

URTICACEAE

荨麻科 qian ma ke

Chen Jiarui (陈家瑞 Chen Chia-jui)¹, Lin Qi (林祁)¹; Ib Friis², C. Melanie Wilmot-Dea³, Alex K. Monro⁴

Herbs, subshrubs, or shrubs, rarely trees, very rarely climbing, stems often fibrous, sometimes succulent. sometimes armed with stinging hairs; epidermal cells of leaves, sometimes stems, perianths mostly with prominent cystoliths punctiform to linear; Leaves alternate or opposite, stipules present, rarely absent; leaf blade simple. Inflorescences cymose, paniculate, racemose, spicate, or cluster-capitate, usually formed from glomerules, sometimes crowded on common enlarged cuplike or discoid receptacle, rarely reduced into a single flower. Flowers unisexual (plants monoecious or dioecious), rarely bisexual in partial flowers; actinomorphic, very small, (1-)4- or 5-merous, rarely perianth absent in female flowers. Calyx absent. Perianth lobes imbricate or valvate. Male flowers: stamens as many as and opposite to perianth lobes, filaments inflexed in bud; anthers 2-locular, opening lengthwise, rudimentary ovary often present. Female flowers: perianth lobes free or connate, usually enlarged in fruit and persistent, occasionally absent; staminodes scarious, opposite to the perianth lobes, or absent. Ovary rudimentary in male flowers, sessile or shortly stipitate, free or adnate to the perianth; 1-locular, ovule solitary, erect from the base; style simple, or absent; stigma diverse, capitate, penicillate-capitate (brushlike), subulate, filiform, ligulate, or peltate. Fruit usually a dry achene, sometimes a fleshy drupe, often enclosed by the persistent perianth. Seed solitary, endosperm usually present; embryo straight; cotyledons ovate elliptical or orbicular.

About 47 genera and 1300 species: most numerous in wet tropical regions, extending into temperate regions; 25 genera and 341 species (163 endemic, one introduced) in China.

Plants in this family have numerous uses. The stem fiber of some genera and species is of high quality and used to make cloth, fishing nets, and ropes and for some industrial materials. In central and southern China, *Boehmeria nivea* is widely cultivated for ramie fiber and *Girardinia diversifolia* subsp. *triloba* is widely cultivated for "red huo ma" fiber. Boiled young shoots of *Girardinia*, *Laportea*, and *Urtica* are eaten as vegetables. Some species are used in local Chinese medicine. *Pellionia repens*, *Pilea cadierei*, *P. microphylla*, and *P. peperomioides*, among other species, are widely cultivated as ornamentals in China and elsewhere. Some genera, such as *Elatostema*, *Pellionia*, and *Pilea*, occur frequently in shady, moist habitats of subtropical forests and become dominant elements of the forest floor vegetation. Plants of the first five genera belong to tribe Urticeae, which is usually characterized by the distinctive stinging hairs.

Chen Chiajui & Wang Wentsai. 1995. Urticaceae. In: Wang Wentsai & Chen Chiajui, eds., Fl. Reipubl. Popularis Sin. 23(2): 1-404.

- 1a. Filaments of stamens erect in bud; shrubs or woody climbers 18. *Poikilospermum*
- 1b. Filaments of stamens inflexed in bud; usually not woody climbers.
 - 2a. Plants armed with stinging hairs; female flowers without staminodes.
 - 3a. Leaves opposite; perianth lobes of female flowers free, lateral pair outer and much smaller than dorsiventral pair 1. *Urtica*
 - 3b. Leaves alternate; perianth lobes of female flowers connate or if free then not as above.
 - 4a. Stipules interpetiolar; achene straight, sessile; stigma penicillate-capitate; slender herb to 40 cm 2. *Nanocnide*
 - 4b. Stipules intrapetiolar; achene strongly oblique, stipitate; stigma filiform, ligulate, or subulate; trees, shrubs or usually robust herbs.
 - 5a. Female perianth with 3 lobes fused and the 4th absent or reduced to a bristle; robust herb with longest stinging hairs more than 5 mm 5. *Girardinia*
 - 5b. Female perianth lobes 4, dorsal lobe largest, ventral lobe smallest, joined at base only, never bristle-like; ± woody shrub or tree or herbs with longest stinging hairs less than 5 mm.
 - 6a. Stipules completely joined, apex entire; trees or shrubs; pedicels of female flowers absent or terete, not winged in fruit 4. *Dendrocnicide*
 - 6b. Stipules 2-fid at apex; herbs or subshrubs; pedicels of female flowers always present, winged in fruit 3. *Laportea*
 - 2b. Plants without stinging hairs; female flowers with or without staminodes.
 - 7a. Cystoliths usually linear or fusiform; stigma sessile, penicillate-capitate; perianth lobes of female flowers free or connate at base, staminodes present (except in *Procris*).
 - 8a. Leaves opposite, rarely spirally alternate and then leaf blade peltate; leaf blade usually symmetric.
 - 9a. Flowers usually forming loose cymes or cymose panicles, sometimes spikes or in clusters; achene without crested appendix at apex 6. *Pilea*
 - 9b. Flowers inserted on discoid or concave, fleshy receptacle; achene with crested or U-shaped appendix at apex 7. *Lecanthus*
 - 8b. Leaves alternate or very strongly heterophyllous with 1 leaf of the pair reduced to a nanophyll very much smaller than the other, leaves usually distichous; leaf blade usually asymmetric.

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URTICACEAE

- 10a. Perianth lobes of female flowers usually 4 or 5, much shorter than ovary, or strongly reduced, not corniculate at apex; achene 6–10-ribbed; male inflorescences usually with receptacle, rarely cymose; female inflorescences with discoid receptacle and bracteoles along margin 9. *Elatostema*
- 10b. Perianth lobes of female flowers 3–5, longer than ovary, usually corniculate below apex; achene tuberculate or striate, rarely smooth, never ribbed; male inflorescences cymose; female inflorescences cymose or capitate on globose receptacle.
- 11a. Female inflorescences cymose, rarely with discoid receptacle and involucre; perianth lobes of female flowers (4 or)5; staminodes present 8. *Pellionia*
- 11b. Female inflorescences capitate on globose receptacle, but without involucre; perianth lobes of female flowers 3 or 4; staminodes absent 10. *Procris*
- 7b. Cystoliths dotlike or very short blunt rods (botuliform); stigma often on a style, mostly linear, less often penicillate-capitate; perianth lobes of female flowers usually connate into a tube, rarely strongly reduced, or absent, staminodes absent.
- 12a. Stipules absent; flowers sometimes bisexual, each subtended by 1 or more leaflike bracts longer than the flower, contrasting with the chaffy brown perianth and glossy black achene 24. *Parietaria*
- 12b. Stipules present; flowers unisexual, bracts and flowers not as above.
- 13a. Inflorescence enclosed within involucre, usually bisexual with several male flowers surrounding 1 or 2 female flowers; male flower with 1 stamen; female flower without perianth 25. *Droguetia*
- 13b. Inflorescence without involucre, often unisexual; male flower with 3–5 stamens; female flower with tubular perianth around ovary.
- 14a. Leaves opposite.
- 15a. Leaf blade margin entire.
- 16a. Male buds truncate, perianth with annular, often villous, crown formed from transverse crests of lobes; leaf blade 3-veined from base 15. *Gonostegia*
- 16b. Male flowers without this combination of characters; leaf blade with at least 2 major lateral veins arising clearly above base 14. *Pouzolzia*
- 15b. Leaf blade margin serrate or dentate.
- 17a. Stigma ovoid-capitate, on short style; stipules persistent, reflexed at flowering; slender stoloniferous herb 13. *Chamabainia*
- 17b. Stigma elongated; stipules often deciduous; shrub or herb, not stoloniferous.
- 18a. Stigma minute, less than 0.5 mm, hooked, persistent; fruit symmetrically enlarged at apex; inflorescences paired at nodes, sessile, ± globose, very dense with base partly enveloping stem 16. *Cypholophus*
- 18b. Stigma relatively long, variously curved [but if hooked then more than 1 mm], sometimes deciduous; fruit ± symmetric at apex, often winged; inflorescence various, often pedunculate, if sessile then base not enveloping stem.
- 19a. Achene not lustrous, remaining attached to perianth; stigma persistent 12. *Boehmeria*
- 19b. Achene lustrous, easily detached from perianth; stigma usually deciduous 14. *Pouzolzia*
- 14b. Leaves alternate.
- 20a. Stigma filiform or ligulate.
- 21a. Stigma ligulate 11. *Archiboehmeria*
- 21b. Stigma filiform.
- 22a. Female perianth fleshy at maturity, apex with tiny, entire opening, lobes completely fused; style deciduous 19. *Pipturus*
- 22b. Female perianth not fleshy, apex minutely 2-toothed; style often persistent.
- 23a. Achene not lustrous, remaining attached to perianth; stigma persistent 12. *Boehmeria*
- 23b. Achene lustrous, easily detached from perianth; stigma usually deciduous 14. *Pouzolzia*
- 20b. Stigma penicillate, peltate or ringlike.
- 24a. Inflorescence elongated with short lateral branches, all axes completely hidden by very closely spaced flowers; stigma ringlike 17. *Sarcochlamys*
- 24b. Inflorescence globose or nearly so or, if more elongated and branched then axes exposed between discrete glomerules of flowers; stigma peltate or penicillate.

URTICACEAE

- 25a. Stigma peltate with long ciliate hairs along margin; achene adnate to thinly fleshy perianth, surrounded at base or almost wholly enclosed by discoid or cuplike fleshy receptacle 20. *Oreocnide*
- 25b. Stigma penicillate; achene without fleshy receptacle.
- 26a. Perianth of female flowers inconspicuous, connate into a shallow pocket or absent; leaves usually discolorous, abaxially white tomentose 23. *Maoutia*
- 26b. Perianth of female flowers conspicuous, connate into a tube; leaves sometimes concolorous.
- 27a. Female perianth small, cupular, 4 or 5-lobed or -toothed, adnate to base of ovary; inflorescences paired, unbranched pedunculate heads 22. *Leucosyke*
- 27b. Female perianth enclosing ovary, tube obovoid or jug-shaped, mouth contracted, very minutely 3- or 4-toothed, in fruit often enlarged, fleshy, and adnate to ovary, rarely membranous and free; inflorescences often branched 21. *Debregeasia*

1. URTICA Linnaeus, Sp. Pl. 2: 983. 1753.

荨麻属 qian ma shu

Chen Jiarui (陈家瑞 Chen Chia-jui); Ib Friis, C. Melanie Wilmot-Dear

Herbs, rarely shrubs, annual or perennial, armed with stinging hairs. Stems often 4-angled. Leaves opposite; stipules often persistent, interpetiolar, lateral, free or connate; leaf blade 3–5(–7)-veined, margin dentate or incised-lobed; cystoliths often punctiform, sometimes short botuliform. Inflorescences in axillary pairs; glomerules forming spikes, racemes, panicles, or rarely capitula, unisexual (plants monoecious or dioecious) or androgynous. Male flowers: perianth lobes 4, imbricate; stamens 4; rudimentary ovary cuplike. Female flowers: perianth lobes 4, free or connate, enlarged in fruit, enclosing achene, strongly unequal, outer 2 (lateral) smaller than inner 2 (dorsal-ventral) lobes. Ovary straight; stigma sessile or on short style, penicillate-capitate. ovule orthotropous. Achene straight, compressed, enclosed by persistent perianth. Seed erect, with scanty endosperm; cotyledons suborbicular, fleshy.

About 30 species: principally in N and S temperate regions, also in montane areas of tropics; 14 species (three endemic) in China.

The stem fibers are used to make ropes, the leaves are used as fodder, and the young shoots are used as a seasoning substitute for sorrel.

- 1a. Stipules connate; inflorescences often branched.
- 2a. Leaf blade ovate to lanceolate with margin dentate to doubly denticulate or doubly serrulate.
- 3a. Leaf blade ovate to lanceolate, surface wrinkled when dried, margin sharply doubly serrulate; stem densely pubescent with many stinging hairs 13. *U. ardens*
- 3b. Leaf blade lanceolate or rarely narrowly ovate, surface nearly smooth when dried, margin crenate or inconspicuously double-denticulate to serrulate; stems sparsely pubescent with a few stinging hairs at least when old 14. *U. parviflora*
- 2b. Leaf blade broadly ovate or subcordate, with margin lobed or rarely doubly denticulate.
- 4a. Stipules partly connate, apex 2-lobed or -cleft 10. *U. thunbergiana*
- 4b. Stipules wholly connate, apex obtuse.
- 5a. Leaf margin shallowly 5–7-lobed or palmately 3-lobed (lobes ± pinnately lobed again), lobe margin serrulate; inflorescences with a few short branches or almost unbranched 11. *U. fissa*
- 5b. Leaf margin usually 10- or more lobed, lobe margin doubly serrulate; inflorescences with many long branches 12. *U. mairei*
- 1b. Stipules mostly free (sometimes partly connate with 2-lobed apex on upper parts of plant in *U. laetevirens*); inflorescences unbranched or branched.
- 6a. Plants usually dioecious; inflorescences branched.
- 7a. Plants often with dense stinging and setose hairs; leaf blade ovate or lanceolate, base cordate; petiole 1/6–1/2 as long as leaf blade 9. *U. dioica*
- 7b. Plants with sparse stinging and setose hairs; leaf blade lanceolate to linear, base rounded or notched; petiole 1/15–1/5 as long as leaf blade 8. *U. angustifolia*
- 6b. Plants monoecious; inflorescences, at least female ones, unbranched or nearly so.
- 8a. Inflorescences bisexual, containing proximal female flowers and distal male flowers.
- 9a. Plant always annual; leaf blade broadly elliptic, apex obtuse-rounded; perianth lobes of female flowers connate at base, sparsely setulose along margin 3. *U. urens*
- 9b. Plant perennial; leaf blade ovate to lanceolate, apex acute to shortly acuminate; perianth lobes of female flowers connate 1/2 of length, subglabrous.

URTICACEAE

- 10a. Stipules 4–7 mm; leaf margin dentate or doubly serrate; achene ca. 0.8 mm 1. *U. atrichocaulis*
 10b. Stipules ca. 2 mm; leaf margin incised-serrulate; achene ca. 1 mm 2. *U. taiwaniana*
 8b. Inflorescences often unisexual, containing either male or female flowers.
 11a. Male inflorescences in distal axils; female perianth lobes without stinging hairs; cystoliths often
 botuliform 7. *U. laetevirens*
 11b. Male inflorescences usually in proximal axils; female perianth lobes with stinging hairs; cystoliths
 often punctiform.
 12a. Female perianth lobes membranous, inner pair 2 times as long as achene; petiole
 0.2–0.5(–1.6) cm 6. *U. hyperborea*
 12b. Female perianth lobes herbaceous, inner pair subequal to achene; petiole 1–8 cm.
 13a. Achene smooth; female inflorescences in fruit drooping; outer 2 female perianth lobes
 1/7–1/5 as long as inner 2 9. *U. dioica*
 13b. Achene verrucose; female inflorescences in fruit erect or spreading; outer 2 female
 perianth lobes 1/4–1/2 as long as inner 2.
 14a. Leaf margin 3–5-palmatisect or -palmatipartite, with pinnatisect lobes; female
 perianth lobes connate for 1/3 of length 5. *U. cannabina*
 14b. Leaf margin coarsely dentate or sharply serrate; female perianth lobes connate
 at base only 4. *U. triangularis*

1. *Urtica atrichocaulis* (Handel-Mazzetti) C. J. Chen, Bull. Bot. Res., Harbin 3(2): 109. 1983.

小果荨麻 xiao guo qian ma

Urtica dioica var. *atrichocaulis* Handel-Mazzetti, Symb. Sin. 7: 110. 1929.

Herbs perennial, monoecious. Rhizomes woody. Stems gracile, simple or branched, 30–150 cm tall; stems, petioles, and both surfaces of leaf blade sparsely hirtellous, armed with stinging hairs, particularly on nodes. Stipules free, oblong-linear, 4–7 mm, puberulent; petiole 1–4 cm; leaf blade ovate or narrowly ovate, rarely lanceolate, 2.5–7(–9) × 1–3 cm, 3-veined, base broadly cuneate, rounded or shallowly cordate, margin 12–15-dentate or rarely doubly serrate, apex acute or shortly acuminate; cystoliths punctiform. Inflorescences containing proximal female flowers and distal male flowers, spicate, as long as petioles. Male flowers short pedicellate, in bud ca. 1.2 mm; perianth lobes connate 1/2 of length, puberulent. Female flowers: perianth lobes connate 1/2 of length, dorsal-ventral lobes elliptic-ovate, as long as achene, lateral lobes shorter reaching to 1/3 of distal part of larger lobes, subglabrous. Achene ovoid, compressed, 0.8 mm, smooth, enclosed by persistent perianth lobes. Fl. May–Jul, fr. Jul–Sep.

• Valleys, along streams, roadsides; 300–2600 m. SW Guizhou, Sichuan, Yunnan.

2. *Urtica taiwaniana* S. S. Ying, Quart. J. Chinese Forest. 8(3): 107. 1975.

台湾荨麻 tai wan qian ma

Herbs perennial, monoecious. Rhizomes present. Stems simple or shortly branched, 30–80 cm tall, sparsely hirtellous, armed with stinging hairs. Stipules free, lanceolate, ca. 2 mm, puberulent; petiole 1–3 cm, sparsely armed with stinging and appressed-puberulent hairs; leaf blade ovate to ovate-lanceolate, 3–6 × 1.5–4 cm, 3(–5)-veined, with stinging and setulose hairs on both surfaces, base broadly cuneate or shallowly cordate, margin incised-serrulate, apex acute or acuminate; cystoliths punctiform. Inflorescences containing proximal female flowers and distal male flowers, spicate, to 4 cm in fruit. Male flowers short pedicellate, in bud ca. 1.2 mm; perianth lobes connate 1/2

of length, puberulent. Female flowers: perianth lobes connate 1/2 of length, dorsal-ventral lobes elliptic-ovate, as long as achene, lateral lobes shorter reaching to apical 1/3 of dorsal-ventral lobes, subglabrous. Achene ovoid, compressed, 1 mm, smooth, invested by persistent perianth lobes. Fl. Jun–Jul, fr. Jul–Sep.

• Thickets, along streams, mountain roadsides; 3400–3600 m. C Taiwan.

3. *Urtica urens* Linnaeus, Sp. Pl. 1: 984. 1753.

欧荨麻 ou qian ma

Herbs annual. Stems branched, 10–60 cm tall, sparsely puberulent and somewhat densely armed with stinging hairs; lower internodes 4–7 cm, upper internodes 1–3 cm. Stipules free, narrowly triangular, 1–2.5 mm, ciliate; petiole 1–2.5 cm, puberulent, sparsely armed with stinging hairs; leaf blade broadly elliptic, sometimes ovate or obovate, 1.2–6 × 0.6–3 cm, 5-veined, often subglabrous except for sparse stinging hairs on both surfaces, base broadly cuneate or rounded, margin 6–11-dentate, apex obtuse-rounded; cystoliths punctiform, distinct adaxially. Inflorescences containing proximal female flowers and distal male flowers, spicate, 0.5–2.5 cm. Male flowers short pedicellate, in bud ca. 1.2 mm; perianth lobes connate 1/2 of length, puberulent. Female flowers: perianth lobes connate at base, dorsal-ventral lobes ovate, equaling achene, often with 1 stinging hair on dorsal rib, sparsely setulose along margin, lateral lobes ovate, ca. 5 times as small as others. Achene brownish gray, ovoid, compressed, 0.8 mm, verrucose, invested by persistent perianth lobes. Fl. May–Jul, fr. Aug–Sep.

Forest margins, roadsides, near villages; 500–1000 m in N China, 2800–2900 m in SW China. Liaoning, Qinghai, Xinjiang (Altay region), S Xizang [Africa, Asia, Europe, very widely distributed in temperate regions and tropical highlands].

Wright (in 1899) and Handel-Mazzetti (in 1929) reported this species from Zhejiang, in SE China; however, we have seen no material from there. If present in Zhejiang, the plants must be naturalized.

4. *Urtica triangularis* Handel-Mazzetti, Symb. Sin. 7: 110. 1929.

三角叶荨麻 san jiao ye qian ma

Herbs perennial, monoecious. Rhizomes woody, ca. 1 cm in diam. Stems light purplish, branched, 60–150 cm tall; stems and petioles sparsely hirtellous, armed with stinging hairs. Stipules free, linear-lanceolate, 5–10 mm, puberulent; petiole 1–5 cm; leaf blade triangular, triangular-lanceolate, sometimes ovate, 2.5–11 × 1–5 cm, 3-veined, lateral veins 2–4 each side, adaxial surface with sparse stinging hirtellous hairs, abaxial surface with sparse stinging and pubescent hairs, base rounded, truncate, or shallowly cordate, margin coarsely 7–12-dentate or sharply serrate, sometimes doubly serrate or several pinnate lobes in the lower part, apex acute, sometimes short acuminate; cystoliths punctiform. Inflorescences unisexual; male inflorescences in distal axils, paniculate, spreading; female inflorescences in proximal axils, spicate, erect or drooping, with a thick axis and few branches in the proximal part. Male flowers short pedicellate or sessile, in bud ca. 1.5 mm; perianth lobes connate 1/2 of length, puberulent. Female flowers: perianth lobes connate at base, dorsal-ventral lobes equal to achene in size and shape, setulose and with 1–3 stinging hairs, lateral lobes ovate, 2–3 × as long as dorsal ones, herbaceous. Achene brownish, ovoid, compressed, 1.2–2 mm, verrucose, sometimes puberulent, with sunken dots, invested by persistent perianth lobes. Fl. Jun–Aug, fr. Aug–Oct.

• Thickets, meadows, along streams, valleys, roadsides, near villages; 2500–4100 m. Gansu, Qinghai, W Sichuan, E Xizang, NW Yunnan.

- 1a. Leaf blade ovate or lanceolate, base often rounded, lateral basal nerves reaching to teeth of upper margin; inflorescences drooping in fruit; achene asperulate 4c. subsp. *trichocarpa*
- 1b. Leaf blade angustate triangular, base truncate or shallowly cordate, lateral basal nerves reaching to the middle-lower margin; inflorescences straight; achene verrucose.
- 2a. Leaf margin coarsely dentate or sharply serrate, sometimes double-serrate in the lower part 4a. subsp. *triangularis*
- 2b. Leaf margin with several pinnatifid lobes in the lower part 4b. subsp. *pinnatifida*

4a. *Urtica triangularis* subsp. *triangularis*

三角叶荨麻(原亚种) san jiao ye qian ma (yuan ya zhong)

Leaf blade often narrowly triangular, lateral basal veins reaching middle-proximal margin, base truncate or shallowly cordate, margin coarsely dentate or sharply serrate, sometimes doubly serrate near base, apex acute; inflorescences erect; female perianth lateral lobes setulose; achene ca. 2 mm, finely verrucose. Fl. Jun–Aug, fr. Aug–Oct.

• Moist places along streams, valleys, roadsides, near villages; 2500–3700 m. S Qinghai, W Sichuan, E Xizang, NW Yunnan.

4b. *Urtica triangularis* subsp. *pinnatifida* (Handel-Mazzetti) C. J. Chen in C. Y. Wu, Fl. Xizang. 1: 526. 1983.

羽裂荨麻 yu lie qian ma

Urtica triangularis f. *pinnatifida* Handel-Mazzetti, Symb. Sin. 7: 111. 1929.

Leaf blade often narrowly triangular, lateral basal veins reaching middle-proximal margin, base truncate or shallowly cordate, margin coarsely dentate or sharply serrate distally and pinnatifid near base; inflorescences erect; female perianth lateral lobes setulose and with stinging hairs; achene coarsely verrucose. Fl. Jun–Aug, fr. Aug–Sep.

• Thickets, meadows, along streams; (2700–)3400–4100 m. S Gansu, Qinghai, E Xizang, NW Yunnan.

4c. *Urtica triangularis* subsp. *trichocarpa* C. J. Chen, Bull. Bot. Res., Harbin 3(2): 111. 1983.

毛果荨麻 mao guo qian ma

Leaf blade ovate or lanceolate, lateral basal veins reaching teeth of distal margin, base often rounded, sometimes shallowly cordate, margin coarsely dentate, apex acute or acuminate; inflorescences drooping; female perianth lateral lobes narrowly ovate or oblong, setulose; achene sparsely setulose, with sunken dots. Fl. Jul–Aug, fr. Aug–Sep.

• Thickets, roadsides; 2200–3000 m. Gansu, NE Qinghai, NW Sichuan.

5. *Urtica cannabina* Linnaeus, Sp. Pl. 2: 984. 1753.

麻叶荨麻 ma ye qian ma

Urtica cannabina f. *angustiloba* Chu.

Herbs perennial, monoecious. Rhizomes woody. Stems branched, 50–150 cm tall, sparsely hirtellous, sparsely armed with stinging hairs. Stipules free, linear, 5–15 mm, puberulent on both surfaces; petiole 2–8 cm, puberulent, with stinging hairs; leaf blade 5-angled in outline, 7–15 × 3.5–10 cm, abaxial surface puberulent and sparsely armed stinging hairs on veins, adaxial surface sparsely setulose, then glabrescent, margin 3-palmatisect or parmatipartite, primary lobes pinnatisect, gradually shortened distally, secondary lobes irregularly incised-serrate or shallowly serrate; cystoliths punctiform, densely adaxially. Inflorescences unisexual; male inflorescences in proximal axils, paniculate, 5–8 cm; female ones in distal axils, spicate, 2–7 cm, often erect, with a thick axis and few branches in proximal part. Male flowers short pedicellate or sessile, in bud 1.2–1.5 mm; perianth lobes connate 1/2 of length, ovate, puberulent. Female flowers: perianth lobes connate at basal 1/3, herbaceous, dorsal-ventral lobes elliptic-ovate, 2–4 mm, setulose and with 1–4 stinging hairs, lateral lobes ovate or oblong-ovate, 3–4 times as short as dorsal ones, often with single stinging hair. Achene gray-brownish, ovoid, slightly compressed, 2–3 mm, apex acute, verrucose, invested by persistent perianth lobes. Fl. Jul–Aug, fr. Aug–Oct.

Thickets, grasslands, sand dunes, sandy beaches, river banks, roadsides, near villages, weed-infested places; 800–2800 m. Gansu, Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shanxi, N and W Sichuan, Xinjiang [Mongolia, Russia (Siberia); C and SW Asia, Europe].

6. *Urtica hyperborea* Jacquin ex Weddell, Monogr. Urtic. 68. 1856.

高原荨麻 gao yuan qian ma

Herbs perennial, caespitose, monoecious or dioecious. Rhizomes woody, thick. Stems pale brownish and purplish, simple or branched, cylindrical basally, somewhat 4-angled apically, 10–50 cm tall, sparsely puberulent and densely armed with stinging hairs; internodes compact. Stipules free, reflexed, oblong or oblong-ovate, 2–4 mm, ciliate; petiole 0.2–0.5(–1.6) cm, puberulent, with stinging hairs; leaf blade green-blue when dry, ovate or cordate, 1.5–7 × 1–5 cm, 3(–5)-veined, lateral basal veins arcuate, reaching distal margin and anastomosing, impressed adaxially, prominent abaxially, both surfaces with stinging and puberulent hairs, base cordate, margin 6–11-dentate, apex acute or short acuminate; cystoliths punctiform, conspicuous adaxially. Inflorescences unisexual, male ones in proximal axils, short spicate or in clusters, 1–2.5 cm. Male flowers long pedicellate, in bud ca. 1.3 mm, perianth lobes connate 1/2 of length, hirtellous. Female flowers: perianth lobes connate at base, membranous, unequal, dorsal-ventral lobes much larger, suborbicular, 3–5 mm, 2 times as long as achene, setulose and sometimes with 1 or 2 stinging hairs on ribs, lateral lobes ovate, 8–10 times as short as dorsal ones. Achene pale gray, oblong-ovoid, compressed, ca. 2 mm, smooth, invested by persistent perianth lobes. Fl. Jun–Jul, fr. Aug–Sep.

Alpine meadows, thickets, crevices; 3000–5200 m. S Gansu, Qinghai, NW Sichuan, S Xinjiang, Xizang [Sikkim].

The invalidly published "*Urtica kaulunshanica*" Chang Y. Yang (Claves Pl. Xinjiang. 2: 84. 1982) belongs here.

7. *Urtica laetevirens* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 22: 236. 1877.

宽叶荨麻 kuan ye qian ma

Herbs perennial, monoecious, rarely dioecious. Rhizomes woody. Stems simple or few branched, 30–100 cm tall, subglabrous or sparsely hirtellous and with sparsely stinging hairs, particularly on nodes. Stipules free (sometimes partly connate with 2-lobed apex on upper parts of plant), lanceolate or oblong, 3–8 mm, puberulent; petiole slender, 1.5–7 cm, with sparse stinging and hirtellous hairs; leaf blade ovate, cordate or lanceolate, often gradually narrow distally, 4–10 × 2–6 cm, often membranous, 3-veined, lateral basal veins arcuate, reaching distal margin and anastomosing, secondary veins 2 or 3 on each side, both surfaces with sparse stinging and hirtellous hairs, base broadly cuneate, rounded, or cordate, margin dentate or serrate, apex short acuminate to caudate-acuminate; cystoliths often botuliform, sometimes punctiform. Inflorescences unisexual; male inflorescences in distal axils, spicate, to 8 cm; female ones in proximal axils, subspicate, slender, sometimes glomerules interrupted along axis. Male flowers sessile or short pedicellate, in bud ca. 1 mm; perianth lobes connate 1/2 of length, puberulent. Female flowers: perianth lobes connate at base, dorsal-ventral lobes elliptic-ovate, ca. 1 mm, sparsely or densely setulose, lateral lobes narrowly ovate, 3–5 times as short as dorsal ones. Achene gray-brown, ovoid or narrowly ovoid, slightly compressed, ca. 1 mm, inconspicuously verrucose or smooth, invested by persistent perianth lobes. Fl. Jun–Aug, fr. Aug–Oct.

Moist places in forests, thickets, along streams, river banks; 100–3500 m. Anhui, Gansu, Hebei, Heilongjiang, Henan, Hubei, Hunan, E Jilin, Liaoning, Nei Mongol, SE Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, SE Xizang, Yunnan [Japan, Korea, Russia (Far East)].

Dmitry Geltman (pers. comm.) believes that *Urtica silvatica* should be treated as a separate species and not as a synonym of *U. laetevirens*. The former species has connate stipules, whereas the latter species always has free stipules.

- 1a. Stipules on upper parts of stems partially connate; achene ovoid, apex obtuse, verrucose 7a. subsp. *laetevirens*
 1b. Stipules all free; achene narrowly ovoid, apex acute, smooth 7b. subsp. *cyanescens*

7a. *Urtica laetevirens* subsp. *laetevirens*

宽叶荨麻(原亚种) kuan ye qian ma (yuan ya zhong)

Urtica dentata Handel-Mazzetti; *U. laetevirens* subsp. *dentata* (Handel-Mazzetti) C. J. Chen; *U. pachyrrhachis* Handel-Mazzetti; *U. silvatica* Handel-Mazzetti.

Stipules free below, partially connate in upper stems; leaf blade green or dark green when dry, ovate or lanceolate, outer secondary veins often reaching teeth, base broadly cuneate or rounded; cystoliths botuliform with mixture of punctiform ones; achene ovoid, apex obtuse, verrucose, persistent perianth lobes sparsely setulose. Fl. Jun–Aug, fr. Aug–Sep.

Moist places in forests, thickets, along streams; 800–3500 m. Anhui, Gansu, Hebei, Henan, Hubei, Hunan, Liaoning, Nei Mongol, SE Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, SE Xizang, Yunnan [Japan, Korea, Russia (Far East)].

7b. *Urtica laetevirens* subsp. *cyanescens* (Komarov ex Jarmolenko) C. J. Chen, Bull. Bot. Res., Harbin 3(2): 115. 1983.

乌苏里荨麻 wu su li qian ma

Urtica cyanescens Komarov ex Jarmolenko in Komarov, Fl. URSS 5: 714. 1936.

Stipules all free; leaf blade blue-green when dry, broadly ovate or ovate, thin membranous, outer secondary veins often reaching teeth, base broadly cuneate or rounded; cystoliths linear or botuliform; achene narrowly ovoid, apex acute, smooth, persistent perianth lobes densely setulose. Fl. Jul–Aug, fr. Aug–Sep.

Moist places in *Pinus* or mixed forests, river banks; 100–1000 m. Heilongjiang, E Jilin, E Liaoning [N Korea, Russia (Far East)].

Dmitry Geltman (pers. comm.) believes that *Urtica cyanescens* is a pure synonym of *U. laetevirens*. If an extremely narrow species concept were adopted, *U. cyanescens* could be separated from *U. laetevirens*, but then it would be necessary to treat *U. laetevirens* as an endemic of Hokkaido, Japan, from where it was described.

8. *Urtica angustifolia* Fischer ex Hornemann, Suppl. Hort. Bot. Hafn. 107. 1819.

狭叶荨麻 xia ye qian ma

Urtica dioica var. *angustifolia* (Fischer ex Hornemann) Ledebour; *U. foliosa* Blume.

Herbs perennial, dioecious. Rhizomes woody, stoloniferous. Stems branched or simple, 40–150 cm tall; stems, petioles, and both surfaces of leaf blade sparsely hirtellous and armed with stinging hairs. Stipules free, linear, 6–12 mm; petiole short, 0.5–2 cm; leaf blade oblong-lanceolate to ovate-lanceolate, rarely linear or ovate, 4–15 × 1–3.5(–5.5) cm, often herba-

ceous, 3-veined, lateral basal veins parallel to midvein in middle of blade, with secondary veins 2 or 3 on each side, adaxial surface often rough, base rounded, rarely shallowly cordate, margin coarsely 9–15(–19)-dentate or serrate, teeth tapered or incurved-tipped, ciliate, apex long acuminate or acute; cystoliths often punctiform. Inflorescences paniculate, sometimes with few, short branchlike spikes, 2–8 cm. Male flowers in bud ca. 2 mm, perianth lobes connate 1/2 of length, puberulent. Female flowers: perianth lobes connate at base, dorsal-ventral lobes elliptic-ovate, ca. 1 mm, sparsely setulose or subglabrous, lateral lobes narrowly obovate, 1/2 the length of dorsal ones. Achene brownish gray, ovoid or broadly ovoid, slightly compressed, 0.8–1 mm, smooth or inconspicuously verrucose, invested by persistent perianth lobes. Fl. Jun–Aug, fr. Aug–Oct.

Moist places in forests, thickets, stream banks; 800–2200 m. Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Shandong, Shanxi [Japan, Korea, Mongolia, Russia (Far East, Siberia)].

The species is similar to *Urtica dioica* in having dioecious plants, paniculate inflorescences, and similar stipule and achene features; however, it differs in having sparser stinging hairs, narrower leaves with a rounded base, and much shorter petioles. The taxa could either be sister species, or *U. angustifolia* could be an eastern geographical vicariant of *U. dioica*.

9. *Urtica dioica* Linnaeus, Sp. Pl. 2: 984. 1753.

异株荨麻 yi zhu qian ma

Herbs perennial, dioecious, rarely monoecious. Rhizomes woody, stoloniferous. Stems simple or few branched, 40–100 cm tall; stems and petioles often densely or sometimes sparsely covered with stinging and setulose hairs. Stipules free, linear, (2–)5–8 mm; petiole 2.5–4 cm; leaf blade ovate, sometimes lanceolate, 5–13 × 2.5–6 cm, often herbaceous, (3–)5-veined, lateral basal veins reaching distal margin and anastomosing, secondary veins 3–5 each side, adaxial surface sparsely covered with stinging and setulose hairs, abaxial surface often densely covered with long, stinging and setulose hairs along veins, base cordate, margin coarsely 15–21-serrate or -dentate, teeth often incurved-tipped, apex acuminate or long acuminate; cystoliths punctiform. Inflorescences paniculate, 3–7 cm; female inflorescences with slender axes, often drooping in fruit. Male flowers in bud ca. 1.4 mm; perianth lobes connate 1/2 of length, puberulent. Female flowers: perianth lobes connate at 1/4 of lower part, dorsal-ventral lobes elliptic-ovate, 1.2–1.5 mm, sparingly setulose, lateral lobes narrowly elliptic, 2–3 × as long as the dorsal ones, Achene brownish gray, ovoid or narrowly ovoid, slightly compressed, 1–1.2(–1.4) mm, smooth, invested by persistent perianth lobes. Fl. Jun–Aug, fr. Aug–Sep.

Moist places in forests, thickets, grasslands, stream banks; (500–)2200–5000 m. E Gansu, Qinghai, NW Sichuan, W Xinjiang, Xizang [Afghanistan, C Himalayas; N Africa, Europe, North America].

Dmitry Geltman (pers. comm.) notes that *U. dioica* subsp. *sondenii* (Simmons) A. Löve & D. Löve (*U. dioica* var. *sondenii* Simmons; *U. sondenii* (Simmons) Avrorin ex Geltman) occurs in the mountainous regions of Xinjiang (Altay Shan, etc.).

- 1a. Plants sparsely covered with stinging and puberulent hairs or subglabrous; petiole 1/6–1/3 as long as leaf blade; leaf blade

- lanceolate with rounded base 9b. subsp. *afghanica*
 1b. Plants densely covered with stinging and setulose hairs; petiole 1/2 as long as leaf blade; leaf blade often ovate with cordate base.
 2a. Leaf blade (3–)5–11 × (1.3–)2.5–4 cm, margin serrate; stipules (2–)5–8 mm; female inflorescences paniculate, longer than petioles 9a. subsp. *dioica*
 2b. Leaf blade 4–7 × 2.5–6 cm, margin incised denticulate; stipules 1–3 mm; female inflorescences subspicate, shorter than petioles 9c. subsp. *gansuensis*

9a. *Urtica dioica* subsp. *dioica*

异株荨麻(原亚种) yi zhu qian ma (yuan ya zhong)

Urtica dioica var. *vulgaris* Weddell; *U. tibetica* W. T. Wang.

Plants densely covered with stinging and setulose hairs. Stipules 5–8 mm; petiole 1/2 as long as leaf blade; leaf blade often ovate, sometimes lanceolate, 5–11 × 2.5–4 cm, base cordate, margin serrate. Female inflorescences paniculate, longer than petioles, often drooping. Fl. Jul–Aug, fr. Aug–Sep.

Partly shady and moist places in forests, thickets, stream banks; 3200–4800 m. Qinghai, W Xinjiang, C and W Xizang [C Asia (C Himalayas); N Africa, Europe, North America].

Urtica tibetica is treated here as merely a shade form of *U. dioica* subsp. *dioica*.

9b. *Urtica dioica* subsp. *afghanica* Chrtek, Fl. Iran. Cont. Nr. 105: 3. 1974.

尾尖异株荨麻 wei jian yi zhu qian ma

Urtica dioica subsp. *xingjiangensis* C. J. Chen.

Plants sparsely covered with stinging and puberulent hairs or subglabrous. Stipules 5–9 mm; petiole 5–6 times as long as leaf blade; leaf blade lanceolate, 9–13 × 3–5 cm, base rounded, margin coarsely serrate, teeth incurved or tapered, apex long caudate. Female inflorescences paniculate, longer than petioles, often drooping. Fl. Jun–Aug, fr. Aug–Oct.

Partly shady and moist places in forests, thickets, grasslands, stream banks; (500–)2400–5000 m. W Xinjiang, NE and W Xizang [Afghanistan].

9c. *Urtica dioica* subsp. *gansuensis* C. J. Chen, Bull. Bot. Res., Harbin 3(2): 119. 1983.

甘肃异株荨麻 gan su yi zhu qian ma

Plants densely covered with stinging and setulose hairs. Stipules triangular or linear, 1–3 mm; petiole equal to or 1/2 as long as leaf blade; leaf blade cordate often ovate-cordate, 4–7 × 2.5–6 cm, base cordate, margin incised denticulate. Female inflorescences subspicate, shorter than petioles, often drooping. Fl. Jun–Aug, fr. Sep.

• Moist places in forests, stream banks; 2200–2800 m. E Gansu, NW Sichuan.

10. *Urtica thunbergiana* Siebold & Zuccarini, Abh. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. 4(3): 214. 1846.

咬人荨麻 yao ren qian ma

Urtica macrorrhiza Handel-Mazzetti.

Herbs perennial, dioecious or monoecious. Rhizomes woody. Stems caespitose, simple or many branched, 60–150 cm tall, ca. 1 cm in diam., antrorsely setulose, armed with spreading stinging hairs, dense in lower parts, sparser in upper parts. Stipules brownish or greenish, interpetiolar, connate, narrowly ovate, oblong or oblong-ovate, 7–15 mm, herbaceous, with several ribs, puberulent, with cystoliths, apex shallowly 2-cleft or emarginate, petiole 1–9 cm, armed with stinging and retrorsely setulose hairs; leaf blade greenish brown abaxially, dark brownish adaxially when dry, triangular-ovate, oblong-ovate, broadly ovate or cordate, 5–12 × 2.5–11 cm, herbaceous or thinly papery, 5-veined, lateral basal veins arcuate, reaching distal margin, secondary veins 2 or 3 each side, both surfaces sparsely armed with stinging and appressed setulose hairs, base truncate to cordate, margin coarsely doubly dentate or incised-lobed, lobes 1- or 2-denticulate each side, apex shortly acuminate or acute; cystoliths botuliform on both surfaces. Inflorescences unisexual, male inflorescences in proximal axils; paniculate, with a few branches, longer than petioles; female ones in distal axils. Male flowers subsessile, in bud 1–1.2 mm; perianth lobes connate 1/2 of length, sparsely puberulent. Female perianth lobes connate at base, dorsal-ventral lobes brownish, elliptic-ovate, setulose, lateral lobes broadly ovate, 1/4–1/3 as long as dorsal ones. Achene light brownish, broadly ovoid, slightly compressed, ca. 1 mm, conspicuously verrucose, invested by persistent perianth lobes. Fl. Jul–Sep, fr. Aug–Oct.

Shady, moist places in forests, along streams, valleys; 1200–2500 m. Taiwan, W Yunnan [S Japan].

The coarsely doubly dentate margins of the leaves on the main stem of the type of *Urtica macrorrhiza*, from Yunnan, correspond very well with *U. thunbergiana*, from Taiwan and, outside China, Japan. This disjunction in distribution is most unusual.

11. *Urtica fissa* E. Pritzl, Bot. Jahrb. Syst. 29: 301. 1900.

荨麻 qian ma

Urtica pinfaensis H. Léveillé & Blin.

Herbs perennial, monoecious or rarely dioecious. Rhizomes stoloniferous. Stems branched, 40–100 cm tall; stems and petioles densely puberulent and covered with spreading, stinging hairs. Stipules greenish, interpetiolar, connate, oblong-ovate or oblong, 10–20 mm, herbaceous, 10–20-ribbed, puberulent, with cystoliths, apex obtuse, petiole 2–8 cm; leaf blade dark greenish or greenish, broadly ovate, elliptic, 5-angled, or suborbicular in outline, 5–15 × 3–14 cm, submembranous or herbaceous, 5-veined, lateral basal veins reaching distal lobes, secondary veins 3–6 each side, adaxial surface sparsely armed with stinging and setulose hairs, abaxial surface densely light greenish pubescent and with stinging hairs on veins, base truncate or cordate, margin shallowly 5–7-lobed or palmately 3-lobed (irregularly 2–4-lobed again), lobes gradually enlarged distally, deltoid or oblong, 1–5 cm, dentate-serrulate, apex acuminate or acute; cystoliths botuliform or subpunctiform on both

surfaces. Inflorescences unisexual, male inflorescences usually in proximal axils, paniculate with a few branches or sometimes subspicate, to 10 cm, longer than petioles; female ones in distal axils. Male flowers pedicellate, in bud ca. 1.4 mm; perianth lobes connate below middle, sparsely puberulent. Female perianth lobes connate at base, dorsal-ventral lobes suborbicular, setulose, lateral lobes suborbicular, ca. 4 times as short as dorsal ones. Achene light brownish, broadly ovoid or subglobose, slightly compressed, ca. 1 mm, conspicuously verrucose, invested by persistent perianth lobes. Fl. Jul–Oct, fr. Sep–Nov.

Partly shady, moist places in forests, thickets, along streams, roadsides; 100–2000 m. Anhui, Fujian, SE Gansu, Guangxi, Guizhou, Henan, Hubei, Hunan, S Shaanxi, C Yunnan, Zhejiang [Vietnam].

This species is widely distributed in the temperature areas of China. It is variable in its leaf margin: populations in Hubei, Shaanxi, and Sichuan have more palmately 3-partite or 3-lobed leaf blades.

12. *Urtica mairei* H. Léveillé, Repert. Spec. Nov. Regni Veg. 12: 183. 1913.

滇藏荨麻 dian zang qian ma

Herbs perennial, monoecious. Rhizomes stoloniferous. Stems few branched, to 100 cm tall; stems and petioles puberulent and densely or sparsely covered with stinging hairs. Stipules greenish, interpetiolar, connate, oblong or ovate-oblong, 10–15 mm, herbaceous, 7–10-ribbed, puberulent and with cystoliths on both surfaces, apex obtuse; petiole 3–8 cm; leaf blade broadly ovate or cordate, sometimes oblong, 6–15 × 3–10 cm, 5-veined, lateral basal veins reaching middle lobes, secondary veins 3–5 each side, adaxial surface with sparse, stinging and setulose hairs, abaxial surface densely setulose and sparsely armed with stinging hairs on veins, base cordate or rounded, margin doubly dentate or many lobed, lobes deltoid, denticulate, interlobes 0.7–2 cm, apex shortly acuminate; cystoliths punctiform, rarely botuliform adaxially. Inflorescences unisexual, paniculate with many long branches, spreading, 4–10 cm, longer than petioles; male flowers in proximal axils; female flowers in distal axils. Male flowers shortly pedicellate, in bud ca. 1.4 mm, perianth lobes connate below middle, sparsely puberulent. Female flowers slenderly pedunculate; perianth lobes connate at base, dorsal-ventral lobes suborbicular, setulose, lateral lobes suborbicular, ca. 1/3 as long as dorsal ones. Achene light brownish, oblong-globose or subglobose, slightly compressed, ca. 1 mm, inconspicuously verrucose, invested by persistent perianth lobes. Fl. May–Aug, fr. Jul–Dec.

Partly shady, moist places in forests, thickets, along streams, roadsides; 1500–3400 m. SW Sichuan, SE Xizang, Yunnan [Bhutan, N India, Myanmar].

13. *Urtica ardens* Link, Enum. Hort. Berol. 2: 385. 1822.

须弥荨麻 xu mi qian ma

Urtica himalayensis Kunth & Bouché; *U. mairei* H. Léveillé var. *oblongifolia* C. J. Chen; *U. zayuensis* C. J. Chen.

Herbs perennial, monoecious. Rhizomes woody. Stems branched, to 150 cm tall; stems, at least when old, and petioles sparsely armed with stinging and setulose hairs. Stipules dark brownish, interpetiolar, connate, oblong, 7–14 mm, herbaceous,

with several ribs, appressed puberulent abaxially, apex obtuse; petiole 1.5–4.5 cm; leaf blade black or dark brownish when dry, narrowly ovate to lanceolate, 5–15 × 2–6 cm, herbaceous, 5-veined, lateral basal veins reaching middle, secondary veins 3 or 4 on each side, anastomosing before margin, adaxial surface glabrescent, abaxial surface setulose, base rounded or cordate, margin dentate or doubly denticulate, apex acuminate; cystoliths punctiform, rarely botuliform. Inflorescences containing male and female flowers, paniculate, with few short branches, longer than petioles. Male flowers subsessile, in bud ca. 1 mm; perianth lobes connate 1/2 of length, sparsely puberulent. Female flowers: perianth lobes connate at base, dorsal-ventral lobes broadly ovate, setulose, lateral lobes ovate, ca. 1/4 as long as dorsal ones. Achene light brownish, broadly ovoid, slightly compressed, ca. 1 mm, verrucose, invested by persistent perianth lobes. Fl. Jul–Aug, fr. Sep–Nov.

Open or partly shady moist places in forests, thickets, along streams; 2400–2700 m. W Guangxi, SE Xizang, C and S Yunnan [Bhutan, N India, Nepal, Sikkim].

This species has been confused with *Urtica parviflora*, but that species has leaves broadly ovate, almost smooth when dried, with margins coarsely doubly dentate and stipules 2-cleft. Hara confused this species in SE Xizang and Yunnan with *U. mairei*, which has leaf margins doubly dentate (not lobed), stipules membranous, male inflorescences borne in distal axils, and achenes smooth.

14. *Urtica parviflora* Roxburgh, Fl. Ind., ed. 1832, 3: 581. 1832.

圓果蕁麻 yuán guó qián ma

Herbs perennial, monoecious. Rhizomes long stolonifer-

ous. Stems slender, simple or few branched, 25–50 cm tall; stems, petioles, and both surfaces of leaf blade sparsely hirtellous and armed with stinging hairs. Stipules greenish, interpetiolar, connate, ovate or oblong-ovate, 4–6 mm, membranous, with several ribs, apex shallowly 2-cleft or emarginate; petiole slender, 2.5–7 cm; leaf blade broadly ovate or ovate-cordate, 2.5–8.5 × 2–7 cm, often membranous, 5-veined, lateral basal veins arcuate, reaching middle margin, secondary veins 2–4 each side, base rounded or shallowly cordate, margin doubly dentate, teeth increasing in size distally, apex acuminate; cystoliths botuliform or sometimes punctiform. Inflorescences unisexual; male inflorescences in distal axils, spicate, 4–7 cm; female ones in proximal axils, subspicate, slender, with a few short branches, or male flowers in middle axils, female flowers in proximal and distal axils, subequal to or shorter than petioles. Male flowers sessile or short pedicellate, in bud ca. 1.3 mm; perianth lobes connate 1/2 of length, densely hirtellous, then glabrescent. Female flowers: perianth lobes connate at base, unequal, dorsal-ventral lobes suborbicular, sparsely setulose, lateral lobes broadly obovate, ca. 2 times as short as dorsal ones. Achene yellowish green, broadly ellipsoid-ovoid, slightly compressed, ca. 1 mm, smooth, invested by persistent perianth lobes. Fl. May–Jun, fr. Jul–Aug.

Partly shady, moist places of evergreen forests, along streams, roadsides; 1500–2400 m. W Guangxi, S Xizang, NW Yunnan [Bhutan, N India, Kashmir, Nepal, Sikkim].

This species has been confused with *Urtica ardens*, e.g., by Chen (in FRPS), but that species has a denser, setulose indumentum and an often ovate leaf blade with the surface conspicuously wrinkled and the margin sharply doubly serrulate.

2. NANOCNIDE Blume, Mus. Bot. 2: 154. 1856.

花点草属 hua dian cao shu

Chen Jiarui (陈家瑞 Chen Chia-jui); Ib Friis, C. Melanie Wilmot-Dear

Herbs, perennial, with creeping rhizomes. armed with stinging hairs. Stems often caespitose. Leaves alternate, petiolate; stipules persistent, lateral, free, membranous; leaf blade broad, membranous, irregularly 2–5-veined, secondary veins dichotomously branched, margin coarsely dentate or subincised; cystoliths often botuliform. Inflorescences axillary, pedunculate cymes (male) or sessile glomerules (female), unisexual (plants monoecious); male dichotomous cymes solitary, with filiform peduncles; female clusters sessile in the same or different axils; bracts present. Male flowers: perianth lobes (4 or)5, slightly imbricate, transversely crested below apex; stamens (4 or)5; rudimentary ovary obovoid or urceolate, transparent. Female flowers: perianth lobes 4, unequal, outer (dorsal-ventral) 2 larger, keeled, corniculate below apex, inner 2 smaller, flat, all usually with stinging hairs below apex. Stigma subsessile, penicillate-capitate. ovule orthotropous. Achene straight, ovoid, compressed, invested by the persistent but not enlarged perianth. Seeds erect, with thin endosperm; cotyledons ovate, fleshy.

Two species: temperate regions of E Asia; two species in China.

Plants of this genus are representative components of the Sino-Japanese flora; they occur from the Hengduan mountains of China eastward to Japan.

- 1a. Stems often erect, antrorsely hirsute; male inflorescences longer than leaves 1. *N. japonica*
1b. Stems diffuse, retrorsely hirsute; male inflorescences never longer than leaves 2. *N. lobata*

1. *Nanocnide japonica* Blume, Mus. Bot. 2: 155. 1856.

花点草 hua dian cao

Nanocnide dichotoma S. S. Chien.

Herbs perennial. Stems yellow-green, but purplish near base, erect, often basally branched, 10–45 cm tall, somewhat

succulent; stems and petioles antrorsely hirsute. Stipules broadly ovate, 1–1.5 mm, ciliate; petiole 1–5 cm; leaf blade triangular-ovate or rhombic-ovate, 1.5–4 × 1.3–4 cm, proximal leaves subflabellate, small, 3–5-veined, secondary and final veins dichotomously branched, adaxial surface greenish, sparsely covered with short, appressed stinging hairs, abaxial surface light green, sometimes purplish, sparsely puberulent, base

broadly cuneate, rounded, or truncate, margin deeply 4–7-crenate-dentate, apex obtuse; cystoliths botuliform, conspicuous on both surfaces. Male inflorescences in distal axils, cymose, many times dichotomously branched, longer than leaves, long pedunculate, antrorsely hirsute on axes. Female inflorescences in clusters, shortly pedunculate, 3–6 mm in diam. Male flowers purplish, pedicellate, in bud 2–3 mm; perianth lobes 5, ovate, ca. 1.5 mm, setulose below apex; stamens 5; rudimentary ovary broadly ovoid, ca. 0.5 mm. Female flowers greenish, ca. 1 mm; perianth lobes 4, unequal, outer 2 larger, boat-shaped, keeled, 1.2 mm, apex with 1 or 2 stinging hairs, inner 2 narrowly obovate, ca. 1 mm, apex with 1 or 2 stinging hairs. Achene broadly ovoid, ca. 1 mm, verrucose. Fl. Apr–May, fr. Jun–Jul.

Shady, moist places in forests, rock crevices, along streams; 100–1600 m. Anhui, Fujian, Gansu, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, S Shaanxi, Sichuan, Taiwan, E Yunnan, Zhejiang [Japan, Korea].

2. *Nanocnide lobata* Weddell in Candolle, Prodr. 16(1): 69. 1869.

毛花点草 mao hua dian cao

Nanocnide pilosa Migo.

Herbs perennial. Stems purplish basally, diffuse, often branched basally, 17–45 cm tall, somewhat succulent, retrorsely hirsute. Stipules ovate, ca. 1 mm, ciliate; petiole 0.8–1.8 cm, retrorsely hirsute; leaf blade broadly ovate, triangular-ovate, or subflabellate, 1.5–2 × 1.3–1.8 cm, proximal leaves small, sub-

flabellate, 3–5-veined, secondary and final veins dichotomously branched, adaxial surface greenish, sparsely covered with short, stinging and puberulent hairs, abaxial surface light green, sometimes lustrous, densely puberulent on veins, base truncate or shallowly cordate, uppermost subtruncate or broadly cuneate, margin unequally 4–5(–7)-crenate or incised-dentate, teeth triangular-ovate, with obtuse or acute tip, 2–5 mm, apex obtuse or acute; cystoliths botuliform, conspicuous on both surfaces. Male cymes in distal axils, many times dichotomously branched, 5–12 mm, never longer than leaves, shortly pedunculate, retrorsely hirsute on axes, sometimes clusters of several flowers below female ones. Female inflorescences in clusters, borne in distal axils or in proximal leafless nodes, or sometimes distal part of main twigs, 3–7 mm in diam. Male flowers light greenish, pedicellate, in bud 2–3 mm; perianth lobes (4 or)5, ovate, ca. 1.5 mm, setulose below apex; stamens (4 or)5; rudimentary ovary broadly obovoid, ca. 0.5 mm. Female flowers greenish, ca. 1.5 mm; perianth lobes 4, unequal, outer 2 larger, boat-shaped, keeled, ca. 1 mm, densely covered with short stinging hairs along keel and margin, inner 2 narrowly ovate, ca. 1 mm. Achene ovoid, compressed, ca. 1 mm, verrucose. Fl. Apr–Jun, fr. Jun–Aug.

Shady, moist places in forests, grasslands, rock crevices, along streams; near sea level–1400 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan, E Yunnan, Zhejiang [Vietnam].

The plants are used as febrifugal medicines.

3. *LAPORTEA* Gaudichaud-Beaupré, Voy. Uranie, Bot. 498. 1830, nom. cons.

艾麻属 ai ma shu

Chen Jiarui (陈家瑞 Chen Chia-ju); Ib Friis, C. Melanie Wilmot-Dear

Fleurya Gaudichaud-Beaupré; *Sceptrocnide* Maximowicz; *Urticastrum* Heister ex Fabricius, nom. rej.

Herbs or subshrubs, armed with stinging hairs. Leaves alternate, petiolate; stipules deciduous, intrapetiolar, incompletely connate, apex 2-cleft; leaf blade papery, pinnately veined or 3-veined, margin often coarsely dentate or serrate, rarely entire; cystoliths punctiform or botuliform. Inflorescences solitary, axillary, pedunculate, loose glomerules forming panicles or sometimes racemes or spikes, unisexual (plants monoecious or dioecious); bracts present, very small. Male flowers: perianth lobes 4 or 5, slightly subvalvate, depressed, inflexed in bud; stamens 4 or 5; rudimentary ovary clavate or subglobose. Female flowers: perianth lobes 4, free or connate at base, strongly unequal, dorsal-ventral 2 greatly unequal and smaller, lateral 2 equal and larger; staminodes absent. Ovary at first straight, soon oblique, ovoid; style usually filiform; stigma often linear, at length often reflexed, papillose on 1 side; ovule orthotropous. Achene ovoid to semicircular, often compressed, sessile or stipitate on oblique torus, usually reflexed on dorsiventrally or laterally winged pedicels. Seeds with thin or no endosperm; cotyledons broad.

About 28 species: pantropical; seven species (two endemic) in China.

The stem fibers are used to make ropes. The stinging hairs are poisonous.

- 1a. Pedicels of female flowers conspicuously laterally and symmetrically winged; achene articulated on pedicel.
 - 2a. Subshrubs or herbs; leaf blade broad ovate to cordate, base often truncate, abaxial surface often purplish 3. *L. violacea*
 - 2b. Herbs; leaf blade ovate to lanceolate, base broadly cuneate or rounded, rarely shallowly cordate, abaxial surface light green.
 - 3a. Herbs often with tuberous roots; leaf axils often with woody bulbils; female perianth with the 2 lateral lobes largest 1. *L. bulbifera*
 - 3b. Herbs without tuberous roots; leaf axils usually lacking woody bulbils; female perianth with the dorsal lobe largest 2. *L. medogensis*
- 1b. Pedicels of female flowers slightly dorsiventrally and asymmetrically winged, or not winged; achene not articulated on pedicel.
 - 4a. Leaf blade apex long caudate; achene smooth 4. *L. cuspidata*
 - 4b. Leaf blade apex acuminate; achene with a triangular ridge enclosing a warty depression.

- 5a. Inflorescences paniculate, to 5 cm; stigma ligulate.
 5b. Inflorescences long spicate, to 25 cm; stigma 3-fid 7. *L. interrupta*
 6a. Stems, petioles, and perianth without gland-tipped hairs; leaf blade 3.5–7.5 × 2–6 cm; inflorescences
 1–5 cm; peduncle 0.1–2.5 cm 5. *L. fujianensis*
 6b. Stems, petioles, and perianth with long, gland-tipped hairs; leaf blade 8–17 × 6–13 cm; inflorescences
 to 20 cm, peduncle 7–14 cm 6. *L. aestuans*

1. *Laportea bulbifera* (Siebold & Zuccarini) Weddell, Monogr. Urtic. 139. 1856.

珠芽艾麻 zhu ya ai ma

Urtica bulbifera Siebold & Zuccarini, Abh. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. 4(3): 214. 1846; *Boehmeria bodinieri* H. Léveillé; *Laportea bulbifera* subsp. *dielsii* (Pampanini) C. J. Chen; *L. bulbifera* subsp. *latiuscula* C. J. Chen; *L. bulbifera* subsp. *rugosa* C. J. Chen; *L. bulbifera* var. *sinensis* S. S. Chien; *L. dielsii* Pampanini; *L. elevata* C. J. Chen; *L. oleracea* Weddell; *L. sinensis* C. H. Wright; *L. terminalis* Wight.

Herbs monoecious, rarely dioecious. Stems often caespitose, slightly woody at base, 50–150 cm tall, upper stems often zigzagged, 5-angled, rarely branched, axils often with 1–3 woody bulbils, 3–6 mm in diam.; upper stems and petioles pubescent and sparsely armed with stinging hairs, particularly at nodes and apically, glabrescent. Leaves whorled at stem apex or not; stipules early caducous, oblong-lanceolate, 5–10 mm, apex 2-cleft 1/2 of length; petiole 1.5–10 cm; leaf blade light green abaxially, lanceolate to ovate or cordate, sometimes orbicular, 6–16 × 2.5–8 cm, papery, 3-veined, lateral basal pair reaching middle margin, lateral veins 4–6 each side of midvein, reaching teeth or anastomosing before margin, abaxial surface pubescent, veins sparsely armed with stinging hairs, particularly at base, adaxial surface appressed hirtellous and with sparse, stinging hairs, base broadly cuneate, rounded, rarely shallowly cordate, margin crenate, dentate or serrate, apex acuminate; cystoliths minutely punctiform, adaxially conspicuous. Male inflorescences in proximal axils, paniculate, 3–10 cm; female inflorescences terminal or in subterminal axils, 10–25 cm, peduncle 3–10 cm, often with flowers along 1 side. Male flowers pedicellate or subsessile, in bud ca. 1 mm; perianth lobes 5, oblong-ovate, puberulent, apex not corniculate; stamens 5; rudimentary ovary obpyramidal, 0.5 mm. Female flowers: pedicel 2–4 mm, strongly laterally winged; perianth lobes 4, almost free, strongly unequal, dorsal lobe concave, ca. 0.5 mm, 2 lateral larger, enclosing the ovary, oblong-ovate, 1/3–1 × as long as achene, abaxially setulose with stinging hairs, ventral lobe smallest, triangular-ovate, ca. 0.3 mm. Ovary stipitate, asymmetrically ovoid; stigma reflexed, filiform, 2–4 mm. Achene minutely purplish spotted, broadly obovoid or semiorbicular, strongly compressed, 1.5–3 mm in diam., smooth, rarely rugose-striate; pedicel winged, spatulate to obovate, stipe ca. 0.5 mm, strongly reflexed; persistent lateral perianth lobes slightly enlarged, ca. 1.5 mm, investing ca. 1/2 of achene. Fl. Jun–Aug, fr. Aug–Dec.

Forest margins, thickets, roadsides, often partly shady, moist places; 700–3500 m. Anhui, N Fujian, Gansu, N Guangdong, N Guangxi, Guizhou, Hebei, Henan, Heilongjiang, Hubei, Hunan, Jiangxi, Jilin, Liaoning, Shaanxi, Shandong, Shanxi, Sichuan, Xizang, Yunnan, Zhejiang [Bhutan, India, Indonesia, Japan, Korea, Myanmar, Russia, Sikim, Sri Lanka, Thailand, Vietnam].

2. *Laportea medogensis* C. J. Chen, Acta Phytotax. Sin. 28: 68. 1990.

墨脱艾麻 mo tuo ai ma

Herbs, often with fusiform tuberous roots, monoecious. Stems 30–60 cm tall, straight, simple, without axillary bulbils; stem and petioles puberulent and very densely armed with stinging hairs. Leaves regularly alternate; stipules early caducous, lanceolate, 10–14 mm, puberulent along rib abaxially, apex 2-cleft; petiole 4–8 cm; leaf blade greenish, broadly ovate, 14–17 × 9–12 cm, herbaceous or submembranous, 3-veined, lateral basal pair reaching middle, lateral veins 5 or 6 each side of midvein, anastomosing before margin, abaxial surface with short, stinging and setulose hairs on veins, adaxial surface with stinging hairs, base shallowly cordate, rarely subtruncate, margin coarsely dentate, each tooth with 1 apical stinging hair, apex short acuminate, acumen entire; cystoliths minutely punctiform, adaxially conspicuous. Male inflorescences in proximal axils, paniculate, 2–4 cm; female inflorescences in distal axils, at least 4 cm (when young), densely armed with stinging hairs. Male flowers shortly pedicellate or subsessile, in bud 1–1.2 mm; perianth lobes 5, puberulent at apex, apex not corniculate; stamens 5; rudimentary ovary obpyramidal, ca. 0.6 mm. Female flowers pedicellate; perianth lobes 4, almost free, strongly unequal, dorsal lobe the largest, concave, ca. 0.9 × 1.2 mm, apex obtuse, 2 lateral (inner) lobes elliptic-ovate, ca. 0.8 mm, apex acute, ventral lobe smallest, narrowly ovate, ca. 0.4 mm. Ovary stipitate, triangular-ovoid; stigma filiform, ca. 2–3 mm. Achene unknown. Fl. Jan.

• Moist places of evergreen forests, along streams; 800–1600 m. SE Xizang (Médog).

This is a remarkable but little-collected species; more collections are needed to understand its relationships.

3. *Laportea violacea* Gagnepain, Bull. Soc. Bot. France 75: 4. 1928.

葡萄叶艾麻 pu tao ye ai ma

Laportea vitifolia Handel-Mazzetti.

Herbs or subshrubs, perennial, monoecious. Stems purplish when dry, straight, many branched, 100–200 cm tall; upper stem, branches, and petioles sparsely armed with stinging hairs; hairs 3–4 mm, thick. Stipules early caducous, triangular-ovate, ca. 3 mm, apex 2-cleft; petiole 4–8 cm; leaf blade usually purplish abaxially, dark green adaxially, broadly ovate or cordate, 5–12 × 4–10 cm, papery, lustrous, 3-veined, lateral basal pair reaching middle and anastomosing with adjacent lateral veins, lateral veins 3 each side of midvein, anastomosing before margin, abaxial surface sparsely armed with stinging hairs, adaxial surface appressed setulose and with long, stinging hairs, base often truncate, rarely shallowly cordate or abruptly atten-

uate, margin coarsely dentate, apex acuminate; cystoliths minutely punctiform, adaxially conspicuous. Male inflorescences in proximal axils, paniculate, to 8 cm; female inflorescences subterminal, to 20 cm, peduncle 7–10 cm. Male flowers sessile, in bud ca. 1.5 mm; perianth lobes (4 or)5, elliptic, setulose, apex not corniculate; stamens 5; rudimentary ovary obpyramidal, 0.3 mm. Female flowers pedicellate; strongly laterally obovate-winged; perianth lobes 4, almost free, strongly unequal, dorsal lobe ovate, concave, ca. 0.3 mm, 2 lateral lobes largest, enclosing the ovary, narrowly ovate, ca. 0.7 mm, ventral lobe smallest, triangular-ovate, ca. 0.2 mm. Ovary stipitate, asymmetrically triangular-ovoid; stigma reflexed, filiform, 2–3 mm. Achene obovoid, strongly compressed, ca. 2 mm in diam., verrucose; stipe strongly reflexed, ca. 0.4 mm. Fl. Jun–Aug, fr. Aug–Nov.

Forests, thickets; 200–1100 m. SW Guangxi [Thailand, Vietnam].

4. *Laportea cuspidata* (Weddell) Friis, Kew Bull. 36: 156. 1981.

艾麻 ai ma

Girardinia cuspidata Weddell in Candolle, Prodr. 16(1): 103. 1869; *Laportea forrestii* Diels; *L. giraldiana* E. Pritzel ex Diels; *L. grossedentata* C. H. Wright; *L. macrostachya* (Maximowicz) Ohwi; *Sceptrocnide macrostachya* Maximowicz.

Herbs, roots often fusiform, tuberous, 5–10(–30) × 0.3–0.5(–1) cm. monoecious. Stems often caespitose, slightly woody at base, 40–150 cm tall, upper stem sometimes purplish, often zigzagged, 5-angled, rarely branched; sterile axils with 1–3 woody bulbils, 3–5 mm in diam.; upper stems and petioles sparsely pubescent and sparsely armed with stinging hairs particularly at nodes and basally, glabrescent. Stipules early caducous, ovate-triangular, 3–4 mm, apex 2-cleft; petiole 3–14 cm; leaf blade ovate, elliptic or suborbicular, 7–22 × 3.5–17 cm, membranous or papery, 3-veined, rarely tripliveined, lateral basal pair reaching to middle margin, lateral veins 2–4 each side of midvein, both surfaces sparsely pubescent and sparsely armed with stinging hairs, sometimes glabrescent, base cordate, rounded, rarely subtruncate, margin grossly dentate, teeth increasing in size toward apex, sometimes doubly serrate, apex long caudate, cauda occasionally serrate; cystoliths minutely punctiform, adaxially conspicuous. Male inflorescences in proximal axils, paniculate, 8–17 cm; female inflorescences subterminal, long spicate, 15–25 cm, peduncle 2–8 cm, often with glomerules at intervals along usually unbranched peduncle, sparsely pubescent and armed with stinging hairs. Male flowers pedicellate or subsessile, in bud ca. 1.5 mm; perianth lobes 5, narrowly ovate, puberulent, apex not corniculate; stamens 5; rudimentary ovary obconic, 0.4 mm. Female flowers: pedicels ca. 1.5 mm, not winged; perianth lobes 4, almost free, strongly unequal, dorsal lobe broadly ovate, concave, ca. 0.6 mm, 2 lateral lobes largest, enclosing the ovary, oblong-ovate, ca. 0.7 mm, setulose beneath, ventral lobe smallest, ovate, ca. 0.4 mm. Ovary short stipitate, enlarged in fruit, asymmetrically ovoid; stigma reflexed, filiform, ca. 2 mm. Achene obovoid, slightly compressed, ca. 2 mm, smooth; stipe 1–2 mm; persistent lateral perianth lobes slightly enlarged, ca. 1.5–1.8 mm. Fl. Jun–Jul, fr. Aug–Sep.

Forest margins, thickets, partly shady, moist places, roadsides; 800–2700 m. Anhui, SE Gansu, N Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangxi, S Shaanxi, Sichuan, SE Xizang [Japan, Myanmar].

5. *Laportea fujianensis* C. J. Chen, Acta Bot. Yunnan. 4: 332. 1982.

福建红小麻 fu jian hong xiao ma

Herbs annual, monoecious. Stems often purplish basally, straight, 20–60 cm tall, upper stem not zigzagged, simple or few branched; upper stems and petioles densely armed with short stinging hairs. Stipules deeply 2-cleft, lobes nearly subulate, ca. 2.5 mm, setulose along rib abaxially; petiole 2–7 cm; leaf blade broadly ovate or subcordate, 3.5–7.5 × 2–6 cm, submembranous, 3-veined, lateral basal pair reaching middle margin, lateral veins 4 or 5 each side of midvein, reaching teeth, abaxial surface with dense, short, stinging hairs on veins, adaxial surface with appressed stinging hairs, base abruptly cuneate, truncate, or cordate, margin denticulate, apex acuminate; cystoliths botuliform, regularly arranged abaxially along veins. Male inflorescences in distal axils, paniculate, 1–2 cm; female inflorescences in proximal axils, 2–5 cm, peduncle 0.1–2.5 cm, densely armed with short stinging hairs. Male flowers pedicellate, in bud ca. 1 mm; perianth lobes (4 or)5(or)6, connate at base, obovate, puberulent, apex corniculate; stamens (4 or)5(or)6; rudimentary ovary obovoid, 0.4 mm. Female flowers pedicel slender, to 2–3 mm, not winged; perianth lobes 4, free, unequal, dorsal lobe far from lateral one, concave, ca. 0.2 mm, 2 lateral lobes largest, enclosing the ovary, broadly ovate, ca. 0.4 mm, ventral lobe smallest, narrowly ovate, ca. 1.5 mm. Ovary asymmetrically triangular-ovoid; stigma reflexed, ligulate, ca. 2 mm. Achene obliquely triangular-obovoid, slightly compressed, ca. 0.8 mm in diam., with triangular ridge enclosing a warty depression; persistent lateral perianth lobes forming a small basal cup. Fl. Jul–Aug, fr. Aug–Sep.

