelform, ca. 6 × 1 cm; segments narrowly lanceolate, ca. 1 × 0.3 cm. Female flowers and fruit not seen.

Thickets on mountain slopes; ca. 900 m. Guizhou [Indonesia, Malaysia, Nepal, Thailand, Vietnam].

**27. *Trichosanthes pedata*** Merrill & Chun, *Sunyatsenia* 2: 20. 1934.

趾叶栝楼 zhi ye gua lou

*Trichosanthes pedata* var. *yunnanensis* C. Y. Cheng & C.

H. Yueh.

Stem slender, striate, grooved, glabrous or pubescent at nodes. Leaves 3–5-foliolate; petiole 2.5–6 cm; leaflets abaxially pale green, lanceolate or oblong-oblancoate, 9–12 × 2.5–3.5 cm, membranous, abaxially glabrous, adaxially hispidulous or white punctate, remotely denticulate, acuminate; petiolule 2–5(–11) mm. Male raceme 14–19 cm; peduncle and pedicels brown pubescent; bracts obovate or rhombic-ovate, 1–1.5 × ca. 0.8 cm, pubescent, margin entire or dentate, apex acuminate. Female flowers solitary; calyx tube cylindrical, ca. 3 × 5 cm; ovary ovoid, ca. 1.5 × 0.8 cm, glabrous. Fruiting peduncle 1(–3) cm; fruit orange-yellow, globose, 5–6 cm, smooth. Seeds brown, ovoid, tumid, 1–1.2 × ca. 0.8 cm, base triangular, apex rounded. Fl. Jun–Aug, fr. Jul–Dec.  $2n = 22$ .

Open forests along valleys, thickets; 200–1500 m. Guangdong, Guangxi, Hainan, Hunan, Jiangxi, Yunnan [Vietnam].

**28. *Trichosanthes quinquefolia*** C. Y. Wu ex C. Y. Cheng & C. H. Yueh, *Acta Phytotax. Sin.* 18: 351. 1980.

木基栝楼 mu ji gua lou

Stems striate, glabrous or pubescent at nodes. Petiole 3–4 cm, pubescent; leaf blade 3–5-foliolate; leaflets sessile; median leaflet abaxially pale green, lanceolate, 15–23 × 2–4 cm, membranous or thinly papery, abaxially glabrous, adaxially hispidulous or white punctate, base cuneate, margin entire, apex acuminate. Male raceme 11–26 cm; peduncle striate, pubescent, 5–15-flowered; bracts rhombic, 7–10 × ca. 5 mm, pubescent, margin crenate, apex obtuse; calyx tube narrowly funnelform, ca. 3 × 0.7 cm, densely pubescent; segments linear-lanceolate, (3–)5–8 × ca. 3 mm, pubescent, margin entire, apex acuminate. Female flowers unknown. Fruit oblong, ca. 6 × 4 cm, smooth, apex acute. Seeds brown, ovoid-oblong, tumid, 12–15 × 8–10 mm, base rounded. Fl. Aug–Sep, fr. Oct–Nov.

Open forests; 900–1400 m. S Yunnan [Laos].

**29. *Trichosanthes pilosa*** Loureiro, *Fl. Cochinch.* 2: 588. 1790.

全缘栝楼 quan yuan gua lou

*Trichosanthes chingiana* Handel-Mazzetti; *T. himalensis* C. B. Clarke; *T. himalensis* var. *indivisa* Chakravarty; *T. okamotoi* Kitamura; *T. ovigera* Blume; *T. ovigera* var. *sikkimensis* Kundu.

Stems slender, grooved, pubescent. Petiole 4–12 cm, striate, densely pubescent; leaf blade ovate-cordate to suborbicular, 7–19 × 7–8 cm, papery, unlobed or very shortly 3-lobed or 3–5-lobed to middle or to base; median lobe ovate, oblong, or obovate-oblong, abaxially pubescent, adaxially glabrous or very shortly puberulent, margin distantly denticulate or dentate, apex acuminate. Male peduncle 10–26 cm, striate, densely pubescent; bracts lanceolate or oblanceolate, ca. 1.6 × 0.5–0.6 cm, attenuate to base, margin triangular-dentate, apex acuminate; calyx tube subcylindric, slightly dilated at apex, ca. 5 cm; segments triangular-ovate, 7–10 × 2–3 mm, entire. Female flowers solitary; pedicel 1–1.3 cm, striate, densely pubescent;

calyx tube cylindrical, 2–5 × 0.2–0.3 cm, glabrous or pubescent; ovary ovoid, 1–1.5 × 0.3–0.5 cm. Fruit ovoid or oblong, 5–7 × 2.5–4 cm, smooth, base rounded, apex acuminate, beaked. Seeds subquadrangular, 7–9 × 7–8 mm, longitudinally surrounded by 2 thick ridges, thick near middle; 3-loculed with 2 lateral locules empty. Fl. May–Sep, fr. Sep–Dec.  $2n = 22$ .

