

## HERNANDIACEAE

莲叶桐科 lian ye tong ke

Li Xiwen (李锡文 Li Hsi-wen)<sup>1</sup>, Li Jie (李捷)<sup>2</sup>; Brigitta E. E. Duyfjes<sup>3</sup>

Trees, shrubs, or scandent lianas. Leaves simple or palmately compound, petiolate, circinate and scandent in part, estipulate. Flowers bisexual, unisexual, or polygamous, actinomorphic, in axillary or terminal corymbs or cymose panicles, with bracts or not. Outer tepals (sepals) 3–5. Inner tepals (petals) similar to outer ones. Stamens 3–5; filament bases with appendages on external sides or not; anthers 2-celled; cells valvate. Ovary inferior, 1-loculed, 1-ovuled; ovule pendulous. Drupe ± costate, broadly 2–4-winged or enclosed in an inflated cupule and wings absent. Seed 1, exalbuminous, coat leathery.

About four genera and 60 species: tropical regions of E and W Africa, SE Asia, NE Australasia, and Central and South America; two genera and 16 species (seven endemic) in China.

Li Ya-rü. 1982. Hernandiaceae. In: Li Hsi-wen, ed., Fl. Reipubl. Popularis Sin. 31: 463–480.

1a. Trees; leaves simple, peltate or not; fruit enclosed in an inflated cupule; flowers unisexual ..... 1. *Hernandia*  
1b. Lianas; leaves trifoliolate; fruit broadly 2–4-winged; flowers bisexual ..... 2. *Illigera*

### 1. *HERNANDIA* Linnaeus, Sp. Pl. 2: 981. 1753.

莲叶桐属 lian ye tong shu

*Biasolettia* C. Presl.

Trees, evergreen, monoecious. Leaves alternate, simple, petiolate, peltately attached or not, broadly ovate or subcircular, 3–7-veined. Flowers 3–5(or 6)-merous, unisexual, pedicellate, ternately involucre at apices of branches of a lax panicle; central flower with a cupular involucre at base, lateral ones staminate; involucre bracts 4 or 5, subvalvate in bud. Staminate flowers: tepals 6–8, in 2 series, subvalvate; stamens as many as and opposite outer tepals; filaments each with 2 free basal glands or glands connate; anther cells extrorse, laterally dehiscent. Pistillate flowers: tepals 8–10, in 2 series, subvalvate; style short, surrounded by 4 or more free or connate glands; stigma dilated, irregularly toothed or lobed; staminodes absent. Fruit enclosed in an inflated fleshy cupule. Seeds globose or ovoid; testa thick, hard, ribbed; embryo thick, lobed, ruminate.

About 24 species: E and W Africa, SE Asia, Central America; one species in China.

**1. *Hernandia nymphaeifolia*** (C. Presl) Kubitzki, Bot. Jahrb. Syst. 90: 272. 1970 [*“nymphaeifolia”*].

莲叶桐 lian ye tong

*Biasolettia nymphaeifolia* C. Presl, Reliq. Haenk. 2: 142. 1835 [*“nymphaeifolia”*]; *Hernandia peltata* Meisner.

Trees. Bark smooth. Petiole nearly as long as blade; leaf blade peltate, ovate or orbicular-cordate, 20–40 × 15–30 cm, papery, glabrous, 3–7-veined, base rounded and cordate, apex acute. Peduncle 6–20 cm. Panicle axillary; involucre bracts 4, elliptic to obovate, 2–6 × 1–3.5 mm. Flowers axillary, 3 together in a corymb, lateral flowers staminate, central one pistil-

late. Staminate flowers: pedicel tomentose; tepals 6, in 2 series; stamens 3; filaments with 2 basal glands, ca. 1 mm. Pistillate flowers: pedicel absent; tepals 8, in 2 series; style ca. 3 mm, papillose; stigma dilated, irregularly toothed; surrounding glands 4, ca. 1 mm. Fruit drupaceous, urn-shaped, costate, 3–4 cm in diam. Fl. and fr. year-round.  $2n = 40$ .

Sparse forests; near sea level. E and NE Hainan, S Taiwan [Cambodia, Indonesia, Japan, Malaysia, Philippines, Sri Lanka, Thailand, Vietnam; E Africa and east to the Pacific].

The name *Hernandia sonora* Linnaeus was misapplied to this species in FRPS (31: 465. 1982). True *H. sonora* is distributed in tropical America.

### 2. *ILLIGERA* Blume, Bijdr. 1153. 1826–1827.

青藤属 qing teng shu

*Gronovia* Blanco (1837), not Linnaeus (1753); *Henschelia* C. Presl.