• Disturbed, moist places in forests, streams; ca. 300 m. S Fujian (Nanjing).

This species superficially resembles the widespread and rather weedy *Laportea aestuans*, but lacks the glandular hairs characteristic of that species, has smaller stipules, cystoliths arranged along the veins abaxially, and much shorter inflorescences.

6. *Laportea aestuans* (Linnaeus) Chew, Gard. Bull. Singapore 21: 200. 1965.

火焰桑叶麻 huo yan sang ye ma

Urtica aestuans Linnaeus, Sp. Pl., ed. 2, 2: 1397. 1763; *Fleurya aestuans* (Linnaeus) Miquel; *F. glandulosa* Weddell.

Herbs annual, monoecious. Stems erect, few-branched, to 1.3 m tall; upper stems and petioles densely armed with stinging hairs and long gland-tipped hairs. Stipules ca. 10 mm, apex 2-cleft; petiole 7–11 cm; leaf blade broadly ovate, 8–17 × 6–13 cm, thinly papery, 3-veined, lateral basal pair reaching middle margin, lateral veins 3 or 4 each side of midvein, both surfaces armed with stinging hairs, denser on abaxial surface, base rounded or cordate, margin dentate, apex acuminate; cystoliths punctiform, adaxially conspicuous. Inflorescences axillary, often bisexual, rarely all male, paniculate, male inflo-

rescences in proximal axils, shorter, bisexual inflorescences in distal axils, 10–20 cm, peduncle 7–14 cm, with stinging hairs and often long gland-tipped hairs. Male flowers pedicellate, in bud ca. 1.5 mm; perianth lobes 4 or 5, connate at base, cymbiform, with a few long gland-tipped hairs and sparsely setulose, apex corniculate; stamens 4 or 5. Female flowers: pedicel ca. 2 mm, not winged; perianth lobes 4, free, unequal, dorsal lobe ovate, ca. 0.25 mm, 2 lateral lobes largest, enclosing the ovary, broadly ovate, ca. 0.5 mm, ventral lobe minute. Ovary asymmetrically ovoid; stigma slightly reflexed, ligulate, ca. 0.3 mm. Achene obliquely ovoid, compressed, ca. 1.5 mm in diam., both central surfaces with inconspicuously warty depression; persistent lateral perianth lobes forming a small, basal cup. Fl. Aug–Sep, fr. Oct–Nov.

Disturbed moist places by streams in forests; 200–500 m. C Taiwan [panropical weed found throughout tropical Asia from India to Indonesia, tropical Africa, Madagascar, tropical America, West Indies].

7. *Laportea interrupta* (Linnaeus) Chew, Gard. Bull. Singapore 21: 200. 1965.

红小麻 hong xiao ma

Urtica interrupta Linnaeus, Sp. Pl. 2: 985. 1753; *Fleurya interrupta* (Linnaeus) Gaudichaud-Beaupré.

Herbs annual, monoecious. Stems straight, branched, 40–100 cm tall; upper stems and petioles sparsely armed with short

stinging and pubescent hairs. Stipules ovate-oblong, ca. 4 mm, setulose along rib abaxially, apex 2-cleft 1/2 of length; petiole 3–9 cm; leaf blade ovate or cordate, 5–8 × 4–5.5 cm, herbaceous, 3-veined, lateral basal pair reaching middle margin, lateral veins 5 or 6 each side of midvein, reaching teeth, both surfaces sparsely armed with short, stinging hairs, base abruptly cuneate or shallowly cordate, margin serrate, apex acuminate; cystoliths botuliform, regularly arranged abaxially along veins. Inflorescences axillary, long spicate, to 25 cm, glomerules at intervals along elongated peduncle consequent upon great reduction of the lateral branches, sparsely armed with minutely stinging hairs. Male flowers pedicellate, in bud ca. 1.2 mm; perianth lobes (3 or)4, connate 1/2 of length, obovate, puberulent, apex corniculate; stamens (3 or)4; rudimentary ovary obpyramidal, 0.5 mm. Female flowers: pedicel to 1.5 mm, not winged; perianth lobes 4, free, unequal, dorsal lobe ovate, concave, ca. 0.4 mm, 2 lateral lobes largest, enclosing the ovary, broadly ovate, ca. 0.4 mm, ventral lobe smallest, triangular ovate, ca. 0.3 mm. Ovary asymmetrically triangular; stigma reflexed, filiform, 3-fid, ca. 0.3 mm. Achene obliquely triangular, compressed, ca. 1.3 mm in diam., with triangular ridge enclosing a warty depression, persistent lateral perianth lobes forming a small basal cup. Fl. Jul–Aug, fr. Aug–Sep.

Disturbed, moist places of dense forests, streams; 600–1000 m. Taiwan, SW Yunnan [India, Indonesia, Japan, Malaysia, Myanmar, Philippines, Sri Lanka, Thailand, Vietnam; Africa].

4. **DENDROCNIDE** Miquel, Pl. Jungh. 1: 29. 1851.

火麻树属 huoma shu shu

Chen Jiarui (陈家瑞 Chen Chia-jui); Ib Friis, C. Melanie Wilmot-Dear

Trees or shrubs, evergreen, branches sympodial, often with terminal rosettes of leaves, armed with stinging hairs. Leaves alternate, spiral, petiolate; stipules deciduous, intrapetiolar, completely connate, leathery, often large, apex entire; leaf blade leathery or papery, pinnately veined, rarely 3–5-veined, margin entire, undulate, or crenulate; cystoliths punctiform. Inflorescences solitary, pedunculate, generally forming cymose-panicles or racemes unisexual (plants dioecious); female glomerules often with thickened, fleshy flabellate receptacle; bracts present. Male flowers 4- or 5-merous; filaments of stamens inflexed in bud; rudimentary ovary conspicuous. Female flowers: perianth lobes 4, connate at base, subequal, lateral lobes slightly larger; staminodes absent. Ovary ovoid, erect; stigma filiform or ligulate, papillous on 1 side; ovule orthotropous. Achene slightly oblique, often compressed, often large, verrucose, persistent stigma usually reflexed; pedicels simple or swollen, cylindrical, not winged. Seeds with thin or no endosperm; cotyledons broad.

About 36 species: S and SE Asia, Australia, Pacific Islands; six species (one endemic) in China.

The stem fibers are used to make ropes. The stinging hairs may be very irritating.

- 1a. Female flowers pedicellate, freely borne or in loose clusters at extremities of peduncles; pedicels often fleshy but not swollen.
 - 2a. Leaf blade broadly ovate or broadly elliptic, base rounded or subcordate; male flowers 5-merous; achene orbicular-ovoid, ca. 2.5 mm 5. *D. basirotunda*
 - 2b. Leaf blade elliptic, oblong- or obovate-lanceolate, base often cuneate, sometimes rounded or deeply cordate; male flowers 4-merous; achene pyramidal, 5–6 mm 6. *D. sinuata*
- 1b. Female flowers sessile or subsessile, usually 1 in a row on often fleshy flabellate swollen receptacles.
 - 3a. Leaf blade cordate; male flowers 5-merous 4. *D. urentissima*
 - 3b. Leaf blade ovate or lanceolate; male flowers 4(or 5)-merous.
 - 4a. Leaf blade obovate or oblong-lanceolate, base often cuneate 1. *D. stimulans*
 - 4b. Leaf blade ovate, elliptic, or oblong, base obtuse or shallowly cordate.
 - 5a. Inflorescence branches densely armed with poisonous stinging hairs, reddish green; bracts of female inflorescence linear; second year branchlets with stinging hairs 2. *D. meyeniana*
 - 5b. Inflorescence branches with a few short non-poisonous hairs, whitish green; bracts of female inflorescence triangular; second year branchlets glabrous 3. *D. kotoensis*

1. *Dendrocnide stimulans* (Linnaeus f.) Chew, Gard. Bull. Singapore 21: 206. 1965.

海南火树麻 hai nan huo shu ma

Urtica stimulans Linnaeus f., Suppl. Pl. 418. 1782; *Laportea annamica* Gagnepain; *L. hainanensis* Merrill & Metcalf; *L. stimulans* (Linnaeus f.) Miquel.

Shrubs or small trees, straight, branches widely spreading. 3 m tall, bark whitish gray, lenticellate, leaf scars conspicuous, otherwise smooth; upper stem and branches glabrous, without stinging hairs, stipules brownish, caducous, ovate, ca. 0.7 cm, leathery, margin herbaceous, puberulent abaxially; petiole 1.5–4 cm, with stinging hairs and dense punctiform cystoliths on both surfaces; leaf blade light green, obovate or oblong-lanceolate, 6–17 × 2–5 cm, papery or leathery, penniveined, lateral veins 6–8 each side, adaxial surface sparsely armed with short, stinging hairs, abaxial surface sparsely pubescent and armed with stinging hairs, base often cuneate, margin entire, sometimes inconspicuously serrulate at apex, apex acuminate, acumen often sharp; cystoliths minutely punctiform, conspicuous adaxially and along veins abaxially. Inflorescences in distal axils of branches, racemose, shorter than leaves; female inflorescences longer than leaves, long pedunculate, armed with stinging hairs. Male flowers sessile, in bud 1.5 mm; perianth lobes 4, elliptic, setulose; stamens 4; rudimentary ovary obpyramidal, 0.8 mm. Female flowers slightly sunken in a row on slightly fleshy flabellate peduncular receptacle, sessile, ca. 1 mm; perianth lobes 4, connate 1/2 of length, unequal, 2 lateral lobes wider, enclosing the ovary, triangular-ovate, ca. 0.4 mm, sparsely puberulent and armed with short stinging hairs; stigma somewhat straight, filiform, ca. 3 mm. Achene subglobose, oblique, compressed, ca. 3 mm in diam., inconspicuously verrucose; persistent perianth forming a minute cupule at base. Fr. Apr.

Forests; 100–600 m. Guangdong, Hainan, Taiwan [Indonesia, Laos, Malaysia, Philippines, Thailand, Vietnam; Borneo].

2. *Dendrocnide meyeniana* (Walpers) Chew, Gard. Bull. Singapore 21: 206. 1965.

咬人狗 yao ren gou

Urtica meyeniana Walpers, Nov. Actorum Acad. Caes. Leop.-Carol. Nat. Cur. 19, Suppl. 1: 422. 1843; *Dendrocnide meyeniana* (Walpers) Chew f. *subglabra* (Hayata) Chew; *Laportea batanensis* C. B. Robinson; *L. gaudichaudiana* Weddell; *L. meyeniana* (Walpers) Warburg; *L. mindanaensis* Warburg; *L. pterostigma* Weddell; *L. pterostigma* var. *subglabra* (Hayata) T. S. Liu & W. D. Huang; *L. subglabra* Hayata.

Trees, crown truncate; 3 m tall, bark gray, armed with stinging hairs, bulbous at base, lenticellate, leaf scars conspicuous, prominent, otherwise smooth; second year branchlets, abaxial surface of stipules, petioles, leaf blade, and inflorescences armed with stinging hairs. Leaves crowded at apex of stem and branches; stipules caducous, broadly triangular, ca. 1 cm, leathery, densely puberulent abaxially; petiole 4–12 cm, pubescent; leaf blade ovate to ovate or obovate-oblong, to 55 × 27 cm, leathery, penniveined, lateral veins 7–12 each side,

abaxial surface pubescent or sometimes subglabrous, base obtuse, rounded, slightly cordate to subpeltate, margin entire, rarely dentate or crenate, apex acute, cuspidate, or acuminate; cystoliths minutely punctiform, conspicuous adaxially. Male inflorescences cymose paniculate, branches and flowers densely armed with stinging hairs; female inflorescences paniculate, more than 10 cm, ultimate branching angle more than 100 degrees, branchlets reddish green, densely armed with poisonous, stinging hairs, bracts linear, larger ones with midvein. Male flowers: perianth lobes 4 (or 5). Female flowers flabellately arranged but often not in 1 plane; sessile, perianth lobes 4, connate at base, unequal, 2 lateral lobes much wider than medial 2, enclosing ovary, ovate, ca. 0.7 mm, sparsely puberulent and armed with short stinging hairs; stigma ligulate. Achene subglobose, oblique, compressed, ca. 2 mm in diam., inconspicuously verrucose; persistent perianth forming a minute cupule at base. Fr. Apr–Jul.

Secondary forests, thickets, along streams; 100–500 m. Taiwan [Philippines].

3. *Dendrocnide kotoensis* (Hayata ex Yamamoto) B. L. Shih & Yuen P. Yang, Bot. Bull. Acad. Sin. 36: 162. 1995.

红头咬人狗 hong tou yao ren gou

Laportea kotoensis Hayata ex Yamamoto, Suppl. Icon. Pl. Formosan. 1: 2. 1925.

Trees; bark smooth, indistinctly lenticellate; second year branchlets glabrous. Stipules broadly triangular, ca. 1 cm, leathery; petiole to 15 cm; leaf blade ovate, ovate-oblong to obovate-oblong, to 40 × 21 cm, leathery, penniveined, lateral veins 7–11 each side, subglabrous, very sparsely setose, base rounded, shallowly cordate to subpeltate, margin entire, rarely dentate or crenate, apex acute or short acuminate; cystoliths minutely punctiform, conspicuous adaxially. Male inflorescences cymose paniculate; subglabrous; branches whitish green, armed with a few non-poisonous hairs, ultimate branching angle less than 90 degrees. Male flowers: perianth lobes 4. Female flowers several on a flabellate receptacle; sessile, bracts triangular, linear, without midvein. Achene subglobose, oblique, compressed, ca. 2 mm in diam., inconspicuously verrucose; persistent perianth forming a minute cupule at base. Fr. Apr–Jul.

• Coastal forests, along streams; 100–200 m. Taiwan (Taidong).

4. *Dendrocnide urentissima* (Gagnepain) Chew, Gard. Bull. Singapore 21: 207. 1965.

火麻树 huo ma shu

Laportea urentissima Gagnepain, Bull. Soc. Bot. France 75: 3. 1928; *Dendrocnide chingiana* (Handel-Mazzettii) Chew; *Laportea chingiana* Handel-Mazzetti.

Trees 3–15 m tall, 8–20 cm d.b.h.; bark whitish gray, lenticels elliptic; leaf scars semiorbicular, conspicuous; upper stem and branchlets velutinous and armed with stinging hairs, soon glabrescent. Stipules caducous, triangular-ovate, ca. 1 cm, leathery, puberulent abaxially; petiole 7–15 cm, velutinous and armed with short stinging hairs; leaf blade dark green, cordate,

15–25 × 12–22 cm, papery, 3–5-veined, lateral veins 5–7 each side, anastomosing before margin, adaxial surface strigose and sparsely armed with short, stinging hairs, abaxial surface velutinous, with red glandular dots, armed with stinging hairs on veins, base cordate, margin entire or inconspicuously serrulate at apex, apex acuminate; cystoliths minutely punctiform, conspicuous adaxially. Inflorescences in subterminal axils of branchlets, long paniculate, shorter than leaves; female inflorescences longer than leaves, to 50 cm, peduncles to 25 cm, densely armed with stinging hairs. Male flowers sessile, in bud 2 mm; perianth lobes 5, ovate, pubescent; stamens 5; rudimentary ovary obconic, 1 mm. Female flowers 4–6 in a row on slightly fleshy flabellate peduncular receptacle, entirely sessile, ca. 1 mm; perianth lobes 4, unequal, 1 large, ca. 1 mm, 2 medium ca. 0.5 mm, 1 small, ca. 0.3 mm. Ovary ca. 1 mm; stigma ligulate, ca. 3 mm; bracts ca. 0.3 mm. Achene dark reddish, subglobose, oblique, compressed, ca. 3 mm in diam., conspicuously verrucose; persistent perianth forming a minute cupule at base. Fl. Sep–Oct or Jan–Feb, fr. Oct–Dec or Apr–May.

Mixed forests on limestone; 800–1300 m. SW Guangxi, S Yunnan [Vietnam].

5. *Dendrocnide basirotunda* (C. Y. Wu) Chew, Gard. Bull. Singapore 25: 34. 1969.

圆基火麻树 yuan ji huo ma shu

Laportea basirotunda C. Y. Wu, Acta Phytotax. Sin. 6: 276. 1957.

Small trees, 5–7 m tall, 20–40 cm d.b.h., branchlets semi-woody; bark gray-green, sometimes purplish, lenticels elliptic; upper stem and branchlets appressed pubescent, soon glabrescent. Stipules caducous, broadly ovate, ca. 0.6–0.8 cm, leathery, densely puberulent abaxially; petiole 4–11 cm, sparsely appressed pubescent and armed with short stinging hairs; leaf blade dark green, broadly ovate or broadly elliptic, 11–22 × 7–16 cm, papery, 3-veined, lateral veins 5–8 each side, anastomosing before margin, tertiary veins subparallel, adaxial surface sparsely strigose or subglabrous, abaxial surface pubescent and sparsely armed stinging hairs on veins, base rounded or subcordate, margin entire or inconspicuously remotely serrulate, apex acuminate; cystoliths minutely punctiform, conspicuous adaxially. Inflorescences in distal axils of branchlets, long paniculate, slightly longer than petioles. Male flowers sessile, in bud 1.2 mm; perianth lobes 5, ovate, pubescent; stamens 5;

rudimentary ovary obovoid, 0.4 mm. Female flowers 3 or 4 in a row on slightly fleshy flabellate peduncular receptacle, subsessile, ca. 1 mm; perianth lobes 4, unequal, 1 large, ca. 1 mm, 2 medium ca. 0.5 mm, ventral small, ca. 0.2 mm. Ovary ca. 1 mm; stigma straight, ligulate, ca. 2 mm; bracts ca. 0.3 mm. Achene orbicular-ovoid, oblique, compressed, ca. 2.5 mm, conspicuously verrucose; persistent perianth forming a minute cupule at base. Fl. Aug–Sep, fr. Sep–Oct.

Mixed forests on limestone; 1000–1200 m. S Yunnan [Myanmar, Thailand].

6. *Dendrocnide sinuata* (Blume) Chew, Gard. Bull. Singapore 21: 206. 1965.

全缘火麻树 quan yuan huo ma shu

Urtica sinuata Blume, Bijdr. Fl. Ned. Ind. 505. 1826; *Laportea crenulata* Gaudichaud-Beaupré; *L. integrifolia* C. Y. Wu; *L. sinuata* (Blume) Miquel; *Urtica ardens* Blume (1825), not Link (1822); *U. crenulata* Roxburgh.

Shrubs or small trees, 3–7 m tall; branchlets spreading, semi-woody; bark gray-green; upper stem and branchlets sparsely armed with stinging hairs. Stipules brownish, caducous, ovate-lanceolate, ca. 1.5–2.5 cm, subleathery, puberulent abaxially; petiole 2–10 cm, sparsely pubescent and armed with stinging hairs; leaf blade elliptic, oblong- or obovate-lanceolate, rarely rhombic, 10–45 × 5–20 cm, leathery or papery, pinniveined, lateral veins 8–15 each side, anastomosing before margin, prominent abaxially, both surfaces subglabrous or sparsely armed with stinging hairs on veins, base cuneate, rounded, or deeply cordate, margin entire, sinuate to irregularly denticulate, apex acute to long acuminate; cystoliths minutely punctiform, conspicuous adaxially. Male inflorescences in distal axils of branchlets, long paniculate, 5–10 cm; armed with stinging hairs; female inflorescences also in distal axils, 10–20 cm. Male flowers subsessile, in bud 1.2 mm; perianth lobes 4, ovate, pubescent and armed with short stinging hairs; stamens 4; rudimentary ovary obovoid, 0.5 mm. Female flowers: pedicels often fleshy but not swollen; perianth lobes 4, unequal, 1–1.5 mm. Ovary ca. 1.5 mm; stigma ligulate, ca. 2 mm. Achene asymmetrically pyramidal, 5–6 mm, conspicuously verrucose; persistent perianth forming a minute cupule at base. Fl. Sep–Apr, fr. Sep–Nov.

Mixed forests; 300–800 m. S Guangdong, SW Guangxi, Hainan, S Xizang, SW Yunnan [India, Malaysia, Myanmar, Sikkim, Sri Lanka, Thailand].

5. *GIRARDINIA* Gaudichaud-Beaupré, Voy. Uranie, Bot. 498. 1830.

蝎子草属 xie zi cao shu

Chen Jiarui (陈家瑞 Chen Chia-ju); Ib Friis, C. Melanie Wilmot-Dear

Herbs annual or perennial, armed with stinging hairs. Stems sympodial, upper stem often zigzag, often 5-angled. Leaves alternate, petiolate; stipules caducous, intrapetiolar, connate, often broad, foliaceous; leaf blade 3-veined, margin dentate or lobed; cystoliths punctiform. Inflorescences in axillary pairs or solitary, cymes, panicles or spikes, unisexual (plants monoecious or dioecious); male inflorescence often long, flowers clustered on rachis of spikes, dichotomous cymes, or panicles; female glomerules lax or dense on rachis of scorpioid cymes, spikes, or panicles. Male flowers: perianth lobes 4 or 5, valvate; filaments inflexed in bud; rudimentary ovary conspicuous. Female flowers: perianth lobes 4, 2 or 3 lobes connate into a tube, 2 or 3-toothed, split to base on 1 side, sometimes also with a small bristle-like segment; staminodes absent. Ovary straight, ovoid; stigma subulate, papillose on 1 side;

ovule orthotropous. Achene often large, slightly oblique, often compressed, verrucose; persistent stigma usually reflexed; pedicels simple or swollen. Seeds with thin or no endosperm; cotyledons broad.

About two species: N Africa, Asia, Madagascar; one species in China.

The stem fibers are used to make ropes, nets, and coarse cloth and the plants are used as febrifugal medicines. The stinging hairs are very strongly irritating.

1. *Girardinia diversifolia* (Link) Friis, Kew Bull. 36: 145. 1981.

大蝎子草 da xie zi cao

Herbs, annual or perennial, dioecious or monoecious. Stems often woody at base, straight, branched or not, 5-angled, 25–200 cm tall; stems and petioles spreading pubescent and armed with stinging and stigose hairs. Stipules oblong-ovate, 1–3 cm, sparsely strigose abaxially; petiole 2–15 cm; leaf blade light green, elliptic, ovate or oblate in outline, sometimes 3-lobed, 5–25 × 4–23 cm, herbaceous, 3-veined, lateral veins 3–5 each side, anastomosing before margin, abaxially sparsely pubescent and with armed stinging and setulose hairs, adaxially sparsely appressed strigose and armed with short stinging hairs, base cordate or subtruncate, margin usually 3, 5, or 7-lobed or, rarely, regularly serrate or sometimes doubly serrate at leaf base, apex short acuminate or acute; cystoliths minutely punctiform. Glomerules densely armed with stinging hairs. Male inflorescences in proximal axils, spicate, cymose-racemose or subpaniculate, 5–11 cm; female ones in distal axils of stem or in same axils as male, sometimes solitary, racemelike or paniculate, rarely long spicate, 1–28 cm, strigose and spreading hirsute. Male flowers subsessile or pedicellate, in bud 1 mm; perianth lobes 4, ovate, concave, setulose abaxially, apex acute, stamens 4; rudimentary ovary cupular. Female flowers ca. 0.5 mm; perianth lobes unequal, the larger connate lobe cymbiform, 0.4 mm, enlarged to 1 mm at fruit, sparsely strigillose on outside, apex 3-toothed, the smaller lobe linear. Achene dark brownish to gray-brown, subcordate to broadly ovoid, slightly compressed, 1.5–3 mm in diam., conspicuously verrucose. Fl. Sep–Oct, fr. Oct–Nov.

Forest margins, shady moist places, along streams, disturbed places, near villages; (?100–)300–2800 m. Chongqing, Gansu, Guizhou, Hebei, W Henan, Hubei, NW Hunan, Jiangxi, Jilin, Liaoning, E Nei Mongol, S Shaanxi, Sichuan, Taiwan, S Xizang, Yunnan, Zhejiang [Bhutan, India, Indonesia, Korea, Malaysia, Nepal, Sikkim, Sri Lanka; Africa (including Madagascar)].

- 1a. Leaf blade usually not lobed, rarely 3-lobed with lobes ca. 1/3 of overall length, margin coarsely dentate or double-dentate, teeth gradually larger toward leaf apex; stipules 6–10 mm; male inflorescence unbranched, 1–2 cm; female inflorescence often in same axil as male, 2–6 cm 1b. subsp. *suborbiculata*
- 1b. Leaf blade 3–7-lobed, rarely lowermost leaves not lobed and then margin regularly serrate or double-serrate, teeth gradually smaller toward leaf apex; stipules 12–30 mm; inflorescences not as above, often more than 6 cm.
- 2a. Leaf blade often deeply (3–)5–7-lobed, variable in overall shape but often broadly ovate; petiole and major leaf

veins greenish; inflorescence 10–28 cm, branched or not, rarely 2–5 cm and

scorpioid 1a. subsp. *diversifolia*

- 2b. Leaf blade usually 3-lobed, often obovate; petiole and veins on abaxial leaf surface usually purplish; inflorescence unbranched, 4–8 cm 1c. subsp. *triloba*

1a. *Girardinia diversifolia* subsp. *diversifolia*

大蝎子草(原亚种) da xie zi cao (yuan ya zhong)

Urtica diversifolia Link, Enum. Hort. Berol. 2: 385. 1822; *Girardinia chingiana* Chien; *G. condensata* (Stuedel) Weddell; *G. cuspidata* Weddell subsp. *grammata* C. J. Chen; *G. diversifolia* subsp. *ciliata* (C. J. Chen) H. W. Li; *G. formosana* Hayata; *G. heterophylla* (Vahl) Decaisne; *G. leschenaultiana* Decaisne; *G. longispica* Handel-Mazzetti; *G. longispica* subsp. *conferta* C. J. Chen; *G. palmata* Blume; *G. palmata* subsp. *ciliata* C. J. Chen; *G. suborbiculata* subsp. *grammata* (C. J. Chen) C. J. Chen; *G. vitifolia* Franchet; *U. buraei* H. Léveillé; *U. condensata* Stuedel; *U. heterophylla* D. Don; *U. lobotifolia* S. S. Ying; *U. palmata* Forsskål.

Herbs perennial, dioecious or monoecious, many branched. Stipules oblong-ovate, 1–3 cm, Leaf blade elliptic, ovate or oblate in outline, base cordate or subtruncate, margin usually 3, 5, or 7-lobed or, rarely, regularly serrate or sometimes doubly serrate at leaf base. Male inflorescences cymose-racemose or subpaniculate, 5–11 cm; female ones in distal axils of stem, 10–28 cm, 2.5–3 mm in diam.

Forest margins, along streams; 1500–2800 m. Gansu, Guizhou, Hubei, Jiangxi, S Shaanxi, Sichuan, Taiwan, S Xizang, Yunnan, Zhejiang [Bhutan, India, Indonesia, Malaysia, Nepal, Sikkim, Sri Lanka; Africa (including Madagascar)].

1b. *Girardinia diversifolia* subsp. *suborbiculata* (C. J. Chen) C. J. Chen & Friis, **comb. et stat. nov.**

蝎子草 xie zi cao

Basionym: *Girardinia suborbiculata* C. J. Chen, Acta Phytotax. Sin. 30: 476. 1992.

Herbs annual, monoecious, Leaf blade often suborbicular, rarely 3-lobed, base rounded or truncate, margin coarsely 8–13-dentate or doubly dentate, teeth gradually larger distally; petiole and veins on abaxial leaf face greenish. Male inflorescences spicate, 1–2 cm. Female inflorescences 1–6 cm, setulose in axil. Achene 2–2.5 mm, not elevated at base. Fl. Jul–Sep, fr. Sep–Nov.

Forest margins, partly shady moist places, along streams, disturbed places; (?100–)400–800 m. Hebei, W Henan, Jilin, Liaoning, E Nei Mongol, S Shaanxi [Korea].

1c. *Girardinia diversifolia* subsp. *triloba* (C. J. Chen) C. J. Chen & Friis, **comb. nov.**

红火麻 hong huo ma

Basionym: *Girardinia cuspidata* subsp. *triloba* C. J. Chen, Acta Bot. Yunnan. 4: 334. 1982; *G. suborbiculata* subsp. *triloba* (C. J. Chen) C. J. Chen.

Herbs annual, monoecious, leaf blade obovate or broadly ovate, often 3-lobed, lobes triangular, terminal one 3–7 cm, lateral lobes 1.5–3 cm, base truncate or cordate, margin regularly

dentate or doubly dentate, petiole and veins on abaxial leaf face often purplish. Male inflorescences spicate, 1–2 cm. Female inflorescences 1–6 cm, often densely spreading hirsute. Achene 2–2.5 mm, not elevated at base. Fl. Jun–Aug, fr. Aug–Oct.

• Shady moist places in forests, along streams, near villages; 300–1800 m. Chongqing, S Gansu, Guizhou, Hubei, NW Hunan, S Shaanxi, Sichuan, Yunnan.

6. *PILEA* Lindley, Collect. Bot. t. 4. 1821, nom. cons.

冷水花属 *leng shui hua shu*

Chen Jiarui (陈家瑞 *Chen Chia-jui*); Alex K. Monro

Adenia Torrey (1843), not Forsskål (1775).

Herbs or subshrubs, rarely shrubs, without stinging hairs. Stems often succulent. Leaves usually opposite, equal or unequal in pairs, rarely alternate; petiolate, stipules deciduous or persistent, 2 at each node, axillary or rarely interpetiolar [or intrapetiolar], usually membranous, sometimes herbaceous, or papery [or fleshy]; leaf blade 3-veined or rarely pinnately veined, base symmetric or asymmetric, margin serrate, crenate, dentate, or entire; cystoliths usually linear. Inflorescences solitary or in pairs, axillary, glomerules usually forming loose, dichotomous cymes or cymose panicles, sometimes spikes or in dense, globose capitula of unisexual or polygamous flowers (plants monoecious or dioecious); bracts small. Male flowers: perianth lobes (2–)4 or 5, valvate or imbricate, often corniculate near apex; stamens (2–)4 or 5; filaments inflexed in bud; rudimentary ovary small to inconspicuous. Female flowers: perianth lobes (2 or)3(–5), subequal or strongly unequal, in fruit enlarged, when 3-lobed, the abaxial one usually gibbous or boat-shaped, much longer and often with a corniculate appendix near apex; staminodes opposite to segments, scale-like, usually oblong, minute or inconspicuous, in fruit enlarged. Ovary straight, often with oblique apex; stigma sessile, shortly penicillate; ovule orthotropous. Achene usually ovoid, usually compressed or slightly compressed, often oblique, without crested appendix at apex, partly enclosed by persistent perianth. Seeds with scarcely any endosperm; cotyledons broad. $x = 8, 12, 13, 15, 18$.

About 400 species: worldwide in tropical, subtropical, and rarely temperate regions; 80 species (31 endemic, one introduced) in China.

- 1a. Inflorescences spicate, very slender; flowers arranged on only 1 side of the axis 2. *P.* sect. *Smithiella*
 1b. Inflorescences cymose or nearly capitate; flowers arranged around the axis.
 2a. Leaves pinnately veined 5. *P.* sect. *Pilea*
 2b. Leaves strongly 3-veined.
 3a. Female perianth lobes 5; male perianth lobes 5, imbricate 1. *P.* sect. *Achudemia*
 3b. Female perianth lobes 2–4; male perianth lobes (2–)4(or 5), valvate.
 4a. Female perianth lobes 4, subequal; male perianth lobes 4(or 5); subshrubs or sometimes perennial herbs 3. *P.* sect. *Tetrameris*
 4b. Female perianth lobes 2 or 3, often unequal; male perianth lobes (2–)4; herbs or rarely subshrubs.
 5a. Female perianth lobes 2 6. *P.* sect. *Dimeris*
 5b. Female perianth lobes 3.
 6a. Male inflorescences cymose, paniculate, moniliform spicate, or capitate, without a receptacle and involucre 4. *P.* sect. *Urticella*
 6b. Male inflorescences capitate, with a receptacle and involucre 7. *P.* sect. *Lecanthoides*

1. *Pilea* sect. *Achudemia* (Blume) C. J. Chen, Bull. Bot. Res., Harbin 2(3): 1. 1982.

五萼组 *wu e zu*

Achudemia Blume, Mus. Bot. 2: 57. 1856.

Herbs. Leaves 3-veined. Inflorescences unisexual, sometimes bisexual, arranged around the axis; female inflorescences cymose or nearly capitate. Male perianth lobes 5, imbricate. Female perianth lobes 5, subequal to each other and often to achene.

About three species: E Asia; three species in China.

- 1a. Leaf blade ± papery, margin inconspicuously serrate or crenate distally, rarely entire, often purplish abaxially; female inflorescences capitate; achene rhombic-ovoid, ca. 2 mm 3. *P. boniana*
 1b. Leaf blade membranous, margin coarsely dentate, light green abaxially; female inflorescences cymose; achene ovoid, 1–1.4 mm.
 2a. Leaf blade oblong-ovate, (5–)9–16 cm, lateral veins 6–8 each side; male inflorescences cymose-racemose, longer than leaves; female inflorescences laxly cymose; achene sunken on both surfaces, verrucose by margin 1. *P. hilliana*

- 2b. Leaf blade rhombic-ovate or ovate, rarely lanceolate, 1–6(–10) cm, lateral veins 2–3(–5) each side; male inflorescences often capitate, 1–1.5 cm; female inflorescences compactly cymose; achene slightly compressed, verrucose 2. *P. japonica*

1. *Pilea hillebrandii* Handel-Mazzetti, Symb. Sin. 7: 129. 1929.

翠茎冷水花 *cui jing leng shui hua*

Herbs, monoecious or dioecious. Stems 25–100 cm tall, succulent, but woody at base, swollen above nodes, glabrous. Stipules deciduous, brown, oblong, 7–10 mm, membranous; petiole 1.5–7 cm; leaf blade abaxially pale green, dark brown when dry, oblong-ovate, often asymmetric, unequal in size, (5–)9–16 × (2.5–)4–8 cm, 3-veined, lateral veins 6–8 each side, abaxial surface glabrous, adaxial surface sparsely pilose, base broadly cuneate or rounded, margin coarsely dentate, apex shortly acuminate or shortly caudate. Inflorescence a cyme, often 3-branched, the central branch often shorter than the laterals, 7–15 cm overall, peduncle 5–10 cm, 1 side of axis densely pubescent; male inflorescence cymose-racemose, longer than leaves; female inflorescence a lax cyme. Male flowers pedicellate, in bud ca. 1.2 mm in diam.; perianth lobes puberulent; stamens 5; rudimentary ovary minute, conic. Female perianth lobes oblong or boat-shaped; staminodes oblong. Achene ovoid, ca. 1 mm, sunken on both central surfaces, slightly oblique, verrucose on elevated surfaces by the margin, enclosed by perianth lobes subequal to achene. Fl. Jun–Aug, fr. Sep–Dec.

Moist forests, near streams; 1100–2600 m. Guangxi, Guizhou, Sichuan, SE Xizang, Yunnan [N Vietnam].

2. *Pilea japonica* (Maximovicz) Handel-Mazzetti, Symb. Sin. 7: 141. 1929.

山冷水花 *shan leng shui hua*

Achudemia japonica Maximowicz, Mélanges Biol. Bull. Phys.-Math. Acad. Imp. Sci. Saint-Petersbourg 9: 627. 1876; *A. insignis* Migo; *Nanochnide closii* Léveillé & Vaniot.

Herbs monoecious. Stems 5–30(–60) cm tall, succulent, swollen above nodes, glabrous. Leaves opposite or subwhorled; stipules almost persistent, light green, oblong, 3–5 mm, membranous; petiole 0.5–2(–5) cm; leaf blade abaxially pale green, rhombic-ovate or ovate, rarely triangular-ovate or lanceolate, slightly asymmetric, unequal in size, 1–6(–10) × 0.8–3(–5) cm, 3-veined, lateral veins 2–3(–5) each side, both surfaces sparsely puberulent, base cuneate, rarely rounded or subtruncate, margin crenate-serrate or dentate, apex often acute, rarely obtuse or shortly acuminate. Inflorescences sometimes of

mixed sexes; male inflorescence often a capitulum, 1–1.5 cm; pedunculate, female inflorescence long pedunculate, 1–3(–5) cm, subglabrous. Male flowers pedicellate, in bud ca. 1 mm in diam.; stamens 5; rudimentary ovary minute, narrowly conic. Female perianth lobes oblong-lanceolate; staminodes scale-like, oblong-lanceolate. Achene ovoid, 1–1.4 mm, slightly compressed, verrucose, enclosed by perianth lobes subequal to achene. Fl. Jul–Sep, fr. Aug–Nov.

Wet rocks in moist forests and near streams; 500–1900 m. Anhui, Fujian, S Gansu, N Guangdong, Guangxi, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangxi, Jilin, Liaoning, S Shaanxi, Shanxi, Sichuan, Taiwan, E Yunnan, Zhejiang [Japan, Korea, Russia (E Siberia)].

The plants are used medicinally to relieve internal fever and as a diuretic.

3. *Pilea boniana* Gagnepain, Bull. Soc. Bot. France 75: 71. 1928.

五萼冷水花 *wu e leng shui hua*

Pilea baviensis Gagnepain; *P. morseana* Handel-Mazzetti; *P. pentasepala* Handel-Mazzetti.

Herbs perennial, creeping rhizomatous, dioecious or monoecious, Stems glabrous. 15–100 cm tall, succulent, but woody at base, Stipules almost persistent, interpetiolar, deltoid, ca. 1 mm, herbaceous; petiole 0.6–5(–7) cm; leaf blade abaxially often purplish, often elliptic, sometimes elliptic-lanceolate, oblong-elliptic, or oblong-ovate, symmetric, often unequal or subequal in size, (1–)3–16 × (0.8–)1.5–7.5 cm, 3-veined, lateral veins 6–10 each side, glabrous adaxially, base broadly cuneate or rounded, margin crenate-serrulate or indistinctly undulate-crenate distally, rarely entire, apex cuspidate, acuminate, or acute. Inflorescence a cyme, racemelike or paniculate, spreading, 6–16 cm overall, peduncle 4–10 cm; female inflorescences capitate. Male flowers pedicellate, in bud obovoid, truncate at top, 1.5–2 mm in diam.; stamens 5; rudimentary ovary minute, conic or linear. Female perianth lobes oblong or boat-shaped; staminodes oblong. Achene rhombic-ovoid, ca. 2 mm, compressed, slightly elevated by margin, verrucose, enclosed by perianth lobes subequal to achene. Fl. Jul–Mar, fr. Sep–Jul.

Rock crevices in limestone mountain forests; 300–2200 m. W Guangxi, SW Guizhou, SE Yunnan [N Vietnam].

2. *Pilea* sect. *Smithiella* Dunn ex C. J. Chen, Bull. Bot. Res., Harbin 2(3): 43. 1982.

长穗冷水花组 *chang sui leng shui hua zu*

Smithiella Dunn, Bull. Misc. Inform. Kew 1920: 211. 1920, not H. Peragallo & M. Peragallo (1901); *Aboriella* Bennet; *Dunniella* Rauschert.

Herbs. Leaves 3-veined. Inflorescences unisexual, male ones not seen, female ones long spicate; flowers borne on 1 side of axis. Female perianth lobes 5, subequal.

One species: China, NE India.

Wu Zhengyi (editor's note) believes this section should be treated as a separate genus, in which case the correct name would be *Aboriella*.

4. *Pilea myriantha* (Dunn) C. J. Chen, Bull. Bot. Res., Harbin 2(3): 44. 1982.

长穗冷水花 chang sui leng shui hua

Smithiella myriantha Dunn, Bull. Misc. Inform. Kew 1920: 211. 1920; *Aboriella myriantha* (Dunn) Bennet; *Dunniella myriantha* (Dunn) Rauschert.

Herbs perennial, creeping rhizomatous, dioecious. 40–50 cm tall, stems woody at base, sparsely appressed pubescent distally. Stipules deciduous, brownish when dry, oblong, ca. 12 mm, papery; petiole 1.5–4 cm, sparsely appressed pubescent; leaf blade black-brown when dry, often broadly elliptic, often

symmetric, unequal or subequal in size, 7–14 × 5–10 cm, thinly papery, 3-veined, lateral veins 5–6 each side, abaxial surface glabrous, adaxial surface sparsely pilose, cystoliths linear, distinct on both surfaces, base broadly cuneate or obtuse, margin shallowly dentate or erose-dentate, apex shortly acuminate. Male inflorescence not seen. Female spike 14–20 cm, peduncle 8–12 cm. Female flowers pedicellate, dense; perianth lobes narrowly ovate, ca. 7 mm, subapically corniculate, hirsute at apex; staminodes 5, semiorbicular. Achene broadly ovoid, ca. 1.5 mm, compressed, inconspicuously verrucose, enclosed by perianth lobes shorter than achene. Fr. Sep.

Shaded and wet places; ca. 300 m. SE Xizang [NE India].

3. *Pilea* sect. *Tetrameris* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 44. 1982.

四萼组 si e zu

Subshrubs or perennial herbs. Leaves 3-veined. Male perianth lobes 4(or 5), valvate; female perianth lobes 4, subequal, shorter than achene.

About 13 species: SE Asia; 11 species (four endemic) in China.

- 1a. Small subshrubs, less than 25 cm tall; stipules often over 20 mm, longitudinally 8–10-ribbed; inflorescences solitary, over 5 cm.
- 2a. Leaf blade oblong-ovate, apex acuminate or shortly caudate; achene oblong-ovoid, spinulose-verrucose 5. *P. basicordata*
- 2b. Leaf blade ovate to suborbicular, apex obtuse, shortly acuminate, or cuspidate; achene broadly ovoid or subglobose, purplish spots or verrucose.
- 3a. Stems terete; leaf blade suborbicular; achene ca. 1.2 mm 6. *P. amplistipulata*
- 3b. Stems roundly 6-angled; leaf blade oblong or broadly ovate; achene ca. 2.8 mm 7. *P. hexagona*
- 1b. Herbs or subshrubs, often more than 30 cm tall; stipules less than 13 mm, longitudinally 2-ribbed; inflorescences in pairs, less than 4 cm.
- 4a. Male flowers in clusters or forming pedunculate capitula.
- 5a. Plants erect, less than 40 cm tall; leaf blade obovate, adaxial surface with 2, white grooves; male flowers forming pedunculate capitula, peduncle 1.5–4 cm 15. *P. cadierei*
- 5b. Plants erect, ascending, or climbing, usually over 50 cm tall; leaf blade lanceolate, uniformly colored, without adaxial white grooves; male flowers in axillary clusters.
- 6a. Leaf blade oblong- or linear-lanceolate, 6–10 × 1.5–2.8 cm; petiole 0.5–1.5 cm 13. *P. rubriflora*
- 6b. Leaf blade elliptic- or ovate-lanceolate, (3–)10–22 × (1.3–)4–6.5 cm; petiole (0.5–)2–7 cm 14. *P. funkikensis*
- 4b. Male flowers in dichotomous cymes, racemes, or panicles.
- 7a. Leaf blade margin entire or erose, rarely inconspicuously serrate distally; achene with a purplish ring on both surfaces 12. *P. longicaulis*
- 7b. Leaf blade margin serrate or crenate-serrate; achene without colored ring on both surfaces.
- 8a. Male flowers in dichotomously branched cymes; leaf blade often lanceolate.
- 9a. Leaf blade narrowly lanceolate, 7–15 × 2–4.5 cm; achene ovoid, spinulose-verrucose 8. *P. spinulosa*
- 9b. Leaf blade ovate to lanceolate, 2.5–10 × 1.2–3.5 cm; achene oblong-ovoid, tuberculate 9. *P. dolichocarpa*
- 8b. Male flowers in racemose cymes, few branched; leaf blade ovate or oblong.
- 10a. Leaf blade oblong, apex acute; male glomerules scattered; achene ca. 2 mm, smooth, densely purplish spotted 10. *P. tsiangiana*
- 10b. Leaf blade ovate or ovate-lanceolate; male glomerules compact; achene ca. 1.2 mm, spinulose-verrucose 11. *P. pseudonotata*

5. *Pilea basicordata* W. T. Wang ex C. J. Chen, Bull. Bot. Res., Harbin 2(3): 44. 1982.

基心叶冷水花 ji xin ye leng shui hua

Shrubs or subshrubs glabrous, monoecious. Stems gray-green, 6–13 cm tall, ca. 6 mm in diam., lenticels elliptic, densely covered with bacilliform cystoliths; internodes compacted; leaf scars semiorbicular, conspicuous. Leaves crowded at apex; stipules almost persistent, brownish, oblong, 20–22 ×

8–10 mm, membranous, longitudinally 8–10-ribbed; petiole 3–8 cm, densely covered cystoliths; leaf blade gray-green, oblong-ovate, symmetric, subequal in size, 8–12 × 5–8 cm, succulent, but thick papery when dry, 3-veined, lateral veins 10 each side, anastomosing by margin, cystoliths conspicuous on both surfaces, base cordate or deeply cordate, margin undulate-erose or subentire from middle, apex acuminate or shortly caudate. Inflorescences solitary, a lax cymose-panicle, 8–13 cm overall, peduncle 6–8 cm; bracts triangular-ovate, ca. 0.8 mm.

Male flowers pedicellate, in bud pear-shaped, ca. 2 mm in diam.; perianth lobes 4, cymbiform, connate 1/2 of length, subapically corniculate; stamens 4; rudimentary ovary minute, conic. Female flowers pedicellate; perianth lobes very unequal, ovate-oblong, slightly keeled; staminodes scale-like, elliptic-oblong, ca. 1.2 mm. Achene orange, oblong-ovoid, ca. 1.5 mm, slightly compressed, spinulose-verrucose. Fl. Mar–Apr, fr. Apr–May.

• Wet shady rocks in mixed forests on limestone mountains; ca. 900 m. Guangxi (Liucheng).

6. *Pilea amplistipulata* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 46. 1982.

大托叶冷水花 da tuo ye leng shui hua

Subshrubs small, glabrous, dioecious. Stems terete, 10–15 cm; internodes 1–2 cm. Leaves crowded at stem apex; stipules deciduous, green, oblong, 25 × 16 mm, papery, longitudinally ribbed; petiole 6–8 cm; leaf blade abaxially gray-green, adaxially dark green, obovate-orbicular or suborbicular, symmetric, subequal in size, 9–13 cm, succulent, but thick papery when dry, 3-veined, lateral veins 10 each side, inconspicuous, with scattered cystoliths along veins, base cordate, margin entire or inconspicuously undulate-erose distally, apex obtuse or mucronate. Inflorescences solitary, 7–10 cm overall, peduncle 4–6 cm; female ones laxly cymose-paniculate. Female flowers pedunculate; 2 large perianth lobes cymbiform, ca. 0.6 mm, 2 smaller lobes oblong, 0.3–4 mm; staminodes scale-like, oblong. Achene purplish, ovoid, ca. 1.2 mm, slightly compressed, verrucose. Fl. Apr–May, fr. Jun–Aug.

• Wet shaded rocks, near streams in limestone mountains; ca. 600 m. S Yunnan (Jinping).

7. *Pilea hexagona* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 46. 1982.

六棱茎冷水花 liu leng jing leng shui hua

Subshrubs small, stipules, petioles, both surfaces of leaf base, and perianth lobes of flowers densely covered with cystoliths. dioecious; Stems roundly 6-angled, ca. 20 cm tall, ca. 6 mm in diam., sparsely pubescent on grooves; internodes 1.5–4 cm. Leaves crowded at stem apex; stipules soon deciduous, green, oblong, 25–30 mm, papery, longitudinally 9-ribbed; petiole unequal in length, 4–11 cm; leaf blade abaxially pale green, adaxially dark green, elliptic, ovate or oblong, symmetric, subequal in size, 10–18 cm, succulent, but thick papery when dry, 3-veined, lateral veins 8–12 each side, elevated abaxially, base rounded or cordate, margin crenate-serrate or subundulate from middle, apex short acuminate or cuspidate. Inflorescences solitary; borne on tops of branches, male cymes dichotomously branched 2–3 times; ca. 5 cm, glomerules capitate, 6–10 mm in diam.; female inflorescence a lax corymbose cyme, 7–10 cm (including gracile peduncle 6–8 cm). Male flowers pedicellate, in bud ca. 2 mm; perianth lobes 4, cymbiform, connate about 1/2 of length; stamens 4; rudimentary ovary minute. Female flowers sessile, ca. 1 mm; perianth lobes light blue, dorsal-ventral lobes cymbiform, longer than lateral, lateral 2 lobes oblong, subapically corniculate; staminodes dark brown, sub-

succulent. Achene purplish spotted. ovoid, ca. 2.8 mm, compressed. Fl. Apr–May, fr. Jun–Sep.

Wet rocky places in limestone mountains; ca. 200 m. SE Yunnan (Hekou) [N Vietnam].

8. *Pilea spinulosa* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 48. 1982.

刺果冷水花 ci guo leng shui hua

Herbs or subshrubs perennial, glabrous, dioecious. Stems light green when dry, 30–100 cm; stems, stipules, and petioles densely covered with cystoliths. Stipules deciduous, green, oblong, ca. 10 mm, papery, longitudinally 2-ribbed; petiole unequal in length, 1–4 cm; leaf blade abaxially pale green, adaxially green, narrowly lanceolate, subequal in size, 7–15 × 2–4.5 cm, thinly papery, 3-veined, lateral veins 10 each side, prominent abaxially, base rounded or subcordate, margin crenate from base, apex acuminate or long acuminate. Inflorescences in pairs; male cymes dichotomously branched 2–3 times, 1–1.5 cm; proximal bracts oblong, ca. 2 mm, distal bracts ovate, ca. 1 mm; female cymes dichotomously branched 3 or 4 times, ca. 1.5 cm. Male flowers sessile, in bud ca. 1.2 mm; perianth lobes 4, ovate-oblong, connate 1/2 of length, subapically corniculate; stamens 4; rudimentary ovary cylindrical, ca. 0.3 mm. Female flowers shortly pedicellate; perianth lobes triangular-ovate; staminodes oblong. Achene ovoid, ca. 1 mm, compressed, oblique, sparsely spinulose-verrucose. Fl. Mar–Apr, fr. May–Jun.

Shaded wet places in forests; 500–900 m. Guangdong, Guangxi, Hainan [N Vietnam].

9. *Pilea dolichocarpa* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 49. 1982.

光疣冷水花 guang liu leng shui hua

Herbs perennial or subshrubs, glabrous, dioecious. Stems black when dry, much branched, terete, to 100 cm tall, woody at base; stems and stipules densely covered with cystoliths. Stipules deciduous, green, oblong, 6–7 mm, papery, longitudinally 2-ribbed; petiole unequal in length, 0.7–2.7 cm; leaf blade abaxially pale green, adaxially dark green, ovate to lanceolate, slightly oblique, subequal in size, 2.5–10 × 1.2–3.5 cm, papery, 3-veined, lateral veins 10 each side, transverse secondary veins anastomosing by margin, both surfaces lustrous, base rounded or subcordate, margin crenate-serrate from base, apex acuminate or shortly caudate-acuminate. Inflorescences in pairs, male inflorescence a cyme, dichotomously branched 4–6 times, ca. 1–2 cm; female ones dichotomously branched 3 times, ca. 1 cm; bracts ovate, ca. 0.6 mm. Male flowers shortly pedicellate, in bud obovoid, ca. 1.4 mm; perianth lobes 4, reddish, oblong-ovate, connate 1/2 of length, subapically corniculate; stamens 4; rudimentary ovary conic, ca. 0.3 mm. Female flowers shortly pedicellate; perianth lobes triangular-ovate; staminodes oblong. Achene oblong-ovoid, ca. 1.2 mm, slightly compressed, sparsely tuberculate, persistent perianth lobes 3 times shorter than achene. Fl. Jan–Apr, fr. Apr–May.

Shaded wet places in forests in limestone mountains; 1100–1300 m. W Guangxi, SE Yunnan (Xichou) [Vietnam].

10. *Pilea tsiangiana* Metcalfe, Lingnan Sci. J. 15: 633. 1936.

海南冷水花 hai nan leng shui hua

Subshrubs glabrous, monoecious or dioecious. Stems light green when dry, 30–100 cm; stems, stipules, petioles, and both surfaces of leaf blade densely covered with cystoliths. Stipules deciduous, green, oblong, 6–8 mm, papery, longitudinally 2-ribbed; petiole subequal in length, 1–3.5 cm; leaf blade abaxially pale green, adaxially green, elliptic or oblong, subequal in size, 7–14 × 3.5–7.5 cm, thinly papery, 3-veined, lateral veins 8–10 each side, transverse, prominent abaxially, external secondary veins anastomosing by margin, base broadly cuneate, rounded, or subcordate, margin crenate-serrate from base, apex acute or acuminate. Inflorescences unisexual or sometimes of mixed sexes, in pairs; male inflorescence a racemelike cyme, few branched, 2–4.5 cm, glomerules scattered; female inflorescence a dichotomous cyme, ca. 1.5 cm. Male flowers reddish brown, pedicellate, in bud ca. 1.5 mm; perianth lobes 4, ovate, connate 1/2 of length, subapically corniculate; stamens 4; rudimentary ovary cylindrical, ca. 0.3 mm. Female flowers subsessile; perianth lobes triangular-ovate, persistent perianth 1/4 as long as achene; staminodes oblong. Achene densely purplish spotted, ovoid, ca. 2 mm, compressed, smooth. Fl. Aug–Oct, fr. Nov–Jan.

Shaded wet places in forests, near streams; 200–300 m. Guangxi, Hainan [N Vietnam].

11. *Pilea pseudonotata* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 50. 1982.

假冷水花 jia leng shui hua

Subshrubs glabrous, monoecious. Stems light green when dry, to 200 cm, ca. 1.5 cm in diam.; stems, petioles, and both surfaces of leaf blade densely covered with cystoliths. Stipules deciduous, green, oblong-lanceolate, 10–12 mm, papery, longitudinally 2-ribbed; petiole subequal in length, 2–11 cm; leaf blade abaxially pale green, adaxially dark green, ovate or ovate-lanceolate, subequal in size, 5–17 × 2.5–8 cm, thinly papery, 3-veined, lateral veins 12–18 each side, transverse, prominent abaxially, external secondary veins anastomosing by margin, base rounded or subcordate, margin serrate or crenate-serrate, apex acuminate. Inflorescences unisexual or sometimes mixed sexes, in pairs, a racemelike cyme, few branched, 1–2.5 cm; male glomerules compact. Male flower greenish, pedicellate, in bud pear-shaped, ca. 2 mm; perianth lobes 4, obovate, connate 1/2 of length, subapically corniculate; stamens 4; rudimentary ovary conic. Female flowers pedicellate; perianth lobes lanceolate, ca. 1 mm, persistent perianth 1/3 as long as achene; staminodes minute. Achene greenish brown, ovoid, ca. 1.2 mm, slightly compressed, oblique, densely spiculate-verrucose. Fl. Mar–Apr, fr. May–Jun.

Shaded wet places in forests, near streams; 700–2500 m. S Guizhou, E Xizang, S Yunnan [N Vietnam].

This species is superficially similar to *Pilea notata* in appearance, but *P. notata* has only 3 female perianth lobes, longer male cymes, and outer secondary veins that do not anastomose near the margin.

12. *Pilea longicaulis* Handel-Mazzetti, Symb. Sin. 7: 127. 1929.

长茎冷水花 chang jing leng shui hua

Subshrubs or perennial herbs glabrous, dioecious. Stems light green when dry, terete, 50–80 cm; stems, stipules, petioles, and leaves densely covered with cystoliths. Stipules deciduous, green, oblong, 7–9 mm, papery, longitudinally 2-ribbed; petiole subequal in length, 1–3 cm; leaf blade pale green, elliptic-lanceolate, elliptic, rarely ovate, subequal in size, 6–15 × 3–6 cm, ± succulent, but thinly papery when dry, 3-veined, lateral veins 10 each side, transverse, inconspicuous on both surfaces, external secondary veins indistinctly anastomosing by margin, both surfaces lustrous, base obtuse, broadly cuneate, rounded, or subcordate, margin entire or erose, rarely serrate distally, apex acuminate or shortly caudate-acuminate. Inflorescences in pairs; male inflorescence a dichotomously branched cymose panicle or cymose raceme, or compacted into capitulum, 1–2(–5) cm. Male flowers purplish or yellow, pedicellate, in bud obovoid, ca. 1.5 mm; perianth lobes 4, elliptic, connate 1/2 of length, subapically corniculate; stamens 4; rudimentary ovary conic. Female flowers subsessile; perianth lobes elliptic, persistent perianth 1/3 as long as achene; staminodes oblong. Achene ellipsoid-ovoid, ca. 1.5 mm, compressed, with a purplish ring on both surfaces. Fl. Jan–Feb, fr. Mar–May.

Shaded wet places in forests often in limestone mountains; 400–1500 m. W Guangxi, Guizhou, Sichuan [Laos, N Vietnam].

- 1a. Herbs perennial; male flowers compacted into capitula, yellowish 12c. var. *flaviflora*
- 1b. Subshrubs; male flowers in cymose racemes or cymose panicles, purplish.
 - 2a. Inflorescences 1–2 cm; leaf blade elliptic-lanceolate or elliptic, base broadly cuneate or obtuse, margin entire or crenate distally 12a. var. *longicaulis*
 - 2b. Inflorescences 1.5–5 cm; leaf blade broadly elliptic or ovate, base rounded or subcordate, margin erose distally 12b. var. *erosa*

12a. *Pilea longicaulis* var. *longicaulis*

长茎冷水花(原变种) chang jing leng shui hua (yuan bian zhong)

Subshrubs. Stems to 80 cm tall. Leaf blade elliptic-lanceolate or elliptic, base broadly cuneate or obtuse, margin entire or crenate distally. Inflorescences 1–2 cm. Male flowers dark purplish. Fl. Jan–Feb, fr. Mar–May.

Shaded wet places in forests often in limestone mountains; ca. 700 m. W Guangxi (Longzhou) [N Vietnam].

The plants are used medicinally as a diuretic and to treat traumatic injuries.

12b. *Pilea longicaulis* var. *erosa* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 52. 1982.

侵蚀冷水花 nie shi leng shui hua

Subshrubs to 60 cm tall. Leaf blade broadly elliptic or ovate, base rounded or subcordate, margin erose distally. Inflorescences 1.5–5 cm. Male flowers dark purplish. Fl. Oct–Nov, fr. Nov–Dec.

• Shaded wet places in forests in limestone mountains; 400–1100 m. W Guangxi (Debao).

12c. *Pilea longicaulis* var. *flaviflora* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 52. 1982.

黄花冷水花 huang hua leng shui hua

Herbs perennial, to 80 cm tall. Leaf blade elliptic-lanceolate, base rounded, margin crenate-serrate distally. Male inflorescence a capitulum. Male flowers yellowish. Fl. Jul–Sep.

Shaded wet places in forests; 400–1500 m. Guizhou, Sichuan [Laos].

This taxon appears to be quite different from the typical variety; further taxonomic study of this group is needed.

13. *Pilea rubriflora* C. H. Wright, J. Linn. Soc., Bot. 26: 478. 1898.

红花冷水花 hong hua leng shui hua

Herbs or subshrubs perennial, glabrous, dioecious. Stems blue-green when dry, terete, 40–80 cm, ca. 8 mm in diam., waxy; stems, stipules, petioles, and leaves densely covered with cystoliths. Stipules deciduous, green, oblong, ca. 7 mm, papery, longitudinally 2-ribbed; petiole subequal in length, 0.5–1.5 cm; leaf blade pale green and lustrous on both surfaces, oblong- or linear-lanceolate, 6–10 × 1.5–2.8 cm, papery, 3-veined, lateral veins 12–15 each side, transverse, conspicuous abaxially, external secondary veins anastomosing by margin, base rounded or subcordate, margin serrulate, apex acuminate. Male inflorescence a compact, cymose cluster; female inflorescence unknown. Male flowers light yellowish, then reddish, pedicel 2–3 mm, in bud obovoid, ca. 1.6 mm; perianth lobes 4, elliptic, connate about 1/2 of length, 2 lobes subapically corniculate; stamens 4; rudimentary ovary minute. Fl. Apr.

• Shaded wet places in forests, near streams; 800–1500 m. W Hubei, E Sichuan.

14. *Pilea funkikensis* Hayata, Icon. Pl. Formosan. 6: 45. 1916.

奋起湖冷水花 fen qi hu leng shui hua

Subshrubs glabrous, monoecious or dioecious. Stems green when dry, erect, ascending, or climbing, terete, to 200 cm tall, woody at base, usually with galls on mid portion of internodes; stems, stipules, petioles, and leaves densely covered with cystoliths. Stipules caducous, green, oblong, 13–23 mm, papery, longitudinally 2-ribbed; petiole unequal in length,

(0.5–)2–7 cm; leaf blade elliptic- or ovate-lanceolate, unequal in size, (3–)10–22 × (1.3–)4–6.5 cm, papery, 3-veined, lateral veins 8–10 each side, transverse, external secondary veins indistinctly anastomosing by margin, cystoliths conspicuous, base slightly oblique, broadly cuneate or rounded, margin serrulate or obscurely serrulate, apex acute to caudate-acuminate. Inflorescences in pairs, of mixed sexes; male inflorescence a cymose panicle or few branched, interrupted spike; peduncle to 4.5 cm; female inflorescence a cyme. Male flowers pedicellate, in bud obovoid, ca. 1.5 mm; perianth lobes (3 or)4, cymbiform, connate about 1/2 of length, subapically corniculate, persistent perianth lobes 0.5–0.7 mm, 1/2 as long as achene; stamens (3 or)4; rudimentary ovary conic. Female flowers sessile; perianth lobes dimorphic; staminodes oblong. Achene asymmetrically ovoid, ca. 1.3 mm, compressed. Fl. May–Jul, fr. Aug–Oct.

• Shaded wet places in forests, ravines; 400–1400 m. Taiwan.

15. *Pilea cadierei* Gagnepain & Guillemin, Bull. Mus. Natl. Hist. Nat., sér. 2, 10: 629. 1939.

花叶冷水花 hua ye leng shui hua

Herbs perennial or subshrubs, rhizomatous, glabrous, dioecious. Stems erect, 15–40 cm tall, somewhat succulent, woody at base; stems, stipules, petioles, and leaves densely covered with cystoliths. Stipules caducous, green, brownish when dry, oblong, 10–13 mm, papery, longitudinally 2-ribbed; petiole subequal in length, 0.7–1.5 cm; leaf blade obovate, subequal in size, 2.5–6 × 1.5–3 cm, papery, 3-veined, lateral veins 3 each side, external secondary veins anastomosing by margin, adaxial surface with 2 interrupted white grooves, base broadly cuneate or subrounded, margin obscurely dentate or erose, apex mucronate. Inflorescences in pairs; male inflorescence a capitulum, peduncle 1.5–4 cm; glomerules 6–10 mm in diam.; bracts broadly ovate, ca. 3 mm. Male flowers: pedicel 2–3 mm, in bud pear-shaped, ca. 2.5 mm; perianth lobes 4, cymbiform, connate 1/2 of length, subapically corniculate; stamens 4; rudimentary ovary conic. Female flowers sessile; persistent perianth lobes 0.5–0.7 mm, 1/2 as long as achene; staminodes oblong. Achene ovoid, ca. 1.5 mm, compressed. Fl. Sep–Nov, fr. Nov–Dec.

Shaded wet places in forests; 500–1500 m. Guizhou, Yunnan [Vietnam].

This species is commonly cultivated as an ornamental.

4. *Pilea* sect. *Urticella* Miquel in Martius, Fl. Bras. 4(1): 198. 1853.

三萼组 san e zu

Herbs, rarely shrubs. Leaves 3-veined from base of blade, rarely main lateral veins arising above base. Inflorescences unisexual. Male perianth lobes (2–)4, valvate; female perianth lobes 3, usually unequal.

About 370 species: worldwide in tropical, subtropical, and rarely temperate regions; 58 species (25 endemic) in China.

1a. Leaves of each pair very unequal, the larger over 5 times as long as the smaller.

2a. Minor leaves of each pair strongly reduced, less than ca. 1 cm, sometimes absent, margin serrulate; male flowers borne around axis of inflorescence 73. *P. pellionioides*

2b. Minor leaves of each pair conspicuous, more than ca. 1 cm, margin entire or subentire; male flowers borne along side of inflorescence.

3a. Leaf blade at least on upper stem base distinctly peltate, lateral veins U-shaped at base; achene verrucose 71. *P. insolens*

3b. Leaf blade basifixed, lateral veins spreading; achene smooth 72. *P. anisophylla*

URTICACEAE

- 1b. Leaves of each pair subequal or unequal but less than 5 times in size.
- 4a. Plants with at least some multicellular hairs.
- 5a. Inflorescences usually unbranched, moniliform, sometimes few branched; leaf blade elliptic or ovate-elliptic, with incurved deeply serrate acumen 70. *P. medogensis*
- 5b. Inflorescences cymose or branched; leaf blade ovate or lanceolate with entire or shallowly serrulate acumen.
- 6a. Inflorescences dichotomously cymose or cymose-paniculate, 1–2 cm; stipules triangular, ca. 1 mm.
- 7a. Male flowers in bud pear-shaped, ca. 1.2 mm, with a beak at apex; leaf blade ovate, cystoliths fusiform, conspicuous only along veins abaxially 66. *P. rostellata*
- 7b. Male flowers in bud globose, ca. 0.7 mm, corniculate below apex; leaf blade narrowly ovate or lanceolate, cystoliths short fusiform or subpunctate, dense on both surfaces 67. *P. salwinensis*
- 6b. Inflorescences paniculate, 8–16 cm; stipules oblong or lanceolate, ca. 5 mm.
- 8a. Leaves unequally paired, broadly ovate or suborbicular, 3–12 × 2–9 cm; petiole 0.6–4.5 cm; achene ca. 0.6 mm 68. *P. umbrosa*
- 8b. Leaves strongly unequally paired, ovate to oblong-ovate, 6–9 × 3.5–4.5 cm; petiole 0–1.5 cm, small leaf sessile; achene ca. 1 mm 69. *P. multicellularis*
- 4b. Plants with unicellular hairs or glabrous.
- 9a. Male flowers 2-merous; inflorescences cincinnus.
- 10a. Stipules soon deciduous, ovate-oblong, 2–3 mm; female perianth lobes 3, subequal or abaxial lobe the shortest; achene with colored dots 64. *P. pumila*
- 10b. Stipules persistent, orbicular or subcordate, 2.5–4 mm; female perianth lobes 3, strongly unequal, abaxial lobe the longest, ca. 10 times as long as the lateral 2 lobes; achene without colored dots 65. *P. pauciflora*
- 9b. Male flowers 4-merous; inflorescences not cincinnus.
- 11a. Leaf blade, all or some, peltate.
- 12a. Leaves submembranous or thinly papery.
- 13a. Stems to 100 cm tall; leaf blade peltate, base often truncate; male inflorescences 3–11 cm 53. *P. paniculigera*
- 13b. Stems ca. 25 cm tall; leaf blade unequally paired, only major one peltate; male inflorescences 1.5–3.5 cm 54. *P. racemiformis*
- 12b. Leaves succulent, papery or thickly papery when dried.
- 14a. Stems 10–40 cm tall, internodes compact; leaf blade suborbicular, apex subrounded; stipule ca. 7 mm; male inflorescences 10–28 cm 55. *P. peperomioides*
- 14b. Stems 5–27 cm, internodes 1–4 cm; leaf blade broadly ovate or suborbicular, apex acute or short acuminate; stipule ca. 1 mm; male inflorescences 3–4 cm 56. *P. peltata*
- 11b. Leaf blade basifixed.
- 15a. Male inflorescences capitate or subcapitate, glomerules sometimes arranged on racemose branches.
- 16a. Plants with tubers.
- 17a. Tubers globose, whitish gray, 3–20 mm in diam.; leaves on middle and upper nodes, ovate or rhombic-ovate, apex obtuse or acute 62. *P. racemosa*
- 17b. Tubers at base of stem or sometimes at rhizome nodes conic, brownish, 5–10 mm in diam.; leaves crowded at stem apex, often 4–6 in whorl, ovate to lanceolate, apex acuminate (acute in upper leaves of var. *incisoserrata*) 63. *P. approximata*
- 16b. Plants without tubers.
- 18a. Leaf blade succulent, broadly ovate, rhombic, or orbicular.
- 19a. Herbs erect; leaf blade 8–20 × 6–18 mm, base often broadly cuneate or rounded; petiole 5–20 mm; male perianth lobes not corniculate at apex 60. *P. cavaleriei*
- 19b. Herbs prostrate; leaf blade 4–8 × 4–8.5 mm, base truncate; petiole 0.2–0.6 mm; male perianth lobes corniculate below apex 61. *P. sinocrassifolia*
- 18b. Leaf blade not succulent, ovate or linear.
- 20a. Herbs 5–10 cm tall, simple; leaf blade elliptic-lanceolate or oblong-linear, membranous, margin entire or shallowly 1-lobed in middle part 59. *P. linearifolia*
- 20b. Herbs 10–35 cm tall, much branched; leaf blade ovate or lanceolate, rarely linear, ± papery, margin serrate.
- 21a. Leaf blade narrowly lanceolate, 2–5 × 0.4–1 cm, margin serrulate; female perianth lobes 3, abaxial lobe short corniculate below apex 57. *P. bambusifolia*
- 21b. Leaf blade ovate, 0.7–2.5 × 0.6–1 cm, margin obtusely 2–4-serrate; female perianth lobes 3, abaxial lobe strongly recurved corniculate below apex 58. *P. unciformis*
- 15b. Male inflorescences dichotomously cymose, cymose-paniculate, or moniliform spicate, but not capitate.
- 22a. Male inflorescences moniliform spicate of remote glomerules; stipules triangular, persistent.
- 23a. Plants 50–150 cm tall; leaf blade 5–13 × 3–7 cm, margin coarsely serrate; achene ca. 1.8 mm 51. *P. monilifera*

URTICACEAE

- 23b. Plants 3–20(–40) cm tall; leaf blade 1–6 × 0.5–3 cm, margin entire or sparsely crenate; achene 0.4–0.6 mm.
- 24a. Leaf blade cordate, 0.6–1.5 × 0.5–1.4 cm, margin 4–6-crenate each side; male inflorescences 0.5–1.2 cm; achene with a colored dotted circle 52. *P. microcardia*
- 24b. Leaf blade 1.5–6 cm, margin entire; male inflorescences ca. 2 cm or more; achene verrucose.
- 25a. Leaf blade broadly elliptic or rhombic-orbicular; male inflorescences 2–5 cm; female ones capitate; achene inconspicuously verrucose 49. *P. media*
- 25b. Leaf blade rhombic-elliptic or rhombic-lanceolate; male inflorescences ca. 2 cm; female ones racemose; achene spinulose-verrucose 50. *P. elegantissima*
- 22b. Male inflorescences dichotomously cymose; stipules different forms, persistent or deciduous.
- 26a. Female perianth lobes usually equal in size (unequal in *P. hookeriana*), connate 1/2 of length or to apex, often obtuse at apex.
- 27a. Stipules soon deciduous, oblong, 7–20 mm.
- 28a. Stipules interpetiolar; male inflorescence unbranched, capitate or moniliform; female perianth lobes unequal 44. *P. hookeriana*
- 28b. Stipules intrapetiolar; male inflorescence cymose, branched; female perianth lobes equal.
- 29a. Leaf blade membranous or herbaceous, margin coarsely serrate, cystoliths fusiform, 0.3–0.4 mm; achene 1.2–1.6 mm 45. *P. angulata*
- 29b. Leaf blade papery, margin serrulate, cystoliths linear, 0.5–0.6 mm; achene ca. 0.8 mm 46. *P. notata*
- 27b. Stipules persistent, triangular, 1–2(–4) mm.
- 30a. Leaf blade acuminate or short caudate, margin 18–24-crenate 16. *P. verrucosa*
- 30b. Leaf blade caudate or long caudate, margin less than 15-dentate 47. *P. sinofasciata*
- 26b. Female perianth lobes unequal in size, free or connate at base, often acute at apex.
- 31a. Female inflorescences dichotomously cymose, sometimes compacted into clusters; male inflorescences dichotomously cymose, or cymose-paniculate; achene subglobose; basal veins on leaf blade prominent adaxially.
- 32a. Stipules cordate or oblong-ovate, 3–8 mm; male inflorescences solitary, cymose-paniculate.
- 33a. Male inflorescences often shorter or sometimes slightly longer than petioles; stipules oblong-ovate.
- 34a. Leaf blade membranous, oblong or elliptic, 9–15 × 5–8 cm 23. *P. elliptilimba*
- 34b. Leaf blade papery, elliptic-lanceolate, 3–7 × 1.2–2.3 cm 24. *P. chartacea*
- 33b. Male inflorescences often longer than petioles; stipules cordate.
- 35a. Leaf blade elliptic, ovate, ovate- or elliptic-lanceolate 20. *P. aquarum*
- 35b. Leaf blade obovate-oblong.
- 36a. Stems with several sinuately membranous wings, glabrous; female cymes 1–1.5 cm 22. *P. subcoriacea*
- 36b. Stems without wings, densely pubescent; female cymes 2–5 cm 21. *P. cordistipulata*
- 32b. Stipules triangular, 1–2(–4) mm; male inflorescences in pairs (solitary in *P. matsudae*), dichotomously cymose.
- 37a. Leaf blade ± leathery; male cymes often longer than leaves 25. *P. lomatogramma*
- 37b. Leaf blade often membranous; male cymes or cymose panicles shorter than leaves.
- 38a. Male inflorescences shorter than petioles; leaf blade broadly elliptic or ovate, margin coarsely serrate.
- 39a. Plants densely pubescent; male cymes in compact clusters 19. *P. villicaulis*
- 39b. Plants subglabrous; male cymes in panicles 48. *P. matsudae*
- 38b. Male inflorescences often longer than petioles; leaf blade elliptic to lanceolate, margin serrate, crenate-serrate, or serrulate.
- 40a. Leaf blade unequally paired, usually elliptic, base narrowly cuneate, margin serrulate or rarely subentire; achene ca. 1.8 mm 18. *P. somae*
- 40b. Leaf blade subequally paired, elliptic to lanceolate, base cuneate or subrounded, margin serrate or crenate-serrate; achene 0.7–0.8 mm.
- 41a. Leaf blade sparsely pilose adaxially, often 3-veined, rarely triplinerved; male perianth lobes acute without corniculate appendix at apex; plants dioecious 16. *P. verrucosa*
- 41b. Leaf blade glabrous, triplinerved; male perianth lobes corniculate at apex; herbs monoecious 17. *P. rotundinucula*
- 31b. Female and male inflorescences all cymose-paniculate; achene ovoid or oblong; basal veins on leaf blade even or sunken adaxially.
- 42a. Stipules oblong or oblong-lanceolate, 4–12 mm.