Thickets along valleys, open forests on mountain slopes; 700–2500 m. Guangdong, Guangxi, Guizhou, Yunnan [India, Indonesia, Japan, Nepal, Thailand, Vietnam].

One of us (Jeffrey) treats the following three species (i.e., *Trichosanthes baviensis*, *T. trichocarpa*, and *T. cucumeroides*) as synonyms of *T. pilosa*.

**30. *Trichosanthes baviensis*** Gagnepain, Bull. Mus. Natl. Hist. Nat. 24: 379. 1918.

短序栝楼 duan xu gua lou

Stems slender, grooved, glabrous or pubescent. Petiole slender, 4–9 cm, striate, densely pubescent; leaf blade abaxially pale green, adaxially deep green, ovate, 5–20 × 5–13 cm, thinly membranous, unlobed, abaxially pubescent, adaxially puberulent, margin denticulate, apex acuminate. Male flowers in corymb, ca. 2 cm; pedicel 1–1.5 cm, pubescent; bracts absent; calyx tube dilated at apex, ca. 2 cm, pubescent; segments narrowly triangular, ca. 3 mm. Female flowers solitary; pedicel ca. 7 mm, pubescent; ovary oblong, 8–10 mm, densely pubescent. Fruit ovoid, 3.5–5 × ca. 3.5 cm, smooth, glabrous, beaked. Seeds unknown. Fl. Apr–May, fr. May–Sep.

• Evergreen broad-leaved forests or thickets; 600–1500 m. Guangxi, SW Guizhou, S and SE Yunnan.

One of us (Jeffrey) treats this taxon as a synonym of *Trichosanthes pilosa*.

**31. *Trichosanthes trichocarpa*** C. Y. Wu ex C. Y. Cheng & C. H. Yueh, Acta Phytotax. Sin. 18: 340. 1980.

杏籽栝楼 xing zi gua lou

Stems slender, grooved, puberulent. Petiole slender, 7–8 cm, striate, puberulent; leaf blade abaxially pale green, adaxially deep green, broadly cordate, 10–16 × 7–13 cm, papery, unlobed or irregularly shortly 3-lobed; lobes triangular, abaxially pubescent, adaxially sparsely hairy, margin entire or denticulate, apex acuminate to long acuminate. Flowers unknown. Fruiting peduncle 3–4 cm, striate, puberulent; fruit yellow or orange-red, ovoid-oblong or oblong, 7–9 × 7–8 cm, densely white villous, beaked. Seeds obovate-triangular, 1–1.1 × ca. 1 cm, 3-loculed with 2 lateral locules narrow. Fr. Oct–Nov.

• Forests on mountain slopes, roadsides; 2100–2400 m. S and SW Yunnan.

One of us (Jeffrey) treats this taxon as a synonym of *Trichosanthes pilosa*.

**32. *Trichosanthes cucumeroides*** (Seringe) Maximowicz in Franchet & Savatier, Enum. Pl. Jap. 1: 172. 1873.

王瓜 wang gua

Stems slender, branched, grooved, pubescent. Petiole 3–10 cm, striate, densely pubescent; leaf blade abaxially pale green, adaxially deep green, broadly ovate or orbicular, 5–13(–19) × 5–12(–18) cm, papery, usually shortly 3–5-lobed, sometimes unlobed; lobes triangular or ovate to obovate-oblong, abaxially densely shortly pubescent, adaxially tomentose, margin denticulate or serrate, apex obtuse or acuminate. Male peduncle 5–10 cm, striate, pubescent; bracts linear-lanceolate, 2–3 mm, pubescent, entire; calyx tube 6–7 cm, pubescent; segments linear-lanceolate, 3–6 × ca. 1.5 mm, entire, acuminate. Female flowers solitary; pedicel 0.5–1 cm; ovary oblong, densely pubescent. Fruiting peduncle 5–20 mm, pubescent; fruit orange-red, ovoid, ovoid-oblong, or globose, 6–7 × 4–5.5 cm, smooth, beaked. Seeds deep brown, oblong or triangular-ovate, 7–12 × 7–14 mm, 3-loculed; 2 lateral ones large, ca. 4.5 mm in diam. Fl. May–Aug, fr. Aug–Nov.