Lianas, climbing by leaf petioles, evergreen. Leaves alternate, 3-foliolate [rarely 5-foliolate], petiolate; leaflets petiolulate. Panicle composed of axillary cymes, rarely terminal. Flowers 5-merous, bisexual. Perianth segments (tepals) in 2 rows, valvate in bud. Outer tepals (sepals) oblong or narrowly elliptic, rarely ovate-elliptic, 3–5-veined. Inner tepals (petals) similar to outer ones, 1–3-veined. Stamens 5, epigynous; filaments each at base with 2 appendages, inflated, membranous and shortly stipitate or appendages clavate and solid; anthers opening by valves. Stamens alternating with mostly 5 small (interstaminal) glands. Ovule pendulous from apex of locule; style filiform; stigma dilated into an undulate crest. Fruit 2–4-winged; wings brown when dry, broad, striate. Seed solitary, with membranous testa; cotyledons plano-convex.

<sup>1</sup> Kunming Institute of Botany, Chinese Academy of Sciences, 132 Lanhei Road, Kunming, Yunnan 650204, People's Republic of China.

<sup>2</sup> Laboratory of Plant Phylogenetics and Conservation Biology, Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences, 88 Xuefu Road, Kunming, Yunnan 650223, People's Republic of China.

<sup>3</sup> Nationaal Herbarium Nederland, Leiden University branch, P.O. Box 9514, 2300 RA Leiden, Netherlands.

About 30 species: tropical regions of Africa and Asia; 15 species (seven endemic) in China.

- 1a. Leaflets orbicular (but see also *I. aromatica*) ..... 1. *I. orbiculata*  
 1b. Leaflets not orbicular.  
 2a. Bases of leaflets cordate or subcordate.  
 3a. Flowers yellow or reddish yellow.  
 4a. Leaflets abaxially pilose; outer tepals abaxially glabrous, adaxially villous; stamen appendages clavate and solid; ovary densely pubescent ..... 2. *I. cordata*  
 4b. Leaflets abaxially glabrous; outer tepals abaxially pellucid-glandular, puberulent; stamen appendages membranous, with open mouth; ovary glabrous ..... 3. *I. nervosa*  
 3b. Flowers red or white with red.  
 5a. Inflorescence rather compact, densely yellow-brown villous; outer tepals 12–14 mm; style hirsute; leaflets adaxially sparsely hispid but yellow-brown strigose on veins, abaxially glabrous or slightly villous, intercostal venation slightly scalariform ..... 4. *I. grandiflora*  
 5b. Inflorescence rather lax, densely golden yellow tomentose; outer tepals 8–10 mm; style tomentose; leaflets adaxially golden yellow pubescent, abaxially golden brown tomentose on veins or at vein base only, intercostal venation conspicuously scalariform ..... 5. *I. rhodantha*  
 2b. Bases of leaflets rounded or cuneate.  
 6a. Leaflets papery.  
 7a. Both surfaces of leaflets ± pubescent especially on veins, adaxially blackish when dry; flower buds ovoid or ellipsoid ..... 6. *I. luzonensis*  
 7b. Leaflets adaxially glabrous or pubescent on veins, not blackish when dry; flower buds globose.  
 8a. Inflorescence glabrous, ca. 5 cm; outer tepals pellucid-glandular; filaments straight in bud; staminal appendages nearly inconspicuous ..... 7. *I. glabra*  
 8b. Inflorescence pubescent, 10–20 cm; outer tepals not pellucid-glandular; filaments curved around anthers in bud; staminal appendages present.  
 9a. Leaflets adaxially not nitid; tepals ca. 5 mm; stamens less than 2 × as long as tepals, filaments ca. 0.5 mm wide at base ..... 8. *I. parviflora*  
 9b. Leaflets adaxially nitid; tepals 5–7 mm; stamens more than 2 × as long as tepals, filaments 1.5–2.5 mm wide at base ..... 9. *I. celebica*  
 6b. Leaflets subleathery, leathery, or thickly leathery.  
 10a. Both surfaces of leaflets glabrous.  
 11a. Fruit wing up to 6 cm wide ..... 10. *I. henryi*  
 11b. Fruit wing 4–4.5 cm wide ..... 11. *I. trifoliata*  
 10b. Both surfaces of leaflets not glabrous.  
 12a. Leaflets acuminate at apex, adaxially pilose on midvein, abaxially glabrous; stamen appendages ca. 3.5 mm, abaxially with open mouth; ovary glabrous ..... 12. *I. khasiana*  
 12b. Leaflets acute to caudate-acuminate at apex, abaxially barbate or villous at axils of veins; stamen appendages ca. 2.5 mm, abaxially with open mouth (navicular) or small and solid; ovary densely pubescent.  
 13a. Leaflets suborbicular, 5–11.5 × 4–9.5 cm, abaxially barbate at axils of veins; stamen appendages navicular, ca. 2.5 mm ..... 13. *I. aromatica*  
 13b. Leaflets lanceolate to broadly lanceolate, narrowly elliptic, or narrowly ovate to broadly lanceolate, abaxially villous at axils of veins; stamen appendages small and solid.  
 14a. Leaflets lanceolate to broadly lanceolate, 6–8 × 2–2.5 cm, thickly papery, base cuneate to broadly cuneate; stamens 4.5–5 mm; style 3–4 mm ..... 14. *I. pseudoparviflora*  
 14b. Leaflets narrowly elliptic or narrowly ovate to broadly lanceolate, 6–9 × 3–4 cm, subleathery, base rounded; stamens ca. 2 mm; style ca. 1 mm ..... 15. *I. brevistaminata*