URTICACEAE

- 43a. Stipules brownish, 4–8 mm; leaf margin serrate; achene smooth.
- 44a. Upper stems and petioles glabrous or puberulent; leaf blade ovate or ovate-lanceolate, asymmetric; inflorescences longer than petioles 26. *P. martini*
- 44b. Stems and petioles densely spreading villous; leaf blade oblong-elliptic; inflorescences shorter than petioles 27. *P. menghaiensis*
- 43b. Stipules greenish, 5–12 mm; leaf margin sharply serrulate or crenate; achene with a colored ring or smooth.
- 45a. Achene with a colored ring; leaf margin shallowly but sharply serrulate, sometimes ciliate 30. *P. bracteosa*
- 45b. Achene smooth; leaf margin crenate.
- 46a. Plants 30–80 cm tall; leaf blade 7–16 × 4–8 cm, oblique; stipules 8–12 mm 28. *P. cordifolia*
- 46b. Plants 10–25 cm tall; leaf blade 1–3 × 0.6–2.5 cm, not oblique; stipules 4–5 mm 29. *P. oxyodon*
- 42b. Stipules triangular, 1–2(–3) mm (to 5 mm in *P. longipedunculata*).
- 47a. Male inflorescences shorter than leaves.
- 48a. Male inflorescences slightly longer than petioles; cystoliths linear.
- 49a. Leaf blade subequally paired, base broadly cuneate to emarginate, margin serrulate, terminal veins interruptedly thickened; achene oblique, verrucose, often with a colored ring by margin 31. *P. scripta*
- 49b. Leaf blade unequally paired, base auriculate or cordate, margin crenate, terminal veins not thickened; achene not oblique, smooth or finely reticulate 32. *P. auricularis*
- 48b. Male inflorescences shorter than petioles; cystoliths subpunctate or very short botuliform.
- 50a. Herbs weak or subshrubs, often climbing, glabrous; leaf apex acuminate, margin entire or shallowly serrate 33. *P. glaberrima*
- 50b. Herbs robust, covered with dense brownish squamae; leaf apex caudate-acuminate; margin crenulate 34. *P. squamosa*
- 47b. Male inflorescences longer than leaves.
- 51a. Leaf margin entire or inconspicuously 1–3-serrulate near apex.
- 52a. Achene strongly elevated as eyeball; leaf blade often falcate-lanceolate 41. *P. longipedunculata*
- 52b. Achene verrucose; leaf blade often ovate.
- 53a. Leaf blade narrowly ovate to elliptic-lanceolate, 5–13 × 2–5 cm, 2-serrulate apically, lateral veins transverse, regularly reticulate 42. *P. subedentata*
- 53b. Leaf blade ovate, lanceolate, or obovate-oblong, 1–15 × 0.6–5 cm, entire, lateral veins irregularly reticulate 43. *P. plataniflora*
- 51b. Leaf margin serrate.
- 54a. Male inflorescences rather longer than leaves; achene with a colored circle or strongly elevated as eyeball.
- 55a. Herbs to 2 m tall; leaf blade elliptic or elliptic-lanceolate, symmetric, 10–25 × 5–16 cm; male inflorescences 15–35 cm 39. *P. melastomoides*
- 55b. Herbs 15–35(–80) cm tall; leaf blade broadly ovate or elliptic, somewhat asymmetric, 5–12(–18) × 2.5–5(–8) cm; male inflorescences 8–14 cm 40. *P. howelliana*
- 54b. Male inflorescences not or slightly longer than leaves; achene smooth or dotted but without colored circle.
- 56a. Leaf base rounded to subcordate; male perianth lobes beaked at apex; achene oblique at apex.
- 57a. Herbs 20–30 cm tall; leaf blade 2–6.5 × 1.5–2.5 cm; achene ca. 1 mm, smooth 35. *P. wightii*
- 57b. Herbs 30–120 cm tall; leaf blade 4–14 × 2–7 cm; achene ca. 1.5 mm, smooth, often purplish dotted 36. *P. symmeria*
- 56b. Leaf base cordate; male perianth lobes acute; achene not oblique.
- 58a. Leaf blade lanceolate, margin sinuate-crenate; female inflorescences 5–11 cm; achene ca. 2 mm, enclosed by equal perianth lobes 37. *P. macrocarpa*
- 58b. Leaf blade usually falcate-lanceolate, margin sharply serrate; female inflorescences 1.5–4 cm; achene ca. 1 mm, enclosed by unequal perianth lobes 38. *P. semisessilis*

16. *Pilea verrucosa* Handel-Mazzetti, Symb. Sin. 7: 134. 1929.

疣果冷水花 liu guo leng shui hua

Herbs perennial, rhizomatous, subglabrous, monoecious or dioecious. Stems brownish when dry, 20–100 cm tall, succulent, with galls on mid portion of internodes. Stipules persistent,

broadly triangular, ca. 1 mm, membranous, veinless; petiole subequal in length, 1–7 cm; leaf blade abaxially purplish or pale green, adaxially dark green, elliptic or elliptic-lanceolate, subequal in size, 3–18 × 1.8–7 cm, membranous to thinly papery, 3-veined or triplinerved, lateral veins many, transverse, reticulate, prominent abaxially, abaxial surface glabrous, adaxial sur-

face sparsely pilose, base rounded or cuneate, margin serrate or crenate-serrate, apex acuminate or caudate-acuminate. Inflorescences in pairs, male a dichotomously branched paniculate cyme, 2–5 cm overall, peduncle 1–2.5 cm; female cymes sometimes compacted into clusters, 0.7–2 cm. subsessile or shortly pedunculate. Male flowers pedicellate, in bud ca. 2 mm; perianth lobes 4, ovate; stamens 4; rudimentary ovary small, conic. Female flowers subsessile, in bud ca. 1.2 mm; perianth lobes connate at base, unequal, abaxial lobe cymbiform, longer, subapically corniculate; staminodes 3, scale-like, oblong. Achene ovoid, 0.7–0.8 mm, slightly compressed, oblique, verrucose. Fl. Apr–May(–Sep), fr. May–Jul(–Jan).

Shaded wet places in forests, near streams; 400–1600 m. Chongqing, Fujian, Guangxi, Guizhou, Hainan, Hubei, Hunan, Sichuan, Yunnan [N Vietnam].

- 1a. Leaf blade 3-veined, base rounded or broadly cuneate 16a. var. *verrucosa*
 1b. Leaf blade triplinerved, base narrowly cuneate or obtuse.
 2a. Leaf blade black when dry; petiole 1–2 cm; achene spinulose-verrucose 16b. var. *fujianensis*
 2b. Leaf blade dark green or brown when dry; petiole 1.5–7 cm; achene verrucose 16c. var. *subtriplinervia*

16a. *Pilea verrucosa* var. *verrucosa*

疣果冷水花(原变种) liu guo leng shui hua (yuan bian zhong)

Pilea gracillis Handel-Mazzetti; *P. nanchuanensis* C. J. Chen; *P. purpurella* C. J. Chen; *P. symmeria* Weddell var. *subcoriacea* Handel-Mazzetti.

Petiole 1–7 cm; leaf blade elliptic or oblong lanceolate, 3–18 × 1.8–5 cm, papery, 3-veined, base rounded or broadly cuneate; Achene ca. 0.7 mm, verrucose. Fl. Apr–May, fr. May–Jul.

Shaded wet places in forests, near streams; 400–1600 m. Chongqing, Guangxi, Guizhou, Hubei, Hunan, Sichuan, Yunnan [N Vietnam].

The plants are used medicinally to stimulate the spleen and relieve edema.

16b. *Pilea verrucosa* var. *fujianensis* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 55. 1982.

闽北冷水花 min bei leng shui hua

Petiole 1–2 cm; leaf blade black when dry, lanceolate, 10–14 × 2.3–4.2 cm, membranous, triplinerved, base narrowly cuneate; Achene ca. 0.5 mm, spinulose-verrucose. Fl. May, fr. Jun–Jul.

- Wet places by streams; 800–1000 m. Fujian (Jianning, Taining).

16c. *Pilea verrucosa* var. *subtriplinervia* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 56. 1982.

离基脉冷水花 li ji mai leng shui hua

Petiole 1.5–7 cm; leaf blade dark green or brownish when dry, narrowly elliptic or elliptic-lanceolate, 8–17 × 3–7 cm,

submembranous, triplinerved, base cuneate or obtuse; Achene ca. 0.8 mm, verrucose. Fl. Sep, fr. Oct–Jan.

- Shaded wet places in forests; 400–600 m. Hainan (Dongfang).

17. *Pilea rotundinucula* Hayata, Icon. Pl. Formosan. 6: 49. 1916.

圆果冷水花 yuan guo leng shui hua

Pilea distachys Yamamoto; *P. funkikensis* Hayata var. *rotundinucula* (Hayata) S. S. Ying.

Herbs perennial, rhizomatous, glabrous, monoecious or dioecious. Stems erect or ascending, 20–60 cm tall, succulent, with galls on mid portion of internodes. Stipules persistent, broadly triangular, ca. 1 mm, membranous, veinless; petiole subequal in length, 0.5–4 cm; leaf blade brownish when dry, elliptic- or oblong-lanceolate, subequal in size, 5.5–22 × 1.1–75 cm, membranous to herbaceous, triplinerved or 3-veined, lateral veins many, apical ones conspicuous, transverse, reticulate, prominent abaxially, base cuneate, margin serrulate, sometimes entire, apex acuminate. Inflorescences in pairs, male a dichotomously branched cyme, 2.5–9 cm overall, peduncle 1–3.2 cm; female cymes sometimes compacted into clusters, 0.6–3.5 cm. subsessile or shortly pedunculate. Male flowers pedicellate, in bud obovoid, ca. 2 mm; perianth lobes 4, ovate, connate about 1/2 of length; stamens 4; rudimentary ovary small, conic. Female flowers subsessile, in bud ca. 1.2 mm; perianth lobes connate at base, unequal, abaxial lobe cymbiform, longer, subapically corniculate; staminodes 3, scale-like, oblong. Achene subglobose, 0.7–0.8 mm, slightly compressed, oblique, verrucose. Fl. Apr–Jun, fr. Jul–Sep.

- Shaded wet places in forests, near streams, sunny roadsides and rocks in moist places; 300–1500 m. Taiwan.

18. *Pilea somae* Hayata, Icon. Pl. Formosan. 6: 50. 1916.

细叶冷水花 xi ye leng shui hua

Pilea funkikensis Hayata var. *somae* (Hayata) S. S. Ying.

Herbs perennial, sometimes woody at base, glabrous, dioecious. Stems ascending, 50–60 cm tall. Stipules persistent, broadly triangular, ca. 1.5 mm, membranous, veinless; petiole subequal or unequal in length, 0.5–7.5 cm; leaf blade elliptic to oblong-lanceolate, subequal or unequal in size, 2.5–15 × 1–5 cm, membranous to herbaceous, 3-veined, lateral veins inconspicuous, reticulate, prominent abaxially, base cuneate, margin serrulate to tip, apex acuminate. Inflorescences in pairs, male a dichotomously branched paniculate cyme, 2.4–6.5 cm overall, peduncle 2.5–4.5 cm; female cymes 0.5–4 cm, shortly pedunculate. Male flowers pedicellate, in bud obovoid, ca. 2 mm; perianth lobes 4, ovate, connate about 1/2 of length; stamens 4; rudimentary ovary small, conic. Female flowers subsessile, in bud ca. 1.4 mm; perianth lobes connate at base, unequal, abaxial lobe cymbiform, longer, subapically corniculate; staminodes 3, scale-like, oblong. Achene subglobose, 0.7–0.8 mm, slightly compressed, oblique, indistinctly verrucose. Fl. Mar–Jun, fr. Jul–Sep.

- Shaded wet places in forests, near streams, sunny roadsides and rocks in moist places; 100–900 m. S Taiwan.

19. *Pilea villicaulis* Handel-Mazzetti, Symb. Sin. 7: 125. 1929.毛茎冷水花 *mao jing leng shui hua**Pilea villicaulis* var. *subglabra* C. J. Chen.

Herbs perennial, rhizomatous, dioecious. Stems few branched, 20–50 cm tall, succulent, with galls on mid portion of internodes; stems and petioles densely spreading-villous or sometimes glabrous. Stipules persistent, broadly triangular, 2–3 mm, membranous, veinless; petiole unequal or subequal in length, 1–7 cm; leaf blade oblong-elliptic, rarely broadly ovate, unequal or subequal in size, 5–15 × 2.5–8 cm, membranous, 3-veined, lateral veins many, prominent abaxially, both surfaces sparsely pilose, base broadly cuneate, rounded or cordate, margin coarsely serrate or dentate, apex entire, acute or caudate. Inflorescences in pairs of dichotomous cymes compacted into clusters, 0.5–1.5 cm, often pubescent on the axis. Male flowers light green or pink, pedicellate, in bud ca. 1.5 mm; perianth lobes 4, 2 cymbiform, subapically corniculate, 2 oblong; stamens 4; rudimentary ovary small, conic. Female flowers subsessile, in bud ca. 0.7 mm; perianth lobes connate at base, unequal, abaxial lobe cymbiform, longer, subapically corniculate; staminodes 3, scale-like, oblong. Achene ovoid, ca. 1 mm, slightly compressed, oblique, strongly verrucose. Fl. Aug. fr. Oct.

• Shaded wet places by streams or in near streams; 500–2500 m. S Yunnan.

20. *Pilea aquarum* Dunn, J. Linn. Soc., Bot. 38: 366. 1908.湿生冷水花 *shi sheng leng shui hua*

Herbs perennial, stoloniferous, sometimes puberulent, dioecious or sometimes monoecious. Stems often reddish, simple or few branched, 10–70 cm tall, succulent, with galls on mid portion of internodes. pubescent or glabrous, Stipules persistent, subcordate, 3–5 mm, membranous, acute at apex, veinless; petioles subequal or unequal in length, 0.5–3.5 cm, pubescent or glabrous; leaf blade abaxially pale green, adaxially dark green, lustrous, broadly elliptic or ovate-elliptic, sometimes lanceolate, subequal or unequal in size, 1.5–14 × 1–7 cm, membranous, 3-veined, prominent adaxially, lateral veins several, subtransverse, inconspicuous, both surfaces pubescent or glabrous, base broadly cuneate or obtuse, sometimes oblique, margin obtusely crenate, crenate-serrate, or coarsely dentate, apex acute, obtuse, or acuminate. Inflorescences solitary; male inflorescence a cymose panicle, 2–7 cm overall, peduncle 1.5–3.5 cm; female cymes dichotomously branched, compacted into clusters, pedunculate or subsessile. Male flowers pedicellate, in bud ca. 2 mm; perianth lobes 4, elliptic, subapically corniculate; stamens 4; rudimentary ovary small. Female flowers subsessile; perianth lobes connate at base, unequal, abaxial lobe cymbiform, longer, subapically corniculate; staminodes 3, scale-like, oblong. Achene greenish brown, obliquely ovoid, ca. 0.7 mm, slightly compressed, verrucose. Fl. (Nov–)Feb–May, fr. (Mar–)May–Jun.

Wet places along ditches or streams; 200–2600 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, Jiangxi, SE Sichuan, Taiwan, SE Yunnan [Japan, Vietnam].

1a. Herbs to 70 tall; leaf blade obliquely ovate, 5–14 × 2.5–7 cm, margin coarsely dentate; male inflorescences shorter than or little longer than petioles

..... 20c. subsp. *acutidentata*

1b. Herbs 10–50 cm tall; leaf blade elliptic or lanceolate, 1.5–6 × 1–4 cm, margin crenate; male inflorescences longer than leaves.

2a. Leaf blade elliptic or ovate-elliptic, apex acute; female cymes in sessile or shortly pedunculate clusters, less than 1 cm 20a. subsp. *aquarum*

2b. Leaf blade ovate-lanceolate or elliptic-lanceolate, apex acuminate; female cymes pedunculate, 0.5–3 cm 20b. subsp. *brevicornuta*

20a. *Pilea aquarum* subsp. *aquarum*湿生冷水花(原亚种) *shi sheng leng shui hua* (yuan ya zhong)*Pilea velutinipes* Handel-Mazzetti, p.p.

Herbs, often puberulent, 10–30 cm tall, Leaf blade broadly elliptic or ovate-elliptic, 1.5–6 × 1–4 cm, margin crenate, apex acute. Male inflorescence a cymose panicle, 1.5–3.5 cm; female cymes in clusters, less than ca. 1 cm. Achene verrucose. Fl. Mar–May, fr. Apr–Jun.

• Shaded wet places along ditches, near streams; 300–1500 m. Fujian, N Guangdong, Hunan, Jiangxi, SE Sichuan.

Other syntype material of *Pilea velutinipes* belongs to species 24, *P. chartacea*.

20b. *Pilea aquarum* subsp. *brevicornuta* (Hayata) C. J. Chen, Bull. Bot. Res., Harbin 2(3): 59. 1982.短角湿生冷水花 *duan jiao shi sheng leng shui hua*

Pilea brevicornuta Hayata, Icon. Pl. Formosan. 6: 43. 1916; *P. brevicornuta* f. *laxiflora* Yamamoto; *P. brevicornuta* f. *magnifolia* Yamamoto; *P. cuneatifolia* Yamamoto; *P. minor* Yamamoto.

Herbs, puberulent, then glabrescent, 10–50 cm tall, Leaf blade ovate to elliptic-lanceolate, 1.5–17 × 1–6.5 cm, margin crenate-serrate, apex acuminate. Male inflorescence a cymose panicle, to 5 cm; female cyme 0.5–1.5(–3) cm. Achene spiculate-verrucose. Fl. Jan–Apr, fr. May–Jul.

Wet places by ditches, near streams; 200–2600 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, Taiwan, SE Yunnan [Japan, Vietnam].

Some material named as *Pilea symmeria* belongs here.

20c. *Pilea aquarum* subsp. *acutidentata* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 60. 1982.锐齿湿生冷水花 *rui chi shi sheng leng shui hua*

Herbs 30–70 cm tall. Leaf blade obliquely ovate, 5–14 × 2.5–7 cm, margin coarsely dentate. Male inflorescence a cy-

mose panicle, 2–6 cm; female cyme ca. 2 cm. Achene verrucose. Fl. Nov–Feb, fr. Mar.

• Semishaded wet places by ditches or streams; 200–600 m. W Guangdong, E Guangxi.

21. *Pilea cordistipulata* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 60. 1982.

心托冷水花 xin tuo leng shui hua

Herbs perennial, stoloniferous, dioecious or monoecious. Stems often reddish, simple or few branched, 5–20 cm tall, succulent, with galls on mid portion of internodes. densely pubescent. Stipules persistent, subcordate, 5–8 mm, membranous, obtuse at apex, veinless; petioles, unequal in length, 0.5–3 cm, pubescent; leaf blade abaxially purplish then brownish green when dry, adaxially dark green, but brownish when dry, obovate-oblong or ovate-oblong, subequal or unequal in size, 1.2–7 × 1–3.8 cm, membranous, 3-veined, rarely basal lateral veins not extending beyond middle of leaf blade, prominent on both surfaces, lateral veins several, subtransverse, inconspicuous, abaxial surface pubescent along veins, adaxial surface sparsely pilose, base rounded or obtuse, margin dentate, apex acute, shortly acuminate. Male inflorescence a cymose panicle, 3–6 cm overall, peduncle 2–3 cm; female cymes dichotomously branched many times, 2–5 cm. pedunculate. Male flowers pedicellate, in bud 2–2.5 mm; perianth lobes 4, ovate-elliptic, subapically inconspicuously corniculate; stamens 4; rudimentary ovary small, cylindrical. Female flowers subsessile; perianth lobes connate at base, unequal, abaxial lobe cymbiform, longer, subapically corniculate; staminodes 3, scale-like, oblong. Achene greenish brown, obliquely ovoid, ca. 0.8 mm, slightly compressed, verrucose. Fl. Nov–Apr, fr. May–Jun.

• Shaded wet places along ditches, streams, near streams; 1100–1300 m. NW Guangdong, Guangxi, Guizhou, SE Yunnan.

22. *Pilea subcoriacea* (Handel-Mazzetti) C. J. Chen, Bull. Bot. Res., Harbin 2(3): 62. 1982.

翅茎冷水花 chi jing leng shui hua

Pilea symmeria Weddell var. *subcoriacea* Handel-Mazzetti, Symb. Sin. 7: 134. 1929; *P. pterocaulis* (Chien) C. J. Chen; *P. symmeria* var. *pterocaulis* Chien.

Herbs perennial, stoloniferous, subglabrous, dioecious. Stems often purplish, simple, with several longitudinal wavy wings, 20–70 cm tall, succulent. Stipules persistent, cordate, 4–7 mm, membranous; petioles subequal in length, 0.5–3.5 cm; leaf blade abaxially pale purplish or pale green, adaxially dark green, obovate-oblong or elliptic, subequal in size, 3–10 × 1.5–5.5 cm, papery, 3-veined, prominent adaxially, lateral veins 10–13 each side, slightly prominent adaxially, base rounded or obtuse, margin crenate-serrate, apex acuminate. Inflorescences solitary; male inflorescence a cymose panicle, often longer than leaves; female cymes dichotomously branched many times, 1–1.5 cm. shortly pedunculate. Male flowers pedicellate, in bud ca. 2 mm; perianth lobes 4, ovate-elliptic; stamens 4; rudimentary ovary small, conic. Female flowers subsessile; perianth lobes connate at base, slightly unequal, abaxial lobe cymbiform, longer, subapically corniculate; staminodes 3, scale-like, oblong. Achene greenish brown, broadly ovoid, ca. 0.8 mm, slightly compressed, verrucose. Fl. Apr, fr. May–Jun.

• Shaded wet places along ditches, streams, near streams; 800–1800 m. Guangxi, Guizhou, Hunan, Sichuan, N Yunnan.

23. *Pilea elliptimba* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 62. 1982.

椭圆叶冷水花 tuo yuan ye leng shui hua

Herbs perennial, stoloniferous, subglabrous, dioecious. Stems often reddish, simple, several longitudinally angled, 20–70 cm tall, succulent. Stipules almost persistent, brownish, oblong-ovate, 4–5 mm, membranous; petioles subequal in length, 1.5–3.5 cm; leaf blade abaxially pale green, adaxially dark green, obovate-oblong or elliptic-oblong, subequal in size, 9–15 × 5–8 cm, membranous, 3-veined, rarely basal lateral veins not extending beyond middle of leaf blade, prominent adaxially, lateral veins many, transverse, slightly prominent adaxially, abaxial surface sparsely reddish squamulose, adaxial surface sparsely setulose, cystoliths linear, conspicuous abaxially, base cuneate, rarely subrounded, margin crenate or crenate-serrate, apex shortly caudate. Female cymes dichotomously branched many times, 1–1.5 cm, shortly pedunculate. Female flowers sessile; perianth lobes unequal, abaxial lobe cymbiform, longer, subapically corniculate; staminodes 3, scale-like, oblong. Achene brownish, broadly ovoid, ca. 0.8 mm, slightly compressed, oblique, spinulose-verrucose. Fl. Mar–Apr, fr. May–Jun.

• Shaded wet places along ditches, streams, near streams; 800–1800 m. N Guangxi, S Guizhou.

24. *Pilea chartacea* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 63. 1982.

纸质冷水花 zhi zhi leng shui hua

Pilea velutinipes Handel-Mazzetti, p.p.

Herbs perennial, stoloniferous, glabrous, dioecious or sometimes monoecious. Stems often reddish, stramineous when dry, simple or few branched, angled, 30–40 cm tall, succulent, with galls on mid portion of internodes. Stipules persistent, brownish, narrowly ovate, 3–4 mm, membranous, acute at apex; petioles subequal in length, 0.7–1.5 cm; leaf blade abaxially pale green, adaxially dark green, rugulose, elliptic-lanceolate, subequal in size, 3–7 × 1.2–2.3 cm, papery, prominently 3-veined on both surfaces, lateral veins several, irregular, inconspicuous, adaxial surface reddish squamulose, with linear cystoliths along margin, base broadly cuneate or obtuse, margin shallowly serrate, apex acuminate. Male inflorescence a cyme, 1–1.5 cm; pedunculate, female cymes often compacted into clusters, ca. 0.7 cm, subsessile or shortly pedunculate. Male flowers pedicellate, in bud ca. 2.5 mm; perianth lobes 4, oblong, subapically corniculate; stamens 4; rudimentary ovary small, conic. Female flowers subsessile; perianth lobes connate at base, unequal, abaxial lobe cymbiform, longer, subapically corniculate; staminodes 3, scale-like, oblong. Achene greenish brown, obliquely ovoid, ca. 1 mm, slightly compressed, verrucose. Fl. and fr. Mar.

• Shaded wet places along streams; below 200 m. Guangdong [?Vietnam].

Other syntype material of *Pilea velutinipes* belongs to species 20, *P. aquarum* (subsp. *aquarum*).

25. *Pilea lomatomgramma* Handel-Mazzetti, Symb. Sin. 7: 135. 1929.

隆脉冷水花 long mai leng shui hua

Herbs perennial, stoloniferous, glabrous, dioecious or monoecious. Stems often reddish, brownish when dry, simple or few branched, angled at base, 10–25 cm tall, somewhat succulent. Stipules persistent, greenish, broadly ovate, 1–2 mm, herbaceous, obtuse at apex; petioles subequal in length, 0.5–2.5 cm; leaf blade abaxially pale green or purplish, adaxially dark green or gray-green, elliptic or ovate, subequal in size, 1–4 × 0.7–2.5 cm, subleathery, 3-veined, very prominent adaxially, lateral veins several, irregular, inconspicuous, base broadly rounded or cuneate, margin crenate-serrate, apex acute or obtuse. Inflorescences solitary; male inflorescence a few branched cyme, longer than leaves, peduncle 2–5 cm; female cymes often compacted into clusters, 0.5–1 cm, subsessile or shortly pedunculate. Male flowers pedicellate, in bud ca. 1.5 mm; perianth lobes 4, ovate-oblong, subapically corniculate; stamens 4; rudimentary ovary small, conic. Female flowers subsessile; perianth lobes connate at base, unequal, abaxial lobe cymbiform, longer, subapically corniculate; staminodes 3, squamiform, oblong. Achene obliquely ovoid, ca. 0.8 mm, slightly compressed, inconspicuously verrucose. Fl. Apr–Sep, fr. Jun–Oct.

• Shaded wet places on rocks or along streams, near streams in forests; 1000–2000 m. NW Fujian, SW Hubei, Sichuan, NE Yunnan.

26. *Pilea martini* (H. Léveillé) Handel-Mazzetti, Symb. Sin. 7: 131. 1929.

大叶冷水花 da ye leng shui hua

Boehmeria martini H. Léveillé, Repert. Spec. Nov. Regni Veg. 11: 551. 1913.

Herbs perennial, stoloniferous, often dioecious. Stems simple or branched, 30–100 cm tall, succulent, with galls on mid portion of internodes, glabrous or puberulent on upper part. Stipules semipersistent, oblong-lanceolate, 4–8 mm, membranous, veinless; petioles unequal in length, 1–8 cm, puberulent or glabrous; leaf blade abaxially pale green, adaxially green, obliquely ovate, narrowly ovate, or lanceolate, unequal in size, 7–20 × 3.5–12 cm, membranous, 3-veined, lateral veins many, subtransverse, abaxial surface glabrous or puberulent when young, adaxial surface sparsely setulose, base rounded or subcordate, rarely obtuse, margin coarsely serrate-dentate, apex long acuminate, acumen serrulate. Inflorescences solitary; male inflorescence a cymose panicle, 4–10 cm overall, peduncle 2–6 cm; female cymose panicles or cymose racemes, 1–4 cm, shortly pedunculate. Male flowers reddish, sessile or pedicellate, in bud ca. 1.2 mm; perianth lobes 4, oblong-ovate, 2 lobes subapically corniculate; stamens 4; rudimentary ovary small, conic. Female flowers subsessile, in bud ca. 0.6 mm; perianth lobes connate at base, unequal, abaxial lobe cymbiform, longer, subapically corniculate; staminodes 3, scale-like, oblong. Achene brownish green, narrowly ovoid, ca. 1 mm, compressed, oblique, smooth. Fl. May–Sep, fr. Aug–Oct.

Shaded wet places along ditches, streams, near streams; 1100–3500 m. S Gangsu, N Guangxi, Guizhou, Hubei, Hunan, Jiangxi, S

Shaanxi, E Sichuan, S Xizang, Yunnan [Bhutan, Nepal, Sikkim].

This species occurs widely in W China and is very common in shady and wet places of the forest understory. It resembles *Pilea sessilis*, *P. symmeria*, and *P. umbrosa*.

27. *Pilea menghaiensis* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 67. 1982.

勐海冷水花 meng hai leng shui hua

Herbs perennial, stoloniferous, dioecious. Stems simple or branched, to ca. 100 cm tall, succulent, with galls on mid portion of internodes, densely spreading villous on upper part. Stipules almost persistent, brownish, ovate-lanceolate, 7–10 mm, membranous, 2-ribbed; petiole unequal in length, 1–3 cm, densely spreading villous; leaf blade abaxially pale green, adaxially dark green, oblong-elliptic, slightly unequal in size, 4–6.5 × 2–3 cm, membranous, 3-veined, lateral veins many, abaxial surface densely villous, adaxial surface sparsely setulose, base broadly cuneate or subrounded, margin crenate-serrulate, apex acuminate, acumen serrulate. Male inflorescences solitary, a paniculate cyme, ca. 3 cm. Female inflorescence not seen. Male flowers orange, pedicellate, in bud ca. 1.2 mm; perianth lobes 4, ovate; stamens 4; rudimentary ovary small, conic. Fl. Jul.

• Shaded wet places, near streams; ca. 1800 m. S Yunnan (Menghai).

This species is distinct, but more complete material is needed to clarify its relationships.

28. *Pilea cordifolia* J. D. Hooker, Fl. Brit. India 5: 558. 1888.

弯叶冷水花 wan ye leng shui hua

Herbs perennial, stoloniferous, monoecious. Stems simple or branched, 30–80 cm tall, succulent, with galls on mid portion of internodes, glabrous. Stipules persistent, ovate-oblong, 8–12 mm, herbaceous, veinless; petioles unequal in length, 1–5 cm, sparsely puberulent; leaf blade abaxially pale green, obliquely ovate or elliptic, unequal in size, 7–12(–16) × 4–6(–8) cm, membranous, 3-veined, lateral veins many, both surfaces sparsely puberulent along veins, base cordate or rounded, margin coarsely crenate-serrate, apex acuminate, acumen serrulate. Inflorescences solitary, male distal, a paniculate cyme, 10–25 cm overall, peduncle 5–15 cm; female inflorescence proximal, shorter. Male flowers reddish, pedicellate, in bud ca. 1 mm; perianth lobes 4; stamens 4; rudimentary ovary small. Female flowers subsessile, in bud ca. 0.6 mm; perianth lobes connate at base, unequal, abaxial lobe cymbiform, longer, subapically corniculate; staminodes 3, scale-like, oblong. Achene brownish, obliquely ovoid, ca. 0.8 mm, compressed, smooth. Fl. Jun–Aug, fr. Aug–Sep.

Shaded wet places along ditches, streams, near streams; 700–1500 m. S Xizang, W Yunnan [NE India, Nepal, Sikkim].

29. *Pilea oxyodon* Weddell, Monogr. Urtic. 221. 1856.

雅致冷水花 ya zhi leng shui hua

Pilea bracteosa var. *oxyodon* (Weddell) H. Hara.

Herbs perennial, stoloniferous, monoecious or dioecious.

Stems branched, 10–25 cm tall, succulent distally, with galls on mid portion of internodes, puberulent adaxially, Stipules persistent, light green, oblong-ovate, 4–5 mm, membranous, veinless; petioles unequal in length, 0.5–2 cm, sparsely puberulent; leaf blade abaxially pale green, broadly ovate, unequal in size, 1–3 × 0.6–2.5 cm, herbaceous, 3-veined, lateral veins many, both surfaces sparsely puberulent along veins, base rounded or subcordate, margin sharply serrulate, apex acute. Inflorescences solitary; male distal, a cymose panicle, 2–7 cm; female inflorescence proximal, shorter. Male flowers reddish, pedicellate, in bud obovoid, ca. 1.5 mm; perianth lobes 4, connate 1/2 of length, subapically corniculate; stamens 4; rudimentary ovary small. Female flowers subsessile, in bud ca. 0.5 mm; perianth lobes connate at base, unequal, abaxial lobe cymbiform, longer, subapically corniculate; staminodes 3, scale-like, oblong. Achene brownish, obliquely ovoid, ca. 0.8 mm, compressed, smooth. Fl. Jun–Sep, fr. Sep–Oct.

Wet places of the mixed forests; ca. 2900 m. S Xizang [N India, Nepal, Sikkim].

30. *Pilea bracteosa* Weddell, Monogr. Urtic. 245. 1856.

多苞冷水花 duo bao leng shui hua

Pilea bracteosa var. *striolata* Handel-Mazzetti; *P. obliqua* J. D. Hooker.

Herbs perennial, stoloniferous, subglabrous, dioecious. Stems blue when dry, 15–30 cm tall, succulent on upper part, with galls on mid portion of internodes. Stipules persistent, light green, oblong, 5–8 mm, membranous, veinless; petioles unequal in length, 1–7 cm, sparsely puberulent; leaf blade abaxially paler green, broadly ovate or oblong, sometimes oblique, unequal in size, 3–9 × 2–4 cm, membranous, 3-veined, lateral veins many, subtransverse, cystoliths prominent adaxially, base rounded or subcordate, sometimes auriculate at base, margin crenate-serrate, apex acuminate or caudate-acuminate. Inflorescences solitary, in upper stems, a cymose panicle, 4–10(–18) cm; bracts triangular, over 2 mm. Male flowers pedicellate or sessile, in bud rhombic-ovoid, ca. 1 mm; perianth lobes 4, connate 1/2 of length, 2 lobes subapically corniculate; stamens 4; rudimentary ovary small. Female flowers subsessile, in bud ca. 0.5 mm; perianth lobes connate at base, unequal, abaxial one cymbiform, longer, subapically corniculate; staminodes 3, small, scale-like, oblong. Achene broadly ovoid, ca. 0.8 mm, compressed, oblique, with an raised brownish ring. Fl. Jul–Aug, fr. Aug–Oct.

Moist places in broad-leaved forests; 1800–2800 m. S Xizang, NW Yunnan [Bhutan, N India, Nepal, Sikkim].

31. *Pilea scripta* (Buchanan-Hamilton ex D. Don) Weddell, Ann. Sci. Nat., Bot., sér. 4, 1: 187. 1854.

细齿冷水花 xi chi leng shui hua

Urtica scripta Buchanan-Hamilton ex D. Don, Prodr. Fl. Nepal. 59. 1825.

Perennial stout herbs, stoloniferous, glabrous, dioecious or monoecious. Stems branched, 1–1.5 m tall, woody at base, succulent distally, with galls on mid portion of internodes. Stipules persistent, light green, triangular, 2–3 mm, herbaceous,

veinless; petiole subequal in length, 1–3(–6) cm; leaf blade abaxially pale green, elliptic- or oblong-lanceolate, sometimes narrowly elliptic, subequal in size, 6–15 × 2.5–5 cm, membranous, 3-veined, lateral veins many, conspicuous, subtransverse, terminal veins often interruptedly thickened at tip or middle, cystoliths minute, adaxial, base broadly cuneate or rounded, rarely subcordate, margin serrulate or shallowly serrate, apex caudate-acuminate. Inflorescences solitary, in upper stem, a cymose panicle, often longer than petioles. Male flowers pedicellate or sessile, in bud ovoid, ca. 1 mm; perianth lobes 4, connate 1/2 of length, conspicuously ribbed; stamens 4; rudimentary ovary small. Female flowers subsessile, in bud ca. 0.5 mm; perianth lobes connate at base, unequal, abaxial lobe cymbiform, longer, subapically corniculate; staminodes 3, small, scale-like, oblong. Achene sometimes purplish spotted, broadly ovoid, ca. 1 mm, compressed, oblique, verrucose. Fl. Jun–Aug, fr. Sep–Oct.

Shaded moist places in broad-leaved forests; 2000–3000 m. S Xizang, W Yunnan [Bhutan, N India, Kashmir, Myanmar, Nepal, Sikkim].

32. *Pilea auricularis* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 70. 1982.

耳基冷水花 er ji leng shui hua

Herbs perennial, stoloniferous, glabrous, dioecious or monoecious. Stems gray green when dry, simple or branched, to 100 cm tall, succulent, with galls on mid portion of internodes. glabrous or puberulent distally, densely covered with cystoliths, Stipules persistent, interpetiolar, triangular, connate at base, ca. 1 mm, membranous; petiole unequal in length, longer one 2.5–12 cm, shorter one 0–4 cm; leaf blade abaxially pale green, adaxially dark green, obliquely oblong-ovate or ovate-lanceolate, unequal in size, 5–15 × 2.5–8.5 cm, submembranous, 3-veined, lateral veins many, transverse, base auriculate, sometimes subcordate, margin coarsely, shallowly crenate-serrate, apex acuminate, acumen serrulate. Inflorescences solitary; male inflorescence a cymose panicle, longer than petioles; female cymose panicles 3–5 cm. Male flowers sessile, in bud ca. 1.2 mm; perianth lobes 4, obovate or obovate-oblong; stamens 4; rudimentary ovary small, subulate. Female flowers subsessile, in bud ca. 0.6 mm; perianth lobes connate at base, unequal, abaxial lobe cymbiform, longer, subapically corniculate; staminodes 3, inconspicuous, scale-like, oblong. Achene dark brownish, ovoid, ca. 1.2 mm, compressed, reticulate. Fl. Sep–Oct, fr. Oct–Jan.

● Shaded wet places along streams, near streams; 2400–2800 m. SE Xizang, NW Yunnan.

This species is similar to *Pilea martini*, but that species has oblong stipules, a rounded leaf base, and an oblique, smooth achene.

33. *Pilea glaberrima* (Blume) Blume, Mus. Bot. 2: 54. 1856.

点乳冷水花 dian ru leng shui hua

Urtica glaberrima Blume, Bijdr. Fl. Ned. Ind. 493. 1826; *Pilea goglado* Blume; *P. smilacifolia* Weddell.

Herbs perennial, weak, or subshrubs, stoloniferous, gla-

brous, dioecious, rarely monoecious. Stems gray green, erect, ascending, or scandent, often branched, longitudinally several angled when dry, to 1.5 m tall, woody at base, densely covered with cystoliths. Stipules persistent, triangular, connate at base, ca. 2 mm, papery; petiole unequal in length, 1.5–5 cm; leaf blade adaxially pale green, ovate, elliptic, oblong- or elliptic-lanceolate, asymmetric, unequal in size, 6–15 × 2.5–7 cm, herbaceous, 3-veined, lateral veins many, transverse, reticulate, cystoliths adaxial, minute, often punctate or mixed with shortly fusiform ones, sometimes inconspicuous, base rounded, obtuse or cuneate, margin shallowly serrate or shallowly crenate sometimes subentire from middle part, apex acuminate. Inflorescences solitary, male a paniculate cyme, usually shorter than subtending petiole; female ones much shorter. Male flowers sessile, in bud ca. 1 mm; perianth lobes 4; stamens 4; rudimentary ovary small, subulate. Female flowers subsessile, in bud ca. 0.6 mm; perianth lobes connate at base, unequal, abaxial lobe cymbiform, longer, subapically corniculate; staminodes 3, inconspicuous, scale-like, oblong. Achene brownish red, ovoid, ca. 1 mm, compressed, inconspicuously verrucose. Fl. May–Sep, fr. Oct–Nov.

Warm wide-leaved forests, shaded wet places by streams, near streams; 500–1300 m. Guangdong, Guangxi, Guizhou, Yunnan [Bhutan, Indonesia, NE India, Myamar, Nepal, Sikkim].

34. *Pilea squamosa* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 72. 1982.

鳞片冷水花 lin pian leng shui hua

Pilea squamosa var. *sparsa* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 73. 1982.

Herbs perennial, robust, stoloniferous, dioecious, rarely monoecious. Stems gray green, often branched, with several longitudinal angles when dry, to 1.2 m tall, woody at base, succulent distally, covered with dense brownish squamae. Stipules persistent, triangular, ca. 1 mm, membranous; petiole unequal in length, 0.5–5 cm, densely squamose; leaf blade black-brown when dry, oblong-lanceolate, ovate- or obovate-lanceolate, rarely elliptic-oblong, unequal in size, major ones 8.5–17 × 3–7 cm, minor ones 3–7 × 1.5–3 cm, papery, 3-veined, elevated on both surfaces, lateral veins many, subtransverse, distinctly reticulate, outer secondary veins anastomosing by margin, brown and densely squamose along veins, adaxial surface sparsely squamose, cystoliths conspicuous on both surfaces, base obliquely rounded, rarely broadly cuneate, margin finely crenate, apex caudate-acuminate, acumen serrulate. Inflorescences solitary; male inflorescence a paniculate cyme, 1–2 cm, densely squamose and sometimes puberulent on peduncle. Female inflorescence not seen. Male flowers shortly pedicellate, in bud ca. 1 mm; perianth lobes 4, apex obtuse, densely squamose abaxially; stamens 4; rudimentary ovary small. Fl. Oct–Apr.

Warm wide-leaved forests, or sunny dry slopes; 1900–2500 m. Xizang, Yunnan [Bhutan, NE India, Nepal, Sikkim].

Further collecting has shown that var. *sparsa* should not be recognized.

35. *Pilea wightii* Weddell, Ann. Sci. Nat., Bot., sér. 4, 1: 186. 1854.

生根冷水花 sheng gen leng shui hua

Herbs perennial, stoloniferous, glabrous, monoecious or dioecious. Stems much branched, 20–30 cm tall, succulent distally, with galls on mid portion of internodes. Stipules persistent, triangular, 1–2 mm, membranous; petiole unequal in length, 0.5–3 cm; leaf blade abaxially pale green, adaxially green, ovate or lanceolate, unequal in size, 2–6.5 × 1.5–2.5 cm, membranous, 3-veined, lateral veins many, with cystoliths, base rounded or emarginate, margin serrate, apex acuminate. Inflorescences solitary; male inflorescence a cymose panicle, often longer than subtending leaf, pedunculate; female cymes much shorter than male ones. Male flowers pedicellate, in bud obovoid, ca. 1.5 mm; perianth lobes 4, connate 1/2 of length, subapically conspicuously corniculate or beaked; stamens 4; rudimentary ovary small. Female flowers subsessile, in bud ca. 0.5 mm; perianth lobes connate at base, unequal, abaxial lobe cymbiform, longer, subapically corniculate; staminodes 3, scale-like, oblong. Achene brownish, obliquely ovoid, ca. 1 mm, compressed, smooth. Fl. Jun–Jul, fr. Aug–Sep.

Roadsides, wet places in broad-leaved forests; 300–1200 m. Guangdong, Guangxi [S India, Sri Lanka].

36. *Pilea symmeria* Weddell, Monogr. Urtic. 246. 1856.

喙萼冷水花 hui e leng shui hua

Herbs perennial, stoloniferous, monoecious or dioecious. Stems branched or simple, 30–120 cm tall, succulent distally, swollen between nodes. Stipules persistent, interpetiolar, triangular, connate into an auricle at base, 1–2 mm, herbaceous; petiole unequal in length, 1–5 cm; leaf blade abaxially pale green, ovate, ovate-lanceolate, or oblong lanceolate, sometimes asymmetric, unequal in size, 4–14 × 2–7 cm, membranous, 3-veined, lateral veins many, transverse, abaxial surface puberulent at base, adaxial surface sparsely pilose, cystoliths small or inconspicuous, adaxial, base rounded or subcordate, margin serrate or crenate-serrate, apex caudate-acuminate. Inflorescences solitary, male a paniculate cyme, often as long as leaves, pedunculate; female ones shorter; bracts triangular-ovate, 1–2 mm. Male flowers pedicellate, in bud obovoid, 1.5–2 mm; perianth lobes 4, connate at base, subapically conspicuously corniculate or beaked; stamens 4; rudimentary ovary small, conic. Female flowers subsessile, in bud ca. 1 mm; perianth lobes connate at base, unequal, abaxial lobe cymbiform, longer, subapically corniculate; staminodes 3, scale-like, oblong. Achene brownish, often purplish spotted, obliquely ovoid, 1.2–1.5 mm, compressed, smooth. Fl. Jun–Jul, fr. Aug–Sep.

Shaded wet places in forests; 2100–3300 m. S Xizang [Bhutan, N India, Nepal, Sikkim].

37. *Pilea macrocarpa* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 74. 1982.

大果冷水花 da guo leng shui hua

Herbs perennial, stoloniferous, glabrous, dioecious. Stems 20–40 cm tall, succulent distally, woody at base, swollen between nodes. Stipules membranous, triangular, ca. 1 mm, persistent; petiole unequal in length, 1–4 cm; leaf blade abaxially pale green, adaxially dark green, lanceolate or oblong-lance-

late, sometimes asymmetric, unequal in size, 6–14 × 2.5–4 cm, membranous, 3-veined, lateral veins many, transverse, cystoliths fusiform often arranged along secondary veins, conspicuous abaxially, base rounded or subcordate, margin shallowly undulate-crenate, with a ciliate tip of teeth from hollow, apex caudate-acuminate. Male inflorescence not seen. Female inflorescence solitary, a paniculate cyme, 5–11 cm, pedunculate. Female flowers subsessile, in bud ca. 1 mm; perianth lobes connate at base, subequal, abaxial lobe large, subapically ± corniculate; staminodes 3, scale-like, oblong. Achene brownish, broadly ovoid, ca. 2 mm, compressed, not oblique, often minutely purplish spotted, enclosed by equal perianth lobes. Fr. Sep.

- Shaded wet places of *Pinus* forests; 1500–1600 m. SE Xizang.

38. *Pilea semisessilis* Handel-Mazzetti, Symb. Sin. 7: 137. 1929.

镰叶冷水花 *lian ye leng shui hua*

Herbs perennial, stoloniferous, glabrous, monoecious or dioecious. Stems blue green when dry, 20–60 cm tall, woody at base, succulent distally, swollen between nodes. Stipules persistent; triangular to oblong, 2–5 mm, membranous, petiole strongly unequal in length, 0–4 cm; leaf blade abaxially pale green, adaxially often blue-green, falcate-lanceolate rarely ovate-lanceolate, usually asymmetric, unequal in size, (2.5–)5–14 × (1–)1.5–5 cm, membranous, 3-veined, lateral veins many, transverse, abaxial surface sometimes puberulent along veins, adaxial surface sparsely pilose, cystoliths fusiform often conspicuous, base emarginate or subcordate, margin sharply serrate or shallowly serrate, acumen serrulate, apex long caudate-acuminate. Inflorescences solitary, male a paniculate cyme, 2–7 cm; pedunculate, female inflorescence 1.5–4 cm, peduncle 1–3 cm. Male flowers subsessile, in bud ca. 1 mm; perianth lobes 4, oblong-elliptic, apex acute; stamens 4; rudimentary ovary minute. Female flowers subsessile, in bud ca. 0.8 mm; perianth lobes connate at base, subequal, abaxial lobe larger, subapically corniculate; staminodes 3, scale-like, oblong. Achene brownish, broadly ovoid, ca. 1 mm, compressed, not oblique, smooth, enclosed by unequal perianth lobes. Fl. Jul–Sep, fr. Sep–Oct.

Shaded wet places of *Pinus* forests, roadsides; 1000–2800(–3400) m. N Guangxi, Hunan, W Jiangxi, Sichuan, SE Xizang, NW Yunnan [N Thailand].

39. *Pilea melastomoides* (Poiret) Weddell, Ann. Sci. Nat., Bot., sér. 4, 1: 186. 1854.

长序冷水花 *chang xu leng shui hua*

Urtica melastomoides Poiret, Encycl. Suppl. 4: 223. 1816; *Pilea cuneatifolia* Yamamoto; *P. ovinucula* Hayata; *P. trinervia* (Roxburgh) Wight; *Urtica trinervia* Roxburgh.

Herbs perennial, robust or subshrubs, stoloniferous, glabrous, monoecious or dioecious. Stems blue green when dry, to 200 cm tall, ca. 1 cm in diam., succulent distally, woody at base, swollen between nodes, upper internodes shorter. Stipules persistent, triangular, ca. 2 mm, membranous; petiole equal in length, 2–9 cm; leaf blade abaxially pale green, adaxially often

dark green or brownish, elliptic to elliptic-lanceolate, subequal in size, 10–23 × 5–16 cm, membranous, 3-veined, lateral veins many, spreading and regularly transverse, cystoliths fusiform, minute, often conspicuous abaxially, base cuneate or rarely subrounded, margin shallowly serrate or crenate, apex cuspidate or acuminate. Inflorescences solitary, male inflorescence a cymose-panicle, 15–35 cm overall, peduncle long and thick; female ones often shorter than petioles. Male flowers subsessile, in bud ca. 1 mm; perianth lobes 4, elliptic, apex acute or sometimes corniculate; stamens 4; rudimentary ovary minute. Female flowers subsessile, in bud ca. 0.8 mm; perianth lobes connate at base, subequal, abaxial lobe larger, subapically corniculate; staminodes 3, scale-like, oblong. Achene brownish, ellipsoid-ovoid, ca. 1 mm, compressed, almost not oblique, smooth or verrucose, with a slightly elevated ring by margin. Fl. Aug–Sep, fr. Oct–Nov.

Broad-leaved forests, shaded wet places by streams; 700–1800 m. SW Guangxi, Guizhou, Hainan, Taiwan, SE Xizang, S Yunnan [India, Indonesia, Sri Lanka, Myanmar, Vietnam].

40. *Pilea howelliana* Handel-Mazzetti, Symb. Sin. 7: 132. 1929.

泡果冷水花 *pao guo leng shui hua*

Herbs perennial, stoloniferous, glabrous, monoecious or dioecious. Stems gray-green when dry, 15–100 m tall, succulent, swollen between nodes. Stipules persistent, triangular, ca. 1 mm, membranous; petiole subequal in length, 1–5 cm; leaf blade abaxially purplish, adaxially often pale green, narrowly ovate, asymmetric, subequal in size, 5.5–14 × 2.5–6 cm, herbaceous, 3-veined, whitish, conspicuous, lateral veins 10 each side, external secondary veins anastomosing by margin and reaching to serrate tips, cystoliths fusiform, often abaxially, conspicuous, base subrounded, margin shallowly crenate, apex acuminate. Inflorescences sometimes androgynous, solitary, a paniculate cyme, 9–14 cm overall, peduncle 5–14 cm. Male flowers subsessile, in bud ca. 1.2 mm; perianth lobes 4, narrowly ovate, apex acute; stamens 4; rudimentary ovary minute. Female flowers subsessile, in bud ca. 0.8 mm; perianth lobes connate at base, subequal, abaxial lobe larger, subapically corniculate; staminodes 3, squamiform, oblong. Achene brownish, broadly ovoid, ca. 1 mm, slightly compressed, almost not oblique, with a strongly elevated convex lens ring by margin. Fl. Jul–Aug, fr. Sep–Nov.

- Broad-leaved forests, shaded wet places, near streams, rocks; 1500–2500 m. S and W Yunnan.

- 1a. Plants 15–35 cm tall; leaf blade margin very shallowly crenate 40a. var. *howelliana*
- 1b. Plants 60–100 cm tall; leaf blade margin denticulate or dentate 40b. var. *denticulata*

40a. *Pilea howelliana* var. *howelliana*

泡果冷水花(原变种) *pao guo leng shui hua* (yuan bian zhong)

Plants 15–35 cm tall. Leaf blade margin very shallowly crenate. Fl. Jul–Aug, fr. Sep–Nov.

- Shaded wet places, rocks, near streams; 1500–1700 m. W Yunnan.

40b. *Pilea howelliana* var. *denticulata* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 77. 1982.

细齿泡果冷水花 xi chi pao guo leng shui hua

Plants 60–80 cm tall. Leaf blade margin denticulate or dentate. Fr. Oct.

• Broad-leaved forests, shaded wet places near streams; 2000–2500 m. S Yunnan.

41. *Pilea longipedunculata* Chien & C. J. Chen, Bull. Bot. Res., Harbin 2(3): 77. 1982.

鱼眼果冷水花 yu yan guo leng shui hua

Herbs perennial, stoloniferous, glabrous, dioecious. Stems green-blue when dry, 30–60 cm tall, succulent, swollen between nodes, cystoliths dense. Stipules persistent, narrowly triangular, 2–4 mm, membranous; petiole unequal in length, 1–10 cm; leaf blade abaxially pale green, adaxially dark green, falcate-lanceolate or elliptic-ovate, asymmetric, unequal in size, 8–23 × 2.5–11 cm, membranous, 3-veined, lateral veins many, regularly transverse, external secondary veins anastomosing by margin, cystoliths fusiform often conspicuous adaxially, base subrounded or subcordate, margin entire or shallowly 1–3-crenate-serrate near apex, apex acuminate or long acuminate. Inflorescences solitary, cymose paniculate, 7–21 cm overall, peduncle 5–12 cm. Male flowers subsessile, in bud ca. 1 mm; perianth lobes 4, narrowly ovate, apex acute; stamens 4; rudimentary ovary minute. Female flowers subsessile; perianth lobes connate at base, subequal, abaxial lobe larger, subapically corniculate; staminodes 3, conspicuous, scale-like, oblong. Achene brownish, triangular-ovoid, ca. 1 mm, compressed, slightly oblique at apex, with a strongly elevated convex lens ring. Fl. Jul–Aug, fr. Sep–Nov.

Broad-leaved forests, shaded wet places or rocks by streams, near streams; 1400–2800 m. W Guangxi, SW Guizhou, Yunnan [Thailand, N Vietnam].

This species is easily confused with *Pilea anisophylla*, which is characterized by the very unequal leaves, the smaller leaves almost sessile, and the smooth achenes.

42. *Pilea subdentata* Chien & C. J. Chen, Bull. Bot. Res., Harbin 2(3): 79. 1982.

小齿冷水花 xiao chi leng shui hua

Herbs perennial, stoloniferous, glabrous, dioecious or monoecious. Stems 30–40 cm tall, succulent, swollen between nodes. Stipules subpersistent, triangular, 1–2 mm, membranous; petiole unequal in length, 1.5–6 cm; leaf blade narrowly ovate to ovate-lanceolate, asymmetric, unequal in size, 5–13 × 2–5 cm, membranous, 3-veined, lateral veins many, transverse, reticulate, external secondary veins anastomosing and slightly thickened by margin, cystoliths finely fusiform, often conspicuous on both surfaces, base obtuse-rounded, often auriculate, margin entire or shallowly 2 serrulate by apex, apex caudate-acuminate. Inflorescences solitary; male inflorescence distal, a cymose panicle, 9–13 cm overall, peduncle 6–8 cm; female cymes proximal, 3.5–8 cm overall, peduncle 2.5–5 cm. Male

flowers subsessile, in bud ca. 1 mm; perianth lobes 4; stamens 4; rudimentary ovary minute. Female flowers subsessile, ca. 0.7 mm; perianth lobes connate at base, subequal, abaxial lobe larger, subapically corniculate; staminodes 3, conspicuous, scale-like, rhombic-oblong. Achene brownish, ovoid, ca. 1 mm, compressed, slightly oblique at apex, verrucose. Fl. Oct, fr. Nov–Dec.

• Broad-leaved forests, shaded wet places by streams, near streams; 400–1000 m. Hainan.

This species is similar to *Pilea melastomoides*, but that species has stems to 2 m tall, leaf margins serrate or crenate, and achenes with a raised ring.

43. *Pilea plataniflora* C. H. Wright, J. Linn. Soc., Bot. 26: 477. 1899.

石筋草 shi jin cao

Pilea blinii H. Léveillé; *P. dielsiana* Handel-Mazzetti; *P. kankaoensis* Hayata; *P. langsonensis* Gagnepain; *P. minutepilosa* Hayata; *P. petelotii* Gagnepain; *P. taitoensis* Hayata.

Herbs perennial, long stoloniferous, glabrous, dioecious or monoecious. Stems green blue when dry, 10–70 cm tall, woody at base, succulent distally, swollen between nodes. Stipules gradually deciduous, triangular, 1–2 mm, membranous; petiole often unequal in length, 0.5–7 cm; leaf blade dark green or green blue, ovate, lanceolate, or obovate-oblong, asymmetric, unequal or equal in size, 1–15 × 0.6–5 cm, thinly papery or submembranous, 3(or 5)-veined, lateral veins many, irregularly reticulate, external secondary veins anastomosing by margin, sometimes inconspicuous, cystoliths finely fusiform, conspicuous adaxially, base obliquely rounded or subcordate, sometimes cuneate, margin entire or sometimes undulate, apex shortly or long caudate-acuminate. Inflorescences solitary; male inflorescence a cymose panicle or racemelike, often longer than leaves; female cymes as long as or shorter than leaves, pedunculate. Male flower subsessile, in bud ca. 1.5 mm; perianth lobes 4; stamens 4; rudimentary ovary minute. Female flowers subsessile, ca. 0.5 mm; perianth lobes connate at base, subequal, abaxial lobe larger, subapically corniculate; staminodes 3, conspicuous, scale-like, rhombic-oblong. Achene brownish, ovoid, ca. 0.6 mm, compressed, slightly oblique at apex, verrucose. Fl. (Apr–)Jun–Sep, fr. Jul–Oct.

Broad-leaved forests, semishaded wet places, karst limestone, near streams; 200–2400 m. SE Gansu, W Guangxi, Hainan, Hubei, S Shaanxi, Sichuan, Taiwan, Yunnan [Thailand, N Vietnam].

This species is widespread and exhibits great variability in plant height, leaf size and shape, and inflorescence length. It has a disjunct distribution, occurring in SW mainland China and Taiwan. Many names not included here have been treated as synonyms of this species.

44. *Pilea hookeriana* Weddell, Monogr. Urtic. 226. 1856.

须弥冷水花 xu mi leng shui hua

Herbs, perennial, or subshrubs, stoloniferous, glabrous, dioecious, rarely monoecious. Stems gray green, erect, ascending, or scandent, often branched, longitudinally several angled when dry, to 2.5 m tall, woody at base, densely covered with

cystoliths. Stipules deciduous, oblong, 1.5–2 mm, herbaceous; petiole unequal in length, 4–10 cm; leaf blade elliptic, ovate, or elliptic-ovate, unequal in size, 9–17 × 4.5–10 cm, membranous, 3-veined, lateral veins many, subtransverse, reticulate, cystoliths conspicuous adaxially, base rounded or broadly cuneate, margin coarsely crenate-serrate, apex caudate-acuminate, acumen serrulate. Inflorescences solitary; male inflorescence a globose capitate raceme, ca. 0.5 cm in diam., shorter than petiole; female ones cymose-paniculate, much shorter, 1–2 cm. Male flowers sessile, in bud ca. 1 mm; perianth lobes 4; stamens 4; rudimentary ovary small, subulate. Female flowers subsessile, in bud ca. 0.6 mm; perianth lobes connate at base, unequal, abaxial lobe cymbiform, longer, subapically corniculate; staminodes 3, inconspicuous, scale-like, oblong. Achene brownish, ovoid, ca. 1 mm, compressed, with 2 or 3 concentric rings of minute tubercles. Fl. Aug–Sep, fr. Oct–Nov.

Warm wide-leaved forests, shaded wet places by streams, near streams; 1200–1800 m. NW Yunnan [Bhutan, NE India, Nepal, Sikkim].

This species is here newly recorded for China.

45. *Pilea angulata* (Blume) Blume, Mus. Bot. 2: 55. 1856.

圓瓣冷水花 yuan ban leng shui hua

Herbs perennial, stoloniferous, subglabrous, monoecious or dioecious. Stems 30–100(–200) cm tall, succulent distally, with galls on mid portion of internodes. Stipules soon deciduous or subpersistent, green or brownish, oblong, 7–25 mm, herbaceous or membranous, obtuse at apex; petiole subequal in length, 2–9 cm; leaf blade abaxially pale green, adaxially dark green, ovate, ovate-elliptic, or oblong-lanceolate, subequal in size, 7–23 × 3–7 cm, herbaceous, 3-veined, lateral veins many, distal veins anastomosing, cystoliths on both surfaces, base rounded, rarely subcordate, margin coarsely serrate or coarsely dentate-serrate, apex acuminate, acumen entire or serrulate. Inflorescences in pairs, male a dense paniculate cyme, 1–2 cm; female ones of lax flowers, 2–5 cm. Male flowers greenish, pedicellate, in bud ca. 2 mm; perianth lobes 4, obovate-oblong, apex acute, subapically corniculate; stamens 4; rudimentary ovary small. Female perianth lobes greenish, connate to apex, equal, semiorbicular or broadly ovate, 1/3–1/2 as long as fruits, apex obtuse; staminodes oblong. Achene green to dark brownish, broadly ovoid, 1.2–1.6 mm, slightly compressed, oblique at apex, spinulose verrucose, enclosed by persistent lobes. Fl. Jun–Oct, fr. Sep–Dec.

Moist places in broad-leaved forests; 300–2300(–2700) m. Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, SW Jiangsu, Jiangxi, S Shaanxi, Sichuan, Taiwan, SE Xizang, Yunnan, Zhejiang [India, Indonesia, Japan, Sri Lanka, Vietnam].

- 1a. Leaf blade ovate, base cordate; stipules membranous, brownish, 7–10 mm, subpersistent; male flower reddish, perianth lobes not corniculate 45c. subsp. *laticuscula*
 1b. Leaf blade ovate-elliptic or oblong-lanceolate; stipules herbaceous, greenish, 10–25 mm, deciduous;

male flower yellowish green, perianth lobes ± corniculate.

- 2a. Male inflorescences cymose-paniculate; male perianth lobes often with a beak by apex; leaf margin serrate with an entire acumen; female tepals often acute, connate for ca. 1/2 length 45a. subsp. *angulata*
 2b. Male inflorescences cymose-racemose; male perianth lobes corniculate by apex; leaf margin crenate- or dentate-serrate and doubly serrate distally, with a serrulate acumen; female tepals rounded, connate for more than 1/2 length 45b. subsp. *petiolaris*

45a. *Pilea angulata* subsp. *angulata*

圓瓣冷水花(原亞種) yuan ban leng shui hua (yuan ya zhong)

Urtica angulata Blume, Bijdr. Fl. Ned. Ind. 494. 1826;
Pilea stipulosa (Miquel) Miquel; *U. stipulosa* Miquel.

Plants dioecious. 30–200 cm tall, Stipules 10–25 mm, herbaceous; leaf blade ovate-elliptic or oblong-lanceolate, 7–23 × 3–7 cm, herbaceous, base rounded or emarginate, margin coarsely serrate or dentate-serrate, acumen entire. Male inflorescence a cymose-panicule, 1–2 cm. Male perianth lobe subapically long-beaked. Fl. Jun–Sep, fr. Sep–Nov.

Moist places in broad-leaved forests; 800–2300 m. Guangdong, Guangxi, Guizhou, S Shaanxi, Sichuan, SE Xizang, Yunnan [India, Indonesia, Sri Lanka, Vietnam].

45b. *Pilea angulata* subsp. *petiolaris* (Siebold & Zuccarini) C. J. Chen, Bull. Bot. Res., Harbin 2(3): 82. 1982.

長柄冷水花 chang bing leng shui hua

Urtica petiolaris Siebold & Zuccarini, Abh. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. 4(3): 215. 1846.

Plants monoecious. 40–150 cm tall, Stipules 20 mm, herbaceous; leaf blade often oblong-lanceolate, 10–24 × 3–7 cm, membranous, base rounded or emarginate, margin coarsely crenate-dentate, doubly serrate, acumen serrulate. Male inflorescence a cymose-panicule, 1–5 cm. Male perianth lobes subapically corniculate. Fl. Jun–Oct, fr. Sep–Dec.

Moist places in broad-leaved forests; 700–1100(–2700) m. Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Sichuan, Taiwan, Yunnan, Zhejiang [Japan].

45c. *Pilea angulata* subsp. *laticuscula* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 83. 1982.

華中冷水花 hua zhong leng shui hua

Plants dioecious. 30–40 cm tall, Stipules almost persistent, brownish, 7–10 mm, membranous; leaf blade ovate, 3.5–10 × 3–5 cm, membranous, base cordate, rarely rounded, margin coarsely crenate-serrate, acumen serrulate. Male inflorescence a cymose-panicule, 2–4 cm; female inflorescence ca. 2 cm, shorter than petioles. Male perianth lobes not corniculate. Fl. Jun–Jul, fr. Sep–Oct.

• Moist places in broad-leaved forests; 300–1800 m. Guizhou, Hubei, Hunan, SW Jiangsu, Jiangxi, E Sichuan, E Yunnan.

46. *Pilea notata* C. H. Wright, J. Linn. Soc., Bot. 26: 470. 1899.

冷水花 *leng shui hua*

Boehmeria vaniotti Léveillé; *Pilea elliptifolia* B. L. Shih & Yuen P. Yang; *P. pseudopetiolaris* Hatusima.

Herbs perennial, stoloniferous, dioecious or monoecious. Stems 25–75 cm tall, woody at base, succulent distally, with galls on mid portion of internodes, glabrous, rarely puberulent distally, densely covered cystoliths. Stipules soon deciduous, greenish, oblong, 8–12 mm, herbaceous; petiole thin, subequal in length, 1–7 cm; leaf blade abaxially pale green, adaxially dark green and lustrous, ovate or ovate-lanceolate, subequal in size, 4–11 × 1.5–4.5 cm, membranous, 3-veined, lateral veins 8–13 each side, cystoliths fusiform, conspicuous on both surfaces, base rounded rarely broadly cuneate, margin shallowly serrate, rarely doubly serrate along apical margin. Inflorescences solitary; male inflorescence a racemelike-cyme, 2–5 cm; female a compact cyme of glomerules, shorter than males. Male flowers yellow-green, pedicellate or sessile, in bud ovoid, ca. 1 mm; perianth lobes 4, connate 1/2 of length, subapically corniculate; stamens 4; rudimentary ovary small. Female flowers subsessile, in bud ca. 0.5 mm; perianth lobes connate 1/2 of length, equal, apex obtuse; staminodes 3, small, scale-like, oblong. Achene oblong-ovoid, ca. 0.8 mm, compressed, oblique, spinulose-verrucose. Fl. Jun–Sep, fr. Sep–Nov.

Shaded moist places in broad-leaved forests; 300–1500 m. S Anhui, Fujian, S Gansu, Guangdong, Guangxi, Guizhou, S Henan, Hubei, Hunan, Jiangxi, Sichuan, Taiwan, Zhejiang [Japan].

47. *Pilea sinofasciata* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 85. 1982 [“*sinofasiata*”].

粗齿冷水花 *cu chi leng shui hua*

Pilea fasciata Franchet, Nouv. Arch. Mus. Hist. Nat., sér. 2, 10: 81. 1888, not Weddell (1869).

Herbs perennial, stoloniferous, dioecious or monoecious. Stems almost simple, 25–100 cm tall, woody at base, succulent distally, with galls on mid portion of internodes, glabrous or sometimes puberulent distally. Stipules persistent, triangular, ca. 2 mm, membranous; petioles subequal in length, 1–5 cm; leaf blade abaxially pale green with 2 whitish striae along median vein, adaxially dark green, elliptic, ovate, or oblong-lanceolate, subequal in size, 4–17 × 2–7 cm, herbaceous, 3-veined, lateral veins many, basal ones inconspicuous, distal 3 or 4 pairs distinct and anastomosing, abaxial surface sometimes pubescent along veins, adaxial surface sparsely pilose, cystoliths worm-shaped, often conspicuously and compactly around the thickened final vein nodes abaxially, base cuneate or obtusely rounded, margin coarsely dentate, apex caudate-acuminate, acumen entire, proximal leaves often obovate, quite small. Inflorescence a paniculate cyme, shorter than petioles. Male flowers pedicellate or sessile, in bud ovoid, 1–1.5 mm; perianth lobes 4, connate 1/2 of length, subapically corniculate; stamens 4; rudimentary ovary small. Female flowers subsessile, in bud ca. 0.5 mm; perianth lobes connate 1/2 of length, equal, apex obtuse; staminodes 3, small, scale-like, oblong. Achene broadly

ovoid, ca. 0.7 mm, compressed, oblique, verrucose. Fl. Jun–Jul, fr. Aug–Oct.

Shaded moist places in forests; 700–2500 m. S Anhui, S Gansu, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, Zhejiang [N India, N Thailand, Sikkim].

48. *Pilea matsudae* Yamamoto, Suppl. Icon. Pl. Formosan. 1: 7. 1925.

细尾冷水花 *xi wei leng shui hua*

Herbs perennial, stoloniferous, dioecious. Stems usually with purple-red spots, erect or ascending, 25–100 cm tall, with galls on lower part of internodes, glabrous. Stipules persistent, broadly triangular, 2–3 mm, membranous; connate at base, petiole unequal in length, 1–10 cm; leaf blade elliptic or elliptic-oblong, unequal in size, 5–18.5 × 2.5–7.5 cm, membranous, 3-veined, prominent abaxially, lateral veins many, basal ones inconspicuous, distal ones distinct and anastomosing, irregularly reticulate, cystoliths worm-shaped, sparse on both surfaces, base cuneate or obtuse, margin coarsely dentate, apex caudate, acumen entire. Inflorescence a paniculate cyme, shorter than petioles. Male flowers greenish, subsessile, in bud ovoid; perianth lobes 4, ca. 0.5 mm, connate at base, dimorphic; stamens 4; rudimentary ovary small. Female perianth lobes unequal. Achene ellipsoid, compressed, oblique, enclosed by persistent perianth. Fl. Mar–May, fr. Jun–Aug.