Dense forests along valleys, open forests on mountain slopes; (200–)600–1700 m. Guangdong, Guangxi, Hainan, Hunan, Jiangxi, Sichuan, Taiwan, SE Xizang, Zhejiang [India, Japan].

One of us (Jeffrey) treats this species and its varieties as synonyms of *Trichosanthes pilosa*.

- 1a. Fruit ovoid or ovoid-oblong.
  - 2a. Seeds oblong, middle ridge as broad as 2 lateral locules ..... 32a. var. *cucumeroides*
  - 2b. Seeds triangular, 2 lateral locules narrow ..... 32b. var. *hainanensis*
- 1b. Fruit globose or narrowly oblong.
  - 3a. Fruit narrowly oblong ..... 32c. var. *stenocarpa*
  - 3b. Fruit globose ..... 32d. var. *dicaelosperma*

**32a. *Trichosanthes cucumeroides* var. *cucumeroides***

王瓜(原变种) wang gua (yuan bian zhong)

*Bryonia cucumeroides* Seringe in Candolle, Prodr. 3: 308. 1828; *Trichosanthes cavaleriei* H. Léveillé; *T. chinensis* Seringe; *T. cucumeroides* var. *formosana* (Hayata) Kitamura; *T. formosana* Hayata; *T. ovigera* Blume subsp. *cucumeroides* (Seringe) C. Jeffrey.

Fruit ovoid or ovoid-oblong. Seeds oblong, middle ridge as broad as 2 lateral locules.

Guangdong, Guangxi, Jiangxi, Sichuan, Taiwan, Zhejiang [Japan].

**32b. *Trichosanthes cucumeroides* var. *hainanensis*** (Hayata) S. K. Chen, Bull. Bot. Res., Harbin 5(2): 117. 1985.

海南栝楼 hai nan gua lou

*Trichosanthes hainanensis* Hayata, Icon. Pl. Formosan. 10: 8. 1921.

Fruit ovoid or ovoid-oblong. Seeds triangular-ovate, with middle ridge broad; 2 lateral locules narrow, ca. 2.5 mm in diam.

• Guangdong, Guangxi, Hainan.

**32c. *Trichosanthes cucumeroides* var. *stenocarpa*** Honda, Bot. Mag. (Tokyo) 54: 223. 1941.

狭果草栝楼 xia guo cao gua lou

*Trichosanthes matsudae* Hayata.

Fruit narrowly oblong, 7–9 × 2.5–4 cm.

Taiwan [Japan].

**32d. *Trichosanthes cucumeroides* var. *dicaelosperma*** (C. B. Clarke) S. K. Chen, Bull. Bot. Res., Harbin 5(2): 118. 1985 [*“dicoelosperma”*].

波叶栝楼 bo ye gua lou

*Trichosanthes dicaelosperma* C. B. Clarke in J. D. Hooker, Fl. Brit. India 2: 609. 1879; *T. ascendens* C. Y. Cheng & C. H. Yueh.

Fruit globose or oblong. Seeds compressed; 2 lateral locules suboblong.

Dense forests; 600–1200 m. Guangxi, SE Xizang [India].

**33. *Trichosanthes tetragonosperma*** C. Y. Cheng & C. H. Yueh, Acta Phytotax. Sin. 12: 425. 1974.

方籽栝楼 fang zi gua lou

Stems slender, grooved, puberulent. Petiole 2–4 cm, twisted, striate, puberulent; leaf blade adaxially green, narrowly ovate, 8.5–11.5 × 4–5 cm, papery, abaxially glabrous or puberulent on veins, adaxially glabrous, apex shortly acuminate. Flowers unknown. Fruiting peduncle slender, 3–4 cm, striate, glabrous; fruit orange-yellow or red, ovoid, 6.5–11 × 4–5.5 cm, smooth, glabrous, base rounded or obtuse, apex acute. Seeds deep brown, 4-angled, ca. 1 × 1–1.2 cm, with narrow middle ridge, base concave, apex triangular, 3-loculed; 2 lateral locules broad, turgid and empty. Fr. Nov–Jan of next year.

• Forests; 1300–1600 m. SE Yunnan.