**1. *Illigera orbiculata*** C. Y. Wu, Acta Phytotax. Sin. 17(2): 75. 1979.

圆叶青藤 yuan ye qing teng

Lianas. Stem striate, glabrous. Leaves 3-foliolate; petiole ca. 9 cm, glabrous except villous at joint connected with petioles; leaflets: petiolules 1–2 cm, sparsely villous; blade orbicular, 10–11 × ca. 9 cm, thickly papery or subleathery, abaxially

puberulent on veins, adaxially glabrous, lateral veins 6- or 7-paired, conspicuous on both surfaces, veinlets lax, conspicuous abaxially, base subcordate, apex mucronate. Cymose panicles axillary, lax, large. Flowers unknown. Fruit 7–9 cm in diam., 2-winged, wings 3–4 cm wide. Fr. Mar.

• Waterside forests; ca. 600 m. S Yunnan.

More field work and collections are needed to establish the status of *Illigera orbiculata*.

**2. *Illigera cordata*** Dunn, J. Linn. Soc., Bot. 38: 296. 1908.

心叶青藤 xin ye qing teng

Lianas. Stem striate, pubescent at first, soon glabrescent. Leaves 3-foliolate; petiole 4–12 cm, pubescent at first, soon glabrescent; leaflets: petiolules 1–3 cm, yellowish villous; blade ovate or elliptic to oblong-elliptic, 8–12 × 4–8 cm, papery, lateral veins 4- or 5-paired, base cordate, asymmetric, apex shortly acuminate. Cymes axillary, compact, subcorymbose; rachis ca. 6 cm, generally shorter than petiole, yellowish villous; bracteoles oblong, ca. 3 mm. Flowers yellow. Outer tepals oblong, 5–6 × ca. 2 mm, abaxially glabrous, adaxially villous. Inner tepals similar to outer ones, subequal. Stamens 3–5 mm; filaments straight in bud, pubescent; appendages clavate, solid, small, ca. 1 mm. Ovary densely pubescent, ca. 2.5 mm; style 4–4.5 mm, hirsute. Interstaminal glands small, 3-lobed. Fruit 4-winged; wings: 2 large and 2 small, large ones 1.8–2.2 cm wide, thickly papery. Fl. May–Jun, fr. Aug–Sep.

• Dense forests, thickets on mountain slopes; (600–)1000–1900 m. Guangxi, Guizhou, Sichuan, Yunnan.

The roots are used medicinally as a tonic for cattle.

- 1a. Leaflets abaxially sparsely villous or glabrous, adaxially villous on veins; fruit 3–4.5 cm in diam., large wings 1.8–2.2 cm wide, densely pubescent ..... 2a. var. *cordata*  
 1b. Leaflets especially abaxially densely pubescent, adaxially densely and shortly velutinous-pubescent; fruit 2.5–4 cm in diam., large wings 1.3–2 cm wide, very sparsely pubescent ..... 2b. var. *mollissima*

**2a. *Illigera cordata* var. *cordata***

心叶青藤(原变种) xin ye qing teng (yuan bian zhong)

Leaflets sparsely villous or glabrous abaxially, villous on veins adaxially. Fruit 3–4.5 cm in diam., large wings 1.8–2.2 cm wide, densely pubescent.

• Dense forests, thickets on mountain slopes; (600–)1000–1900 m. Guangxi, Guizhou, Sichuan, Yunnan.

**2b. *Illigera cordata* var. *mollissima*** (W. W. Smith) Kubitzki, Bot. Jahrb. Syst. 89: 176. 1969.

多毛青藤 duo mao qing teng

*Illigera mollissima* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 42. 1917.

Leaflets densely pubescent especially abaxially, densely and shortly velutinous-pubescent adaxially. Fruit small, 2.5–4 cm in diam., large wings 1.3–2 cm wide, very sparsely pubescent.

• Dense valley forests, thickets; ca. 1100 m. NW Yunnan.