• Shaded moist places in forests, streams, near streams; 1200–2100 m. Taiwan.

49. *Pilea media* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 89. 1982.

中间型冷水花 *zhong jian xing leng shui hua*

Herbs perennial, stoloniferous, glabrous, monoecious or dioecious. Stems blue-green when dry, erect or ascending, much branched, 20–40 cm tall, succulent, swollen between nodes. Stipules almost persistent, triangular, 1–2 mm, membranous; petiole subequal in length, 0.5–3 cm; leaf blade gray-green on both surfaces, broadly elliptic or rhombic-orbicular, subequal in size, 2–5 × 1.5–3 cm, thinly papery, 3-veined, lateral veins 5–7 each side, even and inconspicuous on both surfaces, honeycombed abaxially, cystoliths fusiform, often conspicuous adaxially, base broadly cuneate, subrounded or obtuse, often with small auricle, margin entire, apex shortly caudate-acuminate or acute. Inflorescences solitary; male glomerules in moniliform racemes, 2–5 cm, thinly pedunculate; female inflorescence capitate, shortly pedunculate, ca. 5 mm. Male flowers pedicellate, in bud obovoid, ca. 1.5 mm; perianth lobes 4, connate 1/2 of length, subapically corniculate; stamens 4(or 5); rudimentary ovary conspicuous. Female perianth lobes unequal, longest lobe with apex acute, subapically corniculate. Achene obliquely subglobose, ca. 0.4 mm, slightly compressed, indistinctly verrucose, enclosed by persistent perianth. Fl. Mar–Jun, fr. May–Jul.

• Shaded moist places, rocks; 100–900 m. NW Guangxi, SW Guizhou, SE and W Yunnan.

This species resembles *Pilea boniana* and *P. plataniflora* in habit and floral morphology, and is probably a hybrid between them.

50. *Pilea elegantissima* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 90. 1982.

石林冷水花 shi lin leng shui hua

Herbs annual, weak, glabrous, monoecious or dioecious. Stems blue-green when dry, erect, branched at base, 5–20 cm tall, succulent. Stipules almost persistent, triangular, ca. 1 mm, membranous; petiole subequal in length, 0.5–2 cm; leaf blade abaxially pale green, adaxially green, rhombic-elliptic, rhombic-lanceolate, or ovate, unequal in size, 1.5–6 × 0.7–2.8 cm, submembranous, 3-veined, lateral veins 3–5 each side, slightly elevated and finely honeycombed abaxially, depressed adaxially, cystoliths fusiform, often conspicuous adaxially, base broadly cuneate or subrounded, margin entire, apex acuminate, shortly caudate-acuminate, or acute, acumen obtuse. Inflorescences in pairs; male inflorescence a moniliform spike, 1.5–2.5 cm overall, peduncle slender, 1–1.6 cm; female inflorescence a racemelike cyme, shorter than petioles. Male flowers purplish, pedicellate, in bud obovoid, ca. 1.5 mm; perianth lobes 4, connate 1/2 of length, subapically corniculate with a small gibbose appendix at each side; stamens 4; rudimentary ovary conspicuous. Female perianth lobes unequal, longest one subapically corniculate. Achene brownish, broadly ovoid, ca. 0.4 mm, slightly compressed, oblique, spinulose-verruose, enclosed by persistent perianth. Fl. Jul–Sep, fr. Sep–Oct.

Shaded moist places, rocks; 1500–1900 m. SW Sichuan, C and N Yunnan [N Thailand].

51. *Pilea monilifera* Handel-Mazzetti, Symb. Sin. 7: 124. 1929.

念珠冷水花 nian zhu leng shui hua

Herbs perennial, stoloniferous, monoecious or dioecious. Stems simple or branched, 50–150 cm tall, woody at base, succulent, swollen between nodes, glabrous. Stipules deciduous, narrowly triangular, ca. 1 mm, membranous; petiole unequal in length, 1–5 cm, puberulent adaxially; leaf blade abaxially pale green, adaxially dark green, elliptic, ovate-elliptic or ovate-oblong, often slightly oblique at base, unequal in size, 5–13 × 3–7 cm, submembranous, 3-veined, lateral veins many, regularly transverse, often ending in a gland, abaxial surface glabrous, adaxial surface pilose, cystoliths fusiform, often conspicuous abaxially, base rounded or subcordate, margin coarsely crenate-serrate or dentate-serrate, apex acuminate, caudate-acuminate, acumen entire. Inflorescences solitary, male a moniliform spike of 3–8 loose glomerules on simple axis, 3–10 cm, glabrous or sparsely puberulent; female inflorescence 1–3.5 cm. Male flowers pedicellate, in bud triangular-ovoid, 2–2.5 mm; perianth lobes 4, connate 1/2 of length, subapically long corniculate, sometimes puberulent; stamens 4; rudimentary ovary inconspicuous. Female perianth lobes unequal, longest lobe subapically corniculate; Achene brownish, broadly ovoid, ca. 1.8 mm, slightly compressed, smooth, but with some cystoliths, enclosed by persistent perianth. Fl. Jun–Aug, fr. Jul–Sep.

• Shaded moist places, rocks; (900–)1400–2400(–3500) m. N Guangxi, Guizhou, W Hubei, W Hunan, Jiangxi, Sichuan, Yunnan.

Collections from alpine habitats in NW Yunnan, which have puberulent male inflorescences and perianth lobes, may be ecological forms.

52. *Pilea microcardia* Handel-Mazzetti, Sinensia 2: 2. 1931.

广西冷水花 guang xi leng shui hua

Herbs annual, weak, glabrous, monoecious. Stems erect, simple or branched at base, 3–8 cm tall, succulent. Stipules soon deciduous, triangular, ca. 1 mm, membranous; petiole subequal in length, 3–10 mm; leaf blade abaxially pale green, adaxially lustrous green, cordate, subequal in size, 6–15 × 5–14 mm, subpapery, 3-veined, lateral veins 4–5 each side, depressed adaxially, slightly elevated abaxially, often terminating with a gland, finely honeycombed, cystoliths fusiform, often conspicuous adaxially, base cordate, margin 4–6 crenate each side, apex acute or rounded, proximal leaves smaller, often entire. Inflorescence a capitulum or moniliform spike, 0.5–1.2 cm. Male flowers subsessile, in bud obovoid, ca. 1.2 mm; perianth lobes 4, connate 1/2 of length, subapically corniculate; stamens 4; rudimentary ovary conspicuous. Female perianth lobes unequal, longest one subapically corniculate. Achene brownish, broadly ovoid, ca. 0.6 mm, compressed, oblique, with a colored ring, enclosed by persistent perianth. Fl. and fr. May.

• Shaded moist places, steep rocks; ca. 300 m. N Guangxi.

This is a very rare and local species.

53. *Pilea paniculigera* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 92. 1982.

滇东南冷水花 dian dong nan leng shui hua

Herbs perennial, glabrous, monoecious or dioecious. Stems blue-green when dry, erect, much branched, to 100 cm tall, succulent; lower internodes 2–7 cm, upper internodes 1–4 cm. Stipules almost persistent, triangular, ca. 1 mm, membranous; petiole subequal in length, 1.8–6 cm; leaf blade abaxially green, adaxially dark green, narrowly ovate, ovate-lanceolate, or oblong-lanceolate, peltate, subequal in size, 4.5–11 × 2–5 cm, submembranous, 3-veined, lateral veins 3 or 4 on each side, external secondary veins 5–7, finely honeycombed abaxially, cystoliths fusiform, often conspicuous abaxially and along margin on both surfaces, base often truncate, rarely rounded, margin coarsely dentate, apex long acuminate or caudate-acuminate. Inflorescences solitary; male inflorescence a cymose panicle, 3–11 cm overall, peduncle 1–6 cm; female inflorescence a racemelike cyme, distal, often shorter than petioles. Male flowers greenish, subsessile, in bud obovoid, ca. 1.2 mm; perianth lobes 4, connate at base, apex acute, without corniculate tip by apex; stamens 4; rudimentary ovary conic. Female perianth lobes unequal, longest one corniculate at apex. Achene brownish, obliquely ovoid, ca. 0.8 mm, compressed, enclosed by persistent perianth. Fl. Nov–Feb, fr. Mar–May.

Shaded moist places in mixed forests, on rocks; 1200–1600 m. SE Yunnan [N Vietnam].

54. *Pilea racemiformis* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 93. 1982.

总状冷水花 zong zhuang leng shui hua

Herbs perennial, glabrous, dioecious. Stems blue-green when dry, erect, much branched, to 25 cm tall, succulent, with dense cystoliths when dry; internodes 1–2 cm. Leaves crowded

on upper nodes; stipules almost persistent, triangular, ca. 1 mm, membranous; petiole strongly unequal in length, 0.5–2.5 cm; leaf blade adaxially brownish green, strongly unequal in size, large leaves often peltate, narrowly ovate, ovate- or elliptic-lanceolate, 5–7 × 1.7–2.1 cm, subpapery, cystoliths fusiform, often conspicuous adaxially, base emarginate or subrounded, margin serrate; apex long acuminate; small leaves often basifixed, ovate, 1.4–2.6 × 1–1.4 cm, base emarginate, apex acute. Male inflorescences solitary, a racemelike cyme, of several glomerules, 1.5–3.5 cm overall, peduncle 1–2 cm; female inflorescence unknown. Male flowers pink, subsessile, in bud obovoid, ca. 0.2 mm; perianth lobes 4, obovate-oblong, connate at base, subapically corniculate; stamens 4; rudimentary ovary oblong.

Shaded moist places in dense forests in limestone hills; ca. 1600 m. W Guangxi [N Vietnam].

55. *Pilea peperomioides* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 592. 1912.

镜面草 *jing mian cao*

Herbs perennial, rhizomatous, glabrous, often dioecious, sometimes monoecious. Stems greenish to dark brownish, often simple, erect, ascending, or climbing, 15–40 cm tall, 0.6–2 cm in diam., thick, woody at base, succulent distally, internodes 0.3–1 cm, rough; leaf scars conspicuous, semiorbicular, 3–4 mm in diam., leaves spirally opposite, crowded on upper nodes; stipules persistent, light green, becoming brownish when dry, triangular-ovate, caudate-acuminate, squamose, 7–12 mm, with dense linear cystoliths; petiole unequal in length, 2–17 cm; leaf blade abaxially pale green, adaxially green, suborbicular, peltate, unequal in size, 2.5–9 × 2–8 cm, succulent, papery when dry, 3-veined, lateral veins 3 or 4 on each side, inconspicuous, external secondary veins numerous, anastomosing by margin, finely honeycombed abaxially, cystoliths fusiform, often conspicuous adaxially, base rounded or emarginate, margin entire, rarely inconspicuously undulate, apex rounded or obtuse. Inflorescences solitary, in upper nodes, male inflorescence a cymose panicle, 18–28 cm overall, peduncle thick, 5–14 cm; bracts lanceolate, ca. 0.5 mm; female inflorescence shorter. Male flower purplish, pedicellate, in bud obovoid, ca. 2.5 mm; perianth lobes 4, obovate, connate at base, subapically corniculate; stamens 4; rudimentary ovary oblong. Female perianth lobes unequal, largest lobe cymbiform, 1/2 as long as achene. Achene purplish, broadly ovoid, ca. 0.8 mm, slightly compressed, oblique, verrucose, enclosed by persistent perianth. Fl. Apr–Jul, fr. Jul–Sep.

• Shaded moist rocks in forests; 1500–3000 m. SW Sichuan, W Yunnan.

This species is very rare and possibly endangered in the wild, but is widely cultivated as an ornamental pot plant in China and other countries.

56. *Pilea peltata* Hance, Ann. Sci. Nat., Bot., sér. 5: 242. 1866.

盾叶冷水花 *dun ye leng shui hua*

Herbs perennial, rhizomatous, glabrous, dioecious or monoecious. Stems greenish, erect, often simple, 5–27 cm tall, succulent, internodes 1–4 cm. Leaves crowded on upper nodes;

stipules persistent, triangular, ca. 1 mm, membranous; petiole subequal in length, 0.6–4.5 cm; leaf blade blue-green, suborbicular or subcordate, peltate, subequal in size, 1–4.5(–7) × 1–3.5(–4) cm, succulent, papery when dry, 3-veined, lateral veins 3 or 4 on each side, inconspicuous, external secondary veins 5–7, indistinct on both surfaces, often glandular punctate at terminal veins, finely honeycombed abaxially, cystoliths fusiform, often conspicuous adaxially, base cordate, rounded or truncate, margin shallowly undulate-crenate, apex acute or obtuse. Inflorescences solitary, in upper nodes, male a moniliform spike, 3–4 cm overall, peduncle 1–1.7 cm; female ones 1–2.5 cm (including peduncle 0.5–1 cm); bracts lanceolate, ca. 0.4 mm. Male flowers light yellow-green, pedicellate or sessile, in bud obovoid, ca. 1.5 mm; perianth lobes 4, obovate, connate at base, subapically strongly corniculate; stamens 4; rudimentary ovary oblong. Female perianth lobes unequal, largest lobe cymbiform, 1/2 as long as achene. Achene obliquely ovoid, ca. 0.6 mm, slightly compressed, smooth, with an inconspicuously colored punctulate ring, enclosed by persistent perianth. Fl. Jun–Aug, fr. Aug–Nov.

• Shaded moist places in forests, thickets; 100–500 m. Guangdong, Guangxi, S Hunan.

- 1a. Leaf blade cordate or suborbicular, apex acute or obtuse, margin shallowly undulate-crenate 56a. var. *peltata*
 1b. Leaf blade ovate, apex often acuminate, margin sharply serrate or crenate-serrate 56b. var. *ovatifolia*

56a. *Pilea peltata* var. *peltata*

盾叶冷水花(原变种) *dun ye leng shui hua* (*yuan bian zhong*)

Leaf blade cordate or suborbicular, margin shallowly undulate-crenate, apex acute or obtuse. Fl. Jun–Aug, fr. Aug–Sep.

• Shaded moist rocks in forests, thickets on limestone hills; 100–500 m. Guangdong, Guangxi, S Hunan.

56b. *Pilea peltata* var. *ovatifolia* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 95. 1982.

卵叶盾叶冷水花 *luan ye dun ye leng shui hua*

Leaf blade ovate, margin sharply serrate or crenate-serrate, apex often acuminate. Fl. Apr–Jul, fr. Aug–Nov.

• Shaded moist places in forests, thickets; 300–400 m. N Guangdong.

57. *Pilea bambusifolia* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 95. 1982.

竹叶冷水花 *zhu ye leng shui hua*

Herbs perennial, glabrous, dioecious. Rhizomes fusiform, ca. 3 mm in diam. Stems reddish, blue-green when dry, erect, much branched, 20–30 mm tall, 2–4 mm in diam., slightly succulent, with dense, longitudinally arranged cystoliths when dry; internodes 0.4–1.8 cm. Leaves crowded on upper nodes of stem and branches; stipules almost persistent, triangular, ca. 1 mm, membranous; petiole subequal in length, 5–10 cm; leaf blade abaxially pale green, adaxially dark green, oblong-lanceolate, linear-lanceolate, or linear, subequal in size, 2–5 × 0.4–1

cm, subpapery, 3-veined, lateral veins many, reticulate, both surfaces lustrous, cystoliths shortly fusiform, dense on both surfaces, base obtuse or subrounded, margin sharply serrulate from mid-base. Male inflorescence not known. Female inflorescences solitary, cymose-racemose, of several glomerules, sometimes capitate, 0.5–2 cm, peduncle 0.3–1.3 cm. Female perianth lobes unequal, largest lobe cymbiform, subapically corniculate. Achene obliquely ovoid, ca. 1 mm, slightly compressed, smooth or sparsely verrucose, enclosed by perianth. (Male flowers unknown.) Fr. Nov.

• Shaded moist steep places in mountains; ca. 1300 m. SW Guizhou.

58. *Pilea unciformis* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 96. 1982.

鹰嘴冷水花 ying zui leng shui hua

Herbs perennial, stoloniferous, glabrous, dioecious. Stems gray-green when dry, erect, much branched through main stem like corymb, 10–35 cm tall, somewhat succulent, with shortly fusiform cystoliths when dry; internodes 1–3.5 cm. Leaves crowded on upper nodes of stem and branches, sometimes 4 in whorl; stipules persistent, triangular, ca. 1 mm, membranous; petiole unequal in length, 0.5–1.2 cm; leaf blade abaxially gray-green, adaxially dark green, ovate, unequal in size, 0.7–2.5 × 0.6–1 cm, subpapery, 3-veined, sunken adaxially, prominent abaxially, lateral veins several, inconspicuous, honeycombed abaxially, cystoliths fusiform, adaxially densely, regularly and longitudinally arranged along margin on both surfaces, base subcordate or emarginate, rarely broadly cuneate, margin somewhat thickened, obtusely 2–4-serrate from mid-base. Inflorescences solitary; male inflorescence a capitulum, peduncle 5–12 mm; female ones shorter. Male flowers pedicellate, in bud ca. 0.8 mm; perianth lobes 4, obovate, subapically corniculate; stamens 4; rudimentary ovary conic. Female perianth lobes unequal, largest lobe cymbiform, subapically strongly recurved corniculate. Achene brownish, narrowly ovoid, ca. 0.8 mm, slightly compressed, smooth, enclosed by perianth lobes. Fl. Apr–May, fr. Jun–Sep.

Shaded moist places of limestone mountain; ca. 1300 m. SE Yunnan [N Vietnam].

59. *Pilea linearifolia* C. J. Chen, Acta Phytotax. Sin. 17(1): 105. 1979.

条叶冷水花 tiao ye leng shui hua

Herbs weak, glabrous, dioecious. Stems erect, simple, 5–10 cm tall, ca. 1 mm in diam., succulent. Leaves crowded on upper nodes; stipules persistent, interpetiolar, connate at base, deltoid, ca. 1 mm, membranous; petiole subequal in length, 0.1–0.2 cm; leaf blade elliptic-lanceolate or oblong-linear, subequal in size, 6–12 × 2–4 mm, membranous, 3-veined, lateral pair reaching margin at middle, secondary veins 2–3 each side, inconspicuous, cystoliths linear, conspicuous on both surfaces, base obtuse or emarginate, margin entire, rarely shallowly 1-lobed in middle, apex attenuate, with obtuse tip. Inflorescences solitary, in upper nodes; male a capitulum, peduncle 4–15 mm; glomerules of few flowers, sometimes only 1 developing, bracts ovate-lanceolate, ca. 0.7 mm; female inflorescence a cluster of a

few flowers; bracts ovate, 0.6 mm. Male flowers pedicellate, in bud ca. 2 mm; perianth lobes 4, obovate, connate 1/2 of length, subapically corniculate; stamens 4; rudimentary ovary minute. Female perianth lobes unequal, largest lobe cymbiform, subapically corniculate. Achene narrowly ovoid, ca. 0.6 mm, slightly compressed, enclosed by perianth lobes. Fl. Jul, fr. Aug–Sep.

Shaded moist mossy places in *Quercus* forests; ca. 3100 m. S Xizang (Gyirong) [Nepal].

60. *Pilea cavalieriei* H. Léveillé, Repert. Spec. Nov. Regni Veg. 11: 65. 1912.

石油菜 shi you cai

Herbs perennial, stoloniferous, glabrous, dioecious. Stems blue-green when dry, erect, much branched, 5–40 cm tall, 1.5–5 mm in diam., somewhat succulent, with dense cystoliths. Leaves crowded on apex of stem and branches; stipules persistent, deltoid, ca. 1 mm, membranous; petiole subequal in length, 0.5–2 cm; leaf blade abaxially gray-green, broad-ovate, rhombic-ovate, or suborbicular, subequal in size, 8–20 × 6–18 mm, succulent, papery when dry, 3-veined, lateral pair reaching margin in middle, secondary veins 2–3 each side, inconspicuous, honeycombed abaxially, cystoliths linear, conspicuous adaxially, sometimes on both surfaces, and often longitudinally arranged along margins on both surfaces, base broadly cuneate, subrounded, or subtruncate, often with small auricle, margin entire, rarely undulate or bluntly crenate, apex obtuse, acute, or subrounded. Inflorescences solitary, in upper nodes; male inflorescence a capitulum, peduncle 0.4–1.5 cm; glomerules few flowered, sometimes only 1 developing, bracts ovate-lanceolate, ca. 0.7 mm; female inflorescence a cluster of a few flowers; bracts ovate, 0.6 mm. Male flowers pedicellate, in bud ca. 1.8 mm; perianth lobes 4, obovate-oblong, connate 1/2 of length, subapically corniculate; stamens 4; rudimentary ovary oblong. Female perianth lobes unequal, largest lobe cymbiform, subapically corniculate. Achene ovoid, ca. 0.7 mm, compressed, smooth, enclosed by perianth lobes. Fl. May–Aug, fr. Aug–Oct.

Shaded moist places, rocks in forests; 200–1500 m. Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, E Sichuan, SW Zhejiang [Bhutan].

- 1a. Leaf apex obtuse, acute, or subrounded, margin entire, rarely undulate 60a. subsp. *cavalieriei*
 1b. Leaf apex rounded, margin obtusely crenate 60b. subsp. *crenata*

60a. *Pilea cavalieriei* subsp. *cavalieriei*

石油菜(原亚种) shi you cai (yuan ya zhong)

Pilea cavalieriei subsp. *valida* C. J. Chen; *Pilea peploides* (Gaudichaud-Beaupré) W. J. Hooker & Arnott var. *cavalieriei* (H. Léveillé) H. Léveillé.

Stems 5–30 cm tall, 1.5–2.5 mm in diam. Leaf margin entire, apex obtuse, acute, or subrounded, rarely undulate. Male inflorescences longer than petioles. Fl. May–Aug, fr. Aug–Oct.

Shaded moist places, rocks in forests; 200–1500 m. Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, E Sichuan, SW Zhejiang [Bhutan].

60b. *Pilea cavalieriei* subsp. *crenata* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 99. 1982.

圆齿石油菜 yuan chi shi you cai

Leaf margin obtusely crenate, apex rounded. Fr. May.

- Shaded moist steep rocks; ca. 600 m. N Guangxi, Guizhou.

61. *Pilea sinocrassifolia* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 99. 1982.

厚叶冷水花 hou ye leng shui hua

Pilea crassifolia Hance, J. Bot. 20: 294. 1882, not Blume (1855).

Herbs prostrate, glabrous, monoecious. Stems much branched, succulent, with dense cystoliths when dry. Stipules persistent, triangular, ca. 1 mm, membranous; petiole subequal in length, 0.2–0.6 mm; leaf blade adaxially green, suborbicular, subequal in size, 4–8.5 × 6–18 mm, succulent, papery when dry, 3-veined, lateral pair reaching margin in middle, secondary veins 2–4 each side, all veins inconspicuous, abaxial surface rugose, cystoliths fusiform, conspicuous, base subtruncate, margin entire and revolute, apex subrounded. Male inflorescences solitary, in upper nodes, a capitulum, peduncle 2–5 mm, glomerules of a few flowers; bracts ovate-lanceolate, ca. 0.8 mm. Female inflorescence not seen. Male flowers yellow-green, pedicellate, in bud ca. 2 mm; perianth lobes 4, obovate-oblong, connate 1/2 of length, subapically corniculate, with 2 small gibbose appendices at each side; stamens 4; rudimentary ovary oblong. Fl. Nov–Mar.

- Shaded moist places, rocks along streams; 200–1000 m. SW Fujian, N Guangdong, Guizhou, S Hunan, SE Yunnan.

62. *Pilea racemosa* (Royle) Tuyama in H. Hara, Fl. E. Himal. 61. 1966.

亚高山冷水花 ya gao shan leng shui hua

Procris racemosa Royle, Ill. Bot. Himal. Mts. t. 83, f. 1. 1836; *Pilea subalpina* Handel-Mazzetti; *P. wightii* Weddell var. *roylei* J. D. Hooker.

Herbs perennial, weak, glabrous, monoecious or dioecious. Tuber whitish gray, globose, 3–20 mm in diam. Stems often branched, 2–15(–30) cm tall, succulent. Stipules persistent, triangular, ca. 1 mm, membranous; petiole subequal in length, 0.2–1 cm; leaf blade abaxially pale green, adaxially green, ovate, elliptic, rhombic, obovate, or suborbicular, subequal in size, 0.5–2 × 0.3–1.2 cm, succulent, herbaceous, 3(–5)-veined, rarely triplinerved, lateral veins 1–3 each side, inconspicuous, cystoliths fusiform, conspicuous on both surfaces, base rounded, subcordate, or broadly cuneate, margin bluntly 1–5-serrate each side or entire, apex subacute or obtuse. Inflorescences in pairs, male a capitulum or racemelike-cyme, 1–3.5 cm; female peduncle 0.2–2 cm. Male flowers pedicellate, in bud ca. 1.5 mm; perianth lobes 4, obovate-oblong, connate 1/2 of length, subapically corniculate, stamens 4; rudimentary ovary oblong. Female perianth lobes unequal, subapically corniculate. Achene narrowly ovoid or oblong-ovoid, ca. 0.8 mm, slightly compressed, smooth, enclosed by persistent perianth lobes. Fl. May–Jun, fr. Jul–Sep.

Tsuga or *Picea* forests, semishaded moist places, often on mossy rocks, sometimes on walls by villages; 2200–5400 m. W Sichuan, S Xizang, NW Yunnan, [Bhutan, N India, Nepal, Sikkim].

This species shows great variability in stem branching, leaf shape, leaf margin, and peduncle length. Plants found at higher elevations are shorter, often unbranched, have a less serrate leaf margin, and a shorter peduncle. This species is distinct in always having a globose tuber, capitulate inflorescences, and a narrow, smooth achene.

63. *Pilea approximata* C. B. Clarke, J. Linn. Soc., Bot. 15: 123. 1876.

顶叶冷水花 ding ye leng shui hua

Herbs perennial, weak, glabrous, dioecious, rarely monoecious. Tuber brownish, conic, 5–10 × 3–4 mm, sometimes underground internodes becoming a tuber. Stems often simple, thin, 3–12 × 0.1 cm, succulent. Leaves crowded at stem apex, opposite or 4–6 in whorl; stipules persistent, deltoid, ca. 1 mm, membranous, apex obtuse; petiole unequal in length, 0.1–0.7 cm; leaf blade ovate to ovate- or elliptic-lanceolate, unequal in size, 0.8–4 × 0.5–1.4 cm, submembranous, 3-veined, lateral veins several, reticulate, glabrous, adaxial surface sometimes sparsely pilose on veins, cystoliths fusiform, slightly conspicuous abaxially, base cordate or obtuse, margin sharply serrate, often with a glandular dot by tooth tip abaxially, apex acuminate, sometimes acute. Inflorescences solitary, in upper nodes, a capitulum, peduncle slender, 0.5–2 cm; of several unisexual or rarely bisexual flowers, female peduncle 0.2–2 cm. Bisexual flowers: perianth lobes 3; ovate, ca. 1.5 mm, stamens 3; ovary ellipsoid, ca. 0.8 mm. Male flowers: pedicel 1–1.5 mm; in bud ca. 1.8 mm; perianth lobes (3 or)4, ovate, connate 1/2 of length, subapically corniculate, stamens (3–)4; rudimentary ovary narrowly conic. Female perianth lobes unequal, largest lobe 1/2 as long as achene, subapically corniculate. Achene obliquely ovoid, 1–1.2 mm, slightly compressed, smooth, enclosed by persistent perianth. Fl. Jun–Jul, fr. Jul–Sep.

Abies and *Rhododendron* forests, shaded moist places, mossy rocks, wet mossy trees; 2500–3500 m. S Xizang, NW Yunnan [Bhutan, Nepal, Sikkim].

- 1a. Stipules deltoid, ca. 1 mm; leaves crowded at stem apex or in a whorl of 4–6, leaf blade ovate to lanceolate, apex acuminate or long-acuminate, margin serrate 63a. var. *approximata*
- 1b. Stipules oblong or triangular, 3–4 mm; leaves regularly opposite, subequal in length; leaf blade broadly ovate, apex acute, margin incisoserrate 63b. var. *incisoserrata*

63a. *Pilea approximata* var. *approximata*

顶叶冷水花(原变种) ding ye leng shui hua (yuan bian zhong)

Leaves crowded at stem apex or in a whorl of 4–6; stipules triangular, ca. 1 mm; leaf blades ovate to lanceolate, very unequal in length, 0.8–4 × 0.5–1.4 cm, main veins sunken, adaxial surface glabrous, margin serrate, each tooth often with an abaxial gland dot at tip, apex often acuminate. Fl. Jun–Jul, fr. Jul–Sep.

Abies and *Rhododendron* forests, shaded moist places, mossy rocks along ravines; 2900–3000 m. S Xizang, NW Yunnan [Bhutan, Nepal, Sikkim].

63b. *Pilea approximata* var. *incisoserrata* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 100. 1982.

锐裂齿冷水花 *rui lie chi leng shui hua*

Leaves regularly opposite, subequal in length; stipules oblong or triangular, 3–4 mm; leaf blade broadly ovate, 1–2 × 0.7–1 cm, main veins slightly raised, adaxial surface pubescent on veins, margin sharply incisoserrate, teeth acute, apex always acute. Fl. Jun–Jul, fr. Jul–Aug.

Wet mossy rocks or trees; 2500–3500 m. S Xizang [Bhutan].

64. *Pilea pumila* (Linnaeus) A. Gray, Manual, 437. 1848.

透茎冷水花 *tou jing leng shui hua*

Herbs annual, subglabrous, monoecious. Stems erect, simple or branched, 5–50 cm tall, succulent. Stipules soon deciduous, ovate-oblong, 2–3 mm, membranous; petiole subequal in length, 0.4–4.5 cm, sparsely puberulent adaxially; leaf blade spreading, rhombic-ovate or broadly ovate, subequal in size, 1–9 × 0.6–5 cm, membranous, 3-veined, lateral veins several, distal ones anastomosing, others inconspicuous, both surfaces sparsely pilose, cystoliths linear, base often broadly cuneate, or proximal ones obtuse, margin dentate-serrate, apex shortly acuminate, caudate, or acute; proximal leaf pair often entire. Inflorescences often androgynous, solitary, from almost every node, male a scorpioid cyme, shorter, in the lower nodes, subsessile, many flowered; female inflorescence larger, in upper nodes, in fruit enlarged, but often shorter than petioles. Male flower pedicellate or sessile, in bud obovoid, ca. 1.8 mm; perianth lobes 2(–4), cymbiform, connate at base, subapically corniculate; stamens 2(–4); rudimentary ovary inconspicuous. Female perianth lobes free, subequal or lateral ones slightly larger, all oblong-cymbiform, as long as achene in fruit. Achene often with brownish dots, triangular-ovoid, 1.2–1.8 mm, compressed, smooth. Fl. Jun–Aug, fr. Aug–Nov.

Moist places in forests, ravines, by rice fields, walls by villages; 300–2200(–2900) m. Anhui, Chongqing, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Japan, Korea, Mongolia, Russia (Siberia); North America].

Populations of this species from E Asia were described as *Pilea mongolica*. The authors have examined material of this species, including plants from Asia and North America, and found the specimens were consistently characterized by the scorpioid cyme, 2(–4)-merous male flowers, and triangular-ovoid achene. There is no reason to separate populations from E Asia as a separate species. However, three varieties are recognized here.

The plants are used medicinally as a diuretic.

- 1a. Herbs diffuse; leaf blade rhombic-orbicular or broadly ovate, apex subrounded or obtuse, margin bluntly 3–5-crenate; achene without colored dots 64c. var. *obtusifolia*
1b. Herbs erect or ascending; leaf blade

rhombic-ovate or ovate, apex lanceolate or acute, margin serrate; achene with brownish dots.

- 2a. Female perianth lobes linear, subequal, shorter than or subequal to achene ... 64a. var. *pumila*
2b. Female perianth lobes ovate or obovate-oblong, unequal, lateral 2 broader with conspicuous ribs and longer than achene, abaxial one 1/2 as long as lateral 2 64b. var. *hamaoi*

64a. *Pilea pumila* var. *pumila*

透茎冷水花(原变种) *tou jing leng shui hua* (yuan bian zhong)

Urtica pumila Linnaeus, Sp. Pl. 2: 984. 1753; *Pilea mongolica* Weddell; *P. viridissima* Makino.

Herbs erect. Leaf blade rhombic-ovate or ovate, margin serrate, apex lanceolate or acute. Female perianth lobes subequal, linear, shorter than or subequal to achene. Achene with brownish dots.

Shaded moist places in forests, rocks in ravines; 400–2200(–2900) m. Anhui, Chongqing, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Japan, Korea, Mongolia, Russia (Siberia); North America].

64b. *Pilea pumila* var. *hamaoi* (Makino) C. J. Chen, Bull. Bot. Res., Harbin 2(3): 103. 1982.

荫地冷水花 *yin di leng shui hua*

Pilea hamaoi Makino, Bot. Mag. (Tokyo) 10: 364. 1896.

Herbs erect or ascending. Leaf blade rhombic-ovate or ovate, margin serrate, apex often acute or slightly obtuse. Female perianth lobes unequal, abaxial lobe ovate- or obovate-oblong, 1/2 as long as the 2 lateral lobes which are longer than achene. Achene with brownish dots. Fl. Mar.

Shaded moist places in forests, ravines; 300–900 m. Hebei, Heilongjiang, Jilin [Japan, Korea].

64c. *Pilea pumila* var. *obtusifolia* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 104. 1982.

钝尖冷水花 *dun jian leng shui hua*

Herbs diffuse. Leaf blade rhombic-orbicular or broadly ovate, margin bluntly 3–5-crenate, apex subrounded or obtuse. Female perianth lobes unequal, abaxial lobe ovate-lanceolate or oblong, 1/4–1/3 as long as lateral lobes which are subequal to or 1/2 as long as achene. Achene without colored dots. Fl. Sep–Oct, fr. Oct–Nov.

• Moist places in forests, ravines, by rice fields, walls by villages; 500–1500 m. S Gansu, Guizhou, W Hubei, S Shaanxi, Sichuan.

65. *Pilea pauciflora* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 104. 1982.

少花冷水花 *shao hua leng shui hua*

Herbs annual, weak, subglabrous, monoecious, rarely dioecious. Stems erect, simple or branched, thin, 5–20 cm tall,

1–2.5 mm in diam., succulent. Stipules persistent, light green, suborbicular or subcordate, 2.5–4 mm, thinly membranous, apex rounded; petiole subequal in length, thin, 0.5–2.6 cm, sparsely puberulent adaxially; leaf blade broadly ovate, subequal in size, 0.8–4 × 0.6–3 cm, membranous, 3-veined, lateral veins several, inconspicuous, adaxial surface sparsely pilose, cystoliths minute, base often broadly cuneate or obtuse, margin bluntly 3–5(–7)-crenate, apex obtuse, rarely acute. proximal leaves often smaller, entire. Inflorescences often androgynous, solitary, from almost every node, a cluster or scorpioid cyme, subsessile, few flowered. Male flowers pedicellate, in bud obovoid, 0.4–0.6 mm; perianth lobes 2, hooded, connate at base, subapically corniculate; stamens 2; rudimentary ovary inconspicuous. Female perianth lobes free, very unequal, abaxial lobe longest, hooded, subapically long corniculate, in fruit as long as achene, lateral lobes triangular, quite small, 1/10 as long as abaxial lobe, membranous; staminodes minute, oblong. Achene brownish, triangular-ovoid, ca. 1.5 mm, compressed, attenuate, smooth. Fl. Jun–Aug, fr. Aug–Sep.

• Shaded moist places in forests, by marshes; 2100–2800 m. C and S Gansu, NW Sichuan.

66. *Pilea rostellata* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 106. 1982.

短喙冷水花 *duan hui leng shui hua*

Herbs perennial, stoloniferous, dioecious. Stems erect, simple or branched, ca. 50 cm tall, succulent, with gall-like swellings between nodes; stems, petioles, abaxial leaf blade, and peduncle of male cymes densely covered with villous multicellular hairs. Stipules persistent, triangular, ca. 1 mm, membranous; petiole subequal in length, 1.5–7 cm; leaf blade ovate or narrowly ovate, slightly asymmetric, subequal in size, 9–13 × 4–7.6 cm, membranous, 3-veined, lateral veins many, regularly reticulate, abaxial surface subglabrous, cystoliths fusiform, conspicuous along veins abaxially, base subrounded or broadly cuneate, margin shallowly crenate. Inflorescences in pairs; male cymes ca. 1 cm; bracts narrowly ovate, ca. 0.4 mm. Male flowers pedicellate, in bud obovoid, ca. 1.2 mm; perianth lobes 4, ovate, connate at base, subapically beaked, puberulent, stamens 4; rudimentary ovary conic. Fl. Apr.

• Shaded moist places in forests, near streams; ca. 1700 m. W Yunnan (Longling).

67. *Pilea salwinensis* (Handel-Mazzetti) C. J. Chen, Bull. Bot. Res., Harbin 2(3): 107. 1982.

怒江冷水花 *nu jiang leng shui hua*

Pilea symmeria Weddell var. *salwinensis* Handel-Mazzetti, Symb. Sin. 7: 134. 1929.

Herbs perennial, robust, or subshrubs, stoloniferous, dioecious. Stems brownish when dry, erect, much branched, to 100 cm tall, woody at base, succulent distally; stems and petioles glabrous or sparsely covered with multicellular hairs and squamae above. Stipules persistent, triangular, ca. 1 mm, membranous; petiole unequal in length, 1–6 cm; leaf blade brownish green when dry, narrowly ovate or oblong-lanceolate, unequal in size, 6–12 × 4–5 cm, herbaceous, 3-veined, lateral veins many, regularly transverse, abaxial surface pubescent along

veins, adaxial surface sparsely pilose, cystoliths fusiform on both surfaces, base rounded, margin crenulate, apex acuminate, acumen dentate. Inflorescences in pairs; male inflorescence a cymose panicle, 1–2 cm overall, peduncle thin and short, sparsely pubescent; female inflorescence shorter; bracts linear-lanceolate, ca. 0.6 mm. Male flowers pedicellate, in bud obovoid, ca. 0.7 mm; perianth lobes 4, oblong-ovate, connate at base, subapically corniculate, glabrous; stamens 4; rudimentary ovary minute, conic. Female perianth lobes dimorphic, subequal, abaxial lobe hooded, 1/2 as long as achene, lateral 2 lobes triangular-ovate, membranous. Achene ovoid, ca. 0.5 mm, oblique, smooth, enclosed by persistent perianth. Fl. Apr–May, fr. Jun.

Shaded moist places in forests, near streams; 2000–2500 m. W Yunnan [Myanmar].

68. *Pilea umbrosa* Blume, Mus. Bot. 2: 56. 1856.

荫生冷水花 *yin sheng leng shui hua*

Herbs perennial, stoloniferous, dioecious or monoecious. Stems erect, often branched, 20–50 cm tall, succulent distally, usually covered with multicellular hairs throughout. Stipules soon deciduous, brownish, narrowly ovate or oblong, ca. 5 mm, membranous; petiole unequal in length, 0.6–6.5 cm; leaf blade abaxially pale green, adaxially dark green, broadly ovate, broadly elliptic, or suborbicular, slightly asymmetric, unequal in size, 3–12 × 2–9 cm, submembranous, 3-veined, lateral veins many, cystoliths minute, shortly fusiform, base obtuse to subcordate, margin coarsely dentate, apex short acuminate to caudate-acuminate, acumen untoothed. Inflorescences solitary, male one a widely branched, paniculate cyme, 10–16 cm overall, peduncle 6–10 cm; female inflorescence shorter than male one, shorter than petioles. Male flowers subsessile, in bud obovoid, ca. 0.8 mm; perianth lobes 4, connate at base, corniculate below apex, sparsely setose; stamens 4; rudimentary ovary minute. Female perianth lobes unequal, abaxial lobe hooded, 1/2 as long as achene, lateral 2 lobes triangular-ovate, much shorter, membranous. Achene ovoid, ca. 0.6 mm, compressed, oblique, thinner at margins, smooth, sometimes with an inconspicuously dotted colored ring enclosed by persistent perianth. Fl. Jul–Aug, fr. Sep–Oct.

Shaded moist places in forests, near streams; 1500–2800 m. S Xizang, NW Yunnan [Bhutan, N India, Kashmir, Nepal].

- 1a. Stems, petioles, and abaxial leaf blade densely covered with multicellular hairs; male panicles to 16 cm 68a. var. *umbrosa*
- 1b. Lower stems and abaxial leaf blade subglabrous, otherwise sparsely covered with multicellular hairs; male panicles to 10 cm 68b. var. *obesa*

68a. *Pilea umbrosa* var. *umbrosa*

荫生冷水花(原变种) *yin sheng leng shui hua* (yuan bian zhong)

Pilea producta Blume, p.p.

Stems, petioles, and abaxial leaf blade densely covered

with multicellular hairs. Male panicles to 16 cm. Fl. Jul–Aug, fr. Sep–Oct.

Shaded moist places in forests, near streams; 1500–2800 m. S Xizang, NW Yunnan [Bhutan, N India, Kashmir, Nepal].

Other syntype material of *Pilea producta* belongs to the following species, *P. multicellularis*.

68b. *Pilea umbrosa* var. *obesa* Weddell, Monogr. Urtic. 243. 1856.

少毛冷水花 shao mao leng shui hua

Lower stems and abaxial leaf blade subglabrous; stem in upper part, petioles, and peduncles sparsely covered with multicellular hairs. Male panicles to 10 cm. Fl. Sep.

Shaded moist places in mixed forests; ca. 2600 m. SE Xizang, NW Yunnan [Nepal].

69. *Pilea multicellularis* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 108. 1982.

串珠毛冷水花 chuan zhu mao leng shui hua

Pilea producta Blume, p.p.

Herbs perennial, stoloniferous, dioecious. Stems erect, ca. 40 cm tall, succulent distally; stems, petioles, and both surfaces of leaf blade densely covered with multicellular hairs. Stipules deciduous; petiole strongly unequal in length; the longer one 1–1.5 cm; the shorter one sessile; leaf blade brownish when dry, the major one oblong-ovate, strongly unequal in shape and size; 6–8 × 3.5–4.5 cm, herbaceous, 3-veined, lateral veins many, regularly transverse, cystoliths minute, shortly fusiform, inconspicuous, base cordate, margin serrate, apex acuminate; the minor one broadly ovate to cordate, 2–4 × 1–2.8 cm, base deeply cordate, almost around stem, apex shortly acuminate or acute. Male inflorescence subspicate, few branched, 5–7 cm, flowers densely arranged along 1 side of axis; female inflorescence a cymose panicle, much branched, to 10 cm. Male flowers minute, ca. 1 mm; perianth lobes 4, apex acute; stamens 4; rudimentary ovary minute. Female abaxial perianth lobe hooded, 1/2 as long as achene, lateral 2 lobes triangular-ovate, ca. 1/3 as long as abaxial lobe, membranous. Achene ovoid, ca. 1 mm, slightly compressed, slightly oblique, smooth, sometimes inconspicuously verrucose, enclosed by persistent perianth. Fl. Jul–Aug, fr. Sep–Oct.

• Shaded moist places in forests, near streams; ca. 2900 m. NW Yunnan.

Other syntype material of *Pilea producta* belongs to the previous species, *P. umbrosa*.

70. *Pilea medogensis* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 109. 1982.

墨脱冷水花 mo tuo leng shui hua

Herbs perennial, weak, stoloniferous, dioecious or monoecious. Stems erect, often branched underground, 5–25 cm tall, 1.5–2 mm in diam., woody at base, succulent distally; upper stems, petioles, and inflorescences with multicellular hairs. Stipules soon deciduous, brownish, oblong-lanceolate, membra-

nous; petiole slightly unequal in length, 5–30 mm; leaf blade elliptic or ovate-elliptic, slightly unequal in size, 1.5–8 × 1–4 cm, submembranous, 3-veined, lateral veins 10–13 each side, inconspicuous, abaxial surface pubescent, adaxial surface sparsely multicellular pilose, cystoliths minute, shortly fusiform or punctate, inconspicuous only at margins, base broadly cuneate or obtuse, margin sharply dentate, apex caudate-acuminate, acumen sharply denticulate. Inflorescence glomerules several, in moniliform spikes, sometimes few branched, rarely capitate, 1–4 cm overall, peduncle 0.5–2.5 cm; bracts ovate-oblong, ca. 0.6 mm. Male flowers purplish, ovoid, ca. 1 mm; perianth lobes 4, subapically inconspicuously corniculate; stamens 4; rudimentary ovary minute. Female perianth lobes unequal, abaxial lobe somewhat hooded, 1/2 as long as achene, lateral 2 lobes triangular-ovate, shorter, membranous. Achene ovoid, ca. 1 mm, slightly compressed, slightly oblique, verrucose, enclosed by persistent perianth. Fl. Jun–Jul, fr. Aug–Sep.

Shaded moist places of forest margins, near streams; 2400–3800 m. SE Xizang [N India].

This species was formerly included in *Pilea umbrosa* var. *obesa*, which was based on three collections, which were later recognized as three different taxa. One specimen, *Wallich 4589B*, from Nepal, is considered to be consistent with *P. medogensis* by its general appearance and inflorescence morphology. *Pilea medogensis* is similar to *P. umbrosa*, but is distinct in its moniliform spike, elliptic leaf blades, and leaf apex with a sharply denticulate acumen.

71. *Pilea insolens* Weddell in Candolle, Prodr. 16(1): 118. 1869.

盾基冷水花 dun ji leng shui hua

Pilea anisophylla Weddell var. *khasiana* J. D. Hooker; *P. khasiana* (J. D. Hooker) C. J. Chen.

Herbs perennial, stoloniferous, dioecious or monoecious. Stems simple, 20–50 cm tall, soft, succulent; internodes long. Stipules persistent, triangular-ovate, 1.5–2 mm, membranous; petiole strongly unequal in length, to 5 cm or absent; leaf blade abaxially pale green, adaxially green, the major blade oblong-ovate, asymmetric, strongly unequal in shape and size, sometimes reduced into alternate leaves, 5–13 × 3–6 cm, membranous, 3-veined, basal lateral veins U-shaped near origin, lateral veins many, regularly transverse, reticulate, cystoliths minute, shortly fusiform, conspicuous on both surfaces; base distinctly peltate or deeply cordate in basifixed leaves, margin entire or with a few small teeth near apex, apex caudate-acuminate; the minor blade ovate, 1.5–4 × 0.8–2 cm, base deeply cordate, almost around stem, or subtruncate, margin entire but with a few small teeth near apex, apex acute. Male inflorescence spikelike, somewhat coiled distally, few branched, 5–14 cm, flowers or glomerules loosely arranged along 1 side of axis; female inflorescence a cymose panicle, much branched, to 5 cm; bracts triangular-ovate, ca. 3 mm. Male flowers ca. 2.5 mm; pedicel thin, ca. 2 mm; perianth lobes 4, ovate, connate for ca. 1/2 length, apex caudate; stamens 4; rudimentary ovary minute, conic. Female perianth lobes unequal, abaxial lobe hooded, ca. 1/2 as long as achene, lateral 2 lobes triangular-ovate, ca. 1/2 as long as abaxial lobe, membranous. Achene brownish, ovoid, ca. 1.2 mm, slightly compressed, slightly oblique, verrucose, enclosed by persistent perianth. Fl. Jun–Aug, fr. Sep–Oct.

Shaded moist places in evergreen and broad-leaved mixed forests, near streams; 1600–2700 m. SE Xizang [Bhutan, N India, Nepal].

The type of *Pilea anisophylla* var. *khasiana*, Griffith 4515, has some leaves peltate and clearly belongs here rather than in *P. anisophylla*.

72. *Pilea anisophylla* Weddell, Monogr. Urtic. 193. 1856.

异叶冷水花 *yi ye leng shui hua*

Pilea anisophylla var. *robusta* J. D. Hooker; *P. secunda* Chien.

Herbs perennial, stoloniferous, dioecious or monoecious. Stems ascending, simple or branched, 20–150 cm tall, succulent, glabrous or sparsely multicellular pubescent adaxially. Stipules persistent, triangular-ovate, 1.5–2 mm, herbaceous; petiole strongly unequal in length, 0–2.5 cm; leaf blade abaxially pale green, adaxially green, asymmetric, strongly unequal in shape and size; the major blade falcate-lanceolate, ovate- or oblong-lanceolate, 5–16 × 1.5–5 cm, membranous, 3-veined, lateral veins many, regularly transverse, reticulate, cystoliths minute, shortly fusiform, conspicuous on both surfaces, base deeply or shallowly cordate, rarely rounded, margin entire or shallowly 1–3-serrate distally, apex caudate-acuminate; the minor blade sessile, triangular-ovate, oblong, rarely falcate lanceolate, 1.5–3(–6) × 0.4–2(–3) cm, base deeply cordate, almost around stem or hastate, rarely subrounded, margin entire or 1- or 2-serrulate near apex, apex acute or acuminate. Male inflorescences spikelike, somewhat coiled distally, few branched, flowers or glomerules loosely arranged along 1 side of axis 3–8(–19) cm, female inflorescences cymose-racemose or cymose-paniculate, branched, shorter, 2–6 cm, glabrous or pubescent. Male flowers ca. 1.2 mm; pedicel 0–1 mm, thin; perianth lobes 4, ovate, connate 1/2 of length, subapically corniculate; stamens 4; rudimentary ovary minute, conic. Female perianth

lobes unequal, abaxial lobe hooded, 1/2 as long as achene, lateral 2 lobes triangular-ovate, 1/2 as long as abaxial lobe, membranous. Achene brownish, ovoid, slightly oblique, ca. 1 mm, slightly compressed, smooth, enclosed by persistent perianth. Fl. Jun–Sep, fr. Sep–Dec.

Shaded moist places in evergreen and broad-leaved mixed forests, near streams; 900–2400 m. SE Xizang, S and W Yunnan [Bhutan, N India, Myanmar, Nepal, Sikkim].

73. *Pilea pellioides* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 112. 1982.

赤车冷水花 *chi che leng shui hua*

Herbs perennial, robust, or subshrubs, stoloniferous, dioecious. Stems much branched, to 120 cm tall; upper stems, branches, petioles, and inflorescence with multicellular pubescence. Stipules deciduous, deltoid or subcordate, 1.5–2.5 mm; petiole strongly unequal in length, 0–2 cm; leaf blade brownish when dry, the major blade oblong-oblong-lanceolate, slightly asymmetric, strongly unequal in shape and size; 8–12 × 2.3–3.5 cm; submembranous, 3-veined, lateral veins many, subtransverse, reticulate, abaxial surface sparsely setose, with dense multicellular hairs on veins, adaxial surface with multicellular hairs, cystoliths minute, only at margins, base obtuse or broadly cuneate, margin serrate or crenate, apex acuminate or caudate-acuminate, acumen serrate. The minor blade rarely reduced, sessile, obovate, 6–9 × 4–6 mm. Inflorescence a compact cymose panicle, 0.8–1.5 cm, shortly pedunculate. Male flowers shortly pedicellate, ca. 1 mm; perianth lobes 4, ovate, connate 1/2 of length, apex obtuse; stamens 4; rudimentary ovary minute, conic. Female flowers ca. 0.5 mm; perianth lobes subequal, oblong, persistent, subapically corniculate. Fl. Aug–Oct.

• Shaded moist places in forests, near streams; 1800–2800 m. NW Yunnan.

5. *Pilea* sect. *Pilea*

冷水花组 *leng shui hua zu*

Herbs. Leaves pinnately veined. Inflorescences capitate or subcapitate. male perianth lobes 4, valvate. Female perianth lobes 3, unequal.

About ten species: Central and South America, Asia; three species (one introduced) in China.

1a. Leaf blade obovate or spatulate, 2–7 mm, margin entire 76. *P. microphylla*

1b. Leaf blade elliptic-lanceolate or linear, 1.5–9 cm, margin serrate, sometimes bluntly so.

2a. Stolon nodes often thickened into conic tubers; leaves crowded on upper 2 or 3 nodes, membranous, linear, 3–9 × 0.5–1 cm, lateral veins 6–10 each side 75. *P. ternifolia*

2b. Stolon nodes not thickened; leaves on upper stem and branches, succulent, thick papery when dry, elliptic-lanceolate, 1.5–4 × 0.5–1 cm, lateral veins 4–6 each side 74. *P. penninervis*

74. *Pilea penninervis* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 113. 1982.

钝齿冷水花 *dun chi leng shui hua*

Herbs perennial, stoloniferous but nodes not thickened, glabrous, dioecious. Stems much branched, 15–25 cm tall, somewhat succulent; internodes 1.5–3.5 cm. Leaves on upper stem and branches; stipules almost persistent, deltoid, ca. 1 mm; petiole subequal in length, 2–5 mm; leaf blade abaxially pale

green, adaxially greenish, slightly lustrous, elliptic-lanceolate, symmetric, subequal in size, 1.5–4 × 0.5–1 cm, succulent, thick papery when dry, veins sunken adaxially, prominent abaxially, lateral veins 4–6 each side, honeycombed abaxially, cystoliths linear, sparse abaxially, dense adaxially, base obtuse, subrounded, or emarginate, margin slightly thickened, bluntly 3- or 4-serrate, apex attenuate or acute. Inflorescences in upper nodes, compactly spicate, 0.3–0.8 cm; bracts triangular-ovate, ca. 0.5 mm; female inflorescence unknown. Male flower pedicellate or

sessile, ca. 1 mm; perianth lobes obovate, connate 1/2 of length, apex acute; rudimentary ovary minute, conic. Fl. Feb–Apr.

Shaded moist places in forests in limestone mountains, near streams; ca. 700 m. W Guangxi, SE Yunnan [N Vietnam].

75. *Pilea ternifolia* Weddell, Monogr. Urtic. 202. 1856.

羽脉冷水花 yu mai leng shui hua

Herbs perennial, stoloniferous, glabrous, dioecious. Tubers brownish, conic, from thickened nodes. Stems simple, thin, 6–20 cm tall, 1–2 mm in diam., somewhat succulent; internodes long inferior, very short superior. Leaves crowded on upper 2 or 3 nodes, opposite, sometimes 4 in whorl; stipules persistent, deltoid, ca. 1 mm, membranous; petiole slender, unequal in length, 1–5 mm; leaf blade linear or oblong-lanceolate, slightly asymmetric, unequal in size, 3–9 × 0.5–1 cm, membranous, lateral veins 6–10 each side, base attenuate, obtusely rounded or emarginate, cystoliths linear, margin sharply serrate, apex long acuminate or attenuate. Inflorescences in upper nodes, compact capitula; peduncle 1–2 cm; glomerules few flowered. Male flowers pedicellate, ca. 1.5 mm; perianth lobes obovate, connate 1/2 of length, subapically corniculate; rudimentary ovary minute, conic. Female perianth lobes unequal, abaxial lobe cymbiform, longer, lateral 2 lobes triangular-ovate, much shorter. Achene ovoid, 1–1.2 mm, compressed, oblique, smooth, enclosed by persistent perianth. Fl. Jun–Jul, fr. Aug–Sep.

Shaded moist places in forests, mossy rocks, near streams; 2900–3100 m. S Xizang [Bhutan, N India, Nepal, Sikkim].

6. *Pilea* sect. *Dimeris* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 115. 1982.

二萼组 er e zu

Dubrueilia Gaudichaud-Beaupré.

Herbs ?annual. Leaves 3-veined. Male perianth lobes 4, valvate; female perianth lobes 2(or 3).

About four species: Asia, Pacific Islands; two species in China.

1a. Leaves suborbicular or rhombic-orbicular, base broadly cuneate or subrounded, margin weakly sinuate-crenate

distally or entire, apex rounded or obtuse 77. *P. peploides*

1b. Leaves broadly ovate or triangular-ovate, base cordate or subtruncate, margin serrate or crenate, apex acute 78. *P. swinglei*

77. *Pilea peploides* (Gaudichaud-Beaupré) W. J. Hooker & Arnott, Bot. Beechey Voy. 96. 1832.

苔水花 tai shui hua

Dubrueilia peploides Gaudichaud-Beaupré, Voy. Uranie, Bot. 495. 1830; *Pilea peploides* var. *major* Weddell.

Herbs weak, often clumped, glabrous, monoecious. Stems reddish, simple or branched, slender, 3–20 cm tall, 1–2 mm in diam., succulent; lower internodes long, upper ones very short. Stipules soon deciduous, triangular, minute, ca. 0.5 mm, membranous; petiole slender, subequal in length, 3–20 mm; leaf blade conspicuously purplish punctate, particularly abaxially, suborbicular, rhombic-orbicular, or deltoid-ovate, subequal in size, 3.5–21 × 3–23 mm, membranous, lateral veins indistinct, cystoliths linear, often regularly transverse, conspicuous abaxially, base cuneate or broadly cuneate, rarely subrounded, margin entire or weakly sinuate-crenate distally, apex obtuse, rounded, sometimes subacute. Inflorescences sometimes andro-

76. *Pilea microphylla* (Linnaeus) Liebmann, Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Math. Afd., ser. 5, 5(2): 302. 1851.

小叶冷水花 xiao ye leng shui hua

Parietaria microphylla Linnaeus, Syst. Nat., ed. 10, 2: 1308. 1759.

Herbs weak, glabrous, monoecious. Stems erect or ascending, blue-green when dry, simple or branched, 3–17 cm tall, 1–1.5 mm in diam., succulent, cystoliths dense. Stipules persistent, triangular, ca. 0.5 mm, membranous; petiole slender, unequal in length, 1–4 mm; leaf blade abaxially pale green, adaxially green, obovate or spatulate, unequal in size, 2–7 × 1.5–3 mm, succulent, papery when dry, midvein indistinct distally, lateral veins several, indistinct, abaxial surface honey-combed, cystoliths linear, adaxial, regularly transverse, base cuneate or attenuate, margin entire, somewhat recurved, apex obtuse. Inflorescences often androgynous, compactly cymose-capitate; peduncle 1.5–6 mm, sometimes sessile; glomerules few flowered. Male flowers pedicellate, ca. 0.7 mm; perianth lobes ovate, subapically corniculate; rudimentary ovary minute, conic. Female perianth lobes subequal, oblong, longer lobe subequal to achene. Achene ovoid, ca. 0.4 mm, compressed, smooth, enclosed by persistent perianth. Fl. Jun–Aug, fr. Sep–Oct.

Commonly naturalized in S China and in greenhouses in N China [native to tropical South America].

gynous, often with male and female inflorescences borne in same axil, compactly cymose-capitate, subglobose; male ones 0.3–1 cm overall, peduncle 0.15–0.7 cm; female inflorescence 0.2–0.6 cm, peduncle 1–4 mm or almost absent. Male flower pedicellate, ca. 0.8 mm; perianth lobes ovate, connate 1/2 of length, apex acute; stamens 4; rudimentary ovary minute. Female flowers light green, pedicellate; perianth lobes 2, very unequal, abaxial lobe cymbiform, as long as fruit, thickened in fruit, adaxial lobe triangular-ovate, ca. 1/5 as long as abaxial lobe, membranous; staminodes oblong, ca. 1/2 length of fruit, but abortive ones much longer. Achene light brownish, ovoid, ca. 0.5 mm, slightly compressed, oblique at apex, smooth or spinulose-verrucose. Fl. Apr–Jul, fr. Jun–Aug.

Shaded moist places in forests, mossy rocks, near streams; 100–1300 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hebei, Henan, Hunan, Jiangxi, Liaoning, E Nei Mongol, Taiwan, Zhejiang [Bhutan, N India, Indonesia, Japan, Korea, Myanmar, Russia (Siberia), Sikkim, Thailand, Vietnam; Pacific Islands (Hawaii)].

This species appears to divide into two forms in China, one in the north with usually simple stems, entire leaves, and capitate inflorescences on 2–7 mm long peduncles, and the other in the south with much-branched stems, denticulate leaves, subsessile cymes, and ornamented achenes. However, in SE China, Japan, and Korea, these differences break down and it is not possible to recognize formal taxa.

The plants are used medicinally as an agent to relieve pain and to treat snake bites.

78. *Pilea swinglei* Merrill, Philipp. J. Sci., C, 13: 136. 1918.

玻璃草 bo li cao

Pilea crateriforma Metcalf; *P. henryana* C. H. Wright; *P. peploides* (Gaudichaud-Beaupré) J. D. Hooker & Arnott var. *minutissima* Hsu.

Herbs weak, glabrous, monoecious. Stems simple or branched, 7–30 cm tall, 1–3 mm in diam., succulent. Stipules soon deciduous, triangular, minute, ca. 1 mm, membranous; petiole subequal in length, 0.5–3 mm; leaf blade abaxially pale green with dense purplish dots, adaxially greenish, broadly ovate or triangular-ovate, subequal in size, 1–5.5 × 0.8–3 mm, succulent, thinly papery when dry, lateral veins 2 or 3 each side,

indistinct, sunken adaxially, prominent abaxially, abaxial surface honeycombed, cystoliths linear, often conspicuously along margin adaxially, base cordate or subtruncate, margin often serrate or crenate, sometimes proximal ones entire, apex acute, sometimes acuminate or obtuse. Inflorescence male simple or few-branched; often longer than the subtending leaf; glomerules 2–4, 2–5 mm in diam., remote; female spike shorter than leaves; bracts oblong-lanceolate, ca. 0.4 mm. Male flowers yellow-green, pedicellate or sessile, in bud ca. 1 mm; perianth lobes oblong-obovate, connate at base, subapically 2-corniculate; stamens 4; rudimentary ovary minute. Female flowers light green, pedicellate; perianth lobes 2 (or 3), very unequal, abaxial lobe cymbiform, slightly shorter than achene, adaxial lobe ovate, 1/5 as long as abaxial lobe, membranous; staminodes oblong, 1/2 of length of fruit. Achene light brownish, sometimes with indistinctly dotted colored ring by margin, ovoid, ca. 0.5 mm, slightly compressed, oblique, smooth. Fl. Jun–Aug, fr. Aug–Nov.

?Mossy rocks in moist shaded places in forests; 400–1500 m. S Anhui, Fujian, Guangdong, NE Guangxi, E Guizhou, W Hubei, Hunan, Jiangxi, Zhejiang [Myanmar].

The plants are used medicinally to relieve fever.

7. *Pilea* sect. *Lecanthoides* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 118. 1982.

托序冷水花组 tuo xu leng shui hua zu

Herbs. Leaves 3-veined. Male inflorescences capitate, usually with a receptacle and involucre; female inflorescences compactly cymose-capitate. male perianth lobes 4, valvate. Female perianth lobes 3.

• Two species.

- 1a. Plants dioecious; receptacle of male inflorescence inconspicuous or absent; leaf blade unequal in size, ovate, 1.5–5 × 1–2.5 cm, without white stripe adaxially 79. *P. gansuensis*
 1b. Plants monoecious; receptacle of male inflorescence conspicuous; leaf blade subequal in size, ovate to lanceolate, 6–9 × 2.5–3.5 cm, with 2 broad, interrupted, white stripes along midvein 80. *P. receptacularis*

79. *Pilea gansuensis* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 118. 1982.

陇南冷水花 long nan leng shui hua

Herbs weak, glabrous, dioecious. Stems much branched, to 20 cm tall, succulent. Stipules persistent, greenish, ovate-oblong, 3–5 mm, herbaceous; petiole unequal in length, 0.5–1.5 mm; leaf blade ovate, unequal in size, 1.5–5 × 1–2.5 cm, 3-veined, basal lateral veins reaching margin in middle, anastomosing with adjacent lateral veins, lateral secondary veins 3–6 each side, indistinct, abaxial surface glabrous, adaxial surface sparsely pilose, cystoliths linear, often inconspicuous, base rounded or shallowly cordate, margin denticulate or ciliate, apex acuminate or acute. Inflorescences in pairs, of 2–3 glomerules compactly clustered a globose head 3–6 mm in diam., often with an inconspicuous receptacle and involucre, peduncle 1–3.5 cm; bracts triangular-ovate, somewhat connate at base, ca. 0.5 mm. Female inflorescence not seen. Male flowers yellow-green, pedicellate, in bud ca. 1.5 mm; perianth lobes connate at base, subapically corniculate; rudimentary ovary minute. Fl. Jul–Aug.

• ?Shaded moist places in forests; 1400–1800 m. SE Gansu, NW Sichuan.

80. *Pilea receptacularis* C. J. Chen, Bull. Bot. Res., Harbin 2(3): 119. 1982.

序托冷水花 xu tuo leng shui hua

Herbs subglabrous, monoecious. Stems light green or purplish, almost simple, 25–40 cm tall, 2–3 mm in diam., succulent; internodes 2.5–8 cm. Stipules persistent, greenish, ovate-oblong, 6–9 mm, membranous, obtuse at apex; petiole subequal in length, 1–5 cm, sparsely puberulent above; leaf blade abaxially pale green, adaxially dark green with 2 broad, interrupted, white stripes along midvein, ovate to lanceolate, subequal in size, 6–9 × 2.5–3.5 cm, 3-veined, base-lateral ones reaching margin at middle, anastomosing with adjacent lateral veins, lateral secondary veins 7–10 each side, reticulate, abaxial surface glabrous, adaxial surface sparsely pilose, with minute, linear, often inconspicuous cystoliths, base rounded or broadly cuneate, rarely emarginate, margin denticulate or sparsely ciliate, apex acuminate or long acuminate, proximal leaves acute or obtuse. Male inflorescences solitary, often with female inflores-

cence in same axil, flowers crowded on bracteate, conspicuous fleshy cupulate receptacles, 0.4–0.8 cm in diam., pedunculate, rarely without receptacle; bracts triangular-ovate, ca. 1.2 mm; female inflorescence a compactly clustered cyme, peduncle 0.5–1.2 cm. Male flowers yellow-green, long pedicellate, in bud ca. 1.5 mm; perianth lobes ovate-oblong, connate 1/2 of length,

subapically corniculate, with sparse cystoliths; rudimentary ovary minute. Achene ovoid, ca. 1 mm, slightly compressed, oblique at apex, with several concentric colored circles on both sides. Fl. Jun–Aug, fr. Jul–Sep.

• Shaded moist places in forests, near streams, roadsides; 600–2000 m. W Hubei, S Shaanxi, E Sichuan.

7. *LECANTHUS* Weddell, Ann. Sci. Nat., Bot., sér. 4, 1: 187. 1854.

假楼梯草属 *jia lou ti cao shu*

Chen Jiarui (陈家瑞 Chen Chia-ju); Ib Friis, C. Melanie Wilmot-Dear

Meniscogyne Gagnepain.

Herbs annual or perennial, without stinging hairs. Stems succulent. Leaves opposite, petiolate; stipules deciduous, intrapetiolar, connate, membranous; leaf blade 3-veined, usually symmetric, margin serrate-dentate; cystoliths linear. Inflorescences solitary, axillary, often pedunculate, seated on a receptacle; receptacles at first broadly subcampanulate, soon expanded, of unisexual flowers (plants monoecious or dioecious); male and female inflorescences often separate or sometimes mixed in same receptacle, rarely male ones capitate or cymose without receptacle; involucre bracts in 1 or 2 whorled rows along margin of receptacle. Male flowers often obconic in bud; perianth lobes 4 or 5, slightly unequal, imbricate; stamens 4 or 5; filaments inflexed in bud; rudimentary ovary minute, inconspicuous. Female flowers: perianth lobes (3 or)4(or 5), often unequal, often corniculate below apex; staminodes small, scale-like, inflexed. Ovary straight; style absent; stigma penicillate, deciduous; ovule orthotropous. Achene straight, with crested or U-shaped appendix at apex or along dorsiventral edges, usually verrucose, invested by shorter persistent perianth. Seeds with little endosperm; cotyledons thick, elliptic.

Three species: tropics and subtropics of E Africa and E Asia; three species (one endemic) in China.

Gagnepain described the genus *Meniscogyne* on the basis of U-shaped stigmas. In fact, the stigmas are penicillate, very soon deciduous, and have an enlarged, crested or U-shaped appendix at the apex. These characters are typical for the genus *Lecanthus*. Thus, *Meniscogyne* was treated as a synonym of *Lecanthus* in FRPS 23(2) in 1995.

- 1a. Plants 25–70 cm tall; leaf blade ovate to lanceolate, apex usually acuminate, lateral veins numerous; peduncle 3–30 cm 2. *L. peduncularis*
 1b. Plants 2–20 cm tall; leaf blade ovate, apex often acute, sometimes short acuminate or obtuse, lateral veins 2–4 each side; peduncle less than 3 cm.
 2a. Male inflorescences with discoid or cuplike receptacle; male perianth lobes 4; leaf margin 3–8-serrate each side; stipules triangular-ovate, 1.5–3 mm 3. *L. petelotii*
 2b. Male inflorescences capitate or cymose, without receptacle, rarely with inconspicuous receptacle; male perianth lobes 4(or 5); leaf margin 7–11-serrate each side; stipules oblong, 3–5 mm 1. *L. pileoides*

1. *Lecanthus pileoides* Chien & C. J. Chen, Acta Phytotax. Sin. 21(3): 349. 1983.

冷水花假楼梯草 *leng shui hua jia lou ti cao*

Herbs annual, monoecious. Stems branched or simple, 5–20 cm tall, subglabrous. Stipules oblong, 3–5 mm, membranous, apex obtuse; petiole 0.5–1.5 cm, sparsely pubescent or subglabrous; leaf blade unequal in same pair, ovate, 1.8–4 × 1.2–2.3 cm, membranous, 3-veined, lateral basal pair reaching to middle and anastomosing with adjacent secondary veins before margin or to teeth, lateral veins 3 or 4 on each side, sparsely hirsute adaxially, sparsely pubescent on veins abaxially, base obliquely cuneate, rarely rounded, margin 7–11-serrate each side, apex acute or short acuminate; cystoliths linear; proximal leaves rather small, usually rhombic-orbicular, margin several serrate or entire. Male inflorescences few flowered, capitate or cymose, receptacle inconspicuous or absent, shortly pedunculate, 4–7 mm. Female inflorescences many flowered, sometimes mixed with males, on discoid receptacle; peduncle 0.6–1.5 cm; involucre bracts in 1 row. Male flowers pedicellate, in bud obconic, 1–1.5 mm; perianth lobes 4(or 5) unequal,

obovate-oblong, with a few setulose hairs, corniculate below apex; stamens 4(or 5); rudimentary ovary minute, conic. Female flowers: perianth lobes 4, strongly unequal, with a few setulose hairs, long corniculate below apex; staminodes conspicuous, squamate; stigma penicillate. Achene brownish, ovoid-oblong, ca. 0.8 mm, crested at dorsal edge, botuliform-verrucose. Fl. Jul–Aug, fr. Sep–Oct.

• Shady places of limestone mountains; ca. 2100 m. SW Guizhou, E Yunnan.

2. *Lecanthus peduncularis* (Wallich ex Royle) Weddell in Candolle, Prodr. 16(1): 164. 1869.

假楼梯草 *jia lou ti cao*

Procris peduncularis Wallich ex Royle, Ill. Bot. Himal. Mts. t. 83. 1839; *Elatostema ovatum* Wight; *Lecanthus obtusus* (Royle) Handel-Mazzetti; *L. sasakii* Hayata; *L. wallichii* Weddell; *L. wightii* Weddell; *Procris obtusa* Royle.

Herbs perennial, stoloniferous, monoecious or dioecious. Stems often branched, 25–70 cm tall, pubescent distally. Stipules oblong, 3–9 mm, membranous, apex obtuse; petiole 2–

8 cm, sparsely pubescent; leaf blade unequal in same pair, ovate to lanceolate, 4–15 × 2–6.5 cm, 3-veined, lateral basal pair often unequal, 1 reaching to middle, anastomosing with adjacent secondary veins before margin, other reaching to tooth of distal margin, lateral veins numerous, sparsely hirsute adaxially, sparsely pubescent on veins abaxially, base slightly obliquely rounded, rarely broadly cuneate, margin dentate-serrate, apex usually acuminate; cystoliths linear, conspicuous on both surfaces. Male inflorescences capitate, receptacle discoid, 8–35 mm in diam.; peduncle 5–30 cm. Female inflorescences on discoid receptacles 5–10 mm in diam.; peduncle 3–12 cm; involucre bracts in 1 or 2 rows, ovate or triangular, ca. 1 mm, membranous. Male flowers pedicellate; perianth lobes 5, unequal, obovate-oblong, cuneate below apex; stamens 5; rudimentary ovary minute, conic. Female flowers shortly pedicellate; perianth lobes (3 or)4(or 5), subequal or lobes by the margin of discoid receptacle unequal, oblong-obovate, 2 lobes cuneate below apex; staminodes conspicuous, elliptic-oblong, ca. 0.8 mm. Achene brownish gray, ellipsoid-ovoid, 0.8–1 mm, U-shaped elevated appendix along dorsi-ventral edge, verrucose. Fl. Jul–Oct, fr. Sep–Nov.

Shady, moist places in forests, along streams; 1300–2700 m. Fujian, Guangdong, Guangxi, Hunan, Jiangxi, Sichuan, Taiwan, E and S Xizang, Yunnan [Bhutan, India, Indonesia, Nepal, Pakistan, Philippines, Sri Lanka, Sikkim, Vietnam; Africa].

3. *Lecanthus petelotii* (Gagnepain) C. J. Chen in C. Y. Wu, Fl. Xizang. 1: 546. 1983.

越南假楼梯草 yue nan jia lou ti cao

Meniscogyne petelotii Gagnepain, Bull. Soc. Bot. France 75: 100. 1928.

Herbs annual, monoecious or dioecious. Stems often simple, 2–10 cm tall, sparsely pubescent or subglabrous. Leaves usually crowded at stem apex; stipules triangular-ovate, 1.5–3 mm; petiole 1–15 mm; leaf blade unequal in same pair, broadly ovate or rhombic-ovate, 0.5–9.5 × 0.3–3 cm, 3-veined, lateral basal pair reaching to distal teeth or anastomosing with adjacent secondary veins before margin, lateral veins 2 or 3 on each side, sparsely hirsute adaxially, sparsely pubescent on veins abaxially, base slightly oblique, broadly cuneate or rounded, margin 3–8-serrate, apex acute or obtuse; cystoliths linear, conspicuous on both surfaces. Male inflorescences few flowered, receptacle cuplike; peduncle 1–5 mm. Female inflorescences on discoid

receptacles, 3–6 mm in diam.; peduncle 1–2 cm. Male flowers in bud obovoid, ca. 1 mm; pedicel 1–3 mm; perianth lobes 4, unequal, sometimes corniculate below apex; stamens 4; rudimentary ovary minute, inconspicuous. Female flowers: perianth lobes 4, cymbiform, shorter than ovary, in fruit enlarged and longer than achene, long corniculate below apex; staminodes conspicuous; stigma soon deciduous, penicillate. Achene brown-gray, oblong, slightly compressed, ca. 0.6 mm, U-shaped elevated appendix along distal dorsi-ventral edge, verrucose. Fl. Jun–Aug, fr. Aug–Oct.

Shaded moist places in forests, mossy rocks, along streams; 2500–2900 m. S Xizang, Yunnan [Laos, Vietnam].

Two varieties occur in China; var. *petelotii* occurs in Laos and Vietnam.

- 1a. Leaves usually crowded at stem apex, petiole 1–3 mm; female peduncle 1–2 cm; female perianth lobes glabrous at apex 3a. var. *corniculata*
- 1b. Leaves not crowded at stem apex, petiole 4–15 mm; female peduncle less than 1 cm; female perianth lobes setulose at apex 3b. var. *yunnanensis*

3a. *Lecanthus petelotii* var. *corniculata* C. J. Chen in C. Y. Wu, Fl. Xizang. 1: 547. 1983.

角被假楼梯草 jiao bei jia lou ti cao

Leaves usually crowded at stem apex; petiole 1–3 mm. Female peduncle 1–2 cm. Female perianth lobes glabrous at apex. Achene verrucose.

• Shaded moist places in forests, mossy rocks, along streams; 2500–2900 m. S Xizang, S Yunnan.

3b. *Lecanthus petelotii* var. *yunnanensis* C. J. Chen, Acta Phytotax. Sin. 21(3): 349. 1983.

云南假楼梯草 yun nan jia lou ti cao

Leaves not crowded at stem apex; petiole 4–15 mm. Female peduncle less than 1 cm. Female perianth lobes setulose at apex. Achene with regular, longitudinally arranged, botuliform grooves. Fl. Jul–Aug, fr. Aug–Sep.

• Shaded moist places in forests, along streams; ca. 2700 m. NW Yunnan (Gongshan).

8. *PELLIONIA* Gaudichaud-Beaupré, Voy. Uranie, Bot. 494. 1830, nom. cons.

赤车属 chi che shu

Lin Qi (林祁); Ib Friis, C. Melanie Wilmot-Dear

Polychroa Loureiro, nom. rej.

Herbs or subshrubs, without stinging hairs. Leaves apparently alternate, distichous; nanophylls present or absent, opposite to normal leaves; stipules 2; leaf blade 3-veined, one major lateral vein sometimes inserted above the base, or pinnately veined, base asymmetric, margin entire or serrate; cystoliths mostly present, linear or fusiform. Inflorescences axillary, cymes of unisexual flowers (plants monoecious or dioecious); male ones usually pedunculate; female ones pedunculate or sessile, bracteose, rarely with discoid receptacle and involucre. Male flowers: perianth lobes 4 or 5, elliptic, connate 1/2 of length, slightly valvate, apex usually corniculate; stamens as many as and opposite to perianth lobes; filaments inflexed in bud; rudimentary pistil small. Female flowers: perianth lobes 4 or 5, distinct, longer than or as long as ovary, usually unequal, apex usually corniculate; staminodes as many as and opposite to perianth, scale-like. Ovary straight, ellipsoid; style absent; stigma penicillate; ovule orthotropous. Achenes ovoid or ellipsoid, slightly flattened, usually tuberculate.

URTICACEAE

About 60 species: tropical and subtropical Asia, Pacific islands; 20 species (nine endemic) in China.

- 1a. Leaf blade margin entire.
 - 2a. Petioles 0.5–2 cm 1. *P. heyneana*
 - 2b. Petioles 4–19 cm 2. *P. latifolia*
- 1b. Leaf blade margin denticulate, dentate, crenate, serrate or nearly undulate.
 - 3a. Plants with nanophylls.
 - 4a. Stems prostrate, terete 3. *P. repens*
 - 4b. Stems erect, winged or sharply, longitudinally angled 16. *P. caulialata*
 - 3b. Plants without nanophyll.
 - 5a. Achenes smooth or striolate; leaf blade pinnately veined, without distinct major lateral veins.
 - 6a. Herbs monoecious 20. *P. brachyceras*
 - 6b. Herbs dioecious.
 - 7a. Leaf blade 14–25 cm 17. *P. macrophylla*
 - 7b. Leaf blade 4–10 cm 18. *P. incisoserrata*
 - 5b. Achenes tuberculate; leaf blade with one or both major lateral veins inserted above base or pinnately veined, without distinct major lateral veins.
 - 8a. Leaf blade peltate at base 15. *P. viridis*
 - 8b. Leaf blade not peltate at base.
 - 9a. Leaf blade pinnately veined, without distinct major lateral veins.
 - 10a. Leaf blade with cystoliths 13. *P. grijsii*
 - 10b. Leaf blade without cystolith 14. *P. yunnanensis*
 - 9b. Leaf blade with major lateral veins asymmetric, one inserted above base.
 - 11a. Subshrubs 6. *P. scabra*
 - 11b. Herbs.
 - 12a. Most leaf axils with a single leaf much smaller than the subtending leaf.
 - 13a. Stems ascending, unbranched, hairy; achene tuberculate 8. *P. veronicoides*
 - 13b. Stems erect, branched, glabrous; achene smooth 19. *P. leiocarpa*
 - 12b. Leaf axils without such leaves.
 - 14a. Male peduncles 11–13 cm 4. *P. longipedunculata*
 - 14b. Male peduncles 0–6(–9) cm.
 - 15a. Leaf blade up to 15 cm, petiole up to 7 mm.
 - 16a. Leaf blade nearly undulate or undulate-crenate; cuneate at base 11. *P. paucidentata*
 - 16b. Leaf blade crenate; obtuse or auriculate at base 12. *P. heteroloba*
 - 15b. Leaf blade 0.5–8 cm, petiole 0–4 mm.
 - 17a. Leaf apex rounded or obtuse 10. *P. brevifolia*
 - 17b. Leaf apex acute, caudate or acuminate.
 - 18a. Stipules triangular, 1–1.8 mm wide 5. *P. retrohispida*
 - 18b. Stipules subulate, 0.1–0.2 mm wide.
 - 19a. Stems densely retrorse-strigose 7. *P. acutidentata*
 - 19b. Stems glabrous or puberulent 9. *P. radicans*

1. Pellionia heyneana Weddell, Arch. Mus. Hist. Nat. 9: 287. 1855.

全缘赤车 quan yuan chi che

Elatostema heyneanum (Weddell) A. Haller.

Herbs perennial or subshrubs, monoecious or dioecious. Stems ascending or erect, branched or simple, strigose. Leaves alternate; stipules triangular, ca. 10 × 3.5 mm; petiole 0.5–2.0 cm; leaf blade papery, obliquely elliptic, elliptic-ovate, or obovate, 5–13(–15) × 3–6.8(–7.4) cm, major lateral veins symmetric, both basal, broader outer half auriculate, margin entire, apex acuminate or cuspidate; cystoliths slightly conspicuous, dense; nanophylls narrowly ovate, 3–4 mm. Staminate inflorescences 1.5–3.5 cm in diam., peduncle 5.5–12 cm; staminate flowers: tepals 5, elliptic; stamens 5; rudimentary pistil subulate. Pistillate inflorescences 6–8 mm in diam., peduncle 2–5

mm; pistillate flowers: tepals 5. Achenes ovoid or narrowly ovoid, tuberculate. Fl. May–Aug.

Mountain forests, along streams, streamsides, damp places; 900–1000 m. N Guangxi, Yunnan [Cambodia, India, Indonesia, Sri Lanka, Thailand].

2. Pellionia latifolia (Blume) Boerlage, Handl. Fl. Ned. Ind. 3: 375. 1900.

长柄赤车 chang bing chi che

Procris latifolia Blume, Bijdr. Fl. Ned. Ind. 509. 1826; *Elatostema javanicum* (Weddell) A. Haller; *E. latifolium* Blume ex H. Schroeter; *E. latifolium* (Blume) Boerl. var. *acaule* (Hook. f.) H. Schroeter; *E. latifolium* var. *eulatifolium* H. Schroeter; *E. tsoongii* (Merrill) H. Schroeter; *Pellionia acaulis* J. D. Hooker; *P. balansae* Gagnepain; *P. helferiana* Weddell;

P. javanica (Weddell) Weddell; *P. javanica* (Weddell) Weddell var. *acaulis* Ridley; *P. javanica* (Weddell) Weddell var. *minor* Ridley; *P. pierrei* Gagnepain; *P. tsoongii* (Merrill) Merrill; *Pilea javanica* Weddell; *Polychroa tsoongii* Merrill.

Herbs perennial or subshrubs, usually dioecious. Stems ascending or erect, branched or simple, glabrous or pubescent. Leaves alternate; stipules triangular, 12–18 × 3–6 mm; petiole 4–19 cm; leaf blade papery, obliquely elliptic or oblong-obovate, 12.5–20 × 5.8–11 cm, major lateral veins symmetric, both basal, broader outer half auriculate, margin entire, apex acuminate; cystoliths conspicuous, dense; nanophylls ovate or narrowly ovate, 3–4 mm. Staminate inflorescences 2–4 cm in diam., peduncle 3.2–10 cm; staminate flowers: tepals 5, nearly elliptic; stamens 5; rudimentary pistil conic. Pistillate inflorescences 2–3 cm in diam., peduncle 2–10 cm; pistillate flowers: tepals 5. Achenes ovoid, tuberculate. Fl. Dec–Jul.

Valley forests, dark damp places on precipices; 1100–1300 m. S Guangxi, Hainan, S Yunnan [Cambodia, Indonesia, Laos, Malaysia, Myanmar, Thailand, Vietnam].

3. *Pellionia repens* (Loureiro) Merrill, Lingnan Sci. J. 6(4): 326. 1928.

吐烟花 tu yan hua

Polychroa repens Loureiro, Fl. Cochinch. 2: 559. 1790; *Elatostema daveauanum* (N. E. Brown) A. Haller; *E. gibbosum* Kurz; *E. pulchrum* A. Haller; *E. repens* (Loureiro) A. Haller; *E. repens* var. *pulchrum* (N. E. Brown) H. Schroeter; *E. repens* var. *viride* (N. E. Brown) H. Schroeter; *Pellionia annamica* Gagnepain; *P. daveauana* N. E. Brown; *P. daveauana* var. *viridis* N. E. Brown; *P. pulchra* N. E. Brown; *Procris gibbosa* Wallich.

Herbs perennial, monoecious or dioecious. Stems prostrate, usually branched, terete, pubescent or glabrescent. Leaves alternate; stipules triangular, 4–10 × 2–5 mm; petiole 1.5–5 mm; leaf blade papery, obliquely elliptic or obovate, 1.8–11 × 1.2–4.0 cm, major lateral veins asymmetric, one basal, the other arising above base, broader outer half auriculate, margin undulate, undulate-crenate or nearly entire, apex obtuse, rounded or hebetate; cystoliths conspicuous, dense; nanophylls ovate or nearly linear, ca. 1 mm. Staminate inflorescences 0.6–3 cm in diam., peduncle 2–14 cm; staminate flowers: tepals 5, broadly elliptic or elliptic; stamens 5; rudimentary pistil subulate. Pistillate inflorescences ca. 3 mm in diam., sessile; pistillate flowers: tepals 5. Achenes ovoid or ellipsoidal, tuberculate. Fl. May–Oct.

Valley forests, dark damp places on rocks; 800–1100 m. Hainan, Yunnan [Bhutan, Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Philippines, Thailand, Vietnam].

4. *Pellionia longipedunculata* W. T. Wang, Bull. Bot. Res., Harbin 2(1): 1. 1982.

长梗赤车 chang geng chi che

Pellionia subundulata W. T. Wang var. *angustifolia* W. T. Wang.

Herbs perennial, dioecious or monoecious. Stems erect,

simple, crispately strigose. Leaves alternate; stipules broadly lanceolate, 6–11 × 2.5–4 mm; petiole 1–2.5 mm; leaf blade herbaceous, obliquely elliptic or linear-lanceolate, 6–13 × 2.8–4.5 cm, major lateral veins asymmetric, one basal, the other arising above base, broader outer half auriculate, margin obscurely denticulate, apex caudate-acuminate; cystoliths obscure, sparse; nanophyll absent. Staminate inflorescences 1.4–2 cm in diam., peduncle 5–13 cm; staminate flowers: tepals 5, broadly elliptic; stamens 5; rudimentary pistil nearly triangular. Pistillate inflorescences 2–3 mm in diam., sessile; pistillate flowers: tepals 5. Achenes nearly ellipsoidal, tuberculate. Fl. Dec–Jul.

Dense forests along streams, streamside rocks; 600–1000 m. S Guangxi [N Vietnam].

5. *Pellionia retrohispidata* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 6: 54. 1980.

曲毛赤车 qu mao chi che

Elatostema hirticaule W. T. Wang; *E. hunanense* W. T. Wang.

Herbs perennial, dioecious. Stems ascending, branched, densely retrorse-strigose. Leaves alternate; stipules triangular, 3.2–6.5 × 1–1.8 mm; petiole 1–3 mm; leaf blade herbaceous, obliquely elliptic, 3.5–7.5 × 1.1–3.3 cm, major lateral veins asymmetric, one basal, the other arising above base, broader outer half auriculate, margin denticulate, apex acuminate; cystoliths obscure, dense; nanophyll absent. Staminate inflorescences 0.8–1.5 cm in diam., peduncle 1–5.5 cm; staminate flowers: tepals 5, elliptic; stamens 5; rudimentary pistil small. Pistillate inflorescences 3–14 mm in diam., peduncle 0.5–2.5 cm; pistillate flowers: tepals 4–5. Achenes narrowly ellipsoidal, tuberculate. Fl. Jan–Jun.

• Valley forests; 300–1600 m. W Fujian, SW Hubei, Hunan, N Guizhou, NW Jiangxi, Sichuan, SW Zhejiang.

6. *Pellionia scabra* Benth, Fl. Hongk. 330. 1861.

蔓赤车 wan chi che

Elatostema pellionifolium W. T. Wang; *E. scabrum* (Benth) A. Haller; *Pellionia cephaloidea* W. T. Wang; *P. scabra* subvar. *pedunculata* Yamamoto; *Polychroa scabra* (Benth) Hu.

Subshrubs, usually dioecious. Stems ascending or erect, usually branched, strigose. Leaves alternate; stipules subulate, 1.5–3 × 0.1–0.2 mm; petiole 0.5–2 mm; leaf blade herbaceous, obliquely rhombic-oblancheolate or oblong, 3.2–8.5(–10) × (0.7–)1.3–3.2(–4) cm, major lateral veins asymmetric to almost absent, broader outer half broadly cuneate, rounded or auriculate, margin denticulate, apex acuminate or caudate; cystoliths obscure or conspicuous, dense; nanophyll absent. Staminate inflorescences 0.8–1.5 cm in diam., peduncle 0.5–3.5 cm; staminate flowers: tepals 5, elliptic; stamens 5; rudimentary pistil subulate. Pistillate inflorescences 2–8(–14) mm in diam., peduncle 1–4 mm; pistillate flowers: tepals 4–5. Achenes nearly ellipsoidal, tuberculate. Fl. Mar–Jul.

Valley streamside or forests; 300–1200 m. S Anhui, Fujian,

Guangdong, Guangxi, Guizhou, Hainan, Hunan, Jiangxi, Sichuan, Taiwan, SE Yunnan, Zhejiang [Japan, Vietnam].

7. *Pellionia acutidentata* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 6: 53. 1980.

尖齿赤车 jian chi chi che

Herbs perennial, monoecious. Stems ascending, branched, densely retrorse-strigose. Leaves alternate; stipules subulate, 1–2 × 0.1–0.2 mm; petiole 1–3 mm; leaf blade herbaceous, obliquely elliptic, 1.5–4.4 × 0.9–2 cm, major lateral veins asymmetric, one basal, the other arising above base, broader outer half auriculate, margin dentate, apex acuminate, acute or acute; cystoliths obscure; nanophyll absent. Staminate inflorescences 0.5–1.2 cm in diam., peduncle 1–2.5 cm; staminate flowers: tepals 5, narrowly elliptic; stamens 5; rudimentary pistil triangular. Pistillate inflorescences to 3 mm in diam., peduncle to 1 mm or absent; pistillate flowers: tepals 5. Achenes ellipsoidal, tuberculate. Fl. Dec.

Mountain forests; ca. 1300 m. SE Yunnan [N Vietnam].

8. *Pellionia veronicoides* Gagnepain, Bull. Soc. Bot. France 75: 927. 1928.

硬毛赤车 ying mao chi che

Pellionia crispulihirtella W. T. Wang.

Herbs perennial, dioecious. Stems ascending, simple, densely crispate-hirtellous. Leaves alternate; stipules subulate, 5–10 × 0.2–0.3 mm; petiole 1–3 mm; leaf blade papery, obliquely ovate, elliptic, or obovate, 1.5–4.5 × 1–3.4 cm, unequal, axils with reduced shoot leaves small, 2.5–7 × 2.5–5 mm, major lateral veins asymmetric, one basal, the other arising above base, broader outer half auriculate, margin crenate, apex acute, obtuse or acute; cystoliths obscure; nanophyll absent, 2.5–7 × 2.5–5 mm. Staminate inflorescences sessile, with 3–7 flowers; staminate flowers: tepals 4 or 5, oblong-obovate; stamens 4–5; rudimentary pistil small. Pistillate inflorescences 4–6 mm in diam., sessile; pistillate flowers: tepals 4–5. Achenes ellipsoidal, tuberculate. Fl. Oct–Nov.

Forest margins in mountains, streamsides; 1200–1500 m. SE Yunnan [N Vietnam].

9. *Pellionia radicans* (Siebold & Zuccarini) Weddell in Candolle, Prodr. 16(1): 167. 1869.

赤车 chi che

Procris radicans Siebold & Zuccarini, Fl. Jap. 218. 1846; *Elatostema radicans* (Siebold & Zuccarini) Weddell; *E. radicans* var. *grande* (Gagnepain) H. Schroeter; *Pellionia arisanensis* Hayata; *P. chikushiensis* Yamamoto; *P. radicans* f. *grandis* Gagnepain; *P. radicans* var. *grandis* (Gagnepain) W. T. Wang.

Herbs perennial, usually dioecious. Stems ascending or repent, usually branched, glabrous or puberulent. Leaves alternate; stipules subulate, 1–4 × 0.1–0.2 mm; petiole 1–4 mm; leaf blade herbaceous, obliquely rhombic-ovate or lanceolate, (1.2–)2.4–5(–9) × (0.8–)1–2.5(–4.5) cm, major lateral veins asymmetric, one basal, the other arising above base, broader outer half auriculate, margin dentate, apex acuminate; cystoliths ob-

scure or conspicuous; nanophyll absent. Staminate inflorescences 1–1.5 cm in diam., peduncle 0.5–3.5(–7) cm; staminate flowers: tepals 5, elliptic; stamens 5; rudimentary pistil conic. Pistillate inflorescences 3–5 mm in diam., peduncle 0.3–3(–25) mm; pistillate flowers: tepals 5. Achenes nearly ellipsoidal, tuberculate. Fl. May–Dec.

Valley forests, thickets in shady damp places, streamsides; 200–1500 m. S Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, SW Hubei, Hunan, Jiangxi, Sichuan, Taiwan, SE Yunnan, Zhejiang [Japan, Korea, N Vietnam].

This species is used medicinally.

10. *Pellionia brevifolia* Bentham, Fl. Hongk. 330. 1861.

短叶赤车 duan ye chi che

Elatostema brevifolium (Bentham) A. Haller; *E. radicans* var. *minimum* (Makino) H. Schroeter; *Pellionia minima* Makino.

Herbs perennial, monoecious or dioecious. Stems prostrate, branched, pubescent or strigose. Leaves alternate; stipules subulate, 1–2 × 0.1–0.2 mm; petiole 0.5–2 mm; leaf blade herbaceous, obliquely elliptic or obovate, 0.5–3.2 × 0.4–2 cm, major lateral veins asymmetric, one basal, the other arising above base, broader outer half auriculate, margin undulate-crenate or crenate, apex rounded or obtuse; cystoliths obscure; nanophyll absent. Staminate inflorescences 0.8–1.5 cm in diam., peduncle 1–4 cm; staminate flowers: tepals 5, elliptic; stamens 5; rudimentary pistil obscure. Pistillate inflorescences 2.5–4 mm in diam., peduncle to 3(–10) mm; pistillate flowers: tepals 5. Achenes ellipsoidal or narrowly ovoid, tuberculate. Fl. May–Oct.

Mountain forests, valley streamsides, damp rocks; 300–1600 m. S Anhui, Fujian, Guangdong, Guangxi, SW Hubei, Hunan, Jiangxi, Zhejiang [Japan].

11. *Pellionia paucidentata* (H. Schroeter) Chien, Acta Phytotax. Sin. 8: 354. 1963.

滇南赤车 dian nan chi che

Elatostema paucidentatum H. Schroeter, Repert. Spec. Nov. Regni Veg. Beih. 83(2): 80. 1936; *E. henryanum* var. *oligodontum* Handel-Mazzetti; *Pellionia longgangensis* W. T. Wang; *P. paucidentata* var. *hainanica* Chien & S. H. Wu; *P. subundulata* W. T. Wang.

Herbs perennial, monoecious or dioecious. Stems erect or ascending, usually simple, glabrous or pubescent. Leaves alternate; stipules subulate, 2–7 × 0.1–0.3 mm; petiole 1.5–7 mm; leaf blade papery, obliquely elliptic or oblanceolate, 2–15.5 × 1.5–6.5 cm, major lateral veins asymmetric, one basal, the other arising above base, base obliquely cuneate, margin nearly undulate or undulate-crenate, apex cuspidate or acuminate; cystoliths conspicuous, dense or sparse; nanophyll absent. Staminate inflorescences 0.5–4.5 cm in diam., peduncle 2–7 cm; staminate flowers: tepals 4 or 5, elliptic; stamens 4–5; rudimentary pistil obscure. Pistillate inflorescences 0.4–2 cm in diam., peduncle 0.2–5.5 cm; pistillate flowers: tepals 5. Achenes ellipsoidal, tuberculate. Fl. Apr–Dec.

Valley streamsides, dark damp places; 200–2000 m. Guangxi, S Guizhou, Hainan, S Yunnan [N Vietnam].

12. *Pellionia heteroloba* Weddell, Arch. Mus. Hist. Nat. 9: 283. 1856.

异被赤车 *yi bei chi che*

Elatostema griffithianum (Weddell) H. Hallier; *E. henryanum* Handel-Mazzetti; *Pellionia griffithiana* Weddell; *P. heteroloba* var. *minor* W. T. Wang; *P. keitaoensis* Yamamoto; *P. menglianensis* Y. Y. Qian.

Herbs perennial, dioecious. Stems erect or ascending, usually simple, glabrous or pubescent. Leaves alternate; stipules subulate, 2–8 × 0.1–0.3 mm; petiole 3–8 mm; leaf blade herbaceous or papery, obliquely oblong, obliquely lanceolate, or oblanceolate, (4–)8–15 × (1.5–)2.5–5.7 cm, major lateral veins asymmetric to almost absent, broader outer half auriculate, margin crenate or serrate, apex cuspidate, acuminate; cystoliths obscure or conspicuous; nanophyll absent. Staminate inflorescences 1–4.5 cm in diam., peduncle 1–9 cm; staminate flowers: tepals 5, elliptic; stamens 5; rudimentary pistil obscure. Pistillate inflorescences 5–9 mm in diam., peduncle 1–15 mm; pistillate flowers: tepals 4–5. Achenes narrowly ellipsoidal, tuberculate. Fl. Oct–Feb.

Mountain forests, streamsides, wet rocks, dark damp places; 600–2700 m. Fujian, Guangdong, Guangxi, N Guizhou, SE Sichuan, Taiwan, Yunnan [Bhutan, India, Laos, Myanmar, Sikkim, N Vietnam].

13. *Pellionia grijsii* Hance, J. Bot. 6: 49. 1868.

华南赤车 *hua nan chi che*

Pellionia funingensis W. T. Wang.

Herbs perennial, monoecious or dioecious. Stems erect or ascending, usually simple, densely strigose. Leaves alternate; stipules subulate, 2–4 × 0.1–0.2 mm; petiole 1–4 mm; leaf blade herbaceous, obliquely elliptic or oblong-oblanceolate, (3–)6–14(–18) × (1.2–)2–5(–6) cm, major lateral veins asymmetric to almost absent, broader outer half auriculate, margin crenate or denticulate, apex acuminate or caudate-acuminate; cystoliths sparse, conspicuous or obscure; nanophyll absent. Staminate inflorescences 0.5–5.5 cm in diam., peduncle 1–8 cm; staminate flowers: tepals 5, elliptic; stamens 5; rudimentary pistil small. Pistillate inflorescences 2–10 mm in diam., peduncle (absent to) 1.5–7(–22) mm; pistillate flowers: tepals 5. Achenes ellipsoidal, tuberculate. Fl. Oct–May.

• Valley forests, streamsides, wet rocks; 200–1400 m. S Fujian, Guangdong, Guangxi, Hainan, S Hunan, W Jiangxi, SE Yunnan.

14. *Pellionia yunnanensis* (H. Schroeter) W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 6: 61. 1980.

云南赤车 *yun nan chi che*

Elatostema yunnanense H. Schroeter, Repert. Spec. Nov. Regni Veg. Beih. 83(2): 79. 1936.

Herbs perennial, dioecious. Stems erect, branched or simple, glabrous or pilose. Leaves alternate; stipules linear or subulate, 4–6 × 0.2–0.3 mm; petiole 1–2 mm; leaf blade herbaceous,

obliquely oblong or oblanceolate, 5.5–12.5 × 1.8–3.5 cm, penninerved, broader outer half cordate, margin crenate, apex cuspidate; cystolith absent; nanophyll absent. Staminate inflorescences 1–2.5 cm in diam., peduncle 1–2.5 cm; staminate flowers: tepals 5, oblong; stamens 5; rudimentary pistil nearly terete. Pistillate inflorescences ca. 5 mm in diam., peduncle 0–1 mm. Fl. Feb–Jul.

• Valley forests; 1000–1200 m. SE Yunnan.

15. *Pellionia viridis* C. H. Wright, J. Linn. Soc., Bot. 23: 481. 1899.

绿赤车 *lü chi che*

Herbs perennial or subshrubs, monoecious or dioecious. Stems erect, branched, glabrous. Leaves alternate; stipules subulate, 2–3.5 × 0.1–0.2 mm; petiole 0.4–1.6 cm; leaf blade herbaceous, narrowly oblong or lanceolate, 5–15 × 1.6–5 cm, major lateral veins symmetric, both arising above base, base peltate, obtuse or rounded, margin undulate-crenate or nearly entire, apex acuminate; cystoliths conspicuous, dense; nanophyll absent. Staminate inflorescences 0.5–1 cm in diam., peduncle 0.5–1.8 cm; staminate flowers: tepals 5, elliptic; stamens 5; rudimentary pistil very small. Pistillate inflorescences 3–5 mm in diam., peduncle 1.5–5 mm; pistillate flowers: tepals 5. Achenes narrowly ovoid, tuberculate. Fl. Jun–Sep.

• Mountain or hill forests, streamsides, dark damp places; 500–1200 m. W Hubei, Sichuan, NE Yunnan.

- 1a. Leaf blades nearly equal at base, basiscopic half rounded 15a. var. *viridis*
- 1b. Leaf blades very unequal at base, basiscopic narrow-half obtuse and broad-half auriculate 15b. var. *basinaequalis*

15a. *Pellionia viridis* var. *viridis*

绿赤车(原变种) *lü chi che* (*yuan bian zhong*)

Elatostema viride (C. H. Wright) Handel-Mazzetti.

Leaf blade base symmetric. Fl. Jun–Aug.

• Mountain or hill forests, streamsides, dark damp places; 600–1200 m. W Hubei, Sichuan, NE Yunnan.

15b. *Pellionia viridis* var. *basinaequalis* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 6: 62. 1980.

斜基绿赤车 *xie ji lü chi che*

Leaf blade base very asymmetric, basiscopic narrower side obtuse, broader side auriculate. Fl. Jun–Sep.

• Hill forests, dark damp places; 500–1000 m. S Sichuan.

16. *Pellionia caulialata* S. Y. Liou, Guihaia 3: 317. 1983.

翅茎赤车 *chi jing chi che*

Herbs perennial, dioecious. Stems erect, simple, winged or sharply, longitudinally angled, glabrous. Leaves alternate; stipules narrowly triangular or narrowly lanceolate, 6–9 × 1.5–2 mm; petiole 3–10 mm; leaf blade herbaceous, obliquely obovate or elliptic, 8–18 × 4.4–8.3 cm, venation pinnate, major

lateral veins ill-defined, broader outer half rounded or auriculate, margin undulate-crenate, apex acuminate or caudate-acuminate; cystoliths obscure, sparse; nanophylls 2–15 mm. Staminate inflorescences 2.5–3.5 cm in diam., peduncle 3.5–5.0 cm, pubescent; staminate flowers: tepals 5, elliptic; stamens 5; rudimentary pistil very small. Pistillate inflorescences ca. 1.1 cm in diam., peduncle 0.6–1.2 cm; pistillate flowers: tepals 5. Achenes ellipsoidal, tuberculate. Fl. Sep–Dec.

- Valley forests, streamsides; 400–600 m. Guangxi.

17. *Pellionia macrophylla* W. T. Wang, Acta Bot. Yunnan. 5: 271. 1983.

大叶赤车 da ye chi che

Herbs perennial, dioecious. Stems erect, usually simple, glabrous or pilose. Leaves alternate; stipules linear or subulate, 6–9 × 0.5–0.6 mm; petiole 1–7 mm; leaf blade herbaceous, oblanceolate-oblong or obliquely elliptic, 14–25 × 5–8.5 cm, penninerved, broader outer half auriculate, margin crenate, apex acuminate; cystoliths conspicuous; nanophyll absent. Staminate inflorescences 1.5–3 cm in diam., peduncle 2.8–8 cm; staminate flowers: tepals 5, elliptic; stamens 5; rudimentary pistil small. Pistillate inflorescences 0.8–2 cm in diam., peduncle 3–7 mm; pistillate flowers: tepals 5. Achenes ellipsoidal, smooth or striolate. Fl. Sep–Oct.

- Evergreen broad-leaved forests, along streams, thickets; 1700–2000 m. W Guangxi, S Yunnan.

18. *Pellionia incisoserrata* (H. Schroeter) W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 6: 63. 1980.

羽脉赤车 yu mai chi che

Elatostema incisoserratum H. Schroeter, Repert. Spec. Nov. Regni Veg. Beih. 83(2): 90. 1936.

Herbs perennial, dioecious. Stems erect, simple, glabrous. Leaves alternate; stipules subulate, ca. 2 × 0.1 mm; petiole 2–4 mm; leaf blade herbaceous, obliquely elliptic, 4–10 × 1.6–3.2 cm, venation pinnate, major lateral veins ill-defined, broader outer half broadly cuneate or rounded, margin dentate, apex acuminate; cystoliths conspicuous, dense; nanophyll absent. Staminate inflorescences 1.6–2.8 cm in diam., peduncle 1.5–2.5

cm; staminate flowers: tepals 5, elliptic; stamens 5; rudimentary pistil small. Pistillate inflorescences ca. 5 mm in diam., sessile; pistillate flowers: tepals 5. Achenes ovoid, striolate. Fl. May–Jun.

- Dark damp places in limestone hills. N Guangdong, NE Guangxi.

19. *Pellionia leiocarpa* W. T. Wang, Guihaia 2: 115. 1982.

光果赤车 guang guo chi che

Herbs perennial, monoecious. Stems erect, branched, glabrous. Leaves alternate; stipules linear or subulate, 1.8–2.8 × 0.2–0.3 mm; petiole 0–1 mm; leaf blade papery, obliquely oblong or obliquely elliptic, 2.4–8 × 1–2 cm, unequal, reduced shoot leaves small, venation pinnate, major lateral veins ill-defined, base obliquely cuneate, margin denticulate, apex caudate-acuminate, or rhombic to rhombic-obovate, 0.6–1.5 × 0.3–0.7 cm, apex apiculate or obtuse; cystoliths conspicuous, dense; nanophyll absent. Staminate inflorescences 2–5 mm in diam., peduncle ca. 1 cm. Pistillate inflorescences 3–5 mm in diam., peduncle 1–4 mm; pistillate flowers: tepals 5. Achenes ellipsoidal, smooth. Fl. Apr–May.

- Limestone hillsides, rocks in forests; ca. 1000 m. Guangxi (Napo).

20. *Pellionia brachyceras* W. T. Wang, Bull. Bot. Res., Harbin 3(3): 60. 1983.

短角赤车 duan jiao chi che

Herbs perennial, monoecious. Stems erect, branched, pubescent. Leaves alternate; stipules subulate or linear, 2.5–3.5 × 0.3–0.6 mm; petiole 0.5–1 mm; leaf blade papery, obliquely oblong or narrowly elliptic, 2–5 × 0.8–1.8 cm, venation pinnate, major lateral veins ill-defined, broader outer half cuneate, margin denticulate, apex acuminate or caudate-acuminate; cystoliths conspicuous, dense; nanophyll absent. Staminate inflorescences 3–8 mm in diam., peduncle 0.7–1.2 cm; staminate flowers: tepals 5, elliptic; stamens 5; rudimentary pistil small. Pistillate inflorescences ca. 2.5 mm in diam., sessile; pistillate flowers: tepals 5. Achenes ellipsoidal, smooth. Fl. Nov.

- Limestone valleys, rocks in forests; ca. 1400 m. Guangxi (Longlin).

9. ELATOSTEMA J. R. Forster & G. Forster, Char. Gen. Pl. 53. 1775, nom. cons.

楼梯草属 lou ti cao shu

Lin Qi (林祁); Ib Friis, C. Melanie Wilmot-Dear

Small shrubs, subshrubs, or herbs, without stinging hairs. Leaves apparently alternate, distichous; nanophylls present or absent, opposite to normal leaves; stipules 2; leaf blade 3-veined, one or both major lateral veins sometimes inserted above the base, or pinnately veined, base asymmetric, cystoliths linear or fusiform. Inflorescences usually pedunculate, mostly many-flowered or rarely 1–3-flowered discoid capitula, capitula usually 2-valved, each valve with several glomerules of several flowers and subtended by a few bracteoles; unisexual (plants monoecious or dioecious); male inflorescences usually with discoid receptacle (pyriform young receptacle in *E. brachydotnum* and *E. ficoides*), rarely cymose; female ones with discoid receptacle and bracteoles along margin. Male flowers: perianth lobes 4 or 5, elliptic, connate at base, usually corniculate or short horned below apex; stamens as many as and opposite to perianth lobes; filaments of stamens inflexed in bud; rudimentary pistil small or absent. Female flowers: perianth lobes 4 or 5, or reduced, less than 1/2 length of ovary, free or connate at base, not corniculate at apex; staminodes 3–5, linear. Ovary straight, ellipsoid; style absent; stigma penicillate; ovule orthotropous. Achenes ovoid or ellipsoid, slightly flattened, mostly longitudinally 6–10-ribbed, rarely smooth or tuberculate.

URTICACEAE

About 300 species: tropical and subtropical Africa, Asia, and Oceania; 146 species (108 endemic) in China.

- 1a. Male inflorescences branched, receptacle absent; bracts alternate, not connate into an involucre.
 - 2a. Leaf blade without cystoliths 1. *E. brevipedunculatum*
- 2b. Leaf blade with cystoliths.
 - 3a. Shrubs or subshrubs.
 - 4a. Stems densely hirtellous 4. *E. hirtellum*
 - 4b. Stems glabrous 8. *E. obtusidentatum*
 - 3b. Herbs.
 - 5a. Leaf blade with major lateral veins asymmetric, one inserted above base.
 - 6a. Plants dioecious, glabrous 2. *E. laxicymosum*
 - 6b. Plants monoecious, stems hirtellous or glabrescent 3. *E. hirtellipedunculatum*
 - 5b. Leaf blade pinnately veined.
 - 7a. Stems winged or sharply longitudinally angled 10. *E. angulosum*
 - 7b. Stems rounded or bluntly longitudinally angled.
 - 8a. Leaf blade margin denticulate, denticulations ca. 0.5 mm 6. *E. microdontum*
 - 8b. Leaf blade margin crenate, serrate, or dentate, if denticulate then denticulations more than 1 mm long.
 - 9a. Male inflorescences sessile 5. *E. polystachyoides*
 - 9b. Male inflorescences pedunculate.
 - 10a. Leaf blade margin densely serrate; male inflorescences 4–6 mm in diam. 9. *E. prunifolium*
 - 10b. Leaf blade margin dentate or denticulate; male inflorescences 5–15 mm in diam.
 - 11a. Female inflorescences ca. 2 mm in diam., sessile 7. *E. subtrichotomum*
 - 11b. Female inflorescences 3–9 mm in diam., pedunculate 11. *E. oblongifolium*
 - 1b. Male inflorescences simple, receptacle conspicuous or obscure; bracts connate into an involucre, rarely absent.
 - 12a. Leaf blade margin entire or undulate.
 - 13a. Plants with nanophylls 47. *E. salvinoides*
 - 13b. Plants without nanophyll.
 - 14a. Leaf blade pinnately veined 141. *E. alnifolium*
 - 14b. Leaf blade with major lateral veins either both basal or asymmetric, one inserted above base.
 - 15a. Stems simple.
 - 16a. Leaf blade oblanceolate, with major lateral veins asymmetric, one inserted above base 46. *E. attenuatum*
 - 16b. Leaf blade obliquely elliptic, with both major lateral veins inserted at base 132. *E. petelotii*
 - 15b. Stems branched.
 - 17a. Stipules narrowly lanceolate, 6–10 × 1.5–2 mm 23. *E. integrifolium*
 - 17b. Stipules subulate or narrowly triangular, 0.6–6 × 0.2–0.5 mm.
 - 18a. Leaf blade 1.1–3 × 0.4–0.9 cm 32. *E. glochidioides*
 - 18b. Leaf blade 6.5–16.5 × 2–4.5 cm 92. *E. litseifolium*
 - 12b. Leaf blade margin crenate, denticulate, dentate, or serrate.
 - 19a. Young male receptacles pyriform, bursting open at anthesis.
 - 20a. Stipules linear or lanceolate-linear, 7–10 × 2–3 mm 145. *E. ficoides*
 - 20b. Stipules subulate, 1.5–2.5 × 0.1–0.2 mm 146. *E. brachyodontum*
 - 19b. Male receptacles discoid or very small and obscure.
 - 21a. Subshrubs.
 - 22a. Stems simple 62. *E. crenatum*
 - 22b. Stems branched.
 - 23a. Leaf blade pinnately veined 25. *E. tenuicaudatoides*
 - 23b. Leaf blade with both major lateral veins inserted at base, with major lateral veins either both inserted above base or asymmetric, one inserted at base, the other above.
 - 24a. Leaf blade base auriculate on broader outer half.
 - 25a. Stems furfuraceous 58. *E. baiseense*
 - 25b. Stems not furfuraceous.
 - 26a. Leaf blade 14–25 × 6–10 cm 104. *E. platyphyllum*
 - 26b. Leaf blade 9–12.5 × 2.5–3.5 cm 112. *E. luxiense*
 - 24b. Leaf blade base cuneate, obtuse or rounded on broader outer half.
 - 27a. Leaf blade without cystoliths, rarely with cystoliths only along nerves.
 - 28a. Stipules subulate, 0.1–0.3 mm wide.
 - 29a. Leaf blade cuspidate or acuminate at apex, with major lateral veins either both inserted at base or asymmetric, one inserted at base, the other above 13. *E. acuminatum*

URTICACEAE

- 29b. Leaf blade caudate or caudate-acuminate at apex, with both major lateral veins inserted at base 15. *E. beibengense*
- 28b. Stipules narrowly triangular or lanceolate, 0.8–1.2 mm wide.
- 30a. Male receptacle absent or very small 12. *E. laevisimum*
- 30b. Male receptacle 2–3.5 mm in diam.
- 31a. Stems glabrous 14. *E. paracuminatum*
- 31b. Stems puberulent 17. *E. lihengianum*
- 27b. Leaf blade with dense cystoliths.
- 32a. Female inflorescences 5–9-clustered 100. *E. macintyreii*
- 32b. Female inflorescences solitary or paired.
- 33a. Stems pubescent or strigose.
- 34a. Leaf blade with both major lateral veins inserted symmetrically at or above base.
- 35a. Plants monoecious; stems pubescent; leaf blade herbaceous 16. *E. tenuicaudatum*
- 35b. Plants dioecious; stems densely strigose; leaf blade papery 78. *E. pergamenum*
- 34b. Leaf blade with major lateral veins asymmetric, one inserted above base.
- 36a. Stems densely strigose; leaf blade herbaceous or papery; male inflorescences sessile ... 20. *E. lineolatum*
- 36b. Stems pubescent; leaf blade papery; male inflorescences pedunculate 24. *E. biglomeratum*
- 33b. Stems glabrous.
- 37a. Leaf blade with both major lateral veins inserted symmetrically at or above base.
- 38a. Stipules subulate, 2–5 × 0.1–0.3 mm 16. *E. tenuicaudatum*
- 38b. Stipules linear-lanceolate, 8–10 × 1–1.2 mm 18. *E. recticaudatum*
- 37b. Leaf blade with major lateral veins asymmetric, one inserted above base.
- 39a. Leaf blade ovate, oblong, rhombic, or lanceolate, 1.3–2.5 cm wide 19. *E. oreocnidoides*
- 39b. Leaf blade obliquely elliptic, up to 5.5 cm wide 22. *E. boehmerioides*
- 21b. Herbs.
- 40a. Plants with nanophylls.
- 41a. Stems glabrous or pilose.
- 42a. Stems furfuraceous 29. *E. monandrum*
- 42b. Stems not furfuraceous.
- 43a. Male inflorescences 5–6 mm in diam.; peduncle 2–4 mm 28. *E. sinense*
- 43b. Male inflorescences ca. 1.5 cm in diam.; peduncle 5–6 cm 108. *E. napoense*
- 41b. Stems pubescent or strigose.
- 44a. Female inflorescences 1.1–1.7 × 0.9–1.2 cm 107. *E. tetratpalum*
- 44b. Female inflorescences 2–6 mm in diam.
- 45a. Male inflorescences 1.1–2.6 × 1–1.5 cm; peduncle 2–5.5 cm 106. *E. papillosum*
- 45b. Male inflorescences 2–8 mm in diam., peduncle 0–2.5 mm .
- 46a. Leaf blade with both major lateral veins inserted at base.
- 47a. Plants 5–45 cm tall; leaf blade margin serrate with 7–20 teeth 26. *E. parvum*
- 47b. Plants 2.5–5 cm tall; leaf blade margin dentate with 2–5 teeth 27. *E. cuneatum*
- 46b. Leaf blade with major lateral veins asymmetric, one inserted above base.
- 48a. Male inflorescences sessile 26. *E. parvum*
- 48b. Male inflorescences pedunculate 28. *E. sinense*
- 40b. Plants without nanophyll.
- 49a. Male receptacle very small, obscure, not discoid.
- 50a. Female inflorescences with 1–20 flowers; receptacle obscure.
- 51a. Female inflorescences with 10–20 flowers 75. *E. medogense*
- 51b. Female inflorescences with 1(or 2) flower(s) 76. *E. obtusum*
- 50b. Female inflorescences with 30 flowers or more; receptacle conspicuous.
- 52a. Leaf blade with major lateral veins either both inserted at base or asymmetric, one inserted at base, the other above.
- 53a. Stems glabrous.
- 54a. Leaf blade leathery, 1.2–2.4 × 0.8–1.1 cm 43. *E. coriaceifolium*
- 54b. Leaf blade membranous, herbaceous, or papery.
- 55a. Male bracts 6, unequal, larger two 1.2–1.5 cm, smaller four 5–7 mm 44. *E. ichangense*
- 55b. Male bracts same or unequal, 1.5–7 mm.
- 56a. Stipules 1.5–3.5 mm wide.
- 57a. Male peduncle 0–0.5 mm 30. *E. pycnodontum*
- 57b. Male peduncle 0.3–6 cm.
- 58a. Male peduncle 0.8–1.2 mm in diam. 49. *E. nasutum*

URTICACEAE

- 58b. Male peduncle 0.1–0.4 mm in diam. 50. *E. filipes*
- 56b. Stipules 0.1–1 mm wide.
- 59a. Stems furfuraceous.
- 60a. Leaf blade obliquely ovate 31. *E. myrtillos*
- 60b. Leaf blade obliquely linear-oblongate 34. *E. imbricans*
- 59b. Stems not furfuraceous.
- 61a. Leaf blade with major lateral veins asymmetric, one inserted above base.
- 62a. Female inflorescences sessile 38. *E. asterocephalum*
- 62b. Female inflorescences pedunculate 48. *E. trichocarpum*
- 61b. Leaf blade with both major lateral veins inserted at base.
- 63a. Male inflorescences sessile or subsessile.
- 64a. Leaf blade obliquely elliptic or oblong 33. *E. shanglinense*
- 64b. Leaf blade falcate 35. *E. hookerianum*
- 63b. Male inflorescences pedunculate.
- 65a. Stems branched.
- 66a. Leaf blade strigose on abaxial surface, with cystoliths only near margins 36. *E. microcephalanthum*
- 66b. Leaf blade glabrous, with dense cystoliths on both surfaces 57. *E. pseudodissectum*
- 65b. Stems simple.
- 67a. Plants dioecious 52. *E. gueilinense*
- 67b. Plants monoecious.
- 68a. Leaf blade margin dentate; female inflorescences 3–4 mm in diam.; receptacle 2–3 mm in diam. 51. *E. yaoshanense*
- 68b. Leaf blade margin serrulate; female inflorescences 1–2 mm in diam.; receptacle obscure 53. *E. rhombiforme*
- 53b. Stems pubescent, puberulent, pilose, villous, or strigose.
- 69a. Leaf blade leathery 42. *E. crassiusculum*
- 69b. Leaf blade herbaceous or papery.
- 70a. Stipules 1.5–5.2 mm wide.
- 71a. Leaf blade with both major lateral veins inserted at base.
- 72a. Plants dioecious. Leaves petiolate 49. *E. nasutum*
- 72b. Plants monoecious. Leaves sessile 59. *E. lasiocephalum*
- 71b. Leaf blade with major lateral veins asymmetric, one inserted above base.
- 73a. Plants monoecious 60. *E. aliferum*
- 73b. Plants dioecious.
- 74a. Stipules 3–5 mm; male peduncle 0–1 mm 45. *E. grandidentatum*
- 74b. Stipules 1.5–2 cm; male peduncle 5–10 mm 61. *E. brunneinerve*
- 70b. Stipules 0.1–1 mm wide.
- 75a. Stems 3- or 4-branched 21. *E. ramosum*
- 75b. Stems simple or 1-branched.
- 76a. Stems furfuraceous.
- 77a. Leaf blade obliquely oblanceolate or narrowly obovate, 2.5–6.5 × 1–2 cm 39. *E. liboense*
- 77b. Leaf blade obliquely elliptic, ca. 13 × 4.5 cm 56. *E. minutifurfuraceum*
- 76b. Stems not furfuraceous.
- 78a. Female peduncle 2–35 mm 48. *E. trichocarpum*
- 78b. Female peduncle 0–1.5 mm.
- 79a. Stipules strigillose or hirtellous.
- 80a. Stems simple, pubescent 40. *E. xichouense*
- 80b. Stems branched, densely strigillose 41. *E. strigillosum*
- 79b. Stipules glabrous.
- 81a. Male inflorescences sessile 37. *E. longibracteatum*
- 81b. Male inflorescences pedunculate.
- 82a. Leaf blade base auriculate on broader outer half 54. *E. strigulosum*
- 82b. Leaf blade base obtuse on broader outer half 55. *E. gungshanense*
- 52b. Leaf blade pinnately veined.
- 83a. Female plants with bulbils 63. *E. stewardii*
- 83b. Plants without bulbil.
- 84a. Stems glabrous.
- 85a. Stipules subulate, 1–1.5 × 0.1–0.2 mm 70. *E. youyangense*

URTICACEAE

- 85b. Stipules linear or triangular, 3–7 × 1.5–2 mm.
- 86a. Stipules without cystolith.
- 87a. Leaves sessile; leaf blade herbaceous 64. *E. bracteosum*
- 87b. Petiole 2–10 mm; leaf blade papery or nearly leathery 65. *E. subcoriaceum*
- 86b. Stipules with cystoliths.
- 88a. Leaf blade 2.5–5 × 1.2–2 cm, obtuse at apex 74. *E. obscurinerve*
- 88b. Leaf blade 4.5–19 × 2–6 cm, cuspidate, acuminate, or caudate at apex.
- 89a. Male inflorescences with peduncle (4–)7–20(–32) mm 66. *E. involocratum*
- 89b. Male inflorescences sessile or subsessile 67. *E. acuteserratum*
- 84b. Stems pubescent, puberulent, villous, or strigose.
- 90a. Stipules subulate, 0.1–0.2 mm wide.
- 91a. Stems puberulent; leaf blade 3.5–5 cm 69. *E. mabiense*
- 91b. Stems strigose; leaf blade 6–8.5 cm 73. *E. calciferum*
- 90b. Stipules lanceolate, linear, or triangular, 1.5–2 mm wide.
- 92a. Stems branched.
- 93a. Stems glabrous or sparsely puberulent; leaf blade 4.5–16(–19) × 2–4.5(–6) cm 66. *E. involocratum*
- 93b. Stems densely villous; leaf blade 2–5.5 × 0.7–2.2 cm 71. *E. villosum*
- 92b. Stems simple.
- 94a. Stipules without cystolith 68. *E. tenuicornutum*
- 94b. Stipules with cystoliths.
- 95a. Leaf blade obliquely oblanceolate-oblong or oblong, 4.5–19 × 2–6 cm; male bracts glabrous 66. *E. involocratum*
- 95b. Leaf blade obliquely oblanceolate or linear-oblanceolate, 6–10.5 × 1.2–2.8 cm; male bracts villous 72. *E. sublineare*
- 49b. Male receptacle discoid or pyriform.
- 96a. Leaf blade pinnately veined.
- 97a. Stems pubescent, pilose, or strigose.
- 98a. Stems branched.
- 99a. Male inflorescences without bracts 138. *E. tenuifolium*
- 99b. Male inflorescences with bracts 144. *E. albopilosum*
- 98b. Stems simple.
- 100a. Leaf blade brown-black after drying 139. *E. nanchuanense*
- 100b. Leaf blade green after drying.
- 101a. Leaf blade 1.5–5.5 × 0.5–2 cm 117. *E. hypoglaucum*
- 101b. Leaf blade 10–27 × 3.5–7.5 cm 140. *E. pseudoficoides*
- 97b. Stems glabrous.
- 102a. Plants monoecious.
- 103a. Stems simple 140. *E. pseudoficoides*
- 103b. Stems branched.
- 104a. Male peduncle 1–3 mm; female inflorescences 5–9 mm in diam. 136. *E. pseudobrachyodontum*
- 104b. Male peduncle 1.4–1.8 cm; female inflorescences 2–3.5 mm in diam. 142. *E. wenxiense*
- 102b. Plants dioecious.
- 105a. Leaf blade papery; stipules subulate, 0.1–0.2 mm wide; female receptacle 2–3-lobed 134. *E. schizocephalum*
- 105b. Leaf blade herbaceous or papery; stipules narrowly linear or triangular, 0.8–3 mm wide; female receptacle not lobed.
- 106a. Stems simple.
- 107a. Leaf blade herbaceous, puberulent on abaxial surface; cystoliths obscure 133. *E. acutitepalum*
- 107b. Leaf blade papery, glabrous; cystoliths conspicuous 135. *E. xanthophyllum*
- 106b. Stems branched.
- 108a. Leaf blade 17–23 × 4.5–7.5 cm; male peduncle 1–1.5 cm 137. *E. atropurpureum*
- 108b. Leaf blade 7–11 × 2–4 cm; male peduncle 9–10 cm 143. *E. subpenninerve*
- 96b. Leaf blade with both major lateral veins inserted at base, with major lateral veins either both inserted above base or asymmetric, one inserted at base, the other above.
- 109a. Stems furfuraceous.
- 110a. Stipules 0.1–1 mm wide.
- 111a. Male peduncle ca. 2 mm 89. *E. yui*
- 111b. Male peduncle 1.5–8 cm 127. *E. dissectum*
- 110b. Stipules 1.5–6 mm wide.

URTICACEAE

- 112a. Leaf blade with both major lateral veins inserted at base.
 113a. Female peduncle 0.5–1 mm 82. *E. pachyceras*
 113b. Female peduncle 1.2–1.6 cm 131. *E. ferrugineum*
- 112b. Leaf blade with major lateral veins asymmetric, one inserted above base.
 114a. Male bracts conspicuous, ovate or triangular 83. *E. cuspidatum*
 114b. Male bracts obscure.
 115a. Male inflorescences 4–8 mm in diam.; receptacle 2.5–5.5 mm in diam. 88. *E. yangbiense*
 115b. Male inflorescences 7–15 mm in diam.; receptacle 7–14 mm in diam. 90. *E. platyceras*
- 109b. Stems not furfuraceous.
 116a. Leaf blade lanceolate or narrowly lanceolate, papery 96. *E. longistipulum*
 116b. Leaf blade obliquely elliptic, oblong, ovate, or obovate.
 117a. Leaf blade margin crenulate or crenate.
 118a. Leaf blade with major lateral veins asymmetric, one inserted above base.
 119a. Plants dioecious; stems densely strigose 103. *E. wangii*
 119b. Plants monoecious; stems crispately pubescent 130. *E. crispulum*
 118b. Leaf blade with both major lateral veins inserted at base.
 120a. Stems simple 80. *E. setulosum*
 120b. Stems branched.
 121a. Male peduncle 6–8 mm 79. *E. breviacuminatum*
 121b. Male peduncle 2–7 cm 129. *E. manhaense*
- 117b. Leaf blade margin dentate, denticulate, or serrate.
 122a. Stipules 0.1–1 mm wide.
 123a. Stems pilose, puberulent, pubescent, or strigose.
 124a. Male inflorescences 2–2.8 cm in diam. 94. *E. atroviride*
 124b. Male inflorescences 6–13 mm in diam.
 125a. Plants dioecious; male peduncle ca. 6 mm 77. *E. cyrtandrifolium*
 125b. Plants monoecious; male peduncle up to 4 cm 117. *E. hypoglaucum*
- 123b. Stems glabrous.
 126a. Plants monoecious.
 127a. Stems branched 125. *E. hekouense*
 127b. Stems simple.
 128a. Leaf blade sparsely strigillose on adaxial surface 121. *E. leucocephalum*
 128b. Leaf blade glabrous 124. *E. longipes*
- 126b. Plants dioecious.
 129a. Leaf blade glabrous 91. *E. lungzhouense*
 129b. Leaf blade sparsely strigillose on adaxial surface.
 130a. Male peduncle 1.4–4.2 cm 128. *E. dissectoides*
 130b. Male peduncle 1.8–6 mm .
 131a. Male inflorescences solitary 77. *E. cyrtandrifolium*
 131b. Male inflorescences paired 87. *E. tenuireceptaculum*
- 122b. Stipules 1.5–8 mm wide.
 132a. Stems glabrous.
 133a. Leaf blade with both major lateral veins inserted symmetrically at or above base.
 134a. Leaf blade base rounded or cuneate on broader outer half.
 135a. Male peduncle 0.1–0.2 cm 97. *E. balansae*
 135b. Male peduncle 1.3–2.5 cm 126. *E. procridioides*
 134b. Leaf blade base auriculate or cordate on broader outer half.
 136a. Female inflorescences paired 105. *E. auriculatum*
 136b. Female inflorescences solitary.
 137a. Stems simple; female inflorescence ca. 3 mm in diam. 81. *E. pseudocuspidatum*
 137b. Stems branched; female inflorescence ca. 12 × 8 mm 98. *E. multicanaliculatum*
- 133b. Leaf blade with major lateral veins asymmetric, one inserted above base.
 138a. Male peduncle 0.5–10 mm.
 139a. Leaf blade base auriculate on broader outer half 86. *E. yungshunense*
 139b. Leaf blade base cuneate or rounded on broader outer half.
 140a. Plants monoecious 85. *E. angustitepalum*
 140b. Plants dioecious.
 141a. Leaves petiolate, petiole 1.5–12 mm 99. *E. megacephalum*
 141b. Leaves sessile or subsessile.

URTICACEAE

- 142a. Leaf blade glabrous on adaxial surface; stipules 18–20 mm 93. *E. didymocephalum*
 142b. Leaf blade sparsely strigillose on adaxial surface; stipules 5–14 mm 97. *E. balansae*
 138b. Male peduncle 1.8–12 cm.
 143a. Leaf blade 10–13.5 × 4.5–5.5 cm; petiole 5–11 mm 111. *E. laxisericeum*
 143b. Leaf blade 4–8 × 1.5–3 cm; petiole 0–2 mm.
 144a. Stems branched; male peduncle 3.2–7.5 cm 122. *E. omeiense*
 144b. Stems simple; male peduncle 9–12 cm 123. *E. jinpingense*
 132b. Stems pubescent, puberulent, hirtellous, hirsute, villosulous, or strigose.
 145a. Leaf blade base rounded, obtuse, or cuneate on broader outer half.
 146a. Stems densely strigose 101. *E. rupestre*
 146b. Stems pubescent or puberulent.
 147a. Male peduncle 0.1–0.2 cm 97. *E. balansae*
 147b. Male peduncle 1–12.5 cm.
 148a. Peduncle as long as staminate inflorescences 110. *E. cuneiforme*
 148b. Peduncle 2–10 × as long as staminate inflorescences.
 149a. Plants monoecious 116. *E. dulongense*
 149b. Plants dioecious.
 150a. Peduncle glabrous 119. *E. microtrichum*
 150b. Peduncle puberulent.
 151a. Male inflorescences 5–7 mm in diam.; peduncle 1–1.3 cm 114. *E. tianlinense*
 151b. Male inflorescences 7–13 mm in diam.; peduncle 8–12.5 cm 118. *E. stigmatosum*
 145b. Leaf blade base auriculate, cordate, or subcordate on broader outer half.
 152a. Plants monoecious 113. *E. pubipes*
 152b. Plants dioecious.
 153a. Leaf blade with both major lateral veins inserted at base.
 154a. Leaf blade obliquely oblong-obovate 105. *E. auriculatum*
 154b. Leaf blade obliquely elliptic.
 155a. Stems puberulent 109. *E. subcuspidatum*
 155b. Stems densely strigose.
 156a. Leaf blade 3–7.5 × 1.5–4 cm 95. *E. retrohirtum*
 156b. Leaf blade 10–22.5 × 4.5–11 cm 102. *E. eriocephalum*
 153b. Leaf blade with major lateral veins asymmetric, one inserted above base.
 157a. Stems densely strigose; stipules strigose on abaxial surface 103. *E. wangii*
 157b. Stems hirsute, hirtellous, puberulent, or villosulous; stipules glabrous, ciliate, or hirsute.
 158a. Plants up to 80 cm tall; stipules 13–17.5 × 2–5 mm 120. *E. rivulare*
 158b. Plants 14–40 cm tall; stipules 4–8 × 1.6–2.2 mm.
 159a. Male peduncle 1–1.5 mm 84. *E. menglunense*
 159b. Male peduncle ca. 4.5 cm 115. *E. goniocephalum*

1. *Elatostema brevipedunculatum* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 22. 1980.

短梗楼梯草 duan geng lou ti cao

Herbs perennial, dioecious, 10–25 cm tall, glabrous. Stems ascending, branched. Leaves alternate; nanophylls absent; stipules narrowly linear, 3–5 × 0.6–1 mm, without cystoliths; petiole 0–1 mm; leaf blade oblong-elliptic, 7–13 × 1–3.2 cm, herbaceous, major basal lateral veins asymmetric, 1 basal, the other arising above base, cystoliths absent; base with broader half obtuse, margin dentate, apex acuminate or cuspidate. Male inflorescences ca. 5-clustered, many branched, 2.5–5 mm in diam.; peduncle 1–1.5 mm; receptacle absent; bracts alternate, narrowly oblong or triangular, 0.8–1.2 mm. Male flowers 5-merous. Fl. May.

• Evergreen broad-leaved forests on mountain slopes; ca. 2600 m. W Yunnan.

2. *Elatostema laxicyosum* W. T. Wang, Acta Phytotax. Sin. 17(1): 106. 1979.

疏伞楼梯草 shu san lou ti cao

Herbs perennial, dioecious, 40–50 cm tall, glabrous. Stems ascending or erect, simple or branched. Leaves alternate; nanophylls absent; stipules subulate, 4–7 × 0.1–0.2 mm, with cystoliths; petiole 0–3 mm; leaf blade obliquely elliptic or obovate-elliptic, 5.5–13 × 2.5–5 cm, herbaceous or papery, major basal lateral veins asymmetric, 1 basal, the other arising above base, cystoliths conspicuous, dense; base with broader half broadly cuneate, margin serrate, apex acuminate. Male inflorescences solitary, branched, 10–22 mm in diam.; peduncle 30–65 mm; receptacle absent; bracts alternate, narrowly linear, 2.5–4 mm. Female inflorescences solitary, 5–11 × 4–7 mm; peduncle ca. 1.2 mm; receptacle nearly oblong, ca. 8 × 6 mm; bracts linear;

bracteoles spatulate-linear. Male flowers 4-merous. Achenes narrowly ovoid, 10-ribbed. Fl. Aug–Dec.

Evergreen broad-leaved forests or lake banks; 600–2200 m. SE Xizang [N India].

3. *Elatostema hirtellipedunculatum* B. L. Shih & Yuen P. Yang, Bot. Bull. Acad. Sin. 36: 160. 1995.

糙梗楼梯草 *cao geng lou ti cao*

Herbs perennial, monoecious, to 1 m tall. Stems ascending or erect, often simple, hirtellous or glabrescent. Leaves alternate; nanophylls absent; stipules subulate, 2–5 × 0.1–0.2 mm, glabrous; petiole to 2 mm or absent; leaf blade papery, obliquely elliptic to obliquely ovate, ca. 20 × 1.5–7 cm, semi-triple-nerved, cystoliths conspicuous, sparse; base broadly cuneate or rounded, margin dentate or crenate, apex acuminate or caudate. Male inflorescences ellipsoidal, 7–18 × 7–12 mm, branched; peduncle (1–)1.5–4.5(–5) mm; receptacle absent; bracts ovate or elliptic; bracteoles cymbiform. Female inflorescences solitary or paired, ellipsoidal, ca. 8 × 6 mm; peduncle to 2(–8) mm; receptacle elliptic, ca. 8 × 6 mm; bracts ovate or elliptic; bracteoles linear. Male flowers: perianth lobes 5; stamens 5. Achenes ovoid. Fl. Oct.

• Streamsides, ravines, moist forests or rocky places at low to medium elevations. Taiwan.

4. *Elatostema hirtellum* (W. T. Wang) W. T. Wang, Acta Phytotax. Sin. 28: 307. 1990.

硬毛楼梯草 *ying mao lou ti cao*

Elatostema subtrichotomum var. *hirtellum* W. T. Wang, Bull. Bot. Res., Harbin 2(1): 4. 1982.

Shrubs dioecious, ca. 100 cm tall. Stems erect, branched, densely hirtellous. Leaves alternate; nanophylls absent; stipules subulate, 1.5–2 × 0.1 mm, glabrous; petiole 0.6–1.8 mm; leaf blade obliquely elliptic, 1.8–10 × 1–3.5 cm, papery, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface sparsely strigillose along nerves; cystoliths conspicuous, dense; base with broader half rounded, margin denticulate, apex caudate-acuminate or acuminate. Male inflorescences solitary, branched, 12–14 mm in diam.; peduncle 0.5–1 mm; receptacle absent; bracts alternate, triangular, 0.4–0.6 mm. Male flowers 5-merous. Fl. Jan.

• Dark damp places in ravines; ca. 800 m. NW Guangxi.

5. *Elatostema polystachyoides* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 23. 1980.

多歧楼梯草 *duo qi lou ti cao*

Herbs perennial, dioecious, 50–70 cm tall. Stems ascending or erect, branched or simple, glabrous. Leaves alternate; nanophylls absent; stipules narrowly lanceolate, 8–12 × 1–2 mm, glabrous, with cystoliths; petiole 1–4 mm; leaf blade obliquely oblong-oblancheolate or oblong, 16–24.5 × 3.5–5.5 cm, herbaceous, major basal lateral veins absent and venation pinnate, cystoliths conspicuous, dense; base obliquely cuneate, margin crenate, apex acuminate. Male inflorescences in pairs, branched, 12–20 mm in diam., sessile; receptacle absent; bracts

alternate, triangular to lanceolate, 0.5–1.2 mm. Female inflorescences solitary or in pairs, 5–6 mm in diam.; peduncle 0–1 mm; receptacle ca. 5 mm in diam.; bracts triangular; bracteoles narrowly linear. Male flowers 5-merous. Achenes narrowly ellipsoid, 6-ribbed. Fl. Nov–Apr.

• Evergreen broad-leaved forests or forest margins on limestone mountains; 1000–1800 m. SE Yunnan.

6. *Elatostema microdontum* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 24. 1980.

微齿楼梯草 *wei chi lou ti cao*

Herbs perennial, dioecious, 40–50 cm tall. Stems ascending or erect, simple, glabrous. Leaves alternate, glabrous; nanophylls absent; petiole 2–7 mm; leaf blade obliquely oblong, 15–21 × 5.5–7 cm, papery, major basal lateral veins absent and venation pinnate, cystoliths conspicuous, dense; base obliquely cuneate, margin denticulate (denticulations ca. 0.5 mm), apex acuminate. Female inflorescences solitary, 4–6 mm in diam., sessile; receptacle 2–4 mm in diam.; bracts alternate, triangular; bracteoles linear. Achenes nearly ellipsoid, 8-ribbed. Fl. May–Jun.

• Tropical rain forests in valleys; 300–400 m. SE Yunnan.

7. *Elatostema subtrichotomum* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 25. 1980.

歧序楼梯草 *qi xu lou ti cao*

Elatostema subtrichotomum var. *corniculatum* W. T. Wang.

Herbs perennial, monoecious or dioecious, ca. 50 cm tall. Stems ascending or erect, simple or branched, glabrous. Leaves alternate, glabrous; nanophylls absent; stipules linear, 3–4 × 0.8–1 mm; petiole 2–14 mm; leaf blade obliquely oblong, 12–17 × 3.5–5 cm, herbaceous or nearly papery, major basal lateral veins ± absent and venation pinnate, cystoliths conspicuous, dense; base with broader half cuneate or nearly rounded, margin denticulate, apex acuminate. Male inflorescences in pairs, branched, ca. 10 mm in diam.; peduncle 2–3 mm; receptacle absent; bracts alternate, narrowly ovate or narrowly triangular, 0.8–1.2 mm. Female inflorescences in pairs, ca. 2 mm in diam., sessile; receptacle ca. 1.2 mm in diam.; bracts narrowly triangular; bracteoles lanceolate-linear. Male flowers 5-merous; perianth lobes with apex corniculate or not. Fl. Apr.

• Valley forests, streamsides, rock crevices; 1700–1900 m. N Guangdong, C Hunan, SE Yunnan.

8. *Elatostema obtusidentatum* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 28. 1980.

钝齿楼梯草 *dun chi lou ti cao*

Subshrubs, dioecious, ca. 30 cm tall. Stems ascending or erect, branched, glabrous. Leaves alternate; nanophylls absent; stipules subulate, 1–2 × 0.1–0.2 mm, glabrous; petiole 0–1 mm; leaf blade obliquely oblong or oblong-oblancheolate, 6–12 × 1.5–3 cm, herbaceous or papery, major basal lateral veins absent and venation pinnate, or ± asymmetric with 1 basal and the other arising above base, abaxial surface sparsely strigillose

along nerves, adaxial surface sparsely hirtellous, cystoliths conspicuous, dense; base with broader half obtuse, margin obtusely denticulate, apex cuspidate or acuminate. Male inflorescences solitary, branched, 8–10 mm in diam.; peduncle 2–4.5 mm; receptacle absent; bracts alternate, linear-lanceolate, ca. 0.8 mm. Male flowers 4-merous. Fl. Nov.

- Mountain forests. N Guangxi.

9. *Elatostema prunifolium* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 27. 1980.

樱叶楼梯草 ying ye lou ti cao

Elatostema quinquecostatum W. T. Wang.

Herbs perennial, dioecious, 25–35 cm tall. Stems ascending or erect, simple or branched, glabrous. Leaves alternate; nanophylls absent; stipules narrowly ovate to narrowly lanceolate, 4–7 × 1–2.5 mm, glabrous; with cystoliths, petiole absent; leaf blade obliquely oblong, 5–11 × 1.5–4 cm, herbaceous, major basal lateral veins absent and venation pinnate, abaxial surface sparsely strigillose, adaxial surface pilose or glabrescent; cystoliths conspicuous, dense; base with broader half nearly auriculate, margin densely serrate, apex acuminate. Male inflorescences in pairs or solitary, branched, 4–6 mm in diam.; peduncle 3–6 mm; receptacle absent; bracts alternate, narrowly oblong or linear, 2.5–4 mm. Female inflorescences in pairs or solitary, 3.5–6.5 mm in diam., sessile; receptacle 2.5–5.5 mm in diam. Male flowers 4- or 5-merous. Fl. Apr.

- Mountain forests or streamsides; 700–1900 m. Guizhou, S Sichuan, NE Yunnan.

10. *Elatostema angulosum* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 27. 1980.