**3. *Illigera nervosa*** Merrill, Brittonia 4: 63. 1941.

显脉青藤 xian mai qing teng

Lianas. Stem purple-brown, angulate, glabrous. Leaves 3-foliolate; petiole 7–12 cm, glabrous; leaflets: petiolules 2–3 cm,

sparsely pubescent when young; blade ovate or elliptic-ovate, 7–16 × 4–9 cm, papery or thickly so, lateral veins 4- or 5-paired, conspicuous on both surfaces, veinlets slightly conspicuous abaxially, base subcordate, apex shortly acuminate. Cymes axillary, shorter than leaves; rachis glabrous. Flowers red-yellow. Outer tepals oblong, 7–8 mm, pellucid-glandular, abaxially pubescent. Inner tepals similar to outer ones but shorter, pellucid-glandular. Stamens ca. 3.5 mm; filaments straight in bud, ca. 4 mm, pubescent; appendages membranous, abaxially with open mouth, ca. 3 mm. Ovary ca. 1.5 mm, glabrous; style ca. 5 mm, villous. Interstaminal glands small, 2-lobed. Fruit 5.5–6 cm in diam., 4-winged; large wings ca. 2.5 cm wide, smaller 2 wings ca. 0.5 mm or cristate. Fl. Jun, fr. Nov–Dec.

Thickets, forests; 800–2100 m. SW Yunnan [N Myanmar].

**4. *Illigera grandiflora*** W. W. Smith & Jeffrey, Notes Roy. Bot. Gard. Edinburgh 8: 189. 1914.

大花青藤 da hua qing teng

*Illigera grandiflora* var. *microcarpa* C. Y. Wu; *I. grandiflora* var. *pubescens* Y. R. Li; *I. villosa* C. B. Clarke f. *subglabra* Kubitzki.

Lianas, 2–6 m tall. Stem angulate, yellow-brown villous especially near buds, occasionally glabrous. Leaves 3-foliolate; petiole 4–12 cm, densely yellow-brown villous; leaflets: petiolules 0.5–2 cm, densely hispid; blade ovate or obovate to lanceolate-elliptic, 4–14 × 3–9 cm, papery to subleathery, abaxially glabrous or sparsely villous on midvein at base otherwise glabrous, adaxially sparsely hispid especially on midvein, occasionally glabrous, lateral veins 4- or 5-paired, raised on both surfaces, veinlets inconspicuous, base subrounded to oblique, apex shortly acuminate to mucronate, rarely subobtuse. Cymes axillary, compact, shorter than leaves, or in a panicle subequal to leaves; rachis and peduncle densely yellow-brown pubescent. Flowers red, purple-red spotted or purple-red striate. Outer tepals oblong, 1.2–1.4 cm, adaxially pubescent, 5-veined. Inner tepals similar to outer ones but smaller, 3-veined. Stamens ca. 8 mm; filaments straight in bud, pubescent; appendages stipitate, narrowly ovate, 3–4 mm, membranous, abaxially with open mouth, margin dentate or entire at apex. Ovary ± tetragonous, densely pubescent or hispid; style 0.8–1.3 cm, villous. Interstaminal glands small, 2-lobed. Fruit (2–)4-winged; large wings (2.5–)3–4 cm wide, smaller ones narrower. Fl. Jun–Aug, fr. Aug–Oct.

Forests; 800–2100(–3200) m. S Guizhou, S Yunnan [India, N Myanmar].

The roots and stem are used medicinally for treating traumatic injuries.

*Illigera grandiflora* was reduced to the synonymy of *I. villosa* C. B. Clarke by Kubitzki (Bot. Jahrb. Syst. 89: 171. 1969). However, according to the description of *I. grandiflora* and the amended description of *I. villosa* by Fischer (Bull. Misc. Inform. Kew 5: 212. 1939), the latter species is quite different from *I. grandiflora*. *Illigera villosa* is characterized by its inflorescence being corymbose, flowers smaller, outer tepals 7–8 mm, inner tepals 6–6.5 mm, stamens ca. 4 mm, filaments robust, and appendages ellipsoid and obtuse at the apices.

**5. *Illigera rhodantha*** Hance, J. Bot. 21: 321. 1883.

红花青藤 hong hua qing teng

Lianas. Stem angulate. Branchlets tomentose or villous. Leaves 3-foliolate; petiole 4–10 cm, sparsely pubescent, tomentose, or villous; leaflets: petiolules 0.3–1.5 cm, densely golden brown tomentose; blade ovate to obovate-elliptic or ovate-elliptic, 6–11(–16) × (2–)3–7(–9) cm, papery, lateral veins ca. 4-paired, conspicuous on both surfaces, veinlets scalariform, conspicuous abaxially, base subrounded or subcordate, apex obtuse or shortly acuminate. Cymose panicles axillary, longer than petioles, narrow, densely golden brown tomentose. Flowers red. Outer tepals purple-red, oblong, 8–10 mm, abaxially sparsely pubescent. Inner tepals similar to outer ones but slightly shorter, rose. Stamens 6–9 mm, pubescent; filaments straight in bud, 5–7 mm; appendages on ca. 1 mm stipe, ca. 2.5 mm total, membranous, abaxially with open mouth, apex dentate. Ovary densely brown pubescent; style 5–6 mm, yellow tomentose. Interstaminal glands small. Fruit 4-winged; large wings ligulate or suborbicular, 2.5–3.5 cm wide, smaller ones 0.5–1 cm wide. Fl. (Jun–)Sep–Nov, fr. Dec–Apr or May of following year.

Valley forests, thickets, mountain slopes; 100–600(–2100) m. Guangdong, Guangxi, Guizhou, Hainan, Yunnan [Cambodia, Laos, Thailand, Vietnam].

- 1a. Branchlets golden brown tomentose; leaflets adaxially pubescent on midvein, abaxially sparsely pubescent on midvein or glabrous throughout, apex obtuse ..... 5a. var. *rhodantha*
- 1b. Branchlets yellow-brown villous; leaflets yellow tomentose on both surfaces, apex shortly acuminate, acumen 3–10 mm ..... 5b. var. *dunniana*

**5a. *Illigera rhodantha* var. *rhodantha***

红花青藤(原变种) hong hua qing teng (yuan bian zhong)

*Illigera petelotii* Merrill; *I. rhodantha* var. *angustifoliolata* Y. R. Li; *I. rhodantha* var. *orbiculata* Y. R. Li.

Branchlets golden brown tomentose. Leaflets abaxially sparsely pubescent on midvein or glabrous throughout, adaxially pubescent on midvein, apex obtuse.

Dense valley forests, sparse forests, thickets; (100–)300–600 (–2100) m. Guangdong, Guangxi, Hainan, Yunnan [Cambodia, Laos, Thailand, Vietnam].

The stems and leaves are used medicinally for treating rheumatism, paralysis, and injuries from falls; the leaves are also used to treat conjunctivitis.

**5b. *Illigera rhodantha* var. *dunniana*** (H. Léveillé) Kubitzki, Bot. Jahrb. Syst. 89: 168. 1969.

锈毛青藤 xiu mao qing teng

*Illigera dunniana* H. Léveillé, Repert. Spec. Nov. Regni Veg. 2: 326. 1911; *I. fordii* Gagnepain; *I. glandulosa* Gagnepain.

Branchlets yellow-brown villous. Leaflets yellow tomen-

tose on both surfaces, densely so abaxially, apex shortly acuminate, acumen 3–10 mm.

Mountain slopes, valley forests, thickets; 100–1000 m. Guangdong, Guangxi, Guizhou, Yunnan [Cambodia, Laos, Thailand, Vietnam].

**6. *Illigera luzonensis*** (C. Presl) Merrill, Philipp. Gov. Lab. Bur. Bull. 17: 18. 1904.

台湾青藤 tai wan qing teng

*Henschelia luzonensis* C. Presl, Reliq. Haenk. 2: 81. 1835; *Gronovia ternata* Blanco; *Illigera meyeniana* Kunth ex Walpers; *I. pubescens* Merrill; *I. ternata* (Blanco) Dunn.

Lianas. Stem angulate. Leaves 3-foliolate; petiole 4–10 cm, rugose, villous; leaflets: petiolules 0.5–1.8 cm; blade abaxially pale, adaxially blackish when dry, broadly ovate to lanceolate-ovate or obovate, 3.5–12(–14) × 3–10 cm, papery, rarely subleathery, abaxially subglabrous or sparsely pubescent on midvein when young, adaxially opaque and sparsely pubescent or sparsely pubescent on midvein, lateral veins 3–5-paired, arising from midvein at ca. 30°, veinlets conspicuous abaxially, base rounded, rarely shallowly cordate, apex mucronate to acuminate. Cymes axillary, 7–15 cm, pubescent; bracteoles minute. Flowers green or pink. Outer tepals 8–12 × 3–4 mm, 5(–7)-veined. Inner tepals slightly shorter than outer ones, adaxially densely pilose. Filaments straight in bud, 7–7.5 mm; appendages on 0.5–1 mm stipe, ca. 3 mm total, abaxially with open mouth. Ovary tetragonous, pubescent. Interstaminal glands small, 2- or 3-lobed. Fruit 2(–4)-winged; large wings 1.5–2.5 cm wide, smaller wings 3(–10) mm wide. Fr. Apr–May.

Dense secondary forests; near sea level to 1300 m. S Taiwan (Gaoxiang, Hengchun) [Japan (Ryukyu Islands), Philippines].