翅棱楼梯草 chi leng lou ti cao

Herbs perennial, dioecious, 15–20 cm tall. Stems ascending, simple, winged or sharply, longitudinally angled, glabrous. Leaves alternate; nanophylls absent; stipules narrowly linear, ca. 3.5 mm, glabrous; petiole 0–1 mm; leaf blade obliquely elliptic or oblong, 4–8 × 1.5–2.5 cm, herbaceous or papery, major basal lateral veins absent and venation pinnate, abaxial surface glabrous, adaxial surface sparsely strigillose, cystoliths conspicuous, dense; base with broader half nearly cordate, margin dentate, apex acuminate. Male inflorescences usually in pairs, branched, 5–20 mm in diam.; peduncle 20–50 mm; receptacle absent; bracts alternate, lanceolate-linear, 4–5 mm. Female inflorescences solitary, ca. 4 mm in diam., sessile; receptacle ca. 1.5 mm in diam.; bracts triangular; bracteoles oblong. Male flowers 5-merous. Fl. Jan–Mar.

- Valleys; 900–1400 m. Sichuan (Emei Shan).

11. *Elatostema oblongifolium* Fu ex W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 26. 1980.

长圆楼梯草 chang yuan lou ti cao

Pellionia bodinieri H. Léveillé.

Herbs perennial, monoecious or dioecious, 20–50 cm tall. Stems ascending or erect, branched or simple, glabrous. Leaves

alternate; nanophylls absent; stipules narrowly triangular to subulate, 2.5–5 × 0.2–0.5 mm, glabrous, without cystoliths; petiole 0–2 mm; leaf blade obliquely oblong, 6–16 × 1.5–4.5 cm, herbaceous or papery, major basal lateral veins absent and venation pinnate, both surfaces glabrous, or adaxial surface sparsely strigillose; cystoliths conspicuous, dense; base with broader half rounded, margin dentate, apex acuminate. Male inflorescences in pairs or solitary, branched, 5–15 mm in diam.; peduncle 0.5–3 mm; receptacle absent; bracts alternate, ovate to linear, 2–3 mm. Female inflorescences in pairs or solitary, 3–9 mm in diam.; peduncle ca. 1 mm; receptacle obscure; bracts lanceolate to linear; bracteoles lanceolate. Male flowers 5-merous. Achenes ellipsoid or ovoid, 8-ribbed. Fl. Apr–Aug.

- Dark damp places in valleys; 400–900 m. Guizhou, W Hubei, NW Hunan, Sichuan.

12. *Elatostema laevisimum* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 29. 1980.

光叶楼梯草 guang ye lou ti cao

Elatostema laevisimum var. *puberulum* W. T. Wang.

Subshrubs monoecious or dioecious, 50–200 cm tall. Stems erect, branched, glabrous or densely puberulent. Leaves alternate; nanophylls absent; stipules narrowly triangular, 2–5 × 0.8–1 mm, glabrous, without cystoliths; petiole 2–4 mm; leaf blade obliquely elliptic, 5.5–12 × 3–5.5 cm, herbaceous, major basal lateral veins both arising at base of leaf blade or 1 arising above base, abaxial surface glabrous or pilose along nerves, adaxial surface sparsely strigillose, cystoliths absent or only present along primary nerve and secondary nerves; base with broader half rounded, margin crenate, apex acuminate. Male inflorescences usually 2- or 3-clustered, simple, 3–4 mm in diam.; peduncle 1.5–2 mm; receptacle absent or very small; bracts connate, ca. 0.8 mm. Female inflorescences 1.5–2.5 mm in diam.; peduncle 0–1; receptacle absent or very small; bracts broadly ovate; bracteoles oblong or linear. Male flowers 4-merous. Achenes ovoid, 5-ribbed. Fl. Aug–Feb.

- Dark damp places or forests in valleys; 1000–2200 m. W Guangxi, Hainan, SE Xizang, Yunnan [N Vietnam].

13. *Elatostema acuminatum* (Poiret) Brongniart in Duperrey, Voy. Monde, 211. 1834.

渐尖楼梯草 jian jian lou ti cao

Subshrubs, monoecious or dioecious, 10–50 cm tall, glabrous. Stems erect, branched. Leaves alternate, glabrous; nanophylls absent; stipules subulate, 1–2.2 × 0.1–0.2 mm, without cystoliths; petiole 0–7 mm; leaf blade obliquely elliptic or oblong, 2–10 × 1–3.5 cm, herbaceous, major basal lateral veins both arising at base of leaf blade or 1 arising above base, cystoliths absent or very small, sparse, only present along nerves; base with broader half cuneate or broadly cuneate, margin dentate, apex cuspidate or acuminate. Male inflorescences 4-clustered, simple, ca. 5 mm in diam., subsessile; receptacle small; bracts connate, 1–1.5 mm. Female inflorescences in pairs, 3–5 mm in diam., sessile; receptacle very small; bracts triangular; bracteoles narrowly linear. Male flowers 5-merous. Achenes ellipsoid, 7–9-ribbed. Fl. Dec–May.

Dense forests in valleys, shaded wet rocks or precipices; 500–1900 m. W Guangdong, Hainan, Yunnan [Bhutan, Indonesia, Malaysia, Myanmar, Nepal, Sikkim, Thailand, Vietnam].

- 1a. Petiole to 2 mm or absent; leaf blade 1–3.5 cm wide, margin 3–7-dentate on broader side of leaf blade; cystoliths absent or obscure 13a. var. *acuminatum*
 1b. Petiole to 7 mm; leaf blade to 5 cm wide, margin ca. 10-dentate on broader side of leaf blade; cystoliths conspicuous 13b. var. *striolatum*

13a. *Elatostema acuminatum* var. *acuminatum*

渐尖楼梯草(原变种) jian jian lou ti cao (yuan bian zhong)

Procris acuminata Poir., Encycl. 5: 629. 1804.

Petiole to 2 mm or absent; leaf blade 1–3.5 cm wide, cystoliths absent or obscure, margin of broader side 3–7-dentate. Fl. Dec–May.

Dense forests in valleys; 500–1500 m. W Guangdong, Hainan, Yunnan [Bhutan, Indonesia, Malaysia, Myanmar, Nepal, Sikkim, Thailand, Vietnam].

13b. *Elatostema acuminatum* var. *striolatum* W. T. Wang, Acta Bot. Yunnan., Suppl. 5: 1. 1992.

短齿渐尖楼梯草 duan chi jian jian lou ti cao

Petiole to 7 mm; leaf blade to 5 cm wide, cystoliths conspicuous, margin of broader side ca. 10-dentate. Fl. Mar.

• Shaded wet rocks or precipices; ca. 1900 m. NW Yunnan (Gongshan).

14. *Elatostema paracuminatum* W. T. Wang, Acta Bot. Yunnan., Suppl. 5: 3. 1992.

拟渐尖楼梯草 ni jian jian lou ti cao

Subshrubs, dioecious, ca. 100 cm tall. Stems erect, branched, glabrous. Leaves alternate; nanophylls absent; stipules narrowly linear-lanceolate, 8–10 × 1–1.2 mm, sparsely puberulent, without cystoliths; petiole 1.5–5 mm; leaf blade obliquely elliptic, 11–17 × 3.5–5.5 cm, papery, major basal lateral veins both arising at base of leaf blade, abaxial surface sparsely strigillose, adaxial surface sparsely hirtellous, cystolith absent; base obliquely cuneate, margin dentate, apex caudate. Male inflorescences solitary, in pairs, or 2-clustered, simple, ca. 6 mm in diam.; peduncle ca. 3 mm; receptacle ca. 2 mm in diam.; bracts connate, 2–3 mm wide; bracteoles cymbiform-linear or cymbiform-oblong. Male flowers 4-merous. Fl. Mar.

Mountain forests; 1400–1500 m. Yunnan (Gongshan) [Laos].

15. *Elatostema beibengense* W. T. Wang, Acta Phytotax. Sin. 28: 308. 1990.

背崩楼梯草 bei beng lou ti cao

Subshrubs, dioecious, 40–80 cm tall, glabrous. Stems ascending or erect, branched. Leaves alternate, glabrous; nanophylls absent; stipules subulate, 1.5–2.5 × 0.2–0.3 mm, without cystoliths; petiole 0–2.5 mm; leaf blade obliquely elliptic or oblong-rhombic, 3.5–8.5 × 1.5–3 cm, papery, major basal

lateral veins both arising at base of leaf blade, cystoliths absent; base with broader half obtuse, margin dentate, apex caudate or caudate-acuminate. Male inflorescences solitary, simple, ca. 4 mm in diam.; peduncle ca. 0.5 mm; receptacle obscure; bracts connate, 2–3 mm; bracteoles cymbiform or linear. Female inflorescences solitary, ca. 4 mm in diam., subsessile; receptacle ca. 2 mm in diam.; bracts spatulate-linear; bracteoles narrowly linear. Male flowers 5-merous. Fl. May.

• Evergreen broad-leaved forests in valleys, *Pinus bhutanica* forests; 1700–2100 m. SE Xizang.

16. *Elatostema tenuicaudatum* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 31. 1980.

细尾楼梯草 xi wei lou ti cao

Subshrubs, monoecious or rarely dioecious, 20–100 cm tall. Stems ascending or erect, branched, glabrous or pubescent. Leaves alternate; nanophylls absent; stipules subulate, 2–5 × 0.1–0.3 mm, glabrous, without cystoliths; petiole 0–1 mm; leaf blade obliquely oblanceolate-oblong or oblong, 3–9.5 × 1–2.5 cm, herbaceous, major basal lateral veins both arising at base of leaf blade, sometimes not extending beyond middle of leaf, both surfaces glabrous, or only abaxial surface pubescent; cystoliths conspicuous, dense, very small; base with broader half obtuse or nearly orbicular, margin dentate, apex cuspidate or caudate-cuspidate. Male inflorescences solitary, simple, 3–5 mm in diam., sessile or subsessile; receptacle nearly absent; bracts broadly lanceolate, 1.2–1.5 mm; bracteoles lanceolate-linear. Female inflorescences solitary, 1–4 mm in diam., sessile; receptacle very small; bracts ovate to triangular; bracteoles lanceolate-linear. Male flowers 4-merous. Achenes ellipsoid, 6-ribbed. Fl. Mar–Apr.

Evergreen broad-leaved forests in valleys, dark damp places in forests, valley stream-sides; 300–2200 m. NW Guangxi, S Guizhou, S Yunnan [N Vietnam].

- 1a. Branchlets and leaves glabrous ... 16a. var. *tenuicaudatum*
 1b. Branchlets and abaxial surface of leaf blade pubescent 16b. var. *lasiocladum*

16a. *Elatostema tenuicaudatum* var. *tenuicaudatum*

细尾楼梯草(原变种) xi wei lou ti cao (yuan bian zhong)

Branchlets and leaves glabrous. Leaf blade glabrous. Fl. Mar–Apr.

Dark damp places in forests, valley stream-sides; 300–2200 m. NW Guangxi, S Guizhou, SE Yunnan [N Vietnam].

16b. *Elatostema tenuicaudatum* var. *lasiocladum* W. T. Wang, Bull. Bot. Res., Harbin 9(2): 67. 1989.

毛枝细尾楼梯草 mao zhi xi wei lou ti cao

Branchlets pubescent. Leaf blade abaxial surface pubescent. Fl. Mar.

• Evergreen broad-leaved forests in valleys; 1700–1800 m. S Yunnan.

17. *Elatostema lihengianum* W. T. Wang, Acta Bot. Yunnan., Suppl. 5: 2. 1992.

李恒楼梯草 li heng lou ti cao

Subshrubs dioecious, 50–100 cm tall. Stems erect, branched, puberulent. Leaves alternate; nanophylls absent; stipules narrowly lanceolate, ca. 4.5×1 mm, puberulent, without cystoliths; petiole 1.5–3 mm; leaf blade obliquely elliptic, $7\text{--}15.5 \times 2\text{--}4.5$ cm, papery, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface sparsely strigillose along veins, adaxial surface sparsely strigillose, cystoliths absent or only present along nerves; base obliquely cuneate, margin dentate, apex cuspidate or caudate. Male inflorescences in pairs or 3- or 4-clustered, simple, 3–4 mm in diam.; peduncle 1.5–2.5 mm; receptacle 3–3.5 mm in diam.; bracts connate, ca. 1.1 mm; bracteoles triangular. Female inflorescences solitary, in pairs, or 2- or 3-clustered, 2–4 mm in diam.; peduncle ca. 0.5 mm; receptacle 1.8–3 mm in diam.; bracts broadly ovate; bracteoles cymbiform-linear or obovate. Fl. Mar–Jun.

• Evergreen broad-leaved forests; 1400–1500 m. SE Xizang, NW Yunnan.

18. *Elatostema recticaudatum* W. T. Wang, Acta Phytotax. Sin. 28: 309. 1990.

直尾楼梯草 zhi wei lou ti cao

Subshrubs monoecious, 25–40 cm tall, glabrous. Stems erect, branched. Leaves alternate; nanophylls absent; stipules linear-lanceolate, $8\text{--}10 \times 1\text{--}1.2$ mm, without cystoliths; petiole 0–1 mm; leaf blade narrowly oblong, oblong-oblong, or narrowly elliptic, $7\text{--}15 \times 2\text{--}4$ cm, papery, major basal lateral veins both arising at base of leaf blade, cystoliths conspicuous, dense; base obliquely cuneate, margin denticulate, apex caudate. Male inflorescences solitary, simple, ca. 7 mm in diam., sessile; receptacle obscure; bracts connate, bracteoles cymbiform-oblong. Female inflorescences solitary, 2–5 mm in diam., sessile; receptacle 2–5 mm in diam.; bracts broadly triangular; bracteoles lanceolate-linear. Male flowers 4-merous; perianth lobes oblong. Achenes ellipsoid, 5-ribbed. Fl. Mar.

• Evergreen broad-leaved forests in valleys; 600–700 m. SE Xizang.

19. *Elatostema oreocnidioides* W. T. Wang, Bull. Bot. Res., Harbin 2(1): 5. 1982.

紫麻楼梯草 zi ma lou ti cao

Subshrubs dioecious, 100–160 cm tall, glabrous. Stems erect, branched. Leaves alternate; nanophylls absent; stipules subulate, ca. 0.6×0.1 mm, without cystoliths; petiole 0.5–1 mm; leaf blade obliquely ovate, narrowly rhombic, or broadly lanceolate, $4\text{--}8 \times 1.5\text{--}2.5$ cm, leathery, major basal lateral veins asymmetric, 1 basal, the other arising above base, cystoliths obscure, dense; base obliquely cuneate, margin crenate, apex acuminate. Male inflorescences 2- or 3-clustered, simple, 4–5 mm in diam., sessile; receptacle obscure; bracts connate, 1.5–2 mm; bracteoles cymbiform-ovate or narrowly ovate. Fl. Feb.

• Mountain forests; 1500–1600 m. W Yunnan.

20. *Elatostema lineolatum* Wight, Icon. Pl. Ind. Orient. 6: 11, t. 1984. 1853.

狭叶楼梯草 xia ye lou ti cao

Elatostema lineolatum var. *majus* Weddell.

Subshrubs monoecious or dioecious, 50–200 cm tall. Stems ascending or erect, branched, densely strigose. Leaves alternate; nanophylls absent; stipules linear or narrowly triangular, $4\text{--}7 \times 0.5\text{--}1$ mm, strigose; without cystoliths, petiole 0–1 mm; leaf blade obliquely obovate-oblong or oblong, $3\text{--}15 \times 1.2\text{--}4$ cm, herbaceous or papery, major basal lateral veins asymmetric, 1 basal, the other arising above base, both surfaces strigillose along veins; cystoliths conspicuous or obscure, dense; base obliquely cuneate, margin dentate, apex acuminate or cuspidate. Inflorescences sessile. Male inflorescences solitary, simple, 5–10 mm in diam.; pedunculate, receptacle 1.5–3.5 mm in diam.; bracts connate, bracteoles spatulate-linear or cymbiform. Female inflorescences solitary, 2–4 mm in diam.; receptacle 1–2.5 mm in diam.; bracts triangular; bracteoles narrowly oblanceolate. Male flowers 4-merous. Achenes ellipsoid, 7- or 8-ribbed. Fl. Oct–May.

Mountain streamsides, forest margins, thickets; 200–1800 m. Fujian, Guangdong, Guangxi, Taiwan, SE Xizang, S Yunnan [Bhutan, India, Myanmar, Nepal, Sikkim, Sri Lanka, Thailand].

21. *Elatostema ramosum* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 33. 1980.

多枝楼梯草 duo zhi lou ti cao

Elatostema ramosum var. *villosum* W. T. Wang.

Herbs perennial, dioecious, 20–30 cm tall. Stems ascending or erect, 3- or 4-branched; branchlets villous. Leaves alternate; nanophylls absent; stipules triangular to linear, $1\text{--}2 \times 0.4\text{--}0.6$ mm, glabrous, with cystoliths; petiole absent; leaf blade obliquely elliptic, $2\text{--}3.5 \times 0.5\text{--}1$ cm, herbaceous, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface sparsely villous or puberulent only along veins, adaxial surface glabrous or strigillose, cystoliths conspicuous, dense; base with broader half auriculate, margin serrate, apex cuspidate or acuminate. Female inflorescences solitary, 30-flowered or more, ca. 3 mm in diam., sessile; receptacle very small; bracts triangular; bracteoles narrowly lanceolate to linear. Achenes narrowly ovoid, 8-ribbed. Fl. Sep–May.

• Mountain forests, rock crevices; ca. 1500 m. SW Guangxi, SW Guizhou.

22. *Elatostema boehmerioides* W. T. Wang, Acta Phytotax. Sin. 28: 311. 1990.

苕麻楼梯草 zhu ma lou ti cao

Subshrubs dioecious, 25–40 cm tall. Stems ascending or erect, branched, glabrous. Leaves alternate; nanophylls absent; stipules subulate, $3\text{--}6 \times 0.3$ mm, glabrous, with cystoliths; petiole 1–7 mm; leaf blade obliquely elliptic, $5\text{--}12 \times 2.5\text{--}5.5$ cm, papery, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface sparsely puberulent along veins, adaxial surface glabrous, cystoliths conspicuous, dense; base obliquely cuneate, margin dentate, apex caudate. Male inflorescences solitary or in pairs, simple, ca. 3 mm in diam., sessile; receptacle obscure; bracts connate, ca. 1.2 mm; bracteoles lanceolate. Female inflorescences solitary or in pairs, 3–6 mm in diam., sessile; receptacle 2–2.5 mm in diam.; bracts obscure; bracteoles linear. Achenes ellipsoid, 6-ribbed. Fl. Feb–May.

- Evergreen broad-leaved forests, valleys; 800–900 m. SE Xizang.

23. *Elatostema integrifolium* (D. Don) Weddell in Candolle, Prodr. 16(1): 179. 1869.

全缘楼梯草 *quan yuan lou ti cao*

Herbs perennial or subshrubs, monoecious or dioecious, 60–200 cm tall. Stems erect, branched, glabrous or strigillose. Leaves alternate, glabrous; nanophylls absent; stipules narrowly lanceolate, 6–10 × 1.5–2 mm, with cystoliths; petiole 1.5–6(–10) mm; leaf blade obliquely elliptic to obliquely oblanceolate, 5–19 × 2–6 cm, papery or herbaceous, major basal lateral veins asymmetric, 1 basal, the other arising above base, cystoliths conspicuous, dense; base obliquely cuneate, margin entire or ca. 2-crenate, apex acuminate or caudate. Male inflorescences solitary or in pairs, simple, 10–18 × 6–12 mm, sessile; receptacle 4–6 mm in diam.; bracts connate, ca. 1 mm; bracteoles cymbiform. Female inflorescences solitary or in pairs, 5–8 mm in diam.; peduncle 0–1 mm; receptacle very small; bracts triangular; bracteoles narrowly linear. Male flowers 4-merous. Achenes ellipsoid, 8-ribbed. Fl. Mar–May.

Valley forests, streamsides; below 900 to 1600 m. Hainan, S Yunnan [Bhutan, India, Indonesia, Malaysia, Myanmar, Nepal, Thailand].

- 1a. Stems glabrous 23a. var. *integrifolium*
1b. Stems strigillose 23b. var. *tomentosum*

23a. *Elatostema integrifolium* var. *integrifolium*

全缘楼梯草(原变种) *quan yuan lou ti cao* (*yuan bian zhong*)

Procris integrifolia D. Don, Prodr. Fl. Nepal. 61. 1825; *Elatostema sesquifolium* (Reinwardt ex Blume) Hasskarl; *E. sesquifolium* var. *integrifolium* (D. Don) Weddell; *E. viridicaule* W. T. Wang; *Procris sesquifolia* Reinwardt ex Blume.

Stems glabrous. Fl. Mar–May.

Valley forests, streamsides; 900–1600 m. Hainan, S Yunnan [Bhutan, India, Indonesia, Myanmar, Nepal, Thailand].

23b. *Elatostema integrifolium* var. *tomentosum* (J. D. Hooker) W. T. Wang in W. T. Wang & C. J. Chen, Fl. Reipubl. Popularis Sin. 23(2): 227. 1995.

朴叶楼梯草 *po ye lou ti cao*

Elatostema sesquifolium var. *tomentosum* J. D. Hooker, Fl. Brit. India 5: 565. 1888.

Stems strigose. Fl. Feb.

Valley forests, streamsides; below 900 m. S Yunnan [India, Malaysia, Thailand].

24. *Elatostema biglomeratum* W. T. Wang, Bull. Bot. Res., Harbin 9(2): 67. 1989.

叉序楼梯草 *cha xu lou ti cao*

Subshrubs dioecious, ca. 50 cm tall. Stems erect, branched, pubescent. Leaves alternate; nanophylls absent; stipules linear-lanceolate, 3–5 × 0.5–0.8 mm, puberulent, without cystoliths; petiole 0.2–2 mm; leaf blade obliquely elliptic, 5.5–11 × 2.3–4.5 cm, papery, major basal lateral veins asymmetric, 1 basal, the other arising above base, both surfaces sparsely stri-

gillous along nerves; cystoliths conspicuous, dense; base with broader half broadly cuneate, margin dentate, apex caudate-acuminate or acuminate. Male inflorescences solitary or in pairs, simple, 2–3 mm in diam.; peduncle 1.2–2.5 mm; receptacle obscure; bracts connate, 1–1.5 mm; bracteoles cymbiform-linear. Male flowers 4-merous. Fl. Jan.

Valley thickets; ca. 100 m. Yunnan (Hekou) [Bhutan].

25. *Elatostema tenuicaudatoides* W. T. Wang, Acta Phytotax. Sin. 28: 311. 1990.

拟细尾楼梯草 *ni xi wei lou ti cao*

Subshrubs dioecious, 25–45 cm tall. Stems ascending or erect, branched, glabrous. Leaves alternate, glabrous; nanophylls absent; stipules subulate, ca. 3 × 0.2 mm, without cystoliths; petiole 0–2.5 mm; leaf blade obliquely oblong or oblanceolate-oblong, 5–18 × 1.5–4.5 cm, papery, major basal lateral veins absent and venation pinnate, cystoliths conspicuous or obscure; base obliquely cuneate, margin dentate, apex caudate or caudate-acuminate. Male inflorescences solitary, simple, 4–7 mm in diam.; peduncle ca. 1 mm; receptacle obscure; bracts connate, 1–1.8 mm; bracteoles cymbiform-lanceolate. Female inflorescences solitary, 2.5–5 mm in diam.; peduncle 0–1 mm; receptacle 1.2–2.5 mm in diam.; bracts lanceolate-linear; bracteoles linear. Male flowers 5-merous. Achenes ellipsoid, 4-ribbed. Fl. Oct–Jan.

- Evergreen broad-leaved forests in valleys, shaded wet rocks on precipices; 1300–2400 m. SE Xizang, NW Yunnan.

- 1a. Male tepals with abaxial surface
densely pubescent 25a. var. *tenuicaudatoides*
1b. Male tepals glabrous 25b. var. *orientale*

25a. *Elatostema tenuicaudatoides* var. *tenuicaudatoides*

拟细尾楼梯草(原变种) *ni xi wei lou ti cao* (*yuan bian zhong*)

Male perianth lobes densely pubescent on abaxial surface. Fl. Oct–Jan, fr. Jun.

- Evergreen broad-leaved forests in valleys; 2100–2400 m. SE Xizang.

25b. *Elatostema tenuicaudatoides* var. *orientale* W. T. Wang, Acta Bot. Yunnan., Suppl. 5: 5. 1992.

钦朗当楼梯草 *qin lang dang lou ti cao*

Male perianth lobes glabrous. Fl. Dec–Mar.

- Forests near rivers, shaded wet rocks on precipices; 1300–1900 m. NW Yunnan (Gongshan).

26. *Elatostema parvum* (Blume) Miquel in Zollinger, Syst. Verz. 102. 1854.

小叶楼梯草 *xiao ye lou ti cao*

Herbs perennial, monoecious or dioecious, 5–45 cm tall. Stems ascending or erect, branched or simple, densely retrostrigose. Leaves alternate; nanophylls oblong, 3–9 mm; stipules lanceolate or linear, 4–7 × 1–1.2 mm, glabrous, with cystoliths; petiole 0–1 mm; leaf blade obliquely obovate, obliquely oblanceolate, or oblong, 1.5–8 × 0.5–2.5 cm, herbaceous, major

basal lateral veins both arising at base of leaf blade or 1 arising above base, abaxial surface strigillose along veins, adaxial surface sparsely strigillose or glabrescent, cystoliths conspicuous, dense; base with broader half rounded, margin serrate with 7–20 teeth, apex acuminate, acute, or shortly cuspidate. Male inflorescences solitary or in pairs, simple, 3–5 mm in diam., sessile; receptacle obscure; bracts connate, ca. 5 mm; bracteoles narrowly ovate, lanceolate, or linear. Female inflorescences solitary or in pairs, broadly elliptic, 4–6 mm wide, sessile; receptacle small; bracts narrowly lanceolate or subulate. Male flowers 5-merous. Achenes ovoid, ribbed. Fl. Feb–Aug.

Mountain forests and forest margins, rock crevices, streamsides; 500–2800 m. N Guangdong, NW Guangxi, SW Guizhou, S Sichuan, Taiwan, SE Xizang, S Yunnan [Bhutan, India, Indonesia, Myanmar, Nepal, Philippines, Sikkim].

- 1a. Leaf blade apex acuminate or acute 26a. var. *parvum*
1b. Leaf blade apex shortly cuspidate 26b. var. *brevicuspis*

26a. *Elatostema parvum* var. *parvum*

小叶楼梯草(原变种) xiao ye lou ti cao (yuan bian zhong)

Procris parva Blume, Bijdr. Fl. Ned. Ind. 512. 1826; *Elatostema backeri* H. Schroeter; *E. backeri* var. *villosulum* W. T. Wang; *E. merillii* C. B. Robinson; *E. minutum* Hayata; *E. reptans* J. D. Hooker; *E. stracheyanum* Weddell; *Pellionia esquirolii* H. Léveillé.

Leaf blade apex acuminate or acute. Fl. Jul–Aug.

Mountain forests, rock crevices, streamsides; 500–2800 m. N Guangdong, NW Guangxi, SW Guizhou, S Sichuan, Taiwan, S Yunnan [Bhutan, India, Indonesia, Myanmar, Nepal, Philippines, Sikkim].

26b. *Elatostema parvum* var. *brevicuspis* W. T. Wang, Acta Phytotax. Sin. 28: 312. 1990.

骤尖小叶楼梯草 zhou jian xiao ye lou ti cao

Leaf blade apex shortly cuspidate. Fl. Jul.

- Forest margins in mountains; ca. 900 m. SE Xizang.

27. *Elatostema cuneatum* Wight, Icon. Pl. Ind. Orient. 6: 35, t. 2091, f. 3. 1853 [“*cuniata*”].

稀齿楼梯草 xi chi lou ti cao

Elatostema approximatum Weddell; *E. densiflorum* Franchet & Savatier; *E. nipponicum* Makino.

Herbs dioecious, 2.5–5 cm tall. Stems erect, simple, crispatly pubescent. Leaves alternate; nanophylls 3–5 mm. stipules narrowly triangular, 1–1.5 × 0.4–0.5 mm, glabrous, without cystoliths; petiole 0–1 mm; leaf blade obliquely rhombic-obovate, 1–3.5 × 0.5–1.5 cm, thinly herbaceous, major basal lateral veins both arising at base of leaf blade, abaxial surface puberulent along nerves, adaxial surface sparsely strigillose, cystoliths conspicuous or obscure, sparse; base with broader half rounded, margin dentate with 2–5 teeth, apex acute or obtuse. Female inflorescences solitary, 2–4 mm in diam., sessile; receptacle 2.5–4 mm in diam.; bracts triangular; bracteoles spatulate-linear. Achenes ovoid, 8-ribbed. Fl. Jun–Jul.

Valley forests, precipices; 1200–1400 m. S Yunnan [Japan, Korea, India, Indonesia, Laos, Sikkim].

28. *Elatostema sinense* H. Schroeter, Repert. Spec. Nov. Regni Veg. Beih. 83(2): 152. 1936.

对叶楼梯草 dui ye lou ti cao

Herbs perennial, dioecious, 20–60 cm tall. Stems ascending or erect, simple or rarely branched, crispatly pubescent. Leaves alternate; nanophylls ovate to elliptic, 3–5 mm; stipules lanceolate, 4–6 × 0.8–1 mm, glabrous or ciliate, with cystoliths; petiole 1–3 mm; leaf blade obliquely elliptic or oblong, 3.5–9.9 × 1.5–3 cm, herbaceous, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface sparsely puberulent, adaxial surface sparsely strigillose, cystoliths conspicuous, dense; base with broader half broadly cuneate or rounded, margin dentate, apex acuminate or caudate-acuminate. Male inflorescences solitary or in pairs, simple, 2–8 mm in diam.; peduncle 1–2.5 mm; receptacle very small or absent; bracts connate, 2–2.5 mm; bracteoles oblong or linear. Female inflorescences solitary or in pairs, 4–6 mm in diam.; receptacle small; bracts triangular; bracteoles spatulate-linear. Male flowers 5-merous. Achenes ovoid, 5-ribbed. Fl. Feb–Nov.

- Forests, dark damp places in valleys or at streamsides; 400–2800 m. S Anhui, Fujian, Guangxi, Guizhou, W Hubei, Hunan, Jiangxi, Sichuan, N Yunnan.

- 1a. Stems glabrous or pilose 28c. var. *xinningense*
1b. Stems crispatly pubescent.

2a. Male bracts not subapically

corniculate 28a. var. *sinense*

2b. Male bracts subapically

corniculate 28b. var. *longecornutum*

28a. *Elatostema sinense* var. *sinense*

对叶楼梯草(原变种) dui ye lou ti cao (yuan bian zhong)

Elatostema sinense var. *trilobatum* W. T. Wang.

Bracts of male inflorescences not cornute at apex. Fl. Jun–Sep.

- Evergreen broad-leaved forests, dense forests, dark damp places in valleys or at streamsides; 400–2600 m. S Anhui, Fujian, Guangxi, Guizhou, W Hubei, Hunan, Jiangxi, E Sichuan, NE Yunnan.

28b. *Elatostema sinense* var. *longecornutum* (H. Schroeter) W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 37. 1980.

角苞楼梯草 jiao bao lou ti cao

Elatostema longecornutum H. Schroeter, Repert. Spec. Nov. Regni Veg. Beih. 83(2): 153. 1936.

Bracts of male inflorescences cornute at apex. Fl. Sep.

- Valley forests; 1900–2800 m. Sichuan, N Yunnan.

28c. *Elatostema sinense* var. *xinningense* (W. T. Wang) L. D. Duan & Q. Lin, Acta Phytotax. Sin. 41: 495. 2003.

新宁楼梯草 xin ning lou ti cao

Elatostema xinningense W. T. Wang, Guihaia 5: 323. 1985.

Stems glabrous or pilose. Fl. Sep–Oct.

- Valley forests; 900–1100 m. SW Hunan.

29. *Elatostema monandrum* (D. Don) H. Hara, Fl. E. Himal., 3rd. Rep. 21. 1975.

异叶楼梯草 yi ye lou ti cao

Procris monandra D. Don, Prodr. Fl. Nepal. 61. 1825; *Elatostema diversifolium* Weddell; *E. monandrum* f. *ciliatum* (J. D. Hooker) Hara; *E. monandrum* f. *pinnatifidum* (J. D. Hooker) Hara; *E. monandrum* var. *ciliatum* (J. D. Hooker) Murti; *E. monandrum* var. *pinnatifidum* (J. D. Hooker) Murti; *E. muscicola* W. T. Wang; *E. surculosum* Wight; *E. surculosum* var. *ciliatum* J. D. Hooker; *E. surculosum* var. *elegans* J. D. Hooker; *E. surculosum* var. *pinnatifidum* J. D. Hooker; *Pellionia mairei* H. Léveillé.

Herbs dioecious, 5–20 cm tall. Stems ascending or erect, usually simple, pilose, furfuraceous. Leaves usually opposite, glabrous or glabrescent; nanophylls elliptic to lanceolate, 2–6 mm; stipules obscure; petiole 1–2 mm; leaf blade obliquely cuneate, obliquely elliptic, or lanceolate, 0.8–4(–6.5) × 0.4–1.2(–2) cm, herbaceous or membranous, major basal lateral veins both arising at base of leaf blade, cystoliths conspicuous, sparse or present only along margins; base obliquely cuneate, margin dentate or pinnatifid, apex acuminate to acuminate. Male inflorescences solitary, simple, 1.5–2 mm in diam.; peduncle 0–1 mm; receptacle obscure; bracts connate, 2–2.5 mm; bracteoles lanceolate to linear. Female inflorescences solitary, 2–5 mm in diam., sessile; receptacle small; bracts broadly ovate; bracteoles spatulate-linear. Male flowers 4-merous. Achenes ellipsoid, 6-ribbed. Fl. Jun–Oct.

Mountain or valley forests, streamsides, dark damp rocks, valley precipices, on tree trunks; 800–3000 m. W Guizhou, SW Shaanxi, SW Sichuan, Xizang, Yunnan [Bhutan, India, N Myanmar, Nepal, Sikkim, Sri Lanka, Thailand].

30. *Elatostema pycnodontum* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 36. 1980.

密齿楼梯草 mi chi lou ti cao

Herbs perennial, monoecious or dioecious, 10–45 cm. Stems ascending, simple or branched, glabrous. Leaves alternate; nanophylls absent; stipules narrowly ovate or broadly lanceolate, 4–8 × 1.5–3.5 mm, glabrous, without cystoliths; petiole 1–1.5 mm; leaf blade obliquely oblong-lanceolate or rhombic, (1.2–)2.5–6 × 1–2 cm, herbaceous, major basal lateral veins both arising at base of leaf blade, abaxial surface sparsely puberulent along veins, adaxial surface sparsely strigillose, cystoliths conspicuous, dense; base with broader half broadly cuneate or rounded, margin serrate, apex acuminate. Male inflorescences solitary, simple, 1.2–3 mm in diam.; peduncle 0–0.5 mm; receptacle absent; bracts connate, ca. 2.6 mm; bracteoles linear. Female inflorescences solitary, 30-flowered or more, 2–5 mm in diam.; peduncle 1.5–2 mm; receptacle very small; bracts narrowly triangular or lanceolate-linear; bracteoles linear. Male flowers 5-merous. Achenes ovoid, 5-ribbed. Fl. Aug–Sep.

• Valley streamsides, dark damp places; 800–1100 m. Guizhou, SW Hubei, NW Hunan, NE Yunnan.

31. *Elatostema myrtilus* (H. Léveillé) Handel-Mazzetti, Symb. Sin. 7: 146. 1929.

瘤茎楼梯草 liu jing lou ti cao

Pellionia myrtilus H. Léveillé, Repert. Spec. Nov. Regni Veg. 11: 552. 1913.

Herbs perennial, monoecious or dioecious, 25–40 cm tall. Stems ascending or erect, usually branched, ferruginous-furfuraceous, tuberculate, glabrous. Leaves alternate, glabrous; nanophylls absent; stipules subulate, 1–1.5 × 0.1–0.2 mm, without cystoliths; petiole absent; leaf blade obliquely ovate, 1–3 × 0.5–1 cm, herbaceous, major basal lateral veins both arising at base of leaf blade, cystoliths conspicuous, dense; base with broader half auriculate, margin serrate, apex acuminate. Male inflorescences solitary, simple, 2–5 mm in diam., sessile; receptacle obscure; bracts connate, ca. 2 mm. Female inflorescences solitary, 30-flowered or more, ca. 2 mm in diam., sessile; receptacle obscure; bracts nearly oblong; bracteoles linear. Male flowers 4- or 5-merous. Achenes narrowly ovoid, ribbed. Fl. May–Oct.

• Limestone valleys, streamside rocks; 300–1500 m. W Guangxi, S Guizhou, SW Hubei, NW Hunan, SE Sichuan, SE Yunnan.

32. *Elatostema glochidioides* W. T. Wang, Acta Phytotax. Sin. 31: 172. 1993.

算盘楼梯草 suan pan lou ti cao

Herbs perennial, dioecious, ca. 25 cm tall. Stems ascending, branched, ferruginous-furfuraceous, glabrous. Leaves alternate; nanophylls absent; stipules narrowly triangular, ca. 0.6 × 0.2 mm, glabrous; petiole 0–0.8 mm; leaf blade lanceolate, oblong-lanceolate, narrowly ovate, or elliptic, 1.1–3 × 0.4–0.9 cm, papery, major basal lateral veins both arising at base of leaf blade, abaxial surface glabrous, adaxial surface strigillose along veins, cystoliths conspicuous, dense; base with broader half rounded or auriculate, margin entire, apex attenuate or acute. Female inflorescences solitary, 2.5–4 mm in diam.; peduncle ca. 0.5 mm; receptacle small, ca. 1.8 mm in diam.; bracts connate, triangular; bracteoles linear-oblongate or linear. Achenes nearly ovoid, 7-ribbed. Fl. Apr.

• Mountain forests; ca. 800 m. Guizhou (Libo).

33. *Elatostema shanglinense* W. T. Wang, Guihaia 2: 118. 1982.

上林楼梯草 shang lin lou ti cao

Herbs perennial, dioecious, ca. 9 cm tall. Stems ascending or erect, simple, glabrous. Leaves alternate, glabrous; nanophylls absent; stipules narrowly lanceolate, 2–2.2 × 0.3–0.7 mm; petiole 0–1 mm; leaf blade obliquely elliptic or oblong, 1–4.5 × 0.5–1.5 cm, papery, major basal lateral veins both arising at base of leaf blade, cystoliths obscure, sparse; base with broader half auriculate, margin denticulate, apex caudate-acuminate. Male inflorescences solitary, simple, ca. 3.5 mm in diam., sessile; receptacle obscure; bracts connate, 2–3 mm; bracteoles narrowly linear. Male flowers 4-merous. Fl. Aug.

• Valley streamsides, dark damp rocks. Guangxi (Shanglin).

34. *Elatostema imbricans* Dunn, Bull. Misc. Inform. Kew 1920: 209. 1920.

刀叶楼梯草 *dao ye lou ti cao*

Herbs perennial, dioecious, 11–30 cm tall. Stems ascending or erect, simple or branched, ferruginous-furfuraceous, glabrous. Leaves alternate, glabrous; nanophylls absent; stipules linear-lanceolate, 3–4.5 × 0.6–0.8 mm, without cystoliths; petiole 0–1 mm; leaf blade obliquely linear-oblongate, 1–3.2 × 0.5–1.2 cm, papery, major basal lateral veins both arising at base of leaf blade, cystoliths conspicuous, dense; base with broader half auriculate, margin dentate, apex short cuspidate. Male inflorescences solitary, simple, ca. 3 mm in diam., sessile; receptacle absent; bracts connate, bracteoles ovate. Female inflorescences solitary, 30-flowered or more, 2.5–5 mm in diam., sessile; receptacle ca. 3 mm in diam.; bracts triangular; bracteoles spatulate-oblongate. Male flowers 4-merous. Achenes ellipsoid, 8-ribbed. Fl. Jun.

Mixed forests in mountains; 2200–2300 m. SE Xizang [Bhutan].

35. *Elatostema hookerianum* Weddell, Arch. Mus. Hist. Nat. 9: 309. 1856.

疏晶楼梯草 *shu jing lou ti cao*

Elatostema subfalcatum W. T. Wang.

Herbs perennial, dioecious, 20–30 cm tall, glabrous. Stems ascending or erect, simple. Leaves alternate; nanophylls absent; stipules linear-lanceolate, 6–8 × 0.6–0.8 mm, without cystoliths; petiole 0–1 mm; leaf blade falcate, 2.5–6.5 × 1.5–2 cm, papery, major basal lateral veins both arising at base of leaf blade, cystoliths conspicuous, only present along margins; base with broader half cordate, margin denticulate, apex acuminate or caudate. Male inflorescences solitary, simple, 3–4 mm in diam., subsessile; receptacle very small; bracts connate, 2.5–4 mm; bracteoles lanceolate or linear. Female inflorescences solitary, 30-flowered or more, 4–9 mm in diam., subsessile; receptacle 3.5–7.5 mm in diam.; bracts oblong or broadly ovate; bracteoles linear or spatulate-linear. Male flowers 4-merous. Achenes ellipsoid, 10-ribbed. Fl. Jan–May.

Streamside rocks, dark damp places, evergreen broad-leaved forests in mountains; 1300–2400 m. S Guangxi, SE Xizang, W Yunnan [Bhutan, NE India, Sikkim, N Vietnam].

36. *Elatostema microcephalanthum* Hayata, Icon. Pl. Formosan. 6: 59. 1916.

微序楼梯草 *wei xu lou ti cao*

Herbs perennial, monoecious, 10–20 cm tall. Stems ascending, branched, glabrous. Leaves alternate; nanophylls absent; stipules lanceolate or linear, 0.6–2 × 0.2–0.6 mm, glabrous; petiole 0–1 mm; leaf blade obliquely rhombic-elliptic or nearly rhombic, 1–6 × 0.8–2 cm, herbaceous or membranous, major basal lateral veins both arising at base of leaf blade, abaxial surface strigillose along veins, adaxial surface glabrous, cystoliths obscure or conspicuous, sparse, only present along margins; base with broader half rounded, margin obtusely serrate, apex obtusely acute to acutely acuminate. Male inflorescences solitary, simple, 4–8 mm in diam., peduncle to 4 cm;

receptacle obscure; bracts connate, ca. 4 mm. Female inflorescences solitary, 30-flowered or more, 3–4 mm in diam.; peduncle 0–3 mm; receptacle small; bracts narrowly oblong; bracteoles spatulate or linear. Male flowers 5-merous. Achenes ovoid, 5- or 6-ribbed. Fl. Jun–Jan.

Wet floors in ravines at medium elevations. Taiwan [S Japan].

37. *Elatostema longibracteatum* W. T. Wang, Bull. Bot. Res., Harbin 2(1): 6. 1982.

长苞楼梯草 *chang bao lou ti cao*

Herbs perennial, monoecious, 20–26 cm tall. Stems ascending or erect, simple, rarely branched at base, pubescent. Leaves alternate; nanophylls absent; stipules linear, ca. 3 × 0.8 mm, glabrous; without cystoliths, petiole absent; leaf blade obliquely lanceolate, 1.2–5 × 0.9–1.5 cm, herbaceous, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface sparsely puberulent along veins, adaxial surface glabrous, cystoliths conspicuous, dense; base with broader half auriculate, margin crenate-denticulate, apex caudate-acuminate. Male inflorescences solitary, simple, 9–12 × 4–6 mm, sessile; receptacle obscure; bracts connate, 9–12 mm; bracteoles narrowly triangular or linear-triangular. Female inflorescences solitary, 30-flowered or more, 2–4 mm in diam., sessile; receptacle ca. 2 mm in diam.; bracts triangular; bracteoles linear or cymbiform. Male flowers 5-merous. Fl. Feb.

• Mountain forests; 1200–1300 m. SE Yunnan.

38. *Elatostema asterocephalum* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 40. 1980.

星序楼梯草 *xing xu lou ti cao*

Herbs perennial, monoecious or dioecious, 10–14 cm tall, glabrous. Stems ascending or erect, simple. Leaves alternate; nanophylls absent; stipules subulate, 1.5–2 × 0.1–0.2 mm, without cystoliths; petiole 0–0.5 mm; leaf blade obliquely elliptic or obovate, 4–8 × 1.5–3 cm, herbaceous, major basal lateral veins asymmetric, 1 basal, the other arising above base, cystoliths conspicuous or obscure, dense; base with broader half nearly auriculate, margin denticulate, apex cuspidate or acuminate. Male inflorescences solitary, simple, 5–7 mm in diam., sessile; receptacle obscure; bracts connate, 5–7 mm; bracteoles cymbiform-ovate. Female inflorescences solitary, 30-flowered or more, 3–4 mm in diam., sessile; receptacle small; bracts narrowly triangular or linear-lanceolate; bracteoles lanceolate-linear. Male flowers 4- or 5-merous. Fl. Feb–Mar.

• Broad-leaved forests in limestone mountains. SW Guangxi.

39. *Elatostema liboense* W. T. Wang, Acta Phytotax. Sin. 31: 174. 1993.

荔波楼梯草 *li bo lou ti cao*

Herbs perennial, dioecious, ca. 18 cm tall. Stems ascending or erect, simple, densely ferruginous-furfuraceous, sparsely puberulent. Leaves alternate; nanophylls absent; stipules small, caducous; petiole 0–2 mm; leaf blade obliquely oblongate or narrowly obovate, 2.5–6.5 × 1–2 cm, papery, major basal lateral veins both arising at base of leaf blade, both surfaces strigillose;

cystoliths conspicuous, dense; base with broader half obtuse, margin denticulate, apex acuminate or acute. Female inflorescences solitary, 3-flowered or more, 2.5–4 mm in diam.; peduncle ca. 1.5 mm; receptacle broadly oblong, 2.5–3.5 mm in diam.; bracts connate, triangular; bracteoles linear or oblanceolate-linear. Achenes ellipsoid, 6-ribbed. Fl. Apr.

- Rocks under dense forests; 800–900 m. Guizhou (Libo).

40. *Elatostema xichouense* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 39. 1980.

西畴楼梯草 xi chou lou ti cao

Herbs perennial, dioecious, 13–30 cm tall. Stems ascending or erect, simple, pubescent. Leaves alternate; nanophylls absent; stipules broadly lanceolate, 2.5–3 × 0.5–1 mm, strigillose along midvein; without cystoliths, petiole 0–1 mm; leaf blade obliquely oblong-obovate or elliptic, 3–7.5 × 1.5–2 cm, herbaceous, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface puberulent along nerves, adaxial surface sparsely strigillose, cystoliths obscure, dense; base with broader half auriculate, margin denticulate, apex caudate. Female inflorescences solitary, 30-flowered or more, 2.5–5 mm in diam.; peduncle 0–1.5 mm; receptacle 2–3 mm in diam.; bracts connate, narrowly lanceolate; bracteoles spatulate-linear. Achenes ovoid or ellipsoid, 6-ribbed. Fl. May.

- Evergreen broad-leaved forests in limestone mountains; 1300–1400 m. SE Yunnan.

41. *Elatostema strigillose* B. L. Shih & Yuen P. Yang, Bot. Bull. Acad. Sin. 36: 272. 1995.

微粗毛楼梯草 wei cu mao lou ti cao

Herbs perennial, dioecious, less than 20 cm. Stems prostrate, branched, densely strigillose. Leaves alternate; nanophyll absent; stipules narrowly triangular, ca. 1.5 mm, hirtellous on abaxial surface; petiole 0–1 mm; leaf blade obliquely obovate to oblong-obovate, 0.9–2.5 × 0.5–1.1 cm, thickly papery, major basal lateral veins asymmetric, 1 basal, the other arising above base, cystoliths conspicuous, dense; base with broader half obtuse, margin serrate, apex acute. Female inflorescences solitary, ca. 3.5 × 2.5 mm, sessile or subsessile; receptacle obscure; bracts connate into a narrow-elliptic involucre, up to 3 × 1 mm; bracteoles narrowly oblong-cymbiform. Achenes ovoid, ca. 8-ribbed. Fl. Jun–Oct.

- Ravines. Taiwan (Taidong).

42. *Elatostema crassiusculum* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 43. 1980.

厚叶楼梯草 hou ye lou ti cao

Herbs perennial, dioecious, 4.5–24 cm tall. Stems erect, simple, pilose. Leaves alternate; nanophylls absent; stipules lanceolate, 3.5–5 × 1–1.5 mm, glabrous, with cystoliths; petiole 0–1 mm; leaf blade obliquely elliptic or obliquely obovate-oblong, 1.5–4.5 × 1–2 cm, leathery, major basal lateral veins both arising at base of leaf blade or 1 arising above base, abaxial surface glabrous, adaxial surface sparsely strigillose along veins, cystoliths conspicuous, dense; base with broader half

broadly cuneate or rounded, margin crenate, apex acuminate or acute. Inflorescences sessile. Male inflorescences solitary, simple, 3–5 mm in diam.; receptacle absent; bracts connate, 3–8 mm; bracteoles linear or spatulate-linear. Female inflorescences solitary, 30-flowered or more, 2–2.5 mm in diam.; receptacle obscure; bracts ovate-triangular; bracteoles linear. Male flowers 4-merous. Achenes narrowly ellipsoid, 5-ribbed. Fl. Feb–May.

- Damp rocks in forests; 400–700 m. SE Yunnan.

43. *Elatostema coriaceifolium* W. T. Wang, Acta Phytotax. Sin. 31: 170. 1993.

革叶楼梯草 ge ye lou ti cao

Herbs perennial, dioecious, 14–18.5 cm tall. Stems erect, simple, furfuraceous, glabrous. Leaves alternate, glabrous; nanophylls absent; stipules linear-lanceolate, 1–1.6 × 0.2–0.3 mm, without cystoliths; petiole 0–0.5 mm; leaf blade obliquely elliptic or rhombic-elliptic, 1.2–2.4 × 0.8–1.1 cm, leathery, major basal lateral veins asymmetric, 1 basal, the other arising above base, cystoliths conspicuous, dense; basicopic half obliquely cuneate or auriculate, margin denticulate, apex acute. Female inflorescences solitary, 30-flowered or more, 3–4 mm in diam.; peduncle ca. 1 mm; receptacle nearly orbicular or broadly oblong, ca. 2 mm in diam.; bracts triangular; bracteoles linear or narrowly linear. Fl. Apr–May.

- Rocks under dense forests, wet places in valleys, caverns in limestone hills; 500–900 m. Guangxi (Leye), Guizhou (Libo).

44. *Elatostema ichangense* H. Schroeter, Repert. Spec. Nov. Regni Veg. 47: 220. 1939.

宜昌楼梯草 yi chang lou ti cao

Herbs perennial, monoecious or dioecious, 20–50 cm tall, glabrous. Stems ascending or erect, simple. Leaves alternate; nanophylls absent; stipules linear or oblong, 2–3.5 × 0.5 mm, without cystoliths; petiole 0–1.5 mm; leaf blade obliquely obovate-oblong or obliquely oblong, 6–12.5 × 2–3 cm, herbaceous or papery, major basal lateral veins both arising at base of leaf blade or 1 arising above base, cystoliths conspicuous, dense; base with broader half obtuse or rounded, margin crenate, apex caudate-acuminate. Male inflorescences solitary or rarely in pairs, simple, 3–6 mm in diam.; peduncle 0–1 mm; receptacle very small; bracts 6, connate, ovate, unequal, 2 outer ones 1.2–1.5 cm, 4 inner ones 5–7 mm; bracteoles spatulate or cymbiform-linear. Female inflorescences solitary or rarely in pairs, 30-flowered or more, 6–10 × 3–7 mm; peduncle 2–4 mm; receptacle oblong, 3–8 × 3–6 mm; bracts triangular; bracteoles spatulate-linear. Male flowers 5-merous. Achenes ellipsoid, 8-ribbed. Fl. Aug–Sep.

- Evergreen broad-leaved forests in mountains, rocks; 300–1100 m. N Guangxi, Guizhou, W Hubei, NW Hunan, SE Sichuan.

45. *Elatostema grandidentatum* W. T. Wang, Acta Phytotax. Sin. 17(1): 107. 1979.

粗齿楼梯草 cu chi lou ti cao

Herbs perennial, dioecious, 40–50 cm tall. Stems ascending or erect, simple, sparsely puberulent. Leaves alternate;

nanophylls absent; stipules linear-lanceolate, ca. $3.5 \times 1.5-2$ mm, puberulent on abaxial surface along costa; with cystoliths, petiole 0–2 mm; leaf blade obliquely elliptic, $6-12 \times 2.5-5$ cm, herbaceous, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface sparsely puberulent, adaxial surface sparsely strigillose, cystoliths conspicuous, dense; base with broader half auriculate, margin dentate, apex cuspidate. Male inflorescences solitary, simple, ca. 5 mm in diam.; peduncle ca. 1 mm; receptacle very small; bracts connate, ca. 3 mm; bracteoles oblong. Male flowers 4-merous. Fl. Jul.

Mountain forests; 2400–3100 m. Xizang [Bhutan].

46. *Elatostema attenuatum* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 44. 1980.

渐狭楼梯草 jian xia lou ti cao

Herbs perennial, monoecious, 20–25 cm tall, glabrous. Stems ascending or erect, simple. Leaves alternate; nanophylls absent; stipules lanceolate, $5-15 \times 3-4$ mm, with cystoliths; petiole absent; leaf blade oblanceolate, $9-15 \times 2-4$ cm, papery, major basal lateral veins asymmetric, 1 basal, the other arising above base, cystoliths conspicuous, dense; base attenuate, margin entire, apex acuminate. Male inflorescences solitary, in pairs, or 2-clustered, simple, 5–6 mm in diam.; peduncle 1–2 mm; receptacle 4–5 mm in diam.; bracts connate, ca. 2.5 mm; bracteoles cymbiform-oblanceolate. Female inflorescences solitary, in pairs, or 2-clustered, 4–8 mm in diam.; peduncle ca. 1 mm; receptacle 4–7 mm in diam.; bracts triangular; bracteoles linear. Male flowers 4-merous. Fl. May–Jun.

• Dense forests in valleys; 400–800 m. SE Yunnan.

47. *Elatostema salvinoides* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 45. 1980.

迭叶楼梯草 die ye lou ti cao

Elatostema salvinoides var. *angustius* W. T. Wang; *E. salvinoides* var. *robustum* W. T. Wang.

Herbs perennial, dioecious, 12–17 cm tall. Stems erect, simple, pilose. Leaves alternate, glabrous; nanophylls narrowly obovate-oblong, $4-6 \times 1.2-1.6$ mm; stipules cordate, triangular, or lanceolate, $1-4 \times 0.5-4$ mm, without cystoliths; petiole 0.2–1.2 mm; leaf blade obliquely oblong or elliptic, $1-2.6 \times 0.4-1$ cm, herbaceous, veins obscure, cystoliths conspicuous, sparse; base obliquely cordate, margin entire or 1–2-crenate, apex obtuse or rounded. Male inflorescences solitary, simple, 0.5–1 mm in diam., sessile; receptacle obscure; bracts connate, ca. 2 mm; bracteoles broadly linear. Female inflorescences solitary, ca. 1 mm in diam., sessile; receptacle obscure; bracts oblong-lanceolate; bracteoles narrowly linear. Achene ellipsoid, ribbed. Fl. Apr–Aug.

Valley forests, rocks; 700–1600 m. Yunnan [Laos, Myanmar, N Thailand].

48. *Elatostema trichocarpum* Handel-Mazzetti, Symb. Sin. 7: 148. 1929.

疣果楼梯草 liu guo lou ti cao

Herbs perennial, monoecious or dioecious, 15–50 cm tall.

Stems ascending or erect, simple or 1-branched, glabrous or pilose. Leaves alternate; nanophylls absent; stipules subulate, $0.6-1 \times 0.1$ mm, glabrous, without cystoliths; petiole 0.5–2 mm; leaf blade obliquely elliptic-ovate or elliptic, $2-5 \times 1.2-2$ cm, herbaceous, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface glabrous, adaxial surface sparsely strigose, cystoliths obscure, sparse; base with broader half cordate or nearly auriculate, margin denticulate, apex acute or nearly obtuse. Male inflorescences solitary, simple, 5–10 mm in diam., sessile; receptacle obscure; bracts connate, to 5 mm. Female inflorescences solitary, 30-flowered or more, 2–5 mm in diam.; peduncle 2–12(–35) mm; receptacle small; bracts connate, narrowly ovate or narrowly lanceolate; bracteoles lanceolate-linear. Male flowers 4-merous. Achenes narrowly ovoid, ribbed, tuberculate. Fl. May–Aug.

• Dark damp places in mountains; 1000–1800 m. Guizhou, SW Hubei, NW Hunan, Sichuan, NE Yunnan.

49. *Elatostema nasutum* J. D. Hooker, Fl. Brit. India 5: 571. 1888.

托叶楼梯草 tuo ye lou ti cao

Herbs perennial, dioecious, 15–45 cm tall. Stems ascending or erect, simple or branched, glabrous or puberulent. Leaves alternate; nanophylls absent; stipules narrowly ovate or linear, $9-18 \times 1.5-4.5$ mm, glabrous, without cystoliths; petiole 1–4 mm; leaf blade obliquely elliptic or elliptic-ovate, $3-9(-18) \times 2-3.5(-6.5)$ cm, herbaceous, major basal lateral veins both arising at base of leaf blade, rarely 1 arising above base, both surfaces glabrous, or adaxial surface sparsely strigillose; cystoliths obscure, sparse; base with broader half cordate, margin dentate, apex acuminate. Male inflorescences solitary, simple, 4–14 mm in diam.; peduncle 3–60 mm, 0.8–1.2 mm in diam.; receptacle 2–6 mm in diam.; bracts 6, in 1 whorl, connate, cymbiform-ovate, equal, 2–5 mm; bracteoles linear. Female inflorescences solitary, 30-flowered or more, 3–9 mm in diam.; peduncle 0–1 mm; receptacle 2–5 mm in diam.; bracts triangular; bracteoles narrowly oblong. Male flowers 4-merous. Achenes ellipsoid, 10-ribbed. Fl. May–Oct.

Mountain forests, sparse forests, shaded areas on grassy slopes or in valleys; 400–2400 m. N and W Guangdong, N Guangxi, Guizhou, Hainan, Hubei, Hunan, W Jiangxi, Sichuan, SE Xizang, Yunnan [Bhutan, India, Sikkim, Nepal, Thailand].

- 1a. Stems and male peduncles glabrous 49a. var. *nasutum*
 1b. Stems and male peduncles puberulent
 49b. var. *puberulum*

49a. *Elatostema nasutum* var. *nasutum*

托叶楼梯草(原变种) tuo ye lou ti cao (yuan bian zhong)

Elatostema hainanense W. T. Wang; *E. stipulosum* Handel-Mazzetti.

Stems and peduncles of male inflorescences glabrous. Fl. Jul–Oct.

Mountain forests, shaded areas on grassy slopes; 400–2400 m. N Guangdong, N Guangxi, Guizhou, Hainan, Hubei, Hunan, W Jiangxi, Sichuan, SE Xizang, Yunnan [Bhutan, Nepal].

49b. *Elatostema nasutum* var. *puberulum* (W. T. Wang) W. T. Wang, Bull. Bot. Res., Harbin 12: 207. 1992.

短毛楼梯草 duan mao lou ti cao

Elatostema stipulosum var. *puberulum* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 48. 1980.

Stems and peduncles of male inflorescences puberulent. Fl. May–Jul.

• Shaded wet areas in valleys, sparse forests; 600–700 m. W Guangdong, N Guangxi, W Jiangxi, SE Yunnan.

50. *Elatostema filipes* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 49. 1980.

丝梗楼梯草 si geng lou ti cao

Herbs perennial, dioecious, 11–25 cm tall, glabrous. Stems ascending or erect, simple. Leaves alternate; nanophylls absent; stipules lanceolate, 4–9 × 1.5–2 mm, with cystoliths; petiole absent; leaf blade obliquely oblong or oblong-lanceolate, (2–) 6–11 × 1.4–3 cm, herbaceous or papery, major basal lateral veins both arising at base of leaf blade, cystoliths obscure; base with broader half auriculate, margin dentate, apex acuminate. Male inflorescences solitary, simple, 3–9 mm in diam.; peduncle 1–3 cm, 0.1–0.4 mm in diam.; receptacle 1–1.5 mm in diam.; bracts connate, ca. 2.5 mm; bracteoles broadly linear. Female inflorescences solitary, 30-flowered or more, ca. 5.5 mm in diam.; peduncle ca. 1 mm; receptacle ca. 2 mm in diam.; bracts triangular; bracteoles spatulate or spatulate-linear. Male flowers 4-merous. Achenes ellipsoid, 10-ribbed. Fl. Jun–Oct.

• Streamside rocks in mountains; 900–1200 m. Guangxi.

- 1a. Staminate inflorescences 3–5 mm in diam.
..... 50a. var. *filipes*
1b. Staminate inflorescences 6–9 mm in
in diam. 50b. var. *floribundum*

50a. *Elatostema filipes* var. *filipes*

丝梗楼梯草(原变种) si geng lou ti cao (yuan bian zhong)

Male inflorescences 3–5 mm in diam. Fl. Jun.

• Streamside rocks in mountains; 900–1200 m. N Guangxi.

50b. *Elatostema filipes* var. *floribundum* W. T. Wang, Bull. Bot. Res., Harbin 2(1): 7. 1982.

多花丝梗楼梯草 duo hua si geng lou ti cao

Male inflorescences 6–9 mm in diam. Fl. Oct.

• S Guangxi.

51. *Elatostema yaoshanense* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 51. 1980.

瑶山楼梯草 yao shan lou ti cao

Herbs perennial, monoecious, 10–16 cm tall, glabrous. Stems ascending or erect, simple. Leaves alternate; nanophylls absent; stipules lanceolate-linear, 2–4 × 0.5–1 mm; petiole absent; leaf blade obliquely elliptic or rhombic-elliptic, 1.5–4.5 × 1–1.5 cm, herbaceous or membranous, major basal lateral veins both arising at base of leaf blade, cystoliths conspicuous,

slightly dense; base obliquely cuneate, margin dentate, apex cuspidate. Male inflorescences solitary, simple, ca. 3 mm in diam.; peduncle 0.8–2 cm; receptacle absent; bracts connate, ca. 2.5 mm; bracteoles cymbiform. Female inflorescences solitary, 30-flowered or more, 3–4 mm in diam., sessile; receptacle 2–3 mm in diam.; bracts triangular; bracteoles linear or narrowly ovate. Male flowers 4-merous. Achenes ellipsoid, 10-ribbed. Fl. Jun.

• N Guangxi.

52. *Elatostema gueilinense* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 50. 1980.

桂林楼梯草 gui lin lou ti cao

Herbs perennial, dioecious, 14–20 cm tall, glabrous. Stems ascending or erect, simple. Leaves alternate; nanophylls absent; stipules linear-lanceolate, 1.2–3 × 0.4–0.9 mm, ciliate; petiole absent; leaf blade obliquely elliptic, 2.5–4 × 0.7–1.2 cm, herbaceous or membranous, major basal lateral veins both arising at base of leaf blade, cystoliths conspicuous, slightly sparse; base obliquely cuneate, margin denticulate, apex acuminate. Male inflorescences solitary, simple, ca. 3.5 mm in diam.; peduncle 4–6 mm; receptacle very small; bracts connate, 1.5–2 mm; bracteoles narrowly lanceolate. Male flowers 4-merous. Fl. Jul.

• Streamside rocks. Guangxi (Lingchuan).

53. *Elatostema rhombiforme* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 50. 1980.

菱叶楼梯草 ling ye lou ti cao

Elatostema caveanum Grierson & Long.

Herbs perennial, monoecious, 11–16 cm tall, glabrous. Stems ascending or erect, simple. Leaves alternate; nanophylls absent; stipules lanceolate-linear or subulate, 3–5 × 0.3–0.5 mm, without cystoliths; petiole absent; leaf blade obliquely rhombic, 2–4.5 × 0.5–1.5 cm, herbaceous, major basal lateral veins both arising at base of leaf blade, cystoliths conspicuous, dense; base obliquely cuneate, margin serrulate, apex acuminate. Male inflorescences solitary, simple, ca. 8 mm in diam.; peduncle 15–17 mm; receptacle very small; bracts connate, 2–2.5 mm; bracteoles linear. Female inflorescences solitary, 30-flowered or more, 1–2 mm in diam.; peduncle 0–1 mm; receptacle very small, obscure; bracts narrowly lanceolate. Male flowers 4-merous. Fl. Dec.

Mixed forests in mountains; 1300–1500 m. SE Yunnan [Bhutan, Sikkim].

54. *Elatostema strigosum* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 52. 1980.

伏毛楼梯草 fu mao lou ti cao

Elatostema strigosum var. *semitriplinerve* W. T. Wang.

Herbs perennial, monoecious or dioecious, 7–30 cm tall. Stems ascending or erect, usually simple, crispatly strigose. Leaves alternate; nanophylls absent; stipules narrowly triangular or subulate, ca. 1.5 × 0.1 mm, glabrous, without cystoliths; petiole 0–0.8 mm; leaf blade obliquely elliptic, 1.5–5.5 × 0.5–2.5 cm, papery, major basal lateral veins both arising at base of

leaf blade or 1 arising above base, abaxial surface sparsely puberulent or glabrescent along veins, adaxial surface glabrous or sparsely strigillose, cystoliths conspicuous, dense; base with broader half auriculate, margin denticulate, apex acute or acuminate. Male inflorescences solitary, simple, 2–5 mm in diam.; peduncle 10–35 mm; receptacle very small; bracts connate, 1.5–3 mm; bracteoles narrowly lanceolate. Female inflorescences solitary, 30-flowered or more, 1.8 mm in diam., sessile; receptacle very small; bracts triangular; bracteoles cymbiform-linear. Male flowers 5-merous. Fl. Feb–Sep.

• Mountain thickets, wet places along streamsides; 600–1000 m. NW Guizhou, Sichuan, SE Yunnan.

55. *Elatostema gunshanense* W. T. Wang, Acta Bot. Yunnan. 10: 344. 1988.

贡山楼梯草 gong shan lou ti cao

Herbs perennial, monoecious or dioecious, 12–15 cm tall. Stems ascending or erect, simple or 1-branched, pubescent. Leaves alternate; nanophylls absent; stipules linear, ca. 2 × 0.4 mm, glabrous, with cystoliths; petiole 0–0.8 mm; leaf blade obliquely elliptic, 2–4.5 × 0.5–2 cm, herbaceous, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface strigillose, adaxial surface sparsely strigose, cystoliths conspicuous, sparse; base with broader half obtuse, margin denticulate, apex caudate-acuminate. Male inflorescences solitary, simple, 2–3 mm in diam.; peduncle 20–23 mm; receptacle obscure; bracts connate, ca. 2.8 mm; bracteoles linear. Female inflorescences solitary, 30-flowered or more, 2–3 mm in diam.; peduncle 0–0.3 mm; receptacle 0.8–2 mm in diam.; bracts triangular; bracteoles broadly linear or linear-spatulate. Male flowers 4-merous. Fl. Jun.

• Evergreen broad-leaved forests, rocks; 2400–2600 m. E Xizang, NW Yunnan.

56. *Elatostema minutifurfuraceum* W. T. Wang, Acta Bot. Yunnan. 7: 293. 1985.

微鳞楼梯草 wei lin lou ti cao

Herbs perennial, dioecious, ca. 28 cm tall. Stems ascending or erect, simple, ferruginous-furfuraceous or sparsely pubescent. Leaves alternate; nanophylls absent; stipules linear, 1–1.2 × 0.3 cm, puberulent on abaxial surface along costa; petiole absent; leaf blade obliquely elliptic, ca. 13 × 4.5 cm, herbaceous, major basal lateral veins both arising at base of leaf blade, both surfaces glabrous; cystoliths conspicuous, dense; base with broader half nearly auriculate, margin dentate, apex caudate-acuminate. Male inflorescences solitary, simple, 4–7 mm in diam.; peduncle 8–15 mm; receptacle obscure; bracts connate, 5–7 mm; bracteoles broadly linear. Male flowers 4-merous. Fl. Jun.

• Dark damp places in forests; 1600–1700 m. SE Yunnan.

57. *Elatostema pseudodissectum* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 55. 1980.

滇桂楼梯草 dian gui lou ti cao

Herbs perennial, monoecious, 20–40 cm tall, glabrous. Stems ascending or erect, branched. Leaves alternate; nano-

phylls absent; stipules narrowly triangular, 0.7–1.5 × 0.2–0.4 mm, without cystoliths; petiole 1–3 mm; leaf blade obliquely ovate or elliptic-ovate, 4–11 × 1.5–4 cm, membranous or herbaceous, major basal lateral veins both arising at base of leaf blade, cystoliths conspicuous, dense; base obliquely cuneate, margin denticulate, apex acuminate or cuspidate. Male inflorescences solitary, simple, 4–7 mm in diam.; peduncle 12–40 mm; receptacle small; bracts connate, broadly ovate. Female inflorescences solitary, 30-flowered or more, 3–6 mm in diam., sessile; receptacle 3–5 mm in diam.; bracts narrowly ovate; bracteoles spatulate-linear. Male flowers 4-merous. Achenes ellipsoid, smooth. Fl. Sep–Oct.

• Rocks in valley forests, precipices; 1100–2200 m. Guangxi, SW Guizhou, SE Yunnan.

58. *Elatostema baiseense* W. T. Wang, Acta Phytotax. Sin. 31: 175. 1993.

百色楼梯草 bai se lou ti cao

Subshrubs dioecious, 40–50 cm tall. Stems erect, branched, ferruginous-furfuraceous, glabrous. Leaves alternate, glabrous; nanophylls absent; stipules subulate or narrowly linear, 2–6 × 0.2–0.5 mm, without cystoliths; petiole 2–4 mm; leaf blade obliquely elliptic, 3.5–10 × 1.5–4 cm, papery, major basal lateral veins asymmetric, 1 basal, the other arising above base, cystoliths conspicuous, dense; base with broader half auriculate, margin denticulate, apex acuminate. Male inflorescences solitary, simple, 4–6 mm in diam.; peduncle 5–10 mm; receptacle 1–1.5 mm in diam.; bracts connate, 3–4 mm; bracteoles ovate or cymbiform-linear. Male flowers 5-merous. Fl. Jun.

• Evergreen forests; ca. 300 m. Guangxi (Bose).

59. *Elatostema lasiocephalum* W. T. Wang, Bull. Bot. Res., Harbin 2(1): 7. 1982.

毛序楼梯草 mao xu lou ti cao

Herbs perennial, monoecious, 17–40 cm tall. Stems ascending or erect, simple or branched, pubescent. Leaves alternate; nanophylls absent; stipules lanceolate-linear, 5 × 1.5–2 mm, puberulent along costa; petiole absent; leaf blade obliquely elliptic, 6–8 × 1.5–3.5 cm, thinly herbaceous, major basal lateral veins both arising at base of leaf blade, abaxial surface puberulent, adaxial surface strigose, cystoliths conspicuous or obscure, slightly sparse; base with broader half auriculate, margin dentate, apex caudate-acuminate. Male inflorescences solitary, simple, 5–11 mm in diam.; peduncle 15–50 mm; receptacle small; bracts connate, 1.5–2.8 mm; bracteoles subulate. Female inflorescences solitary, 30-flowered or more, 4–7 mm in diam., sessile; receptacle 3–5 mm in diam.; bracts triangular or narrowly triangular; bracteoles linear. Male flowers 3- or 4-merous. Achenes narrowly ovoid, 10-ribbed. Fl. Jun–Jul.

• Dense mountain forests. NW Guangxi.

60. *Elatostema aliferum* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 57. 1980.

翅苞楼梯草 chi bao lou ti cao

Herbs perennial, monoecious, 10–25 cm. Stems prostrate, branched, strigose. Leaves alternate; nanophylls absent; stipules

lanceolate to linear, 5–7 × 1.8–2.5 mm, strigillose, with cystoliths; petiole 0–1 mm; leaf blade obliquely elliptic, 1–4.5 × 0.6–2.5 cm, herbaceous, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface puberulent, adaxial surface sparsely strigose, cystoliths conspicuous or obscure, dense; base with broader half auriculate, margin denticulate-serrate, apex acuminate. Male inflorescences solitary, simple, 3–10 mm in diam.; peduncle 4–30 mm; receptacle small; bracts connate, ca. 3.5 mm; bracteoles spatulate-linear. Female inflorescences solitary, 30-flowered or more, 1.5–2.5 mm in diam.; peduncle 0–1 mm; receptacle small; bracts triangular; bracteoles linear-oblong. Male flowers 5-merous. Fl. May–Jun.