**7. *Illigera labra*** Y. R. Li, Acta Phytotax. Sin. 17(2): 77. 1979.

无毛青藤 wu mao qing teng

Lianas. Stem purple-brown, glabrous. Leaves 3-foliolate; petiole usually much longer than leaflets; leaflets: petiolules 5–10 mm; blade ovate to ovate-elliptic, 9–11 × 4–6 cm, papery, both surfaces glabrous except adaxially minutely pubescent on midvein, lateral veins 4- or 5-paired, conspicuous on both surfaces, base rounded, apex shortly acuminate or mucronate. Cymose panicles axillary, short, ca. 5 cm, slender, glabrous; bracts ovate, ca. 1 mm. Flowers red, glabrous throughout; flower buds red, globose, glabrous throughout. Outer tepals ovate-elliptic, 3.5–4 × ca. 2.5 mm, densely pellucid-glandular. Inner tepals similar to outer ones but narrower. Stamens 1–1.5 mm; appendages minute, nearly inconspicuous. Ovary glabrous; style ca. as long as stamens. Interstaminal glands absent. Fruit unknown. Fl. Jun.

• Dense forests on mountain slopes; 700–800 m. W Yunnan (Cangyuan).

**8. *Illigera parviflora*** Dunn, J. Linn. Soc., Bot. 38: 296. 1908.

小花青藤 xiao hua qing teng

Lianas. Stem angulate. Branchlets puberulent. Leaves 3-foliolate; petiole 4–8 cm, glabrous; leaflets: petiolules 1.2–2.5 cm, glabrous; blade elliptic-oblong to elliptic, 7–14 × 3–7 cm,

papery, both surfaces glabrous, lateral veins 5- or 6-paired, conspicuous on both surfaces, veinlets conspicuous abaxially only, base broadly cuneate, oblique on both sides, apex acuminate or long acuminate. Cymose panicles axillary, 10–20 cm, densely gray-brown puberulent. Flowers green-white, without bracts; buds globose, 2–3 mm in diam. Outer tepals green, elliptic-oblong, 3.5–5 × 1.5–2 mm, sparsely pubescent. Inner tepals white, similar to outer ones, 3–4 × ca. 1 mm, abaxially pubescent. Stamens 6–7 mm; filaments curved around anthers in bud, ± filiform, 4.5–6 mm, puberulent; appendages inconspicuous, clavate, obovate-oblong, 0.3–0.6 mm. Ovary constricted at apex, densely gray-brown puberulent; style 3.5–4 mm, gray villous; stigma dilated, cristate. Interstaminal glands small, 3-lobed. Fruit 7–9 cm in diam., 4-winged; large wings 2–3 cm wide, smaller ones ca. 0.5 cm wide. Fl. May–Oct, fr. Nov–Dec.

Dense or sparse forests on hills; (300–)500–1400 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Yunnan [Malaysia, Vietnam].

The roots are used medicinally for treating rheumatic arthralgia.

**9. *Illigera celebica*** Miquel, Ann. Mus. Bot. Lugduno-Batavi 2: 215. 1866.

宽药青藤 kuan yao qing teng

*Illigera platyandra* Dunn; ?*I. yaoshanensis* K. S. Hao.

Lianas. Stem angulate, glabrous. Leaves 3-foliolate; petiole 5–7(–14) cm, striate, glabrous; leaflets: petiolules 1–2.5 cm, glabrous; blade ovate to ovate-elliptic, 6–15 × 3.5–7 cm, papery to subleathery, both surfaces glabrous, lateral veins 4- or 5-paired, veinlets conspicuous on both surfaces, base rounded to subcordate, apex abruptly acuminate. Cymose panicles axillary, lax, ca. 20 cm. Flowers green-white; bracteoles small; flower buds globose, 2–5 mm in diam. Outer tepals elliptic-oblong, 5–6 × 2–2.5 mm, pubescent. Inner tepals similar to outer ones but narrower and abaxially conspicuously densely shortly white pubescent. Filaments curved around anthers in bud, tepal-like, lower part complanate, 1.5–2.5 mm wide, filiform toward apex, ca. 2 × as long as tepals when open, pubescent; appendages stipitate, clavate, ovoid, ca. 0.6 mm, inserted abaxially on broad base of filaments and covered by them. Ovary ca. 3 mm, tetragonous, constricted at apex, glabrous; style ca. 2.5 mm, villous; stigma dilated, cristate. Interstaminal glands absent. Fruit 3–5 cm in diam., 4-winged; large wings 1.5–2.5 cm wide, smaller wings 0.5–1.4 cm wide. Fl. Apr–Dec, fr. Jun–Nov.

Sparse or dense forests; (200–)300–1300 m. Guangdong, Guangxi, Hainan, Yunnan [Cambodia, Indonesia, Malaysia, New Guinea, Philippines, Thailand, Vietnam].

The roots and stems are used medicinally for relieving foot pain and pain from rheumatism and headaches.

**10. *Illigera henryi*** W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 42. 1917.

蒙自青藤 meng zi qing teng

Lianas, tall. Stem angulate, pubescent at first, soon glabrescent. Leaves 3-foliolate; petiole 6–12 cm, glabrous; leaflets: petiolules 2–3 cm, glabrous; blade ovate to elliptic, 8–13 × 5–8 cm, thickly papery to subleathery, both surfaces glabrous,

lateral veins 4- or 5-paired, raised on both surfaces, veinlets conspicuous abaxially, base broadly cuneate and somewhat oblique, apex mucronate. Cymose panicles axillary, lax, 5–18 cm, densely yellow tomentose. Outer tepals oblong, 7–12 mm, both surfaces pubescent. Inner tepals similar to outer ones but smaller, abaxially pubescent. Stamens 5–6 mm; filaments straight in bud, pilose; appendages stipitate, narrowly ovate, ca. 3 mm, membranous, abaxially with open mouth. Ovary densely shortly tomentose; style ca. 7 mm, triquetrous, hirsute. Interstaminal glands small, dentate. Fruit 12–14 cm in diam., 4-winged; large wings ca. 6 cm wide, smaller ones ca. 2 cm wide. Fl. Jul, fr. Sep–Nov.

• Dense forests; 1100–1600 m. Guangxi, SE Yunnan.

**11. *Illigera trifoliata*** (Griffith) Dunn subsp. *cucullata* (Merrill) Kubitzki, Bot. Jahrb. Syst. 89: 169. 1969.

兜状青藤 dou zhuang qing teng

*Illigera cucullata* Merrill, Univ. Calif. Publ. Bot. 13: 132. 1926.

Lianas. Stem brown, angulate, glabrous. Leaves 3-foliolate; petiole terete, 6–8 cm, striate, glabrous; leaflets: petiolules 0.8–2 cm, glabrous; blade lanceolate-elliptic, elliptic, or ovate, 6–9 × 3.5–6 cm, papery to subleathery, both surfaces glabrous, lateral veins 3- or 4-paired, arising from midvein at ca. 45°, base rounded, apex abruptly shortly acuminate. Cymose panicles axillary, yellow-brown pubescent; bracteoles narrowly elliptic, ca. 2.5 mm, yellow-brown pubescent. Flowers purple-green or green. Outer tepals 6–7 mm, abaxially yellow-brown pubescent. Inner tepals similar to outer ones but shorter, 5–6 mm. Stamens ca. as long as inner tepals; filaments straight in bud; appendages on ca. 1 mm stipe, narrowly ellipsoid, to 3 mm total, membranous, abaxially with open mouth, apex broadly cuneate. Ovary tetragonous, densely yellow-brown pubescent. Interstaminal glands small. Fruit 2-winged; wings suborbicular or ligulate, 4–4.5 cm wide. Fl. Aug–Mar of following year, fr. Jan–Sep.

Valley forests; 1100–1300 m. SE Yunnan [Laos, Thailand, Vietnam].

*Illigera trifoliata* subsp. *trifoliata* is characterized by its leaflets, which are 5.5–15 × 3–9 cm, ± pubescent on both surfaces, with lateral veins arising from midvein at 60°–80°; also, its wings of fruit are ligulate, 2.5–4.5 cm wide. It is distributed in India (Andaman Islands), Indonesia, Malaysia, Myanmar, and Thailand.

**12. *Illigera khasiana*** C. B. Clarke in J. D. Hooker, Fl. Brit. India 2: 461. 1879.

披针叶青藤 pi zhen ye qing teng

Lianas. Leaves 3-foliolate; petiole 4–12 cm; leaflets: petiolules 0.5–1.5 cm, adaxially slightly channeled and villous; blade olive-brown or brown on both surfaces when dry, lanceolate, rarely lanceolate-elliptic, 7–17 × 3–8 cm, subleathery, abaxially glabrous, adaxially glabrous except pilose on midvein, lateral veins (3 or) 4–6-paired, arising from midvein at ca. 45°, base obtuse to rounded, apex acuminate, acumen 0.7–1 cm. Flower buds ovoid, 5–8 mm. Outer tepals 0.9–1.2 cm, 3-veined. Inner tepals 0.9–1.1 cm, adaxially densely white lanose, 1-veined.

Stamens with filaments pubescent adaxially; filaments straight in bud; appendages stipitate, narrowly ovate, ca. 3.5 mm, membranous, abaxially with open mouth, margin denticulate, apex obliquely truncate. Ovary glabrous. Interstaminal glands small, 2-lobed. Fruit ca. 6 cm in diam., 2-winged; large wings 2.5–3 cm wide. Fl. Aug–Nov, fr. Jan–Apr.