- Valley forests; 2100–2500 m. SE Xizang, W Yunnan.

61. *Elatostema brunneinerve* W. T. Wang, Bull. Bot. Res., Harbin 3(3): 64. 1983.

褐脉楼梯草 he mai lou ti cao

Herbs perennial, dioecious, ca. 65 cm. Stems ascending, branched, villous. Leaves alternate; nanophylls absent; stipules broadly lanceolate, 15–20 × 4.5–5.2 mm, glabrous, with cystoliths; petiole 1.5–2 mm; leaf blade obliquely obovate or broadly oblanceolate, 6.5–9 × 2.5–4 cm, papery, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface puberulent, adaxial surface sparsely strigose, cystoliths obscure, sparse; base with broader half auriculate, margin denticulate or dentate, apex acuminate or cuspidate. Male inflorescences solitary, simple, ca. 5 mm in diam.; peduncle 5–10 mm; receptacle obscure; bracts connate, 3–6 mm; bracteoles oblong or linear-cymbiform. Male flowers 4-merous. Fl. Jun.

- Forests on limestone slopes; ca. 1300 m. W Guangxi.

62. *Elatostema crenatum* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 58. 1980.

浅齿楼梯草 qian chi lou ti cao

Subshrubs dioecious, 30–50 cm tall, glabrous. Stems erect, simple. Leaves alternate; nanophylls absent; stipules broadly lanceolate or narrowly lanceolate, 10–12 × 3–4 mm, with cystoliths; petiole 4–11 mm; leaf blade obliquely oblong, 10.5–18 × 4–7.5 cm, papery, major basal lateral veins absent and venation pinnate, cystoliths conspicuous, dense; base with broader half broadly cuneate or rounded, margin crenate, apex acuminate. Male inflorescences solitary, simple, 15–18 mm in diam.; peduncle ca. 1.5 mm; receptacle obscure; bracts connate, 7–9 mm; bracteoles cymbiform-linear or spatulate-linear. Male flowers 5-merous. Fl. Jun–Sep.

- Valley forests, streamsides; 200–300 m. Yunnan (Hekou).

63. *Elatostema stewardii* Merrill, Philipp. J. Sci. 27: 161. 1925.

庐山楼梯草 lu shan lou ti cao

Herbs perennial, dioecious, 24–70 cm tall, usually with bulbils. Stems ascending or erect, simple or rarely branched, glabrous. Leaves alternate; nanophylls absent; stipules triangular or subulate, 4 × 0.3–0.4 mm, glabrous, with cystoliths;

petiole 1–4 mm; leaf blade obliquely elliptic-obovate or oblong, 7–16 × 2.5–4.5 cm, herbaceous or papery, major basal lateral veins absent and venation pinnate, both surfaces glabrous or adaxial surface hirtellous; cystoliths conspicuous, dense; base with broader half auriculate or rounded, margin dentate, apex cuspidate. Male inflorescences solitary, simple, 7–10 mm in diam.; peduncle 1.5–3 mm; receptacle small; bracts connate, bracteoles linear. Female inflorescences solitary, 30-flowered or more, 5–12 × 4–8 mm in diam., sessile; receptacle ca. 3 mm in diam.; bracts triangular; bracteoles spatulate or oblanceolate. Male flowers 5-merous. Achenes ovoid, obscurely ribbed. Fl. Jul–Sep.

- Streamsides in ravines, forests; 400–1500 m. S Anhui, N Fujian, S Gansu, SE Henan, W Hubei, NW Hunan, N Jiangxi, S Shaanxi, E Sichuan, NW Zhejiang.

This species is used medicinally, known as 白龙骨 (bai long gu).

64. *Elatostema bracteosum* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 59. 1980.

显苞楼梯草 xian bao lou ti cao

Herbs perennial, dioecious, ca. 26 cm tall. Stems ascending or erect, simple, glabrous. Leaves alternate; nanophylls absent; stipules linear, 6–7 × 1.5–2 mm, glabrous, without cystoliths; petiole absent; leaf blade obliquely elliptic or obovate-elliptic, 5–15 × 2.5–5.5 cm, herbaceous, major basal lateral veins absent and venation pinnate, abaxial surface sparsely puberulent along veins, adaxial surface sparsely strigillose, cystoliths obscure, dense; base with broader half nearly cordate, margin densely dentate, apex cuspidate or caudate-acuminate. Female inflorescences solitary or in pairs, 30-flowered or more, 3–5 mm in diam.; peduncle ca. 1 mm; receptacle small; bracts narrowly triangular or linear; bracteoles linear. Achenes ellipsoid, 4-ribbed. Fl. May.

- Dark damp places in valleys; 400–500 m. N Guizhou.

65. *Elatostema subcoriaceum* B. L. Shih & Yuen P. Yang, Bot. Bull. Acad. Sin. 36: 272. 1995.

近革叶楼梯草 jin ge ye lou ti cao

Herbs perennial, monoecious, up to 70 cm tall. Stems ascending or erect, branched, glabrous. Leaves alternate; nanophyll absent; stipules lanceolate, triangular or narrowly elliptic, up to 14 × 3 mm, without cystolith, glabrous; petiole 2–10 mm; leaf blade obliquely elliptic, 6–24 × 3–8 cm, thickly papery to nearly leathery, major basal lateral veins absent and venation pinnate, cystoliths conspicuous, dense; base with broader half rounded, margin dentate or crenate, apex acuminate or caudate. Male inflorescences solitary, simple, up to 1.8 × 1.6 cm, peduncle 2–10 mm; receptacle usually obscure; bracts connate into an oblong involucre, up to 1.6 × 0.6 cm; bracteoles cymbiform. Female inflorescences solitary, up to 12 × 6 mm, sessile or subsessile; receptacle obscure; bracts connate into an oblong involucre, up to 1.6 × 0.6 cm; bracteoles lanceolate. Male flowers 5-merous. Achenes ellipsoidal, ca. 6-ribbed. Fl. Jul–Oct.

- Ravines, moist forests at low elevations. Taiwan (Lan Yu).

66. *Elatostema involucratum* Franchet & Savatier, Enum. Pl. Jap. 1: 439. 1875.

楼梯草 lou ti cao

Elatostema bijiangense W. T. Wang; *E. umbellatum* (Siebold & Zuccarini) Blume var. *majus* Maximowicz.

Herbs perennial, monoecious or dioecious, 20–60 cm tall. Stems ascending or erect, usually simple, glabrous or sparsely puberulent. Leaves alternate; nanophylls absent; stipules narrowly linear or narrowly triangular, 3–5 × 1.5–2 mm, glabrous, with cystoliths; petiole 0–2 mm; leaf blade obliquely oblanceolate-oblong or oblong, 4.5–16(–19) × 2–4.5(–6) cm, herbaceous, major basal lateral veins absent and venation pinnate, abaxial surface glabrous or sparsely puberulent along nerves, adaxial surface sparsely strigillose, cystoliths conspicuous, dense; base with broader half rounded, margin dentate, apex cuspidate. Male inflorescences solitary or in pairs, simple, 3–9 mm in diam.; peduncle (4–)7–20(–32) mm; receptacle obscure; bracts connate, ca. 2 mm, glabrous; bracteoles linear. Female inflorescences solitary or in pairs, 30-flowered or more, 1.5–4(–14) mm in diam.; peduncle 0–1 mm; receptacle 0.5–2(–5) mm in diam.; bracts ovate or triangular; bracteoles linear. Male flowers 5-merous. Achenes ovoid, ribbed. Fl. May–Oct.

Rocks along valley streamsides, forests, thickets; 200–3200 m. S Anhui, Fujian, S Gansu, N Guangdong, W Guangxi, Guizhou, SW Henan, W Hubei, Hunan, S Jiangsu, Jiangxi, S Shaanxi, Sichuan, NE Yunnan, Zhejiang [Japan, S Korea].

This whole plant is used medicinally, known as 赤车使者 (chi che shi zhe).

67. *Elatostema acuteserratum* B. L. Shih & Yuen P. Yang, Bot. Bull. Acad. Sin. 36: 260. 1995.

台湾楼梯草 tai wan lou ti cao

Herbs perennial, monoecious or dioecious, up to 80 cm tall. Stems ascending or erect, branched, glabrous. Leaves alternate; nanophyll absent; stipules narrowly triangular, 1.5–2.3 mm, with cystoliths, nearly glabrous; petiole 0–3 mm; leaf blade lanceolate or narrowly elliptic to elliptic, to 18 × 5 cm, membranous to very thickly papery, major basal lateral veins absent and venation pinnate, cystoliths conspicuous, dense; base with broader half broadly cuneate, margin sharply serrate to dentate, apex acuminate or caudate. Male inflorescences solitary, simple, ca. 12 mm in diam., sessile or subsessile. Receptacle obscure; bracts ovate-cymbiform; bracteoles cymbiform. Female inflorescences ca. 7 mm in diam.; receptacle obscure; bracts nearly triangular; bracteoles linear-lanceolate. Male flowers 5-merous. Achenes ellipsoidal, ca. 12-ribbed. Fl. spring-autumn.

• Ravines, moist shady forests. Taiwan (Lan Yu).

68. *Elatostema tenuicornutum* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 60. 1980.

细角楼梯草 xi jiao lou ti cao

Herbs perennial, dioecious, 20–50 cm tall. Stems erect, simple, densely pubescent. Leaves alternate; nanophylls absent;

stipules narrowly linear, 7–11 × 1.5–2 mm, sparsely puberulent, without cystoliths; petiole 2–5 mm; leaf blade obliquely oblong or obovate-oblong, 7–11.5 × 2.5–4 cm, herbaceous, major basal lateral veins absent and venation pinnate, abaxial surface puberulent, adaxial surface sparsely strigillose; cystoliths obscure, dense; base with broader half auriculate, margin densely dentate, apex acuminate or caudate. Male inflorescences solitary, simple, 6–8 mm in diam.; peduncle 6–12 mm; receptacle obscure; bracts connate, 4.5–7.5 mm; bracteoles lanceolate-linear. Female inflorescences solitary, 30-flowered or more, 3–6 mm in diam.; peduncle 0–1 mm; receptacle 2–4 mm in diam.; bracts broadly ovate; bracteoles spatulate-linear. Male flowers 5-merous. Achenes ellipsoid, ribbed. Fl. Apr–Jun.

• Valley thickets, forests, on rocks; 1100–2200 m. W Sichuan.

69. *Elatostema mabiense* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 63. 1980.

马边楼梯草 ma bian lou ti cao

Herbs perennial, dioecious, 14–24 cm tall. Stems ascending or erect, simple or branched, puberulent. Leaves alternate; nanophylls absent; stipules subulate, ca. 1 × 0.2 mm, glabrous, without cystoliths; petiole 0–1 mm; leaf blade obliquely elliptic, 3.5–5 × 1.5–2 cm, herbaceous, major basal lateral veins absent and venation pinnate, both surfaces glabrous or strigose; cystoliths conspicuous or obscure, dense; base with broader half auriculate, margin crenate, apex acuminate or cuspidate. Male inflorescences solitary, simple, ca. 4 mm in diam.; peduncle 2–9.5 mm; receptacle absent; bracts connate, 2.5–3 mm; bracteoles linear-lanceolate. Male flowers 5-merous. Fl. Nov–Feb.

• Mountain forests or slopes; 1500–1600 m. W Sichuan, SE Yunnan.

- 1a. Leaf blade glabrous; male peduncle 2–6 mm; bracts ca. 2 69a. var. *mabiense*
1b. Leaf blade strigose; male peduncle ca. 9.5 mm; bracts 6 69b. var. *sexbracteatum*

69a. *Elatostema mabiense* var. *mabiense*

马边楼梯草(原变种) ma bian lou ti cao (yuan bian zhong)

Leaf blade with both surfaces glabrous. Peduncles of male inflorescences 2–6 mm; bracts 2. Fl. Nov.

• Mountain forests; ca. 1600 m. W Sichuan.

69b. *Elatostema mabiense* var. *sexbracteatum* W. T. Wang, Bull. Bot. Res., Harbin 9(2): 69. 1989.

六苞楼梯草 liu bao lou ti cao

Leaf blade with both surfaces strigose. Peduncles of male inflorescences ca. 9.5 mm; bracts 6. Fl. Feb.

• Mountain slopes; ca. 1500 m. SE Yunnan.

70. *Elatostema youyangense* W. T. Wang, Bull. Bot. Res., Harbin 4(3): 113. 1984.

酉阳楼梯草 you yang lou ti cao

Herbs perennial, monoecious, ca. 20 cm tall, glabrous. Stems ascending or erect, simple, glabrous. Leaves alternate;

nanophylls absent; stipules subulate, 1–1.5 × 0.1–0.2 mm, without cystoliths; petiole absent; leaf blade oblong-lanceolate, 4.5–7 × 1.5–2 cm, papery, major basal lateral veins absent and venation pinnate, cystoliths obscure, dense; base with broader half cordate, margin dentate, apex caudate. Male inflorescences solitary, simple, 2–6 mm in diam.; peduncle 3–15 mm; receptacle very small; bracts connate, ca. 2 mm; bracteoles lanceolate-linear. Female inflorescences solitary, 30-flowered or more, 1–1.6 mm in diam.; peduncle ca. 0.5 mm; receptacle small; bracts broadly ovate; bracteoles cymbiform. Male flowers 5-merous. Fl. Apr.

- Mountains; ca. 1300 m. Chongqing (Youyang).

71. *Elatostema villosum* B. L. Shih & Yuen P. Yang, Bot. Bull. Acad. Sin. 36: 277. 1995.

柔毛楼梯草 rou mao lou ti cao

Herbs perennial, dioecious, up to 45 cm. Stems aggregated, ascending or suspending, branched, densely villous. Leaves alternate; nanophyll absent; stipules narrowly triangular, 3–5.5 mm, hirsute on abaxial surface; petiole 0–1 mm; leaf blade obliquely obovate-oblong, 2–5.5 × 0.7–2.2 cm, thickly papery, major basal lateral veins absent and venation pinnate, cystoliths conspicuous, dense; base with broader half cordate, margin serrate, apex cuspidate. Female inflorescences solitary, ca. 4.5 mm in diam.; peduncle to 1 mm or absent; receptacle ca. 3 × 3 mm in diam.; bracts connate into a subquadrate involucre; bracteoles narrowly lanceolate. Achenes ovoid, ca. 12-ribbed. Fl. Jun.

- Ravines, moist forests at low to medium elevations. S Taiwan.

72. *Elatostema sublineare* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 61. 1980.

条叶楼梯草 tiao ye lou ti cao

Herbs perennial, monoecious or dioecious, 15–40 cm tall. Stems ascending or erect, simple, villous, brown furfuraceous. Leaves alternate; nanophylls absent; stipules lanceolate or linear-lanceolate, 6–9 × 1.5–2 mm, glabrous or sparsely puberulent, with cystoliths; petiole absent; leaf blade obliquely oblanceolate or linear-oblong, 6–10.5 × 1.2–2.2(–2.8) cm, herbaceous, major basal lateral veins absent and venation pinnate, abaxial surface villous along veins, adaxial surface sparsely pubescent, cystoliths conspicuous, dense; base with broader half cordate, margin denticulate, apex acuminate. Male inflorescences solitary, simple, ca. 9 mm in diam.; peduncle 6–10 mm; receptacle obscure; bracts connate, 3–6 mm, villous; bracteoles absent. Female inflorescences solitary or in pairs, 30-flowered or more, 2–8 mm in diam.; peduncle 1–3.5 mm; receptacle 2–7 mm in diam.; bracts triangular; bracteoles spatulate-linear. Male flowers 4- or 5-merous. Achenes ovoid, 8-ribbed. Fl. Mar–May.

Dark damp rocks along valley streamsides, forests; 400–1000 m. Guangxi, Guizhou, SW Hubei, Hunan, SE Sichuan [N Vietnam].

73. *Elatostema calciferum* W. T. Wang, Keys Vasc. Pl. Wuling Mts. 577. 1995.

具钙楼梯草 ju gai lou ti cao

Herbs perennial, dioecious, ca. 27 cm tall. Stems ascending or erect, simple, strigose. Leaves alternate; nanophylls absent; stipules subulate, ca. 4 × 0.5 mm, hirtellous, without cystoliths; petiole 0–1.5 mm; leaf blade obovate-oblong or broadly oblanceolate, 6–8.5 × 1.5–3 cm, papery, major basal lateral veins absent and venation pinnate, abaxial surface pilose along nerves, adaxial surface strigose, cystoliths obscure, sparse; base cuneate, margin dentate or denticulate, apex acuminate. Female inflorescences solitary, 30-flowered or more, 4–5 mm in diam.; peduncle 0–1.5 mm; receptacle elliptic, 3–4 mm in diam.; bracts narrowly triangular; bracteoles spatulate. Achenes narrowly ovoid, 7-ribbed. Fl. Jun.

- Woodland margins on mountain slopes; ca. 200 m. NW Hunan.

74. *Elatostema obscurinerve* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 63. 1980.

隐脉楼梯草 yin mai lou ti cao

Herbs perennial, dioecious, ca. 28 cm tall, glabrous. Stems ascending or erect, branched. Leaves alternate; nanophylls absent; stipules ovate-linear, 4–5 × 2 mm, with cystoliths; petiole absent; leaf blade obliquely rhombic-obovate or rhombic-oblong, 2.5–5 × 1.2–2 cm, herbaceous or membranous, major basal lateral veins absent and venation pinnate, cystoliths conspicuous, dense; base obliquely cuneate, margin denticulate or crenate, apex obtuse. Male inflorescences solitary, simple, ca. 5 mm in diam.; peduncle 4–6.5 mm; receptacle obscure; bracts connate, ca. 3 mm; bracteoles narrowly ovate or linear. Male flowers 5-merous. Fl. Jul.

- Shaded wet areas along rocks in mountains. Guangxi (Fengshan).

75. *Elatostema medogense* W. T. Wang, Bull. Bot. Res., Harbin 2(1): 10. 1982.

墨脱楼梯草 mo tuo lou ti cao

Elatostema medogense var. *oblongum* W. T. Wang; *E. shuzhii* W. T. Wang.

Herbs perennial, monoecious or dioecious, 7–20 cm tall. Stems ascending or erect, simple or branched, puberulent. Leaves alternate; nanophylls absent; stipules narrowly linear, 1.5–2 × 0.2–0.3 mm, glabrous, without cystoliths; petiole 0–1 mm; leaf blade obliquely elliptic or oblong, 1–3 × 0.5–1.5 cm, herbaceous, major basal lateral veins both arising at base of leaf blade, abaxial surface sparsely strigillose along nerves, adaxial surface glabrous, cystoliths conspicuous or obscure, sparse; base with broader half auriculate, margin crenate-dentate, apex acute. Male inflorescences solitary, simple, 3–7 mm in diam.; peduncle 2–5 cm; receptacle elliptic, 1.5–3.5 mm; bracts connate, 2.5–3.5 mm; bracteoles linear. Female inflorescences solitary, 10–20-flowered, 2–6 mm in diam.; peduncle ca. 1 mm; receptacle 1.5–3.5 mm in diam.; bracts triangular; bracteoles narrowly linear. Male flowers 4-merous. Achenes ovoid, smooth. Fl. May–Aug.

Mountain forests or evergreen broad-leaved forests in valleys; 1600–2600 m. SE Xizang [India].

76. *Elatostema obtusum* Weddell, Ann. Sci. Nat., Bot., sér. 4, 1: 190. 1854.

钝叶楼梯草 *dun ye lou ti cao*

Herbs perennial, dioecious, 10–50 cm tall. Stems ascending or creeping, branched or simple, nearly glabrous, very sparsely retrorse-hirtellous, or crispately strigose. Leaves alternate; nanophylls absent; stipules lanceolate-linear, 2–3 × 0.1–0.2 mm, glabrous, without cystoliths; petiole 0–1.5 mm; leaf blade obliquely obovate, obliquely obovate-elliptic, or oblong-obovate, 0.5–1.5(–3) × 0.5–1.2(–1.6) cm, herbaceous, major basal lateral veins both arising at base of leaf blade, both surfaces glabrous or adaxial surface sparsely strigillose; cystoliths conspicuous or obscure, dense; base with broader half cordate, margin dentate, apex obtuse or rounded. Male inflorescences solitary, simple, 4–7 mm in diam.; peduncle 0.2–2(–6.5) cm; receptacle very small; bracts connate, ca. 2.5 mm; bracteoles absent. Female inflorescences solitary, 1(or 2)-flowered, 2–3 mm in diam., sessile; receptacle absent; bracts lanceolate; bracteoles absent. Male flowers 4-merous. Achenes narrowly ovoid, smooth. Fl. Jun–Sep.

Forests, streamsides, rocks; 700–3000 m. Fujian, S Gansu, N Guangdong, N Guangxi, SE Guizhou, W Hubei, NW and SE Hunan, W Jiangxi, S Shaanxi, Sichuan, Taiwan, SE Xizang, Yunnan, S Zhejiang [Bhutan, NE India, Nepal, Philippines, Sikkim, Thailand].

- 1a. Stems crispately strigose 76a. var. *obtusum*
 1b. Stems nearly glabrous or very sparsely retrorse-hirtellous 76b. var. *trilobulatum*

76a. *Elatostema obtusum* var. *obtusum*

钝叶楼梯草(原变种) *dun ye lou ti cao* (yuan bian zhong)

Stems crispately strigose. Fl. Jun–Sep.

Mountain forests, streamsides, rocks; 1500–3000 m. S Gansu, W Hubei, NW Hunan, S Shaanxi, Sichuan, SE Xizang, Yunnan [Bhutan, NE India, Nepal, Sikkim, Thailand].

76b. *Elatostema obtusum* var. *trilobulatum* (Hayata) W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 66. 1980.

三齿钝叶楼梯草 *san chi dun ye lou ti cao*

Pellionia trilobulata Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 280. 1911; *Elatostema filicaulum* C. B. Clarke; *E. obtusum* var. *glabrescens* W. T. Wang; *E. trilobulatum* (Hayata) T. Yamazaki.

Stems glabrescent or very sparsely retrorse-hirtellous. Fl. Jun–Sep.

Forests, valley streamsides; 700–1600 m. Fujian, N Guangdong, N Guangxi, SE Guizhou, W Hubei, SE Hunan, W Jiangxi, Taiwan, S Zhejiang [Philippines].

77. *Elatostema cyrtandrifolium* (Zollinger & Moritz) Miquel, Pl. Jungh. 1: 21. 1851.

锐齿楼梯草 *rui chi lou ti cao*

Herbs perennial, dioecious, 14–70 cm tall. Stems as-

ending or erect, branched or rarely simple, glabrous, pilose, or densely pubescent. Leaves alternate; nanophylls absent; stipules narrowly lanceolate or subulate, 3–5 × 0.5–1 mm, glabrous, with cystoliths; petiole 0.5–5 mm; leaf blade obliquely elliptic, 5–15 × 2.2–5 cm, herbaceous or membranous, major basal lateral veins both arising at base of leaf blade or 1 arising above base, abaxial surface sparsely puberulent or glabrescent along veins, adaxial surface sparsely strigillose, cystoliths slightly conspicuous, dense; base with broader half broadly cuneate or rounded, margin sharply serrate, apex acuminate or short caudate. Male inflorescences solitary, simple, 6–13 mm in diam.; peduncle ca. 6 mm; receptacle 5–11 mm in diam.; bracts connate, ca. 2.5 mm; bracteoles cymbiform. Female inflorescences solitary or in pairs, 3–12 mm in diam.; peduncle 0.5–2 mm; receptacle 2–10 mm in diam.; bracts ovate; bracteoles spatulate or linear-lanceolate. Male flowers 4-merous. Achenes ovoid or ellipsoid, 6–8-ribbed. Fl. Apr–Oct.

Forests, streamsides; 300–1900 m. Fujian, S Gansu, N Guangdong, N and W Guangxi, Guizhou, W Hubei, Hunan, Jiangxi, Sichuan, Taiwan, SE Yunnan [Bhutan, India, Indonesia, Malaysia, Myanmar].

This species is used medicinally.

- 1a. Stems glabrous or pilose; leaf blade apex acuminate 77a. var. *cyrtandrifolium*
 1b. Stems densely pubescent; leaf blade apex short caudate 77b. var. *brevicaudatum*

77a. *Elatostema cyrtandrifolium* var. *cyrtandrifolium*

锐齿楼梯草(原变种) *rui chi lou ti cao* (yuan bian zhong)

Procris cyrtandrifolia Zollinger & Moritz in Moritz et al., Syst. Verz. 74. 1846; *Elatostema herbaceifolium* Hayata; *E. sessile* J. R. Forster & G. Forster var. *cyrtandrifolium* (Zollinger & Moritz) Weddell; *E. sessile* var. *pubescens* J. D. Hooker.

Stems glabrous or pilose. Leaf blade apex acuminate. Fl. Apr–Oct.

Forests, rocks near valley streamsides; 300–1900 m. Fujian, S Gansu, N Guangdong, W Guangxi, Guizhou, W Hubei, Hunan, Jiangxi, Sichuan, Taiwan, SE Yunnan [Bhutan, India, Indonesia, Malaysia, Myanmar].

77b. *Elatostema cyrtandrifolium* var. *brevicaudatum* (W. T. Wang) W. T. Wang in W. T. Wang & C. J. Chen, Fl. Reipubl. Popularis Sin. 23(2): 267. 1995.

短尾楼梯草 *duan wei lou ti cao*

Elatostema herbaceifolium var. *brevicaudatum* W. T. Wang, Bull. Bot. Res., Harbin 2(1): 13. 1982.

Stems densely pubescent. Leaf blade apex shortly caudate. Fl. Jul–Aug.

- Mountain forests, streamsides. N Guangxi.

78. *Elatostema pergamenum* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 67. 1980.

坚纸楼梯草 *jian zhi lou ti cao*

Subshrubs dioecious, 10–16 cm tall. Stems erect, branch-

ed, densely strigose. Leaves alternate; nanophylls absent; stipules lanceolate, 2.5–4 × 0.5–1 mm; petiole 0–0.5 mm; leaf blade obliquely ovate or elliptic-ovate, 2–5 × 1–1.6 cm, papery, major basal lateral veins both arising at base of leaf blade, abaxial surface densely strigillose along nerves, adaxial surface glabrous, cystoliths conspicuous, dense; base with broader half broadly cuneate or rounded, margin denticulate, apex acuminate or cuspidate. Female inflorescences solitary, 5–10 mm in diam.; peduncle 2–2.5 mm; receptacle oblong, 4–7 × 3.5–5 mm; bracts broadly triangular to ovate; bracteoles spatulate-linear. Fl. Jun–Jul.

- Guangxi (Longzhou).

79. *Elatostema breviacuminatum* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 71. 1980.

短尖楼梯草 duan jian lou ti cao

Herbs perennial, dioecious, 20–45 cm tall. Stems ascending, branched, retrorsely strigose. Leaves alternate; nanophylls absent; stipules lanceolate, ca. 5 × 2 mm; petiole 1–3 mm; leaf blade obliquely elliptic, 8–16 × 5–8.5 cm, papery, major basal lateral veins both arising at base of leaf blade, abaxial surface sparsely puberulent along veins, adaxial surface glabrous, cystoliths conspicuous, dense; base with broader half nearly rounded, margin crenulate, apex short acuminate. Male inflorescences solitary, simple, 13–15 mm in diam.; peduncle 6–8 mm; receptacle elliptic, 12–14 × 8–14 mm; bracts connate, 8–15 mm wide; bracteoles cymbiform-oblong. Male flowers 4-merous. Fl. May.

- Valley forests; 700–800 m. S Yunnan (Jinping).

80. *Elatostema setulosum* W. T. Wang, Guihaia 2: 120. 1982.

刚毛楼梯草 gang mao lou ti cao

Herbs perennial, dioecious, ca. 22 cm tall. Stems ascending or erect, simple, sparsely hispidulous. Leaves alternate; nanophylls absent; stipules lanceolate-linear, ca. 3 × 0.4 mm, glabrous; petiole absent; leaf blade obliquely elliptic, 3.5–9.5 × 2–5 cm, papery, major basal lateral veins both arising at base of leaf blade, abaxial surface glabrous, adaxial surface sparsely setulose, cystoliths obscure, dense; base with broader half auriculate, margin crenate, apex acuminate. Female inflorescences in pairs, 2–4 mm in diam.; peduncle 1–3 mm; receptacle elliptic, 1–3.5 mm; bracts lanceolate-linear; bracteoles narrowly linear. Achenes ellipsoid, 8-ribbed.

- Guangxi (Tianlin).

81. *Elatostema pseudocuspdatum* W. T. Wang, Acta Bot. Yunnan. 10: 345. 1988.

假骤尖楼梯草 jia zhou jian lou ti cao

Herbs perennial, monoecious or dioecious, 30–40 cm tall, glabrous. Stems ascending, usually simple. Leaves alternate; nanophylls absent; stipules lanceolate-linear or triangular, 4–7 × 1.6–3.2 mm, with cystoliths; petiole 0–3 mm; leaf blade obliquely obovate-elliptic or elliptic, 3.5–8.5 × 1.5–3.5 cm, papery, major basal lateral veins both arising at base of leaf

blade, cystoliths conspicuous, dense; base with broader half auriculate, margin denticulate, apex caudate or caudate-acuminate. Male inflorescences solitary, simple, 4–7 mm in diam.; peduncle 2–3 mm; receptacle elliptic, 3.5–6 mm; bracts connate, ca. 1.2 mm; bracteoles oblong. Female inflorescences solitary, ca. 3 mm in diam.; peduncle 0.5–1 mm; receptacle elliptic, ca. 2 mm; bracts broadly ovate; bracteoles obovate-oblong or linear. Male flowers 4-merous. Fl. Mar–Jun.

- Evergreen broad-leaved forests, streamsides in ravines; 1900–2800 m. NW Yunnan.

82. *Elatostema pachyceras* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 70. 1980.

粗角楼梯草 cu jiao lou ti cao

Elatostema longipetiolatum W. T. Wang; *E. pachyceras* var. *majus* W. T. Wang.

Herbs perennial, monoecious or dioecious, 20–150 cm tall. Stems ascending or erect, simple or branched, lower stems ferruginous-furfuraceous, glabrous. Leaves alternate; nanophylls absent; stipules lanceolate, 13–17 × 4–6 mm, glabrous, with cystoliths; petiole 2–6(–15) mm; leaf blade obliquely elliptic or oblong, 9–25(–28) × 3.5–9 cm, papery, major basal lateral veins both arising at base of leaf blade, both surfaces glabrous or adaxial surface sparsely puberulent; cystoliths conspicuous, dense; base obliquely cuneate, margin dentate, apex acuminate or caudate-acuminate. Male inflorescences solitary or rarely in pairs, simple, 7–18 × 5–9 mm in diam.; peduncle 1–3 mm; receptacle elliptic, 6–12 × 5–8; bracts connate, 0.5–1 mm; bracteoles linear. Female inflorescences solitary, 9–13 × 6–9 mm in diam.; peduncle 0.5–1 mm; receptacle elliptic, 7–11 × 4–7 mm; bracts broadly ovate; bracteoles spatulate. Male flowers 4-merous. Achenes narrowly ellipsoid, 9-ribbed. Fl. Apr–Jun.

- Valley forests, forest margins; 1100–2400 m. Yunnan.

83. *Elatostema cuspidatum* Wight, Icon. Pl. Ind. Orient. 6: 11, t. 1983, 2091, f. 1. 1853.

骤尖楼梯草 zhou jian lou ti cao

Herbs perennial, monoecious or dioecious, 25–90 cm tall. Stems ascending or erect, simple or rarely branched, lower stems ferruginous-furfuraceous, glabrous. Leaves alternate; nanophylls absent; stipules linear or linear-lanceolate, 5–10(–20) × 2–3 mm, glabrous, with cystoliths; petiole 0–3 mm; leaf blade obliquely elliptic or oblong, 2–13.5(–23) × 1–5(–8) cm, herbaceous, major basal lateral veins asymmetric, 1 basal, the other arising above base, both surfaces glabrous or adaxial surface sparsely strigillose; cystoliths conspicuous, dense; base with broader half broadly cuneate or nearly auriculate, margin dentate, apex cuspidate. Male inflorescences solitary, simple, 6–12 mm in diam.; peduncle 1.5–4 mm; receptacle oblong, 6–11 × 5–7 mm; bracts connate, 0.5–1.6 mm; bracteoles oblong or cymbiform-oblong. Female inflorescences solitary, 3–15 mm in diam.; peduncle 0.5–1 mm; receptacle 2–13 mm in diam.; bracts broadly ovate or triangular; bracteoles narrowly linear.

Male flowers 4-merous. Achenes narrowly ellipsoid, 8-ribbed. Fl. May–Oct.

Valley streamsides, rock crevices, forests; 900–2800 m. NW Fujian, W Guangxi, Guizhou, SW Hubei, Hunan, SW Jiangxi, Sichuan, S Xizang, Yunnan [NE India, Myanmar, Nepal].

1a. Male bracts with corniculus 0.6–2 mm

..... 83a. var. *cuspidatum*

1b. Male bracts with corniculus 3–5 mm 83b. *dolichoceras*

83a. *Elatostema cuspidatum* var. *cuspidatum*

骤尖楼梯草(原变种) zhou jian lou ti cao (yuan bian zhong)

Elatostema bodinieri H. Lévillé; *Elatostema sessile* J. R. Forster & G. Forster var. *cuspidatum* (Wight) Weddell.

Cornus of bracts of male inflorescences 0.6–2 mm. Fl. May–Oct.

Valley streamsides, rock crevices, forests; 900–2800 m. NW Fujian, W Guangxi, Guizhou, SW Hubei, Hunan, SW Jiangxi, Sichuan, S Xizang, Yunnan [NE India, Myanmar, Nepal].

83b. *Elatostema cuspidatum* var. *dolichoceras* W. T. Wang, Acta Bot. Yunnan. 10: 346. 1988.

长角骤尖楼梯草 chang jiao zhou jian lou ti cao

Cornus of bracts of male inflorescences 3–5 mm. Fl. Jun.

• Wet areas at valley streamsides; ca. 2300 m. SW Yunnan.

84. *Elatostema menglunense* W. T. Wang, Bull. Bot. Res., Harbin 16: 1. 1996.

勐仑楼梯草 meng lun lou ti cao

Herbs perennial, dioecious, 14–18 cm tall. Stems ascending or erect, branched, puberulent or villosulous. Leaves alternate; nanophylls absent; stipules lanceolate to lanceolate-linear, 4–8 × 1.6–2.2 mm, ciliate, without cystoliths; petiole 0.8–4 mm; leaf blade obliquely oblong or elliptic, 2.5–12 × 2–3 cm, herbaceous, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface pubescent along nerves, adaxial surface strigose, cystoliths obscure, sparse; base with broader half subcordate, margin dentate, apex cuspidate or caudate. Male inflorescences solitary, simple, ca. 7 × 4 mm; peduncle 1–1.5 mm; receptacle oblong, ca. 6 × 4 mm; bracts connate, 7–9 mm; bracteoles oblong. Male flowers 4-merous. Fl. Jun.

• Rocks under rain forests in valleys; ca. 700 m. Yunnan (Mengla).

85. *Elatostema angustitepalum* W. T. Wang, Acta Phytotax. Sin. 28: 315. 1990.

狭被楼梯草 xia bei lou ti cao

Herbs perennial, monoecious, 30–40 cm tall. Stems ascending or erect, usually simple, glabrous. Leaves alternate; nanophylls absent; stipules narrowly triangular, 11–18 × 6–8 mm, glabrous, with cystoliths; petiole 0–2 mm; leaf blade obliquely elliptic, 9–13.5 × 4.5–6 cm, papery, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface puberulent, adaxial surface sparsely strigillose, cystoliths conspicuous, dense; base obliquely cuneate, margin

dentate, apex cuspidate. Male inflorescences solitary, simple, 10–15 mm in diam.; peduncle 2–7 mm; receptacle nearly pentagonal, ca. 10 × 15 mm; bracts obscure; bracteoles spatulate-linear. Female inflorescences solitary, oblong, ca. 10 × 7 mm in diam.; peduncle 0.5–1 mm; receptacle oblong, ca. 10 × 7 mm; bracts absent; bracteoles spatulate-linear. Male flowers 4-merous. Achenes ellipsoid, 6-ribbed. Fl. Apr–May.

• Valley forests; 1300–1400 m. SE Xizang.

86. *Elatostema yungshunense* W. T. Wang, Guihaia 5: 325. 1985.

永顺楼梯草 yong shun lou ti cao

Herbs perennial, dioecious, ca. 35 cm tall. Stems ascending, simple, glabrous. Leaves alternate; nanophylls absent; stipules linear-lanceolate, ca. 7 × 2 mm, glabrous, without cystoliths; petiole 0.5–2 mm; leaf blade obliquely oblong, 5–13 × 2.5–4.5 cm, papery, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface glabrous, adaxial surface sparsely strigillose along veins, cystoliths obscure, slightly dense; base with broader half auriculate (auricle 2–4 mm), margin dentate, apex acuminate. Male inflorescences in pairs, simple, 8–13 mm in diam.; peduncle 3–5 mm; receptacle broadly elliptic, 4–9 × 3–7 mm; bracts obscure; bracteoles broadly linear or linear. Male flowers 4-merous. Fl. Aug.

• Forests along rivers; ca. 400 m. NW Hunan.

87. *Elatostema tenuireceptaculum* W. T. Wang, Guihaia 11: 1. 1991.

薄托楼梯草 bao tuo lou ti cao

Herbs perennial, dioecious, ca. 34 cm tall. Stems ascending or erect, branched, glabrous. Leaves alternate; nanophylls absent; stipules lanceolate-linear or triangular, 3–5.5 × 0.8 mm, glabrous, without cystoliths; petiole ca. 1.2 mm; leaf blade obliquely elliptic, 8–11 × 3–4.5 cm, herbaceous, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface glabrous, adaxial surface sparsely strigillose, cystoliths obscure, sparse; base with broader half rounded, margin dentate, apex acuminate. Male inflorescences in pairs, simple, ca. 9 × 5 mm in diam.; peduncle ca. 1.8 mm; receptacle nearly oblong, ca. 5 × 2.5 mm in diam.; bracts connate, 1.5–2.5 mm; bracteoles linear-lanceolate. Male flowers 4-merous. Fl. Apr.

• Evergreen broad-leaved forests in valleys; 1000–1100 m. Guangxi (Leye).

88. *Elatostema yangbiense* W. T. Wang, Acta Bot. Yunnan. 7: 294. 1985.

漾濞楼梯草 yang bi lou ti cao

Herbs perennial, dioecious, ca. 33 cm tall. Stems ascending or erect, branched, glabrous, densely ferruginous-furfuraceous. Leaves alternate; nanophylls absent; stipules lanceolate or narrowly ovate, 10–16 × 4 mm, glabrous, with cystoliths; petiole 1–4 mm; leaf blade obliquely oblong, 3.5–8 × 1.5–2.5 cm, herbaceous or papery, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface sparsely

strigillose along veins, adaxial surface sparsely strigillose, cystoliths conspicuous or obscure, dense; base with broader half nearly rounded, margin dentate or denticulate, apex acuminate. Male inflorescences solitary, simple, 4–8 mm in diam.; peduncle 1–2 mm; receptacle 2.5–5.5 mm in diam.; bracts obscure; bracteoles oblong or linear. Male flowers 4-merous. Fl. Jun.

• Woodland margins in valleys; 2100–2400 m. SW Sichuan, W Yunnan.

89. *Elatostema yui* W. T. Wang, Bull. Bot. Res., Harbin 9(2): 70. 1989.

俞氏楼梯草 *yu shi lou ti cao*

Herbs perennial, dioecious, 23–45 cm tall. Stems ascending or erect, usually simple, densely ferruginous-furfuraceous. Leaves alternate; nanophylls absent; stipules linear-lanceolate, 5–9 × 0.5–1 mm, glabrous, without cystoliths; petiole 0–2 mm; leaf blade obliquely elliptic or obliquely oblong, 2.5–11 × 1–3.5 cm, herbaceous, major basal lateral veins both arising at base of leaf blade or 1 arising above base, abaxial surface strigillose along veins, adaxial surface glabrous, cystoliths conspicuous or obscure, dense; base with broader half auriculate, margin dentate, apex acuminate or caudate-acuminate. Male inflorescences in pairs, simple, ca. 5 mm in diam.; peduncle ca. 2 mm; receptacle 3–4 mm in diam.; bracts connate, 2–6.5 mm; bracteoles cymbiform-oblong or linear. Female inflorescences solitary, sessile, 4–7 mm in diam.; receptacle 4–6 mm in diam.; bracts triangular; bracteoles linear. Male flowers 4-merous. Achenes ellipsoid, 6-ribbed. Fl. Jul–Aug.

• Evergreen broad-leaved forests in valleys, *Tsuga chinensis* forests, streamsides; 1900–2800 m. NW Yunnan.

90. *Elatostema platyceras* W. T. Wang, Acta Bot. Yunnan. 10: 346. 1988.

宽角楼梯草 *kuan jiao lou ti cao*

Herbs perennial, monoecious or dioecious, 44–80 cm tall. Stems ascending or erect, simple, densely ferruginous-furfuraceous. Leaves alternate; nanophylls absent; stipules linear, 14–17 × 4–5 mm, ciliolate, without cystoliths; petiole 2–5 mm; leaf blade obliquely elliptic or narrowly ovate, 5–15 × 2.5–4.5 cm, papery, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface puberulent, adaxial surface glabrous, cystoliths conspicuous, dense; base with broader half broadly cuneate or nearly rounded, margin dentate, apex acuminate or caudate. Male inflorescences solitary, simple, 7–15 mm in diam.; peduncle ca. 5 mm; receptacle nearly orbicular, 7–14 mm in diam.; bracts obscure; bracteoles linear. Female inflorescences solitary, 4–6 mm in diam.; peduncle ca. 0.6 mm; receptacle 3–5 mm in diam.; bracts ovate; bracteoles narrowly obovate or linear. Male flowers 4-merous. Fl. Jun.

• Valley streamsides; ca. 1700 m. NW Yunnan.

91. *Elatostema lungzhouense* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 68. 1980.

龙州楼梯草 *long zhou lou ti cao*

Herbs perennial, dioecious, ca. 40 cm tall. Stems erect, branched, glabrous. Leaves alternate, glabrous; nanophylls ab-

sent; stipules subulate, 2.5–3.2 × 0.1–0.2 mm; petiole 1–4 mm; leaf blade obliquely elliptic, 7.5–11 × 3–5 cm, herbaceous, major basal lateral veins asymmetric, 1 basal, the other arising above base, cystoliths conspicuous, dense; base with broader half broadly cuneate, margin denticulate, apex acuminate. Female inflorescences solitary, 5–13 × 4–11 mm; peduncle 1–4 mm; receptacle oblong, 4–11 × 3–10 mm; bracts obscure or triangular; bracteoles linear. Achenes ellipsoid, 3-ribbed, tuberculate. Fl. Jul.

• Valleys in hills, rocks in forests; ca. 400 m. Guangxi (Longzhou).

92. *Elatostema litseifolium* W. T. Wang, Acta Phytotax. Sin. 28: 313. 1990.

木姜楼梯草 *mu jiang lou ti cao*

Herbs perennial, dioecious, 20–30 cm tall, glabrous. Stems erect, branched. Leaves alternate; nanophylls absent; stipules subulate, 4–6 × 0.3–0.5 mm, without cystoliths; petiole 1–5 mm; leaf blade lanceolate, 6.5–16.5 × 2–4.5 cm, papery, major basal lateral veins asymmetric, 1 basal, the other arising above base, cystoliths conspicuous, dense; base cuneate, margin entire, apex caudate-acuminate. Male inflorescences solitary, simple, 7–10 mm in diam.; peduncle 2–2.5 mm; receptacle ca. 6 mm in diam.; bracts connate, 3–7 mm; bracteoles linear or spatulate-linear. Male flowers 4-merous. Fl. Apr.

• Evergreen broad-leaved forests, rocks in ravines; ca. 1600 m. SE Xizang.

93. *Elatostema didymocephalum* W. T. Wang, Acta Phytotax. Sin. 28: 316. 1990.

双头楼梯草 *shuang tou lou ti cao*

Herbs perennial, dioecious, 40–50 cm tall. Stems ascending or erect, simple, glabrous. Leaves alternate; nanophylls absent; stipules linear, 18–20 × 2.5–2.8 mm, glabrous, with cystoliths; petiole 0–1 mm; leaf blade obliquely elliptic, 9–17 × 4–8 cm, papery, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface sparsely puberulent along veins, adaxial surface glabrous, cystoliths conspicuous, dense; base with broader half rounded, margin dentate, apex caudate-acuminate. Male inflorescences solitary, simple, 3–16 mm in diam.; peduncle 2–4.5 mm; receptacle 12–14 mm in diam.; bracts connate, 6–8 mm; bracteoles cymbiform. Male flowers 5-merous. Fl. May–Jun.

• *Ficus* forests in valleys, dark damp places 900–1000 m. SE Xizang.

94. *Elatostema atroviride* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 83. 1980.

深绿楼梯草 *shen lu lou ti cao*

Elatostema atroviride var. *lobulatum* W. T. Wang; *E. leiocephalum* W. T. Wang; *E. papilionaceum* W. T. Wang.

Herbs perennial, monoecious or dioecious, 20–30 cm tall. Stems ascending or erect, branched, pubescent. Leaves alternate; nanophylls absent; stipules linear or linear-lanceolate, 3–3.5 × 0.5–0.8 mm, strigillose, with cystoliths; petiole 2–4.5 mm; leaf blade obliquely elliptic or obovate, 6–10 × 2.5–5 cm,

herbaceous, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface densely puberulent along nerves, adaxial surface sparsely strigillose, cystoliths conspicuous, dense; base obliquely cuneate, margin dentate, apex cuspidate to short acuminate. Male inflorescences solitary, simple, 20–28 mm in diam.; peduncle ca. 15 mm; receptacle elliptic, ca. 27×17 mm; bracts absent; bracteoles linear. Female inflorescences solitary, nearly oblong or papilionaceous, $5-14 \times 4-10$ mm; peduncle 1.5–2(–9) mm; receptacle oblong, $5-12 \times 3-7$ mm; bracts triangular; bracteoles spatulate-linear. Male flowers 4-merous. Achenes ellipsoid, ribbed, tuberculate. Fl. Aug–Nov.

Forests on limestone hills, shaded wet areas in mountains; 200–1500 m. SW Guangxi, SW Guizhou [N Vietnam].

95. *Elatostema retrohirtum* Dunn, Bull. Misc. Inform. Kew, Addit. Ser. 10: 249. 1912.

曲毛楼梯草 qu mao lou ti cao

Herbs perennial, dioecious, 15–35 cm tall. Stems ascending or erect, branched, densely retrorse-strigose. Leaves alternate; nanophylls absent; stipules linear-lanceolate, $4-6 \times 1.5-2$ mm, strigillose, with cystoliths; petiole 0–1 mm; leaf blade obliquely elliptic, $3-7.5 \times 1.5-4$ cm, herbaceous or papery, major basal lateral veins both arising at base of leaf blade, abaxial surface densely puberulent along nerves, adaxial surface sparsely strigillose, cystoliths conspicuous, dense; base with broader half nearly auriculate, margin denticulate, apex short acuminate or acute. Female inflorescences solitary, 3.5–6 mm in diam.; peduncle ca. 1 mm; receptacle 3–5.5 mm in diam.; bracts triangular; bracteoles spatulate-linear. Achenes ovoid or ellipsoid, 6-ribbed. Fl. Jun–Sep.

• Hill or valley forests, woodland margins; 600–700 m. N Guangdong, Guangxi, S Sichuan, Yunnan.

96. *Elatostema longistipulum* Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 57: 242. 1920.

显脉楼梯草 xian mai lou ti cao

Herbs perennial, dioecious, 50–70 cm tall. Stems ascending or erect, usually simple, strigose. Leaves alternate; nanophylls absent; stipules linear-lanceolate, $7-11 \times 1-1.5$ mm, strigillose along costa, with cystoliths; petiole 0–2.5 mm; leaf blade lanceolate or narrowly lanceolate, $7-12 \times 1.3-2.5$ cm, papery, major basal lateral veins both arising at base of leaf blade, abaxial surface sparsely strigillose along nerves, adaxial surface glabrous, cystoliths conspicuous, dense; base obliquely cuneate, margin denticulate, apex acuminate or caudate-acuminate. Male inflorescences solitary, simple, $6-15 \times 5-11$ mm; peduncle ca. 2.5 mm; receptacle oblong, ca. 7×4 mm; bracts connate, 3–4 mm; bracteoles cymbiform-linear. Female inflorescences solitary, 5–7 mm in diam.; peduncle ca. 1 mm; receptacle 4–6 mm in diam. Male flowers 5-merous. Fl. Nov–Jan.

Valley streamsides, forest margins; 1000–1300 m. W Guangxi, SE Yunnan [N Vietnam].

97. *Elatostema balansae* Gagnepain, Bull. Soc. Bot. France 76: 80. 1929.

华南楼梯草 hua nan lou ti cao

Elatostema platyphyllum var. *balansae* (Gagnepain) Yahara.

Herbs perennial, dioecious, 20–40(–80) cm tall. Stems ascending or erect, simple or branched, glabrous or pubescent. Leaves alternate; nanophylls absent; stipules lanceolate, $5-14 \times 3-4$ mm, strigillose, without cystoliths; petiole 0–2 mm; leaf blade obliquely elliptic to oblong, $6-17 \times 3-6$ cm, herbaceous, major basal lateral veins both arising at base of leaf blade or 1 arising above base, abaxial surface sparsely puberulent or glabrous, adaxial surface sparsely strigillose, cystoliths conspicuous, dense; base with broader half broadly cuneate or rounded, margin dentate, apex cuspidate or acuminate. Male inflorescences solitary, simple, $8-9 \times 4-7$ mm; peduncle 1–2 mm; receptacle 6–7 mm in diam.; bracts connate, 2.5–3 mm; bracteoles linear. Female inflorescences solitary or in pairs, 5–10 mm in diam.; peduncle 0–2 mm; receptacle 3–9 mm in diam.; bracts triangular; bracteoles spatulate-linear. Achenes ellipsoid, 8-ribbed. Fl. Apr–Jun.

Valley forests, shaded wet places along streamsides; 300–2400 m. N Guangdong, NW Guangxi, S Guizhou, NW Hunan, SW Sichuan, SE Xizang, SE Yunnan [Malaysia, Thailand, N Vietnam].

98. *Elatostema multicanaliculatum* B. L. Shih & Yuen P. Yang, Bot. Bull. Acad. Sin. 36: 268. 1995.

多沟楼梯草 duo gou lou ti cao

Herbs perennial, dioecious, up to 80 cm. Stems ascending or repent, branched, glabrous. Leaves alternate; nanophyll absent; stipules lanceolate, $5-7 \times 2$ mm, glabrous; petiole 0–1 mm; leaf blade obliquely elliptic to lanceolate-oblong, $5-14.5 \times 2.5-5.5$ cm, membranous, major basal lateral veins both arising above base of leaf blade, rarely absent and venation pinnate, nearly glabrous, cystoliths conspicuous, dense; base with broader half cordate, margin serrulate to coarsely serrate, apex acuminate. Female inflorescences solitary, \pm 4-sided, ca. 12×8 mm, sessile or subsessile; receptacle ca. $10 \times 2.5-6$ mm; bracts connate into a narrowly oblong or lanceolate involucre; bracteoles narrowly lanceolate. Achenes ovoid, 5–6-ribbed. Fl. Sep–Nov.

• Moist ravines at medium elevations. Taiwan (Taoyuan).

99. *Elatostema megacephalum* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 73. 1980.

巨序楼梯草 ju xu lou ti cao

Elatostema mollifolium W. T. Wang.

Herbs perennial, dioecious, 50–100 cm tall. Stems erect, simple, glabrous. Leaves alternate; nanophylls absent; stipules lanceolate or broadly lanceolate, $10-18 \times 2.5-3$ mm, glabrous, with cystoliths; petiole 1.5–12 mm; leaf blade obliquely elliptic, $9-25 \times 3.5-10$ cm, nearly papery or herbaceous, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface glabrous or sparsely puberulent along nerves, adaxial surface sparsely hirtellous, cystoliths conspicuous, dense; base with broader half broadly cuneate, margin denticulate, apex acuminate. Male inflorescences solitary, simple, 10–25 mm in diam.; peduncle 5–7 mm; receptacle 8–23 mm in diam.; bracts connate, ca. 5 mm wide; bracteoles cymbiform-

linear. Female inflorescences solitary, 15–25 × 10–20 mm; peduncle ca. 5 mm; receptacle oblong, 14–23 × 9–18 mm; bracts triangular; bracteoles spatulate-linear. Male flowers 4-merous. Achenes ellipsoid, 8-ribbed. Fl. Feb–May.

Evergreen broad-leaved forests in ravines; 1000–2000 m. C and S Yunnan [Malaysia, Thailand].

100. *Elatostema macintyreii* Dunn, Bull. Misc. Inform. Kew 1920: 210. 1920.

多序楼梯草 duo xu lou ti cao

Subshrubs dioecious, 30–120 cm tall. Stems erect, branched, glabrous or sparsely pubescent. Leaves alternate; nanophylls absent; stipules lanceolate, 9–14 × 2–3 mm, glabrous, with cystoliths; petiole 1–5 mm; leaf blade obliquely elliptic or elliptic-obovate, (8–)10–18(–21) × (3.5–)4.5–7.5(–10) cm, papery, major basal lateral veins asymmetric, 1 basal, the other arising above base, both surfaces glabrous or abaxial surface sparsely strigillose along nerves, cystoliths conspicuous, dense; base with broader half broadly cuneate, margin crenate, apex cuspidate or acuminate. Male inflorescences 2–5-clustered, simple, ca. 2 mm in diam.; peduncle 1–2 mm; receptacle very small; bracts connate, broadly ovate. Female inflorescences 5–9-clustered, 4–9 × 3–5 mm; peduncle 2–6 mm; receptacle 2–5 mm in diam.; bracts triangular or ovate; bracteoles spatulate-linear. Male flowers 4-merous. Achenes ellipsoid, 10-ribbed. Fl. Jul–Dec.

Valley forests, dark damp places along streamsides; 200–2000 m. Guangdong, Guangxi, S Guizhou, S Sichuan, SE Xizang, Yunnan [Bhutan, India, Thailand, N Vietnam].

101. *Elatostema rupestre* (Buchanan-Hamilton ex D. Don) Weddell, Arch. Mus. Hist. Nat. 9: 304. 1856.

石生楼梯草 shi sheng lou ti cao

Procris rupestris Buchanan-Hamilton ex D. Don, Prodr. Fl. Nepal. 60. 1825.

Herbs perennial, dioecious, 45–60 cm tall. Stems ascending or erect, simple, densely strigose. Leaves alternate; nanophylls absent; stipules lanceolate, 10–15 × 3–5 mm, sparsely strigillose, with cystoliths; petiole 1.5–5.5 mm; leaf blade obliquely elliptic or obovate-elliptic, 11–16 × 3.5–5.5 cm, herbaceous, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface sparsely strigillose along nerves, adaxial surface sparsely hirtellous, cystoliths conspicuous, dense; base with broader half obtuse, margin dentate, apex acuminate. Female inflorescences solitary, 6–11 mm in diam.; peduncle ca. 1 mm; receptacle nearly quadrate, 5–9 mm; bracts triangular; bracteoles spatulate or linear. Achenes ovoid, 8-ribbed. Fl. May.

Valley forests; ca. 1500 m. S Yunnan [NE India, Nepal].

102. *Elatostema eriocephalum* W. T. Wang, Acta Phytotax. Sin. 28: 317. 1990.

绒序楼梯草 rong xu lou ti cao

Herbs perennial, dioecious, 80–100 cm tall. Stems ascending or erect, branched, densely strigose. Leaves alternate; nanophylls absent; stipules lanceolate, ca. 12 × 3.5 mm, densely pubescent on abaxial surface along costa, with cystoliths; peti-

ole 0–1 mm; leaf blade obliquely elliptic, (5–)10–22.5 × (2.5–)4.5–11 cm, papery, major basal lateral veins both arising at base of leaf blade, abaxial surface densely puberulent along nerves, adaxial surface glabrous or glabrescent, cystoliths conspicuous, dense; base with broader half auriculate (auricle ca. 4 mm), margin denticulate, apex caudate-acuminate. Male inflorescences in pairs, simple, 9–11 × 5–7 mm; peduncle 2–3 mm; receptacle oblong, 8–11 × 5–6 mm; bracts obscure; bracteoles cymbiform-oblong or linear. Female inflorescences in pairs, ca. 12 × 8 mm, sessile; receptacle ca. 12 × 8 mm; bracts obscure; bracteoles spatulate or spatulate-linear. Male flowers 4-merous. Fl. Feb–Mar.

• Evergreen broad-leaved forests in valleys; 700–900 m. SE Xizang.

103. *Elatostema wangii* Q. Lin & L. D. Duan, *sp. nov.*

文采楼梯草 wen cai lou ti cao

Type: China. Yunnan: Gongshan Xian: Dulongjiang, Qintangdang, 1240 m, 10 Mar 1991, *Dulongjiang Expedition 4482* (holotype, PE; isotype, KUN).

Proximum *Elatostemo eriocephalo*, sed a quo differt petioli 3–20 mm longis, inflorescentiis femineis solitariis, breviter pedunculatis, pedunculis 2–3 mm longis, bracteolis dense villosis, floribus femineis tepalis instructis.

Herbs perennial, dioecious, 100–150 cm tall. Stems ascending or erect, simple or rarely 1-branched, densely strigose. Leaves alternate; nanophyll absent; stipules lanceolate, 9–17 × 2.5–4.5 mm, with sparse cystoliths only on adaxial surface, strigose on abaxial surface; petiole 3–20 mm, densely strigose; leaf blade obliquely obovate to obliquely ovate, (3–)7–19.5 × (2.7–)4.0–11.7 cm, papery or thickly papery, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface sparsely strigose or densely strigose on veins, adaxial surface glabrescent or pubescent on nerves, cystoliths obscure, sparse, 0.1–0.2 mm; base with broader half auriculate (auricle 5–13 mm), margin crenate or dentate, apex acuminate, cuspidate or caudate. Female inflorescences solitary, papilionaceous, 1.4–1.5 × 0.9–1.1 cm; peduncle 2–3 mm; receptacle papilionaceous, 1.3–1.4 × 0.8–1.0 cm, sparsely puberulent; bracts obscure; bracteoles very many, oblanceolate-linear, densely villous. Achenes ovoid. Fl. Nov–Mar.

• Evergreen broad-leaved forests in valleys; 1200–1500 m. NW Yunnan (Dulongjiang).

104. *Elatostema platyphyllum* Weddell, Arch. Mus. Hist. Nat. 9: 301. 1856.

宽叶楼梯草 kuan ye lou ti cao

Elatostema ebracteatum W. T. Wang; *E. edule* C. B. Robinson; *E. platyphylloides* B. L. Shih & Yuen P. Yang; *E. platyphyllum* var. *polycephalum* Hara.

Subshrubs dioecious, 100–150 cm tall, glabrous. Stems erect, branched. Leaves alternate; nanophylls absent; stipules lanceolate, 2–4 × 0.2–0.8 cm, with cystoliths; petiole 2–6 mm; leaf blade obliquely elliptic or narrowly elliptic, 14–25 × 6–10 cm, herbaceous, major basal lateral veins both arising at base of leaf blade or 1 arising above base, sometimes not extending

beyond middle of leaf blade, cystoliths conspicuous or obscure, dense; base with broader half auriculate (auricle 1–1.4 cm), margin denticulate, apex acuminate or caudate-acuminate. Male inflorescences solitary or in pairs, simple, 10–25 × 7–18 mm; peduncle 0.5–1 mm; receptacle nearly papilionaceous, 10–25 × 7–18 mm; bracts connate, narrowly ovate, obscure; bracteoles spatulate-oblong. Female inflorescences solitary, nearly oblong, 6–7 × 2–5 mm; peduncle ca. 5 mm; receptacle 6–7 × 2–5 mm; bracts narrowly ovate; bracteoles spatulate. Male flowers 4-merous. Fl. Mar–Oct.

Valley forests, shaded areas along streamsides; 700–1900 m. Hainan, S Sichuan, Taiwan, SE Xizang, Yunnan [Bhutan, S Japan, N India, Nepal, Philippines, Sikkim].

105. *Elatostema auriculatum* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 74. 1980.

耳状楼梯草 *er zhuang lou ti cao*

Herbs perennial, dioecious, 60–80 cm tall. Stems ascending or erect, simple, glabrous or strigose. Leaves alternate; nanophylls absent; stipules lanceolate-oblong, 14–16 × 2–3 mm, glabrous, with cystoliths; petiole 0–1.5 mm; leaf blade obliquely oblong-obovate, 15–19 × 4–6.5 cm, papery, major basal lateral veins both arising at base of leaf blade, abaxial surface sparsely puberulent along veins, adaxial surface glabrous, cystoliths conspicuous, dense; base with broader half auriculate (auricle ca. 8 mm), margin densely dentate, apex acuminate or caudate. Male inflorescences in pairs, simple, 10–13 mm in diam.; peduncle 2–3.5 mm; receptacle ca. 6.5 mm; bracts obscure; bracteoles cymbiform-lanceolate. Female inflorescences in pairs, 8–12 × 5–9 mm; peduncle 6–10 mm; receptacle oblong, 7–10 × 4–8 mm; bracts nearly absent; bracteoles linear. Male flowers 5-merous. Achenes ovoid, 8-ribbed. Fl. May–Aug.

• Evergreen broad-leaved forests in mountains, forest margins or streamsides in valleys; 800–2200 m. SE Xizang, NW Yunnan.

1a. Stems glabrous 105a. var. *auriculatum*
1b. Stems strigose 105b. var. *strigosum*

105a. *Elatostema auriculatum* var. *auriculatum*

耳状楼梯草(原变种) *er zhuang lou ti cao (yuan bian zhong)*

Stems glabrous. Fl. May–Jun.

• Evergreen broad-leaved forests in mountains; 800–2200 m. SE Xizang, NW Yunnan.

105b. *Elatostema auriculatum* var. *strigosum* W. T. Wang in C. Y. Wu, Fl. Xizang. 1: 552. 1983.

毛茎耳状楼梯草 *mao jing er zhuang lou ti cao*

Stems strigose. Fl. Aug.

• Forest margins or streamsides in valleys; 800–1800 m. SE Xizang.

106. *Elatostema papillosum* Weddell, Arch. Mus. Hist. Nat. 9: 327. 1856.

微晶楼梯草 *wei jing lou ti cao*

Herbs perennial, monoecious or dioecious, 25–50 cm tall.

Stems ascending or erect, simple or branched, crispately pubescent. Leaves alternate; nanophylls cordate or ovate, 3–10 mm; stipules lanceolate-linear, 5–7 × 0.5–0.8 mm, glabrous, without cystoliths; petiole 1–5 mm; leaf blade obliquely elliptic or obliquely obovate, 4.5–13.5 × 2–5.5 cm, papery, major basal lateral veins both arising at base of leaf blade or 1 arising above base, not extending beyond middle of leaf blade, abaxial surface puberulent along nerves, adaxial surface glabrous, cystoliths conspicuous or obscure, dense; base with broader half broadly cuneate or nearly auriculate, margin crenate, apex cuspidate or caudate. Male inflorescences solitary, simple, 11–26 × 10–15 mm; peduncle 20–55 mm; receptacle elliptic, 10–25 × 10–14 mm; bracts connate, 5–12 mm wide; bracteoles spatulate-linear. Female inflorescences solitary, 4–6 mm in diam.; peduncle ca. 1 mm; receptacle nearly orbicular, 3–5 mm in diam.; bracts triangular; bracteoles lanceolate-linear. Male flowers 4-merous. Fl. Jun–Jul.

Evergreen broad-leaved forests in valleys, woodland margins; 1100–1300 m. SE Xizang [Bhutan, NE India].

107. *Elatostema tetratpalum* W. T. Wang, Bull. Bot. Res., Harbin 2(1): 25. 1982.

四被楼梯草 *si bei lou ti cao*

Herbs perennial, dioecious, 50–56 cm tall. Stems ascending or erect, usually simple, strigose. Leaves alternate; nanophylls ovate, 4–5 mm; stipules lanceolate-linear, 14–16 × 2–3 mm, glabrous, with cystoliths; petiole 0–2.5 mm; leaf blade obliquely elliptic or narrowly elliptic, 5.5–20 × 3.5–10.5 cm, herbaceous, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface strigillose along veins, adaxial surface glabrous, cystoliths conspicuous, dense; base with broader half broadly cuneate or nearly auriculate, margin dentate, apex acuminate. Female inflorescences solitary, 11–17 × 9–12 mm, subsessile; receptacle nearly elliptic, 10–15 × 10 mm; bracts triangular; bracteoles linear-lanceolate. Achenes ovoid, 6-ribbed. Fl. Jul.

• Mountain forests; ca. 700 m. SE Xizang.

108. *Elatostema napoense* W. T. Wang, Guihaia 2: 121. 1982.

那坡楼梯草 *na po lou ti cao*

Herbs perennial, monoecious, ca. 45 cm tall, glabrous. Stems ascending or erect, simple, glabrous or pilose, not furfuraceous. Leaves alternate; nanophylls ovate, 0.8–1.2 mm; stipules linear-lanceolate, ca. 7 × 1–2 mm; petiole 1–2 mm; leaf blade obliquely elliptic or oblong, 10.5–15.5 × 4–6 cm, herbaceous, major basal lateral veins asymmetric, 1 basal, the other arising above base, cystoliths conspicuous or obscure, sparse; base with broader half auriculate, margin crenate or denticulate, apex short caudate. Male inflorescences solitary, simple, ca. 15 mm in diam.; peduncle 50–60 mm; receptacle ca. 14 mm in diam.; bracts connate, ca. 2.5 mm; bracteoles linear. Female inflorescences 2 mm in diam., sessile; receptacle ca. 1.8 mm in diam.; bracts cymbiform-triangular; bracteoles narrowly linear. Male flowers 5-merous. Fl. Oct.

• Shaded wet forests on limestone mountains; ca. 1100 m. Guangxi (Napo).

109. *Elatostema subcuspidatum* W. T. Wang, Bull. Bot. Res., Harbin 4(3): 115. 1984.

拟骤尖楼梯草 ni zhou jian lou ti cao

Herbs perennial, dioecious, 25–60 cm tall. Stems ascending or erect, usually simple, puberulent. Leaves alternate; nanophylls absent; stipules lanceolate, 10–15 × 4–6 mm, nearly glabrous, without cystoliths; petiole 0–3 mm; leaf blade obliquely elliptic, 7.5–15 × 4–7.5 cm, papery, major basal lateral veins both arising at base of leaf blade, abaxial surface sparsely strigillose along veins, adaxial surface sparsely strigillose, cystoliths obscure, dense; base with broader half auriculate, margin dentate, apex caudate-acuminate or acuminate. Male inflorescences solitary, simple, 9–14 mm in diam.; peduncle 9–15 mm; receptacle elliptic, ca. 9 × 5 mm; bracts connate, ca. 1 mm; bracteoles linear or spatulate-linear. Female inflorescences solitary, 4–5 mm in diam.; peduncle 0.5–1 mm; receptacle nearly orbicular, ca. 4 mm in diam.; bracts lanceolate-linear; bracteoles cymbiform or oblong. Male flowers 4-merous. Fl. Aug.

- Mountain forests; 1600–1900 m. Chongqing (Nanchuan).

110. *Elatostema cuneiforme* W. T. Wang, Acta Phytotax. Sin. 17(1): 107. 1979.

楔苞楼梯草 xie bao lou ti cao

Herbs perennial, monoecious, ca. 100 cm tall. Stems ascending or erect, simple or rarely branched, pubescent. Leaves alternate; nanophylls absent; stipules lanceolate, 10–14 × 3.5–4 mm, glabrous; with cystoliths, petiole 0–7 mm; leaf blade obliquely elliptic, 12–18 × 4–7.5 cm, herbaceous, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface sparsely puberulent along nerves, adaxial surface sparsely puberulent, cystoliths conspicuous, dense; base with broader half broadly cuneate, margin dentate, apex cuspidate. Male inflorescences solitary, simple, 20–30 mm in diam.; peduncle 20–30 mm; receptacle nearly orbicular, 20–30 mm in diam.; bracts connate, ca. 0.8 mm; bracteoles broadly linear or linear. Female inflorescences solitary, oblong, 4–11 × 3–6 mm, sessile; receptacle oblong, 5–12 × 3.5–7 mm; bracts broadly ovate; bracteoles spatulate or linear. Male flowers 4-merous. Fl. Jun–Aug.

- Tropical rain forests, montane broad-leaved forests; 1800–2000 m. SE Xizang.

- 1a. Male peduncles 1.2–2 mm thick;
bracteoles ciliate 110a. var. *cuneiforme*
1b. Male peduncles ca. 0.8 mm thick;
bracteoles glabrous 110b. var. *gracilipes*

110a. *Elatostema cuneiforme* var. *cuneiforme*

楔苞楼梯草(原变种) xie bao lou ti cao (yuan bian zhong)

Peduncles of male inflorescences 1.2–2 mm in diam.; bracteoles ciliate. Fl. Aug.

- Montane broad-leaved forests; ca. 2000 m. SE Xizang.

110b. *Elatostema cuneiforme* var. *gracilipes* W. T. Wang, Acta Phytotax. Sin. 28: 319. 1990.

细梗楔苞楼梯草 xi geng xie bao lou ti cao

Peduncles of male inflorescences 0.8 mm in diam.; bracteoles glabrous. Fl. Jun.

- Tropical rain forests; 1800–1900 m. SE Xizang.

111. *Elatostema laxisericeum* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 76. 1980.

绿春楼梯草 lu chun lou ti cao

Herbs perennial, monoecious, ca. 80 cm tall, glabrous. Stems ascending or erect, simple. Leaves alternate; nanophylls absent; stipules linear-lanceolate, 10–12 × 1.5–2.5 mm, glabrous, with cystoliths; petiole 5–11 mm; leaf blade obliquely elliptic, 10–13.5 × 4.5–5.5 cm, herbaceous, major basal lateral veins asymmetric, 1 basal, the other arising above base, cystoliths conspicuous, dense; base with broader half broadly cuneate or rounded, margin denticulate, apex acuminate or short acuminate. Male inflorescences solitary, simple, 1.4–2.6 × 0.9–1.4 mm; peduncle 18–22 mm; receptacle narrowly elliptic, 13–18 × 7–11 mm; bracts connate, ca. 0.8 mm; bracteoles narrowly linear. Female inflorescences solitary or in pairs, 3–4 × 2 mm; peduncle 0.5–1 mm; receptacle 2–3 × 1.5 mm. Male flowers 5-merous. Fl. Sep–Oct.

- Valley forests; 600–700 m. S Yunnan.

112. *Elatostema luxiense* W. T. Wang, Bull. Bot. Res., Harbin 2(1): 18. 1982.

潞西楼梯草 lu xi lou ti cao

Subshrubs dioecious, ca. 25 cm tall, glabrous. Stems erect, branched. Leaves alternate; nanophylls absent; stipules subulate, 5–7 × 0.1–0.2 mm, without cystoliths; petiole absent; leaf blade obliquely oblong, 9–12.5 × 2.5–3.5 cm, herbaceous, major basal lateral veins asymmetric, 1 basal, the other arising above base, cystoliths conspicuous, sparse; base with broader half auriculate, margin denticulate, apex caudate-acuminate. Male inflorescences solitary, simple, 4–10 mm in diam.; peduncle ca. 15 mm; receptacle 3–9 mm in diam.; bracts connate, 1–2.5 mm; bracteoles lanceolate. Fl. Feb.

- Valleys; 1700–1800 m. W Yunnan.

113. *Elatostema pubipes* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 75. 1980.