Forests; 700–1000(–1600) m. Yunnan [India, Malaysia, Myanmar].

**13. *Illigera aromatica*** S. Z. Huang & S. L. Mo, *Guihaia* 5: 17. 1985.

香青藤 *xiang qing teng*

Lianas, aromatic throughout. Stem gray-brown, to 10 cm in diam.; bark 4–8 mm thick, longitudinally fissured. Branchlets gray, glabrous, striate. Leaves 3-foliolate; petiole 7–11 cm, glabrous; leaflets: petiolules 0.7–2 cm, puberulous; blade abaxially greenish, adaxially green, suborbicular, 5–11.5 × 4–9.5 cm, subleathery, abaxially barbate at vein axils but otherwise glabrous, adaxially glabrous, lateral veins 3- or 4-paired, base rounded, apex acute; lateral leaflets smaller, base unequal. Cymose panicles axillary or terminal, shorter than leaves, 5–10 cm; peduncles and pedicels pubescent; bracts oblong, ca. 2 × 1 mm, pubescent. Flowers rose. Outer tepals ovate-lanceolate, ca. 10 × 3 mm, adaxially densely glandular pubescent. Inner tepals similar to outer ones, ca. 8 × 2.5 mm, adaxially densely pubescent. Stamens ca. 8 mm; filaments curved around anthers in bud, densely glandular pubescent; appendages navicular, ca. 2.5 mm. Ovary ca. 2 mm, densely pubescent; style ca. 6 mm, densely glandular pubescent. Fruit unknown. Fl. Oct–Nov.

• Sparse forests or forest margins on limestone hills; 500–700 m. SW Guangxi.

The stems are used medicinally for treating rheumatic arthralgia, coughs, indigestion, and injuries from falls. It is said that simple crystals (C<sub>18</sub>H<sub>17</sub>NO<sub>4</sub>) distilled from the stem solution reduce fever, relax muscles, alleviate pain, and serve as a local anesthetic.

**14. *Illigera pseudoparviflora*** Y. R. Li, *Acta Phytotax. Sin.* 17(2): 77. 1979.

尾叶青藤 *wei ye qing teng*

Lianas. Stem angulate, glabrous. Leaves 3-foliolate; peti-

ole 4–5 cm; leaflets: petiolules 0.5–1.2 cm, adaxially yellow-brown pubescent on midvein; blade blackish on both surfaces when dry, lanceolate to broadly lanceolate, 6–8 × 2–2.5 cm, thickly papery, abaxially yellow-brown villous at leaf axils, adaxially slightly nitid and glabrous, lateral veins 3- or 4-paired, very conspicuous abaxially, slightly conspicuous adaxially, base cuneate to broadly cuneate, apex caudate-acuminate, acumen 1–1.2 cm. Cymose panicles axillary or terminal, robust, shorter than leaves, densely yellow-brown pubescent; rachis 3–4 cm. Flowers green. Outer tepals oblong, 6–7 mm, 5-veined. Inner tepals similar to outer ones but shorter, 3-veined. Stamens 4.5–5 mm; filaments straight in bud; appendages small, solid. Ovary densely yellow-brown pubescent, tetragonous; style 3–4 mm, densely yellow-brown villous. Interstaminal glands 5, small. Fruit unknown. Fl. May.

• Sparse roadside forests on mountain slopes; 400–800 m. S Guizhou (Luodian).

**15. *Illigera brevistaminata*** Y. R. Li, *Acta Phytotax. Sin.* 17(2): 77. 1979.

短蕊青藤 *duan rui qing teng*

Lianas. Stem gray-brown, glabrous, angulate. Leaves 3-foliolate; petiole 4–6 cm, glabrous; leaflets: petiolules 1–1.5 cm, adaxially shallowly channeled and sparsely pubescent; blade olive-green, narrowly elliptic or narrowly ovate to broadly lanceolate, 6–9 × 3–4 cm, subleathery, abaxially yellowish villous at vein axils, adaxially nitid and glabrous except sparsely pubescent at midvein base, lateral veins 3- or 4(or 5)-paired, distinctly raised abaxially, somewhat conspicuous adaxially, veinlets raised abaxially, inconspicuous adaxially, base rounded or subrounded and oblique on both sides, apex caudate-acuminate, rarely mucronate. Cymes axillary, sparsely yellowish villous; rachis ca. 2 cm. Flowers green. Outer tepals oblong, 4–5 mm. Inner tepals similar to and nearly as long as outer ones. Stamens ca. 2 mm, robust; filaments straight in bud; connectives sparsely pubescent; appendages small, solid. Ovary tetragonous, densely yellowish pubescent; style ca. as long as filaments, ca. 1 mm. Fruit unknown. Fl. Sep.

• Sparse valley forests; 100–300 m. S Guizhou, S Hunan.