毛梗楼梯草 mao geng lou ti cao

Herbs perennial, monoecious, 10–16 cm tall. Stems ascending or erect, branched, sparsely pubescent. Leaves alternate; nanophylls absent; stipules linear-lanceolate, ca. 6 × 1.5 mm; petiole absent; leaf blade obliquely elliptic, 3–7.5 × 1.5–3 cm, herbaceous, major basal lateral veins both arising at base of leaf blade, abaxial surface densely puberulent along nerves, adaxial surface sparsely strigillose, cystoliths conspicuous or obscure, dense; base with broader half nearly auriculate, margin dentate, apex cuspidate or short acuminate. Male inflorescences solitary, simple, ca. 6 × 3 mm; peduncle 10–30 mm; receptacle elliptic, ca. 4 × 2.5 mm; bracts connate, ca. 0.5 mm; bracteoles linear. Female inflorescences solitary, ca. 3 mm in diam.,

sessile; receptacle small; bracts shorter than 0.5 mm; bracteoles linear. Male flowers 4-merous. Fl. May.

- Montane bamboo forests; ca. 2300 m. SE Yunnan.

114. *Elatostema tianlinense* W. T. Wang, *Guihaia* 11: 2. 1991.

田林楼梯草 tian lin lou ti cao

Herbs perennial, dioecious, 40–50 cm tall. Stems ascending or erect, simple, puberulent. Leaves alternate; nanophylls absent; stipules linear-lanceolate or triangular, 7–10 × 2–2.5 mm, pubescent on adaxial surface along costa, with cystoliths; petiole 1.5–3.5 mm; leaf blade oblong-elliptic, 8–12 × 3.5–5 cm, herbaceous, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface puberulent, adaxial surface sparsely strigillose, cystoliths conspicuous, dense; base with broader half rounded, margin dentate, apex acuminate. Male inflorescences solitary, simple, 5–7 mm; peduncle 10–13 mm, puberulent; receptacle nearly oblong, ca. 5.5 × 2.5 mm; bracts connate, 1–1.5 mm; bracteoles oblong or cymbiform-linear. Fl. Apr.

- Mountain streamsides; 1000–1100 m. Guangxi (Tianlin).

115. *Elatostema gonioccephalum* W. T. Wang, *Bull. Bot. Lab. N. E. Forest. Inst.*, Harbin 7: 77. 1980.

角托楼梯草 jiao tuo lou ti cao

Herbs perennial, dioecious, 20–40 cm tall. Stems ascending or erect, branched, hirtellous. Leaves alternate; nanophylls absent; stipules linear-lanceolate, 5–7.5 × 1.5–2 mm, glabrous; petiole 0–2 mm; leaf blade obliquely elliptic, 6.5–8 × 3–4 cm, herbaceous or nearly papery, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface sparsely puberulent along veins, adaxial surface sparsely hirtellous, cystoliths obscure, sparse; base with broader half auriculate, margin dentate, apex short acuminate. Male inflorescences solitary, simple, ca. 11 × 8 mm in diam.; peduncle ca. 45 mm; receptacle oblong, ca. 10 × 7 mm; bracteoles cymbiform-elliptic or obovate. Male flowers 5-merous. Fl. Jun.

- Valley streamsides; ca. 900 m. S Sichuan.

116. *Elatostema dulongense* W. T. Wang, *Bull. Bot. Res.*, Harbin 9(2): 72. 1989.

独龙楼梯草 du long lou ti cao

Herbs perennial, monoecious, 30–40 cm tall. Stems ascending or erect, usually simple, pubescent. Leaves alternate; nanophylls absent; stipules linear, 4–6 × 1.5–2 mm, glabrous, without cystoliths; petiole absent; leaf blade obliquely oblong-obovate or oblong, 6.5–11 × 2.3–4 cm, herbaceous, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface puberulent along nerves, adaxial surface sparsely strigillose, cystoliths conspicuous, dense; base with broader half broadly cuneate or rounded, margin dentate, apex caudate. Male inflorescences solitary, simple, 6–12 × 3–9 mm; peduncle 12–25 mm; receptacle elliptic, 5–10 × 2–7 mm; bracts absent; bracteoles oblong or linear. Female inflorescences solitary, 5–7 × 3–4 mm; peduncle 0–1 mm; receptacle oblong, 3.5–5.5 × 2.5–3.5 mm; bracts triangular; bracteoles ovate or linear. Male flowers 4-merous. Fl. Aug.

- Shaded wet areas in evergreen broad-leaved forests; 1300–1400 m. NW Yunnan.

117. *Elatostema hypoglaucum* B. L. Shih & Yuen P. Yang, *Bot. Bull. Acad. Sin.* 36: 162. 1995.

白背楼梯草 bai bei lou ti cao

Herbs perennial, monoecious, 15–35 cm tall. Stems ascending, often simple, quadrate with distinct angles, sparsely puberulent. Leaves alternate; nanophyll absent; stipules lanceolate, ca. 2 × 0.5 mm, glabrous on adaxial surface and minutely puberulent on abaxial surface; petiole 0–1 mm; leaf blade narrowly elliptic, obovate, or oblong, 1.5–5.5 × 0.5–2 cm, membranous, major basal lateral veins asymmetric, 1 basal, the other arising above base, or both absent and venation pinnate, cystoliths conspicuous, dense; base with broader half rounded, margin dentate, apex acute. Male inflorescences solitary, ca. 7 mm in diam., simple; peduncle up to 4 cm; receptacle ca. 5 mm in diam.; bracteoles cymbiform. Female inflorescences solitary, ca. 4 × 3 mm; peduncle to 1 mm or absent; receptacle oblong, 3.5 × 2 mm; bracts completely connate into an unlobed, oblong involucre; bracteoles cymbiform. Male flowers 5-merous. Achenes ovoid or ellipsoidal. Fl. Sep.

- Moist forests along streams and in ravines at medium elevations. Taiwan.

118. *Elatostema stigmatosum* W. T. Wang, *Acta Bot. Yunnan.* 7: 297. 1985.

显柱楼梯草 xian zhu lou ti cao

Herbs perennial, dioecious, ca. 20 cm tall. Stems ascending or erect, usually simple, pubescent. Leaves alternate; nanophylls absent; stipules linear-lanceolate, ca. 9 × 2.5 mm, nearly glabrous, with cystoliths; petiole 0–2.5 mm; leaf blade obliquely elliptic, 7–12 × 3.5–4.5 cm, herbaceous, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface puberulent along nerves, adaxial surface sparsely puberulent, cystoliths conspicuous, dense; base with broader half rounded, margin dentate, apex caudate. Male inflorescences solitary, simple, 7–13 mm in diam.; peduncle 80–125 mm, puberulent; receptacle elliptic, ca. 12 × 6 mm; bracts connate, 0.5–1 mm; bracteoles cymbiform-linear or linear. Female inflorescences solitary, 5–6 mm in diam.; peduncle 0.5–1 mm; receptacle elliptic, ca. 4 × 2.5 mm; bracts triangular; bracteoles linear or narrowly oblanceolate. Male flowers 4-merous. Achenes ellipsoid. Fl. Mar–Aug.

- Montane forests; 2400–2500 m. Yunnan (Jingdong).

119. *Elatostema microtrichum* W. T. Wang, *Acta Bot. Yunnan.* 7: 299. 1985.

微毛楼梯草 wei mao lou ti cao

Herbs perennial, dioecious, ca. 30 cm tall. Stems ascending or erect, branched, puberulent. Leaves alternate; nanophylls absent; stipules lanceolate-linear, 4.5–5.5 × 1.5–2 mm, glabrous, without cystoliths; petiole 0–1 mm; leaf blade obliquely elliptic, 5.5–9.5 × 2.5–4 cm, papery, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface puberulent along nerves, adaxial surface sparsely strigil-

lose, cystoliths conspicuous, dense; base with broader half rounded, margin dentate, apex acuminate or caudate-acuminate. Male inflorescences solitary, simple, 4–8 mm in diam.; peduncle 60–70 mm, glabrous; receptacle broadly elliptic, 4–7 × 2.5–6 mm; bracts connate, 0.8–1 mm; bracteoles broadly linear or linear. Male flowers 4-merous. Fl. Jun.

• Evergreen broad-leaved forests on mountain slopes; 2100–2200 m. SW Yunnan.

120. *Elatostema rivulare* B. L. Shih & Yuen P. Yang, Bot. Bull. Acad. Sin. 36: 270. 1995.

溪涧楼梯草 xi jian lou ti cao

Herbs perennial, dioecious, up to 80 cm tall. Stems ascending or suberect, branched, sparsely puberulent. Leaves alternate; nanophyll absent; stipules lanceolate-cymbiform or obliquely triangular-lanceolate, 13–17.5 × 2–5 mm, hirsute on abaxial nerves; petiole 0–2 mm; leaf blade narrowly oblong, narrowly elliptic to elliptic, 4–16 × 2–6.5 cm, thickly papery, major basal lateral veins asymmetric, 1 basal, the other arising above base, cystoliths conspicuous, dense; base with broader half cordate, margin serrate, apex abruptly caudate. Female inflorescences solitary, up to 12 × 8 mm, sessile or subsessile; receptacle ca. 10 × 4 mm; bracts completely connate into an unlobed, narrowly oblong to oblong involucre; bracteoles narrowly oblong. Achenes ellipsoidal, ca. 6-ribbed. Fl. Feb–Jul.

• Ravines, moist forests near ravines; medium elevations. Taiwan.

121. *Elatostema leucocephalum* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 78. 1980.

白序楼梯草 bai xu lou ti cao

Herbs perennial, monoecious, 25–80 cm tall. Stems ascending, simple, glabrous. Leaves alternate; nanophylls absent; stipules subulate or narrowly lanceolate, 2–3 × 0.2–0.4 mm, glabrous, without cystoliths; petiole 1–3 mm; leaf blade obliquely elliptic, 3–6.5 × 1–3 cm, herbaceous, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface glabrous, adaxial surface sparsely strigillose, cystoliths obscure, sparse; base with broader half auriculate, margin denticulate, apex short acuminate. Male inflorescences solitary, simple, 7–9 mm in diam.; peduncle ca. 6.5 cm; receptacle ca. 7 mm in diam.; bracts connate, ca. 1.5 mm; bracteoles narrowly linear. Female inflorescences solitary, 2–3 mm in diam.; peduncle ca. 0.5 mm; receptacle oblong, ca. 3 × 1.5 mm; bracts triangular; bracteoles elliptic or linear. Male flowers 5-merous. Achenes ellipsoid, 5-ribbed. Fl. Jul–Aug.

• Shaded wet areas in montane forests. S Sichuan.

122. *Elatostema omeiense* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 79. 1980.

峨眉楼梯草 e mei lou ti cao

Herbs perennial, dioecious, 10–25 cm tall. Stems prostrate, branched, glabrous. Leaves alternate; nanophylls absent; stipules lanceolate-linear, ca. 10 × 2 mm, glabrous, without cystoliths; petiole 0–2 mm; leaf blade obliquely elliptic, 4–8 × 1.5–3 cm, herbaceous, major basal lateral veins 1 or ± 2, abaxial surface glabrous, adaxial surface sparsely strigillose, cystoliths

conspicuous or obscure, dense; base with broader half auriculate, margin denticulate, apex acuminate. Male inflorescences solitary, simple, 6–14 mm in diam.; peduncle 32–75 mm; receptacle 5–13 mm in diam.; bracts connate, 1.2–2.5 mm; bracteoles lanceolate-linear. Male flowers 5-merous. Fl. Apr.

• Shaded areas along mountain roadsides; ca. 1000 m. Sichuan (Emei Shan).

123. *Elatostema jinpingense* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 80. 1980.

金平楼梯草 jin ping lou ti cao

Herbs perennial, dioecious, ca. 40 cm tall. Stems ascending, simple, glabrous. Leaves alternate; nanophylls absent; stipules narrowly lanceolate, 6–7 × 2–2.5 mm, strigillose on abaxial surface along costa, with cystoliths; petiole 0–1 mm; leaf blade obliquely elliptic, 4–6 × 2–2.5 cm, herbaceous, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface hispidulous, adaxial surface strigillose, cystoliths conspicuous, dense; base with broader half obtuse, margin denticulate, apex short acuminate. Male inflorescences solitary, simple, 16–19 × 1–120 mm; peduncle 90–120 mm; receptacle elliptic, 14–18 × 9–10 mm; bracts connate, ca. 2 mm; bracteoles oblong or linear. Male flowers 4-merous. Fl. May.

• Dense forests in valleys; ca. 1800 m. S Yunnan.

124. *Elatostema longipes* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 80. 1980.

长梗楼梯草 chang geng lou ti cao

Herbs perennial, monoecious, 30–50 cm tall, glabrous. Stems ascending or erect, simple. Leaves alternate; nanophylls absent; stipules lanceolate or subulate, 3–4.5 × 0.3–0.6 mm, with cystoliths; petiole ca. 1 mm; leaf blade obliquely elliptic, 7–13 × 2.5–4.5 cm, herbaceous, major basal lateral veins asymmetric, 1 basal, the other arising above base, or both absent and venation pinnate, cystoliths conspicuous, dense; base with broader half auriculate, margin dentate, apex acuminate. Male inflorescences solitary, simple, ca. 18 × 12 mm; peduncle 135–155 mm; receptacle elliptic, ca. 17 × 10 mm; bracts obscure; bracteoles narrowly linear. Female inflorescences solitary, 2–5 mm in diam.; peduncle ca. 1 mm; receptacle 2–4 mm in diam.; bracts broadly ovate; bracteoles broadly elliptic. Male flowers 5-merous. Achenes ovoid, 6-ribbed. Fl. Aug.

• Shaded moist rocks in mountains; 1200–1300 m. SE Sichuan.

125. *Elatostema hekouense* W. T. Wang, Acta Bot. Yunnan. 7: 296. 1985.

河口楼梯草 he kou lou ti cao

Herbs perennial, monoecious, ca. 70 cm tall, glabrous. Stems erect, branched. Leaves alternate; nanophylls absent; stipules narrowly triangular-linear or subulate, 3.4–4.5 × 0.3–0.5 mm, without cystoliths; petiole 0–7 mm; leaf blade oblong-ovate, or oblong, 6.5–16.5 × 2–5 cm, herbaceous, major basal lateral veins asymmetric, 1 basal, the other arising above base, cystoliths conspicuous or obscure, dense; base obliquely cuneate, margin obtusely denticulate, apex acuminate. Male inflorescences solitary, simple, ca. 5 × 4.5 mm; peduncle ca. 75

mm; receptacle elliptic, ca. 3×2.5 mm; bracts connate, bracteoles broadly linear. Female inflorescences solitary, 1.5–2 mm in diam.; peduncle 0.5–1 mm; receptacle nearly orbicular, 1–1.5 mm in diam.; bracts triangular; bracteoles spatulate. Male flowers 5-merous. Fl. Jun.

- Densely forested slopes; 100–200 m. Yunnan (Hekou).

126. *Elatostema procridioides* Weddell in Candolle, Prodr. 16(1): 180. 1869.

渤生楼梯草 bo sheng lou ti cao

Elatostema beshengii W. T. Wang; *E. treutleri* J. D. Hooker.

Herbs perennial, dioecious, 30–80 cm tall, glabrous. Stems ascending or erect, simple. Leaves alternate; nanophylls absent; stipules lanceolate-linear, $14-22 \times 2-3.5$ mm, with cystoliths; petiole 2–6 mm; leaf blade obliquely oblong or obliquely obovate-oblong, $8-19 \times 3-7$ cm, papery, major basal lateral veins 2, cystoliths conspicuous, dense; base obliquely cuneate, margin denticulate, apex acuminate. Male inflorescences solitary, simple, $14-17 \times 10-12$ mm; peduncle 13–25 mm; receptacle oblong or broadly elliptic, $13-15 \times 5-8$ mm; bracts connate, 6–10 mm; bracteoles linear. Female inflorescences solitary, $7-13 \times 4-7$ mm; peduncle ca. 4 mm; receptacle elliptic, $7-12 \times 4-6$ mm; bracts ovate or triangular; bracteoles oblanceolate-linear. Male flowers: perianth lobes 4. Achenes ellipsoid, 6-ribbed. Fl. Jan–Apr.

Evergreen broad-leaved forests in ravines; 600–1300 m. SE Xizang [N India, Sikkim].

127. *Elatostema dissectum* Weddell, Arch. Mus. Hist. Nat. 9: 314. 1856.

盘托楼梯草 pan tuo lou ti cao

Elatostema paragunshanense W. T. Wang.

Herbs perennial, monoecious or dioecious, 30–100 cm tall, glabrous. Stems ascending or erect, simple or rarely branched, lower stems brown furfuraceous. Leaves alternate; nanophylls absent; stipules narrowly linear or subulate, $3-5 \times 0.1-0.3$ mm, with cystoliths; petiole 0–0.5 mm; leaf blade obliquely oblong or obliquely oblong-lanceolate, $(4.5-8-15) \times (1.5-2.5-5)$ cm, herbaceous, major basal lateral veins asymmetric, 1 basal, the other arising above base, cystoliths conspicuous, dense; base obliquely cuneate, margin dentate, apex acuminate or cuspidate. Male inflorescences solitary, simple, $10-12 \times 8-10$ mm; peduncle 15–80 mm; receptacle elliptic or nearly oblong, $4-10 \times 3-6$ mm; bracts connate, 2–2.5 mm; bracteoles linear. Female inflorescences 5–9 mm in diam.; peduncle 0–1 mm; receptacle 4–8 mm; bracts lanceolate; bracteoles nearly linear. Male flowers 4-merous. Achenes narrowly ovoid, 8-ribbed. Fl. Jan–Jun.

Montane forests, evergreen riverine forests, or valley forests; 500–2100 m. W Guangdong, Guangxi, Yunnan [Bhutan, NE India, Laos, Sikkim, Thailand].

128. *Elatostema dissectoides* W. T. Wang, Acta Bot. Yunnan., Suppl. 5: 1. 1992.

拟盘托楼梯草 ni pan tuo lou ti cao

Herbs perennial, dioecious, ca. 100 cm tall. Stems ascending or erect, simple, glabrous. Leaves alternate; nanophylls absent; stipules narrowly lanceolate, $10-14 \times 2-3$ mm, glabrous, with cystoliths; petiole 1–3.5 mm; leaf blade obliquely obovate or elliptic, $6-14.5 \times 2-5.5$ cm, papery, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface puberulent along nerves, adaxial surface sparsely strigillose, cystoliths conspicuous, dense; base obliquely cuneate, margin dentate, apex cuspidate. Male inflorescences solitary, simple, 14–16 mm in diam.; peduncle 14–42 mm; receptacle oblong, $13-16 \times 6-8$ mm in diam.; bracts connate, ca. 1 mm; bracteoles linear. Male flowers 4-merous. Fl. Mar.

• Evergreen broad-leaved forests; 1200–1400 m. Yunnan (Gongshan), SE Xizang.

129. *Elatostema manhaoense* W. T. Wang, Bull. Bot. Res., Harbin 16: 247. 1996.

曼耗楼梯草 man hao lou ti cao

Herbs perennial, monoecious or dioecious, 20–35 cm tall. Stems ascending or erect, branched, retrorsely strigose. Leaves alternate; nanophylls absent; stipules lanceolate, $5-9 \times 1.3-3.2$ mm, glabrous; petiole 1.5–5 mm; leaf blade obliquely elliptic, $7-11.5 \times 0.5-6$ cm, papery, major basal lateral veins both arising at base of leaf blade, abaxial surface strigillose along veins, adaxial surface glabrous, cystoliths conspicuous, dense; base with broader half rounded or nearly auriculate, margin repand-crenate, apex acuminate or nearly caudate. Male inflorescences solitary, simple, $1-1.8 \times 0.6-1.2$ mm; peduncle 20–70 mm; receptacle oblong, $9-16 \times 5-10$ mm; bracts connate, 4–6 mm wide; bracteoles cymbiform-linear or linear. Female inflorescences solitary, ca. 2.3 mm in diam.; peduncle ca. 1.2 mm; receptacle nearly quadrate, 2.2×2.2 mm; bracts triangular; bracteoles linear. Male flowers 4-merous. Achenes ellipsoid, 7-ribbed. Fl. Aug.

- Streamsides under rain forests; 400–800 m. Yunnan (Gejiu).

130. *Elatostema crispulum* W. T. Wang, Acta Bot. Yunnan. 7: 295. 1985.

弯毛楼梯草 wan mao lou ti cao

Herbs perennial, monoecious, 25–32 cm tall. Stems ascending, branched, crispately pubescent. Leaves alternate; nanophylls absent; stipules narrowly triangular or triangular-linear, $5-9 \times 2$ mm, glabrous, with cystoliths; petiole 0–3.5 mm; leaf blade obliquely elliptic, $4-10 \times 2.5-4.5$ cm, papery, major basal lateral veins asymmetric, 1 basal, the other arising above base, abaxial surface crispately strigillose along nerves, adaxial surface glabrous, cystoliths conspicuous, dense; base with broader half obtuse, margin crenate, apex obtuse or short acuminate. Male inflorescences solitary, simple, 13–14 mm in diam.; peduncle 50–70 mm; receptacle elliptic, ca. 10×5 mm; bracts connate, 2–3 mm; bracteoles cymbiform-linear. Female inflorescences solitary, 3–8 mm in diam.; peduncle 1–8 mm; receptacle broadly linear, ca. 3.5×1 mm; bracts triangular; bracteoles linear or oblanceolate-linear. Male flowers 5-merous. Fl. Aug.

- Rain forests in valleys; 300–400 m. W Yunnan.

131. *Elatostema ferrugineum* W. T. Wang, Bull. Bot. Res., Harbin 9(2): 73. 1989.

锈茎楼梯草 xiu jing lou ti cao

Herbs perennial, dioecious, 30–45 cm tall. Stems suberect, simple, densely ferruginous-furfuraceous. Leaves alternate; nanophylls absent; stipules linear-lanceolate, 8–14 × 1.5–2.5 mm, glabrous, without cystoliths; petiole 0–1 mm; leaf blade obliquely elliptic, 7–17 × 2–5 cm, herbaceous, major basal lateral veins both arising at base of leaf blade, abaxial surface glabrous, adaxial surface strigillose along veins, cystoliths conspicuous, dense; base obliquely cuneate, margin dentate, apex caudate or caudate-acuminate. Female inflorescences solitary, ca. 8 × 4 mm; peduncle 12–16 mm; receptacle oblong, ca. 5 × 3 mm; bracts triangular; bracteoles narrowly spatulate or linear. Achenes ellipsoid, 5- or 6-ribbed. Fl. Jul–Aug.

• Rocks in evergreen broad-leaved forests; 1300–1400 m. NW Yunnan.

132. *Elatostema petelotii* Gagnepain, Bull. Soc. Bot. France 76: 81. 1929.

樟叶楼梯草 zhang ye lou ti cao

Herbs perennial, monoecious or dioecious, ca. 25 cm tall, glabrous. Stems ascending, simple. Leaves alternate; nanophylls absent; stipules linear, ca. 8 × 1–1.5 mm, without cystoliths; petiole 1–4 mm; leaf blade obliquely elliptic, 5.5–14 × 2.5–5 cm, herbaceous, major basal lateral veins both arising at base of leaf blade, cystoliths conspicuous, dense; base with broader half rounded, margin entire, apex acuminate. Male inflorescences solitary, simple, 8–11 mm in diam.; peduncle 20–35 mm; receptacle 6–9 mm in diam.; bracts connate, bracteoles oblong. Female inflorescences solitary, 4–7 mm in diam.; peduncle 5–40 mm; receptacle nearly orbicular, 3–6 mm in diam.; bracts narrowly triangular; bracteoles lanceolate or spatulate-linear. Male flowers 4-merous. Fl. Jun.

Shaded moist places in ravines; ca. 1000 m. W Guangxi, SE Yunnan [Vietnam].

133. *Elatostema acutitapalum* W. T. Wang, Bull. Bot. Res., Harbin 9(2): 74. 1989.

尖被楼梯草 jian bei lou ti cao

Herbs perennial, dioecious, 50–60 cm tall. Stems ascending or erect, simple, glabrous. Leaves alternate; nanophylls absent; stipules narrowly linear, 5–12 × 1–1.2 mm, glabrous, with cystoliths; petiole 3–5 mm; leaf blade obliquely oblong or obovate-oblong, 8–16 × 3–6 cm, herbaceous, major basal lateral veins absent and venation pinnate, abaxial surface puberulent along nerves, adaxial surface sparsely strigillose or glabrous, cystoliths usually obscure, slightly dense; base with broader half rounded, margin crenate-dentate, apex caudate. Female inflorescences solitary, ca. 7 × 10 mm; peduncle ca. 1 mm; receptacle nearly orbicular, 6–8 mm in diam.; bracts triangular; bracteoles linear. Achenes ellipsoid, striolate. Fl. Aug.

• Evergreen broad-leaved forests on mountain slopes; ca. 1300 m. NE Yunnan.

134. *Elatostema schizocephalum* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 82. 1980.

裂序楼梯草 lie xu lou ti cao

Herbs perennial, dioecious, 20–30 cm tall, glabrous. Stems ascending or erect, simple or rarely branched. Leaves alternate; nanophylls absent; stipules subulate, 5 × 0.1–0.2 mm, with cystoliths; petiole 0–2.5 mm; leaf blade obliquely elliptic or elliptic-obovate, 7–13 × 3–5 cm, papery, major basal lateral veins absent and venation pinnate, cystoliths conspicuous, dense; base with broader half broadly cuneate, margin dentate or denticulate, apex acuminate. Female inflorescences in pairs, 4–5 mm in diam.; peduncle 0.5–1 mm; receptacle 2- or 3-lobed, ca. 2 × 1 mm; bracts lanceolate-linear; bracteoles linear. Achenes ovoid, 10-ribbed. Fl. Jan–Feb.

• Forests, streamsides, shaded moist areas; 100–1300 m. E Guangxi, N Guizhou, S Hunan, S Sichuan, SE Yunnan.

This species is used medicinally.

135. *Elatostema xanthophyllum* W. T. Wang, Bull. Bot. Res., Harbin 2(1): 19. 1982.

变黄楼梯草 bian huang lou ti cao

Herbs perennial, dioecious, 30–40 cm tall. Stems ascending or erect, simple, glabrous. Leaves alternate, glabrous; nanophylls absent; stipules lanceolate-triangular, 8–10 × 2–3 mm, with cystoliths; petiole 2–4 mm; leaf blade obliquely elliptic, 7–15.5 × 3–6 cm, papery, major basal lateral veins absent and venation pinnate, cystoliths conspicuous, dense; base with broader half broadly cuneate, margin crenate-denticulate, apex caudate-acuminate. Female inflorescences solitary or in pairs, nearly orbicular, 7–17 mm in diam.; peduncle 0–1 mm; receptacle nearly orbicular, 6–8 mm in diam.; bracts triangular; bracteoles linear. Achenes ovoid, 8-ribbed. Fl. Aug–Dec.

• Rocks in valley forests; 400–500 m. Guangxi (Longzhou).

136. *Elatostema pseudobrachyodontum* W. T. Wang, Bull. Bot. Res., Harbin 2(1): 21. 1982.

隆林楼梯草 long lin lou ti cao

Herbs perennial, monoecious, ca. 40 cm tall. Stems ascending or erect, branched, glabrous. Leaves alternate; nanophylls absent; stipules lanceolate-linear, 3–4 mm, ciliolate; petiole 0–5 mm; leaf blade obliquely elliptic or oblong, 5.5–10.5 × 1.5–3.5 cm, herbaceous, major basal lateral veins ± absent and venation pinnate, abaxial surface glabrous, adaxial surface sparsely puberulent or glabrous, cystoliths conspicuous, dense; base obliquely cuneate, margin dentate, apex caudate-acuminate. Male inflorescences solitary, simple, ca. 13 mm in diam.; peduncle 1–3 mm; receptacle ca. 9 mm in diam.; bracts connate, ca. 2 mm; bracteoles spatulate. Female inflorescences solitary, nearly orbicular, 5–9 mm in diam., sessile; receptacle nearly orbicular, 4–8 mm in diam.; bracts triangular; bracteoles cuneate. Male flowers 5-merous. Achenes ellipsoid, 4-ribbed. Fl. Aug.

• Grassy banks along streamsides. Guangxi (Longlin).

137. *Elatostema atropurpureum* Gagnepain in Lecomte, Fl. Indo-Chine 5: 919. 1930.

深紫楼梯草 shen zi lou ti cao

Herbs perennial, dioecious, 70–80 cm tall, glabrous. Stems ascending or erect, branched. Leaves alternate; nanophylls absent; stipules triangular, ca. 2×1.5 mm; petiole 5–8 mm; leaf blade elliptic or oblong, $17\text{--}23 \times 4.5\text{--}7.5$ cm, herbaceous, major basal lateral veins absent and venation pinnate, cystoliths conspicuous, dense; base obliquely cuneate, margin crenate-dentate, apex caudate-acuminate. Male inflorescences solitary, ca. 2.6 mm in diam.; peduncle 10–15 mm; receptacle ca. 2.5 mm in diam.; bracteoles linear. Female inflorescences solitary or in pairs, nearly orbicular, 4–9 mm in diam., sessile; receptacle nearly orbicular, 4–7 mm in diam.; bracts triangular; bracteoles subulate. Male flowers 5-merous. Achenes ellipsoid, 8-ribbed. Fl. Apr.

Evergreen broad-leaved forests in ravines; ca. 1400 m. SE Yunnan [N Vietnam].

138. *Elatostema tenuifolium* W. T. Wang, Bull. Bot. Res., Harbin 2(1): 22. 1982.

薄叶楼梯草 bao ye lou ti cao

Herbs perennial, monoecious, 30–60 cm tall. Stems ascending or erect, branched, sparsely pubescent. Leaves alternate; nanophylls absent; stipules linear, $4 \times 1.5\text{--}2$ mm, glabrescent, without cystoliths; petiole 0–1 mm; leaf blade obliquely oblong, $8\text{--}18 \times 2.5\text{--}5$ cm, membranous, major basal lateral veins absent and venation pinnate, abaxial surface sparsely puberulent, adaxial surface glabrescent, cystoliths conspicuous, dense; base with broader half broadly cuneate, margin dentate, apex acuminate. Male inflorescences solitary, simple, $14\text{--}18 \times 11\text{--}13$ mm; peduncle 3–11 mm; receptacle tetragonal, $14\text{--}17 \times 10\text{--}12$ mm; bracts absent; bracteoles spatulate-linear or linear. Female inflorescences solitary, $6\text{--}9 \times 4\text{--}6$ mm; peduncle 0–1 mm; receptacle oblong, ca. $7 \times 3\text{--}5$ mm; bracts very small, obscure; bracteoles spatulate. Male flowers 5-merous. Achenes ovoid, 3-ribbed. Fl. Aug–Dec.

• Rocks in montane forests; 1000–1100 m. Guangxi, Guizhou, Yunnan.

139. *Elatostema nanchuanense* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 84. 1980.

南川楼梯草 nan chuan lou ti cao

Herbs perennial, monoecious or dioecious, 25–45 cm tall. Stems erect, simple, sparsely pubescent. Leaves alternate; nanophylls absent; stipules lanceolate, $6\text{--}10 \times 1.5\text{--}2$ mm, sparsely strigillose, without cystoliths; petiole 0–1.5 mm; leaf blade brown-black after drying, obliquely oblong, $8\text{--}17 \times 1.5\text{--}4$ cm, herbaceous, major basal lateral veins absent and venation pinnate, abaxial surface sparsely strigillose along nerves, adaxial surface sparsely strigose, cystoliths conspicuous, dense; base obliquely cuneate, margin densely dentate or denticulate, apex acuminate to caudate. Male inflorescences solitary or in pairs, simple, 8–12 mm in diam.; peduncle ca. 1.5 mm; receptacle 7–11 mm in diam.; bracts 15, ovate, ca. 2.5 mm wide; bracteoles cymbiform-oblong. Female inflorescences solitary or in pairs,

2–6 mm in diam.; peduncle 0–1 mm; receptacle nearly elliptic, 2–5 mm; bracts connate, triangular or broadly ovate; bracteoles spatulate-linear. Male flowers 5-merous. Achenes narrowly ovoid or ellipsoid, 8-ribbed. Fl. Jun.

• Shaded places in valleys; 600–1200 m. Chongqing, W Hubei, Yunnan.

140. *Elatostema pseudoficoides* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 85. 1980.

多脉楼梯草 duo mai lou ti cao

Elatostema pseudoficoides var. *pubicaule* W. T. Wang.

Herbs perennial, monoecious, 40–100 cm tall. Stems ascending or erect, simple, glabrescent or pilose. Leaves alternate; nanophylls absent; stipules narrowly linear, $4\text{--}8 \times 0.2\text{--}0.3$ mm, glabrous, with cystoliths; petiole 0–2.5 mm; leaf blade green after drying, obliquely oblong, $10\text{--}27 \times 3.5\text{--}7.5$ cm, thinly herbaceous, major basal lateral veins absent and venation pinnate, abaxial surface sparsely puberulent or glabrescent along veins, adaxial surface sparsely strigillose, cystoliths conspicuous, dense; base with broader half rounded, margin densely dentate, apex cuspidate. Male inflorescences solitary, simple, $11\text{--}22 \times 10\text{--}15$ mm; peduncle 3–4 mm; receptacle nearly elliptic, $10\text{--}16 \times 9\text{--}12$ mm; bracts connate, 5–7 mm; bracteoles linear. Female inflorescences solitary or rarely in pairs, 2–5 mm in diam., sessile; receptacle nearly quadrate, ca. 4×4 mm; bracts triangular; bracteoles spatulate-linear. Male flowers 5-merous. Fl. Mar–Sep.

• Forests, forest margins or streamsides in valleys; 600–2600 m. W Hubei, NW Hunan, Sichuan, Yunnan.

141. *Elatostema alnifolium* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 86. 1980.

桤叶楼梯草 qi ye lou ti cao

Herbs perennial, dioecious, ca. 36 cm tall. Stems erect, simple or branched, densely strigose. Leaves alternate; nanophylls absent; stipules linear, ca. 10×1.5 mm, hirtellous on abaxial surface, with cystoliths on adaxial surface; petiole 1–2 mm; leaf blade obliquely elliptic or obovate, $8\text{--}12 \times 4.5\text{--}7$ cm, herbaceous, major basal lateral veins absent and venation pinnate, abaxial surface densely strigillose along nerves, adaxial surface glabrous, cystoliths conspicuous, dense; base with broader half broadly cuneate, margin undulate or rarely entire, apex short acuminate. Male inflorescences in pairs, simple, 12–24 mm in diam.; peduncle 3–4 mm, densely strigillose; receptacle papilionaceous, 12–20 mm; bracts connate, ca. 1.5 mm; bracteoles narrowly linear. Female inflorescences solitary, nearly orbicular, 3.5–7 mm in diam.; peduncle ca. 1 mm, densely strigillose; receptacle 2.5–6 mm in diam. Male flowers 5-merous. Achenes ellipsoid, 5-ribbed. Fl. May–Jul.

• Streamsides; ca. 1200 m. SE Yunnan.

142. *Elatostema wenxienense* W. T. Wang & Z. X. Peng, Bull. Bot. Res., Harbin 2(1): 27. 1982.

文县楼梯草 wen xian lou ti cao

Herbs perennial, monoecious, ca. 55 cm tall. Stems as-

ending or erect, branched, glabrous. Leaves alternate; nanophylls absent; stipules lanceolate-subulate, 2–2.8 × 0.4 mm, glabrous, without cystoliths; petiole 0.5–3 mm; leaf blade obliquely oblong, 4.5–11.5 × 1–3.5 cm, papery, major basal lateral veins absent and venation pinnate, abaxial surface sparsely puberulent, adaxial surface sparsely strigillose, cystoliths conspicuous or obscure, dense; base with broader half rounded, margin dentate, apex acuminate. Male inflorescences solitary, simple, 10–13 mm in diam.; peduncle 14–18 mm; receptacle nearly orbicular, 9–12 mm in diam.; bracts connate, bracteoles cymbiform-linear. Female inflorescences solitary, 2–3.5 mm in diam., sessile; receptacle elliptic, ca. 3 × 2 mm; bracts broadly ovate; bracteoles cymbiform. Male flowers 4-merous. Achenes ellipsoid, 5-ribbed. Fl. Jun–Jul.

- Valley forests. Gansu (Wenxian).

143. *Elatostema subpenninerve* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 87. 1980.

近羽脉楼梯草 jin yu mai lou ti cao

Herbs perennial, dioecious, ca. 42 cm tall. Stems ascending or erect, branched, glabrous. Leaves alternate; nanophylls absent; stipules narrowly linear, 3–5 × 0.8–1 mm, glabrous; petiole 0–1 mm; leaf blade obliquely oblong, 7–11 × 2–4 cm, nearly papery, major basal lateral veins ± absent and venation pinnate, abaxial surface glabrous, adaxial surface sparsely puberulent, cystoliths conspicuous or obscure, sparse; base with broader half auriculate, margin dentate, apex acuminate. Male inflorescences solitary, simple; peduncle 90–100 mm; receptacle elliptic; bracts connate, 3–4 mm; bracteoles narrowly linear. Male flowers 5-merous. Fl. Jul.

- Mountain streamsides; ca. 1000 m. S Sichuan.

144. *Elatostema albopilosum* W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 88. 1980.

疏毛楼梯草 shu mao lou ti cao

Herbs perennial, monoecious, 35–75 cm tall. Stems ascending or erect, branched, pilose. Leaves alternate; nanophylls absent; stipules linear or oblong, 4–7 × 1.5–2.8 mm, glabrous, with cystoliths; petiole 0–2.5 mm; leaf blade obliquely oblanceolate-oblong, 12–17 × 3–5 cm, herbaceous, major basal lateral veins absent and venation pinnate, abaxial surface sparsely puberulent along veins, adaxial surface sparsely strigillose, cystoliths conspicuous, dense; base with broader half auriculate, margin dentate, apex cuspidate or caudate. Male inflorescences solitary, simple, 13–28 mm in diam.; peduncle 80–150(–330) mm; receptacle broadly elliptic, 12–22 × 10–18 mm; bracts connate, ca. 3 mm; bracteoles narrowly linear. Female inflorescences solitary, 1.5–5 mm in diam.; peduncle 0–1.5 mm; receptacle nearly oblong, 1–4 mm; bracts triangular; bracteoles spatulate or linear. Male flowers 5-merous. Achenes ellipsoid, 5-ribbed. Fl. Oct.

- Shaded moist areas under valley forests; 1200–2500 m. NW Guangxi, S Sichuan, S Yunnan.

145. *Elatostema ficoides* Weddell, Arch. Mus. Hist. Nat. 9: 306. 1856.

梨序楼梯草 li xu lou ti cao

Herbs perennial, monoecious or dioecious, 45–100 cm tall. Stems ascending or erect, simple or branched, glabrous or puberulent. Leaves alternate; nanophylls absent; stipules linear or lanceolate-linear, 7–10 × 2–3 mm, glabrous, without cystoliths; petiole 2–4 mm; leaf blade obliquely elliptic or oblong, 10–23 × 3.5–8 cm, thinly herbaceous, major basal lateral veins absent and venation pinnate, abaxial surface glabrous or puberulent, adaxial surface sparsely strigillose, cystoliths conspicuous or obscure, dense; base with broader half rounded or auriculate, margin densely dentate, apex acuminate. Male inflorescences solitary, simple, 17–28 × 10–18 mm; peduncle 50–100 mm; receptacle pyriform when young, papilionaceous when mature, 16–27 × 8–15 mm; bracts obscure; bracteoles linear or narrowly linear. Female inflorescences usually 2-clustered, 2–3 mm in diam., sessile; receptacle 1.5–2.5 mm in diam.; bracts triangular; bracteoles linear or spatulate-linear. Male flowers 4- or 5-merous. Fl. Aug–Sep.

Forests, thickets, streamsides, dark damp places or rocks in valleys; 800–2000 m. N Guangxi, Guizhou, W Hunan, Sichuan, NW Yunnan [NE India, Nepal, Sikkim].

- 1a. Stems glabrous; leaf blade glabrous on abaxial surface 145a. var. *ficoides*
- 1b. Stems puberulent; leaf blade puberulent on abaxial surface 145b. var. *puberulum*

145a. *Elatostema ficoides* var. *ficoides*

梨序楼梯草(原变种) li xu lou ti cao (yuan bian zhong)

Stems glabrous. Leaf blade abaxial surface glabrous. Fl. Aug–Sep.

Forests, thickets, streamsides, dark damp places or rocks in valleys; 900–2000 m. N Guangxi, Guizhou, SW Hunan, Sichuan, NW Yunnan [NE India, Nepal, Sikkim].

145b. *Elatostema ficoides* var. *puberulum* W. T. Wang, Keys Vasc. Pl. Wuling Mts. 578. 1995.

毛茎梨序楼梯草 mao jing li xu lou ti cao

Stems puberulent. Leaf blade abaxial surface puberulent. Fl. Aug.

- Montane forests; ca. 800 m. NW Hunan.

146. *Elatostema brachyodontum* (Handel-Mazzetti) W. T. Wang, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 7: 90. 1980.

短齿楼梯草 duan chi lou ti cao

Elatostema ficoides (Wallich) Weddell var. *brachyodontum* Handel-Mazzetti, Symb. Sin. 7: 147. 1929.

Herbs perennial, monoecious or dioecious, 60–100 cm tall. Stems ascending or erect, branched, glabrous. Leaves alternate; nanophylls absent; stipules subulate, 1.5–2.5 × 0.1–0.2 mm, glabrous, without cystoliths; petiole 1.5–4 mm; leaf blade obliquely oblong, 7–17 × 2.5–5.5 cm, herbaceous or papery, major basal lateral veins absent and venation pinnate, both surfaces glabrous or adaxial surface sparsely puberulent; cystoliths conspicuous, dense; base with broader half cuneate or broadly cuneate, margin crenate-dentate, apex acuminate. Male inflorescences solitary, simple, 2.5–3.5 × 1.7–2.8 mm; peduncle

URTICACEAE

2.5–6 mm; receptacle pyriform when young, nearly papilionaceous when mature, 12–30 mm in diam.; bracts connate, bracteoles narrowly lanceolate. Female inflorescences solitary, 4–17 mm in diam.; peduncle ca. 1 mm; receptacle nearly square, 3–10 × 3–10 mm; bracts broadly ovate; bracteoles

obovate. Male flowers 4-merous. Achenes ovoid, 6-ribbed. Fl. Jun–Sep.

Valley forests or rocks along streamsides; 500–2100 m. NW Guangxi, Guizhou, W Hubei, NW Hunan, Sichuan, NE Yunnan [N Vietnam].

10. PROCRIS Commerson ex Jussieu, Gen. Pl. 403. 1789.

藤麻属 *teng ma shu*

Chen Jiarui (陈家瑞 Chen Chia-jui); Ib Friis, C. Melanie Wilmot-Dear

Herbs perennial, subshrubs, or shrubs, sometimes epiphytic or epilithic, without stinging hairs. Stems often succulent. Leaves apparently alternate, distichous; nanophylls often present, very small, opposite to developed leaves; stipules intrapetiolar, small, undivided; leaf blade ± fleshy, pinnately veined, base asymmetric, margin usually entire or serrulate; cystoliths linear. Inflorescences axillary, sometimes at leafless nodes, of unisexual flowers (plants monoecious or dioecious); male glomerules in lax cymes or crowded on a small, bractless receptacle; female capitula solitary, subsessile, on fleshy subglobose receptacle; bracteoles present, often spatulate. Male flowers: perianth lobes 4 or 5, segments often valvate; stamens 4 or 5; filaments inflexed in bud; rudimentary ovary globose or obovoid. Female flowers: perianth lobes 3 or 4, very small, boat-shaped, free or connate at base, ± fleshy; staminodes absent. Ovary straight; stigma sessile, penicillate, soon disappearing; ovule orthotropous. Achene ovoid or ellipsoid, not ribbed, enclosed by persistent, fleshy perianth or exerted from small perianth. Seeds without endosperm; cotyledons ovate.

About 20 species: warm-temperate and tropical regions of the Old World; one species in China.

1. Procris crenata C. B. Robinson, Philipp. J. Sci., C, 5: 507. 1911.

藤麻 *teng ma*

Elatostema gagnepainianum H. Schroeter; *Pellionia procrioides* Gagnepain; *Procris wightiana* Wallich ex Weddell, nom. illeg. superfl.

Herbs perennial or subshrubs, epiphytic or epilithic. 30–80 cm tall. Stems branched or simple, somewhat woody basally, succulent, many striate, glabrous. Leaves often on upper stems or branches, glabrous; stipules deciduous, ovate, very small; petiole 1.5–12 mm; leaf blade narrowly oblong, elliptic, or oblanceolate to oblong-lanceolate, 8–20 × 2.2–4.5 cm, membranous or herbaceous, lateral veins 5–8 pairs, base attenuate or narrowly cuneate, margin crenate-serrate or undulate distally,

apex acuminate; cystoliths slightly conspicuous or inconspicuous. Male inflorescences proximal to female ones, clusters often on leafless nodes, short and thinly pedunculate; female inflorescence an axillary cluster of 1–7 heads, each on a short and thick peduncle or sessile, globose, 2–4 mm in diam.; bracteoles obovate or elliptic, ca. 0.4 mm, glabrous. Male flowers 5-merous; perianth lobes oblong or ovate, ca. 1.5 mm, crenulate below apex. Female flowers sessile; perianth lobes often 4, ca. 3.5 mm, glabrous. Ovary ellipsoid, ca. 0.3 mm. Achene narrowly ovoid, compressed, 0.6–0.8 mm, often minutely punctate. Fl. Jul–Aug, fr. Aug–Oct.

Shady, moist places in forests, mossy rocks, tree trunks, along streams; 300–2000 m. S Fujian, Guangdong, Guangxi, Hainan, SW Guizhou, S Sichuan, Taiwan, S Xizang, SW Yunnan [Bhutan, India, Indonesia, Laos, Malaysia, Nepal, Philippines, Sri Lanka, Thailand, Vietnam; Africa].

11. ARCHIBOEHMERIA C. J. Chen, Acta Phytotax. Sin. 18: 477. 1980.

舌柱麻属 *she zhu ma shu*

Chen Jiarui (陈家瑞 Chen Chia-jui); Ib Friis, C. Melanie Wilmot-Dear

Shrubs or subshrubs, without stinging hairs. Leaves alternate, petiolate; stipules deciduous, intrapetiolar, 2-cleft; leaf blade greenish on both surfaces, 3-veined, base symmetric, margin dentate; cystoliths punctiform. Inflorescences in axillary pairs, dichotomous cymes, unisexual or androgynous (plants monoecious or partially hermaphroditic), bracts scale-like. Bisexual flowers: perianth lobes 5, joined for ca. 1/2 of length; stamens 5; ovary and style as in female flowers. Male flowers: perianth lobes (4 or)5, connate ca. 1/2 of length, valvate, stamens (4 or)5; filaments inflexed in bud; rudimentary ovary obovoid, apex with a reduced stigma, densely white woolly at base. Female flowers: perianth tubular, membranous, constricted at mouth, apex 4(or)5-toothed; staminodes absent. Ovary included by free perianth, sessile; style short; stigma ligulate, papillose on 1 side, persistent; ovule orthotropous. Achene nutlike, ovoid, enclosed by marcescent perianth. Seeds with oily endosperm; cotyledons small, suborbicular.

One species: China, N Vietnam.

1. Archiboechmeria atrata (Gagnepain) C. J. Chen, Acta Phytotax. Sin. 18: 479. 1980.

舌柱麻 *she zhu ma*

Debregeasia atrata Gagnepain, Bull. Soc. Bot. France 75:

556. 1928; *Oreocnide tremula* Handel-Mazzetti.

Shrubs or subshrubs 0.6–4 m tall; branches nearly appressed pubescent, soon glabrescent. Stipules 2-cleft 1/2 of length, lanceolate, 5–8 mm, pubescent on ribs abaxially; petiole

2–14 cm, sparsely pubescent; leaf blade abaxially light greenish, sometimes veins and petioles reddish, adaxially greenish and slightly lustrous, becoming dark greenish, ovate to lanceolate, (4–)7–18 × (2–)3–8 cm, membranous or nearly so, lateral basal pair of veins reaching middle margin, anastomosing with adjacent lateral veins, lateral veins 2–4 pairs along midvein before margin, abaxially pubescent on veins, adaxially sparsely pubescent, base rounded or broadly cuneate, rarely truncate or subcordate, margin coarsely dentate or crenate-dentate, apex caudate-acuminate, acumen 1–2 cm, entire. Male cymes proximal to female ones, dichotomously branched 4–6 times, 1–9

cm, sometimes drooping, sparsely pubescent; bracts narrowly ovate, ca. 0.4 mm. Bisexual flowers: pedicel ca. 0.3 mm; perianth lobes ca. 0.5 mm, abaxially puberulent. Male flowers pedicellate, bud oblate, ca. 2 mm in diam.; perianth lobes puberulent abaxially; rudimentary ovary ca. 0.6 mm. Female flowers sessile; perianth tube free from ovary, puberulent abaxially; stigma 0.3–0.4 mm. Achene light greenish, 0.8–1 mm, verrucose. Fl. May–Aug, fr. Aug–Oct.

Partly shady, moist places in forests, rocky crevices; 300–1500 m. Guangdong, Guangxi, Hainan, S Hunan [N Vietnam].

The stem fibers are used to make ropes.

12. BOEHMERIA Jacquin, Enum. Syst. Pl. 9: 31. 1760.

苎麻属 zhu ma shu

Chen Jiarui (陈家瑞 Chen Chia-ju); Ib Friis, C. Melanie Wilmot-Deard

Trees small, shrubs, subshrubs, or perennial herbs, without stinging hairs. Leaves alternate or opposite; stipules deciduous, intrapetiolar, free or rarely connate at base; leaf blade 3-veined, margin dentate, rarely 2- or 3-lobed; cystoliths punctiform. Inflorescence an axillary glomerule, on normal leafy stems or on specialized, slender, mostly axillary, occasionally terminal, shoots, these unbranched and spikelike to branched and panicle-like, mostly unisexual, less often bisexual. Flowers unisexual (plants monoecious or dioecious); bracts and bracteoles small, scarious. Male flowers: perianth (3 or)4 or 5-lobed or parted, segments valvate; stamens (3 or)4 or 5; filaments inflexed in bud; rudimentary ovary clavate or subglobose. Female flowers: perianth tubular, usually compressed, apex 2–4-toothed, in fruit sometimes enlarged and dilated into 2 acute angles or wings; staminodes absent. Ovary included; stigma filiform, on a style, pilose on 1 side, usually persistent for some time; ovule orthotropous. Achene not lustrous, enclosed by marcescent perianth, Seed with endosperm; cotyledons elliptic or ovate.

About 65 species: tropical, subtropical, and rarely temperate regions; 25 species (six endemic) in China.

- 1a. Glomerules all axillary on normal leaf branches; male flowers 4-merous; leaves alternate 1. *B. glomerulifera*
- 1b. Glomerules all or partly arranged on specialized slender flowering branches; male flowers (3–)4–5-merous; leaves alternate or opposite.
 - 2a. Male glomerules in axils of foliage leaves, female glomerules on specialized long spikelike shoots in terminal and subterminal axils; male flowers 4–5-merous, pedicel 2–5 mm 3. *B. zollingeriana*
 - 2b. Glomerules all arranged on specialized slender flowering shoots, rarely simply axillary; male flowers 4-merous, pedicel very short to absent.
 - 3a. Flowering shoots with tuft of foliage leaves at apex.
 - 4a. Leaves not lobed, apex acuminate or caudate 4. *B. clidemioides*
 - 4b. Leaves lobed, apex cuspidate 5. *B. umbrosa*
 - 3b. Flowering shoots without tuft of leaves at apex (except rarely in *B. silvestrii*).
 - 5a. Flowering shoots branched; leaves alternate or opposite.
 - 6a. Flowering shoots in pairs; leaves alternate, abaxially often white tomentose (or strigose in var. *tenacissima*); achene long stipitate at base 2. *B. nivea*
 - 6b. Flowering shoots solitary; leaves opposite, glabrous or sparsely strigillose abaxially; achene base obtuse or cuneate.
 - 7a. Leaf blade elliptic ovate, apex acuminate; flowering shoots with irregular second order branching; achene base narrowly cuneate 20. *B. polystachya*
 - 7b. Leaf blade ovate-orbicular to suborbicular, apex abruptly caudate; flowering shoots with simple, spikelike branches only; achene base rounded 21. *B. conica*
 - 5b. Flowering shoots usually unbranched, sometimes loosely branched at base; leaves opposite, seldom alternate in distal part of stem (only in *B. allophylla* and *B. tricuspis*).
 - 8a. Leaf blade often 3-cusped or 3-lobed, rarely 5-lobed at apex.
 - 9a. Leaf blade often papery, 7–15(–22) cm wide, teeth 10–20 mm.
 - 10a. Leaf blade ovate or broadly ovate, apex sometimes inconspicuously tricuspidate, base often broadly cuneate; spikes or rarely few branched at base 15. *B. japonica*
 - 10b. Leaf blade oblate to 5-angled or oblate to orbicular-ovate, apex often 3-lobed, base often truncate or subcordate; spikes well branched into subpanicle 16. *B. tricuspis*
 - 9b. Leaf blade herbaceous, 1–8(–13) cm wide, teeth less than 10 mm.
 - 11a. Leaves all opposite, apex 3- or 5-cuspidate, base broadly cuneate to subtruncate, teeth 2–10 mm, sparsely strigose or subglabrous on both surfaces 17. *B. silvestrii*

URTICACEAE

- 11b. Leaves alternate on upper stems, opposite on lower stems, apex tricuspidate, base broadly cuneate, teeth 1–2.5 mm, long appressed hirsute adaxially, pubescent abaxially 19. *B. allophylla*
- 8b. Leaf blade not divided at apex.
- 12a. Leaf blade lanceolate or linear-lanceolate.
- 13a. Leaf blade herbaceous, lanceolate, smooth adaxially, apex caudate or acuminate; female spikes of usually distant glomerules, often branched at base, straight; achene stipitate or very shortly so.
- 14a. Leaf blade apex entire, margin dentate; flowering shoots unbranched or with a few short irregular branches near base; achene almost without stipe 10. *B. formosana*
- 14b. Leaf blade apex serrulate, margin finely serrulate; female flowering shoot dichotomously forked at lowermost glomerule; achene stipitate 23. *B. ingjiangensis*
- 13b. Leaf blade thickly papery, linear-lanceolate, often strongly rugose adaxially, apex tapering to acuminate; female spikes of congested glomerules, simple, nodding; achene long stipitate.
- 15a. Leaf blade 14–29 × 2.2–5.5 cm, glabrous or glabrescent adaxially, teeth revolute; female spikes 6–32 cm; perianth tube of female flower 1.6–2.2 mm, apex rounded 24. *B. penduliflora*
- 15b. Leaf blade 5–24 × 2–6.4 cm, densely appressed strigillose adaxially, teeth flattened; female spikes 4–18 cm; perianth tube of female flower 1–1.5 mm, apex attenuate 25. *B. densiflora*
- 12b. Leaf blade ovate or suborbicular, rarely sublanceolate (in *B. hamiltoniana*).
- 16a. Flowering shoots branched at base.
- 17a. Shrubs.
- 18a. Leaf blade elliptic ovate; flowering shoots with irregular second order branching 20. *B. polystachya*
- 18b. Leaf blade oblong, narrowly ovate or oblanceolate; flowering shoots with simple, spikelike branches only.
- 19a. Branches glabrous; spikes very slender, to 26 cm 11. *B. hamiltoniana*
- 19b. Branches strigose; spikes straight, 4–10 cm.
- 20a. Branches dark purplish brown; leaf blade oblong or oblong-lanceolate, apex acuminate, tip denticulate; inflorescence unbranched 8. *B. lanceolata*
- 20b. Branches light brown; leaf blade elliptic, apex acuminate, tip entire; inflorescence with shorter branches from base 9. *B. lohuiensis*
- 17b. Herbs perennial or subshrubs.
- 21a. Leaf margin coarsely 7–14-dentate, teeth gradually larger distally 15. *B. japonica*
- 21b. Leaf margin dentate, denticulate, or serrulate, all regular.
- 22a. Leaf blade herbaceous or rarely membranous, suborbicular or orbicular-ovate.
- 23a. Leaf base rounded, patent pubescent abaxially 6. *B. macrophylla*
- 23b. Leaf base truncate or cordate, appressed strigose abaxially.
- 24a. Leaf blade 6.5–19 × 6–17.5 cm; spikes of distant glomerules to 40 cm 13. *B. dolichostachya*
- 24b. Leaf blade 5–9.4 × 5–8 cm; spikes of congested glomerules to 5.5 cm 14. *B. densiglomerata*
- 22b. Leaf blade usually herbaceous or papery, ovate or oblong.
- 25a. Leaf blade papery, oblong, apex denticulate 8. *B. lanceolata*
- 25b. Leaf blade usually herbaceous, ovate or narrowly ovate, apex entire.
- 26a. Leaf margin dentate; achene verrucose 10. *B. formosana*
- 26b. Leaf margin denticulate or serrulate; achene smooth 6. *B. macrophylla*
- 16b. Flowering shoots unbranched.
- 27a. Leaf blade ovate-rhombic or rhombic, margin coarsely 3–9-dentate 18. *B. spicata*
- 27b. Leaf blade ovate or suborbicular, margin serrulate, crenulate, or denticulate.
- 28a. Leaf blade suborbicular.
- 29a. Leaf margin coarsely 9–14-dentate, teeth gradually larger distally 15. *B. japonica*
- 29b. Leaf margin subregularly dentate, denticulate, or serrulate.
- 30a. Branchlets densely yellowish tomentose; leaf blade tomentose to densely pubescent on both surfaces 12. *B. tomentosa*
- 30b. Branchlets strigose; leaf blade strigose adaxially.
- 31a. Leaf blade patent pubescent abaxially.
- 32a. Leaf blade sparsely puberulent abaxially 6. *B. macrophylla*
- 32b. Leaf blade densely pubescent abaxially 13. *B. dolichostachya*
- 31b. Leaf blade strigillose abaxially.
- 33a. Herbs perennial to 0.5 m tall; leaf blade 5–9.4 × 5–8 cm; female or bisexual spikes of congested glomerules 2–5 cm 14. *B. densiglomerata*
- 33b. Subshrubs or shrubs to 3 m tall; leaf blade 6.5–19 × 6–17.5 cm; female spikes of distant glomerules 9–40 cm 13. *B. dolichostachya*
- 28b. Leaf blade ovate, rarely also lanceolate (in *B. hamiltoniana*).

URTICACEAE

- 34a. Branches glabrous; leaf blade narrowly ovate to lanceolate, margin finely crenulate throughout; spikes very slender, to 26 cm 11. *B. hamiltoniana*
- 34b. Branches strigose; leaf blade ovate or narrowly ovate, margin dentate, denticulate, or serrulate, with entire tip; spikes usually less than 26 cm.
- 35a. Female spikes 0.8–2 cm; plants 0.4–0.6 m tall 7. *B. pilosiuscula*
- 35b. Female spikes 4–20 cm; plants 0.7–3.5 m tall.
- 36a. Shrubs or small trees; petiole to 1.2 cm; female inflorescences often in groups of 2–4; female perianth tube patent-puberulent all over 22. *B. siamensis*
- 36b. Herbs perennial or subshrubs; petiole to 6 or 13 cm; female inflorescences solitary; female perianth tube strigillose on shoulder.
- 37a. Leaf teeth 6–20 mm, gradually larger distally 15. *B. japonica*
- 37b. Leaf teeth 2–5 mm, regular.
- 38a. Leaf narrowly ovate or oblong-ovate, glabrous or subglabrous adaxially; achene verrucose 10. *B. formosana*
- 38b. Leaf ovate, often rugose, strigose adaxially; achene smooth 6. *B. macrophylla*

1. *Boehmeria glomerulifera* Miquel in Zollinger, Syst. Verz. 2: 101, 104. 1854.

腋球苧麻 ye qiu zhu ma

Boehmeria depauperata Weddell; *B. glomerulifera* var. *leioclada* W. T. Wang; *B. leiophylla* W. T. Wang; *B. malabarica* Weddell, nom. illeg. superfl.; *B. malabarica* var. *leioclada* (W. T. Wang) W. T. Wang; *B. oblongifolia* W. T. Wang.

Shrubs or small trees 1–5 m tall; branchlets pubescent or glabrous. Dioecious or monoecious. Leaves alternate; stipules lanceolate, 4–8 mm; petiole 2–11(–13) cm, pubescent or glabrous; leaf blade ovate, elliptic, oblong or subelliptic, (5–)9–21 × 2.5–10 cm, papery, slightly rough, secondary veins 3 or 4 pairs along midvein, abaxial surface strigillose or pubescent on veins, rarely glabrous, adaxial surface sparsely appressed strigillose or glabrous, base broadly cuneate, rounded, or obtuse, margin denticulate, apex acuminate or caudate-acuminate. Glomerules usually unisexual, sometimes bisexual, in the axils of current and fallen leaves along normal leafy stems, 4–10 mm in diam.; male ones on proximal part of flower-bearing branches; female ones on distal part. Male flowers 4-merous, sessile or very shortly pedicellate, ca. 1 mm, pubescent; rudimentary ovule ellipsoid, ca. 0.7 mm. Female flowers broadly obovoid or obovoid, ca. 1 mm, pubescent, with short neck, 2-toothed; stigma ca. 1.2 mm. Fruiting perianth brown, obovoid, ca. 1.2 mm, sessile. Fl. Nov–Jan, fr. Feb–Apr.

Subtropical forests; 100–1400 m. SW Guangxi, SE Xizang, S Yunnan [Bhutan, India, Indonesia, Laos, Myanmar, Sikkim, Sri Lanka, Thailand, Vietnam].

This species is variable in the shape, size, and indumentum of the leaves and in the length of the neck of the female perianth tube. These features show some correlation with geography, with leaves mostly ovate, more pubescent abaxially, and with inconspicuous fruiting perianth necks in the northern and western part of the range, and leaves more elliptic, less pubescent (even glabrous), and with conspicuous fruiting perianth necks in the southern and eastern parts of the range. However, there are frequent intermediates, not only in the middle part of the range, but also within populations, such that it is not possible to maintain any infraspecific taxa.

2. *Boehmeria nivea* (Linnaeus) Gaudichaud-Beaupré, Voy. Uranie, Bot. 12: 499. 1830.

苧麻 zhu ma

Subshrubs or shrubs simple or few branched, 0.5–1.5 m tall; upper stems, branchlets, and petioles densely patent hirsute, appressed strigose or only strigose. Monoecious. Leaves alternate; stipules lanceolate, free or connate and 2-cleft, 7–11 mm; petiole 2.5–10 cm; leaf blade often orbicular or broadly ovate, sometimes ovate or elliptic-ovate, 5–15 × 3.5–13 cm, herbaceous, secondary veins ca. 3 each side of midvein, abaxial surface snowy tomentose, sometimes light green with strigose hairs on veins, or thinly white tomentose, adaxial surface slightly rough and sparsely hispid, base subtruncate, rounded, cordate, or cuneate, margin dentate from base, apex cuspidate or acuminate. Glomerules unisexual, on specialized, unisexual flowering branches in the axils of current or recently fallen leaves, these paired and much branched, usually shorter than petioles and often congested in fruit, male branches proximal or sometimes absent, female distal. Male glomerules few-flowered, 2–4 mm in diam.; female glomerules many-flowered, 2–3 mm in diam. Male flowers 4-merous, sessile; perianth lobes connate to middle, ca. 1.5 mm, pubescent. Female flowers rhomboid-ellipsoidal, 0.6–0.8 mm; stigma ca. 1 mm. Fruiting perianth rhomboid-obovoid, compressed, ca. 1 mm, strigose on shoulder, base constricted and stalklike, apex almost without neck, 2–3-toothed; achenes subovoid, ca. 0.6 mm, base stipitate. Fl. May–Aug, fr. Sep–Nov.

Forest margins, thickets, moist places along streams, roadsides, often cultivated; 200–1700 m. S Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangxi, S Shaanxi, Sichuan, Taiwan, Yunnan, Zhejiang [Bhutan, Cambodia, India, Indonesia, Japan, Korea, Laos, Nepal, Sikkim, Thailand, Vietnam].

This species is extremely variable, but can be distinguished easily by its alternate leaves, cymose inflorescences, and stipitate achenes. Two varieties are recognized: var. *nivea* is known only from cultivation or from naturalized populations; it is a stout plant with dense, long, spreading hairs, free stipules, and broadly ovate to suborbicular leaf blades with the abaxial surface densely, rarely more thinly, white or gray tomentose. Naturalized plants are often smaller with smaller, relatively narrower leaves and shorter inflorescences. Truly wild populations are very variable in stature and indumentum, but can be consistently distinguished by the appressed to assurgent hairs on the stems and leaves and the connate stipules, and are here distinguished as var. *tenacissima*. The plants are sometimes cultivated. Such plants with concolorous leaves have been variously named as var. *concolor*, var. *tenacissima*, var. *viridula*, and *Boehmeria thailandica*, but the diagnostic characters seem inconsistent, with many intermediate forms, even within local populations, and so all have been included here within

var. *tenacissima*. More field work and molecular studies are needed to understand more fully this complex species.

Boehmeria nivea is cultivated widely in China, mainly in Jiangxi, but also in S Gansu, S Henan, Hubei, Hunan, S Shaanxi, and Sichuan. The history of the cultivation of this species in China can be traced back at least 3000 years. Ramie, which provides high-quality fiber, is used to make ropes, cloth, and some industrial materials. Ramie was introduced to Europe and North and South America in the early 18th century. Ramie plants are used medicinally to relieve internal fevers and treat infections of the urethra. In addition, young leaves are used as fodder for silkworms.

- 1a. Stems densely patent hirsute; stipules free; leaf blade abaxial surface densely white or gray tomentose 2a. var. *nivea*
 1b. Stems not patent hirsute, assurgent or appressed strigose; stipules partly connate; leaf blade abaxial surface white tomentose, green and sparsely strigose or pubescent, sometimes thinly canescent tomentose 2b. var. *tenacissima*

2a. *Boehmeria nivea* var. *nivea*

苧麻(原变种) zhu ma (yuan bian zhong)

Urtica nivea Linnaeus, Sp. Pl. 2: 985. 1753.

Shrubs to 2.5 m, most parts densely patent hirsute. Stipules free, linear, 9–11 mm; leaf blade suborbicular or broadly ovate, 7–15 × 4–13 cm, abaxial surface densely white tomentose, base subtruncate or broadly cuneate, apex cuspidate. Fl. Jul–Aug, fr. Sep–Oct.

Margins of secondary forests, thickets, roadsides, often cultivated; 200–1700 m. Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [Bhutan, Cambodia, India, Indonesia, Japan, Laos, Nepal, Sikkim, Vietnam].

This variety is cultivated in S Gansu, S Henan, Hubei, Hunan, Jiangxi, S Shaanxi, and Sichuan. The fibers are used to make 夏布 (xia bu, literally “summer cloth”).

2b. *Boehmeria nivea* var. *tenacissima* (Gaudichaud-Beaupré) Miquel, Fl. Ind. Bot. 1(2): 253. 1859.

青叶苧麻 qing ye zhu ma

Boehmeria tenacissima Gaudichaud-Beaupré, Voy. Uranie, Bot. 500. 1830; *B. frutescens* var. *concolor* (Makino) Nakai; *B. nipononivea* Koidzumi; *B. nivea* var. *candicans* Weddell; *B. nivea* var. *concolor* Makino; *B. nivea* var. *nipononivea* (Koidzumi) W. T. Wang; *B. nivea* var. *viridula* Yamamoto; *B. thailandica* Yahara.

Plants 0.5–2.5 m tall; stems and petioles sparsely appressed strigose, occasionally hairs dense and assurgent. Stipules connate at base or rarely to middle; leaf blade usually ovate or elliptic-ovate, 5–13 × 3.5–12 cm, abaxial surface greenish, sparsely appressed strigillose or patent pubescent, sometimes thinly canescent-tomentose on veinlets, base rounded, broadly cuneate or abruptly narrowly cuneate.

Forest margins, thickets, moist places along streams, occasionally cultivated; 200–1200 m. S Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangxi, Sichuan, Taiwan, SE Yunnan, Zhejiang [Indonesia, Japan, Korea, Laos, Thailand, Vietnam].

This variety is cultivated in Anhui, Guangdong, Jiangxi, Taiwan, and Zhejiang. It is perhaps the original wild form of the species.

3. *Boehmeria zollingeriana* Weddell, Ann. Sci. Nat., Bot., sér. 4, 1: 201. 1854.

帚序苧麻 zhou xu zhu ma

Shrubs or small trees, 1.5–3 m tall; branchlets glabrous. Leaves opposite or alternate on distal branches; stipules lanceolate, ca. 1 cm; petiole 2–12 cm, glabrous; leaf blade ovate, broadly ovate to subcordate, or in upper branches narrowly ovate or narrowly elliptic, 8–17(–20) × 4.5–12 cm, secondary veins 3–5 pairs along midvein, anastomosing near margin, abaxial surface sparsely strigillose on veins, adaxial surface glabrous or subglabrous, base rounded or subcordate, margin crenulate from base, apex acuminate or caudate. Glomerules unisexual; male glomerules in the axils of current or fallen leaves on normal branches; female glomerules on long slender terminal or subterminal branches, drooping, usually rebranching, 30–50 cm, all leaves reduced and scale-like. Male glomerules axillary, 1–1.5 cm in diam. Male flowers 5-merous; pedicel 4–5 mm; perianth lobes boat-shaped to elliptic, ca. 1 mm, glabrous or subglabrous, connate at base, often corniculate near apex; rudimentary ovule ellipsoid, ca. 0.5 mm. Fruiting perianth brown, obovoid or ellipsoid with a cuneate to ± stipitate base, compressed, 0.8–1 mm, smooth, sparsely pubescent, sessile, apex with prolonged neck, ca. 0.2 mm, 2(or 3)-toothed. Fl. May–Sep, fr. Sep–Nov.

Forests, thickets, along streams; 100–1200 m. NW Guangxi, S Guizhou, Taiwan, S Yunnan [E India, Indonesia, Laos, Myanmar, Thailand, Vietnam].

- 1a. Leaf blade broadly ovate to subcordate; stipules ca. 1.5 times as long as wide; male flowers glabrous or subglabrous; female spikes or panicles often more than 30 cm 3a. var. *zollingeriana*
 1b. Leaf blade narrowly ovate to lanceolate; stipules (2–)3–4 times as long as wide; male flowers pubescent; female spikes or panicles less than 30 cm.
 1a. Achene sessile; branchlets and petiole glabrous 3b. var. *blinii*
 1b. Achene stipitate; branchlets and petiole pubescent 3c. var. *podocarpa*

3a. *Boehmeria zollingeriana* var. *zollingeriana*

帚序苧麻(原变种) zhou xu zhu ma (yuan bian zhong)

Boehmeria heteroidea Blume; *B. heteroidea* var. *latifolia* Gagnepain.

Branchlets and petioles glabrous. Leaf blade ovate, broadly ovate to subcordate, or in upper branches narrowly ovate or narrowly elliptic, 8–17(–20) × 4.5–12 cm, base rounded or subcordate. Male perianth glabrous or subglabrous. Fruiting perianth tube sessile, brown, obovoid or ellipsoid with a cuneate to ± stipitate base, compressed, 0.8–1 mm, smooth, sparsely pubescent, apex with prolonged neck, ca. 0.2 mm, 2(or 3)-toothed. Fl. Jul–Sep, fr. Sep–Nov.

Forests, thickets, along streams; 400–1200 m. S Yunnan [E India, Indonesia, Laos, Myanmar, Thailand, Vietnam].

3b. *Boehmeria zollingeriana* var. *blinii* (H. Léveillé) C. J. Chen, **comb. et stat. nov.**

黔桂苎麻 qian gui zhu ma

Basionym: *Boehmeria blinii* H. Léveillé, Repert. Spec. Nov. Regni Veg. 11: 551. 1913.

Branchlets and petioles glabrous or appressed strigillose. Distal leaves sometimes alternate. Leaf blade narrowly ovate to lanceolate, 8–24 × 2–9 cm, base broadly cuneate, rounded or cordate. Male perianth densely puberulent. Fruiting perianth brown, obovoid, ca. 0.8 mm, base ± rounded, sometimes cuneate. Fl. May–Jul, fr. Aug–Nov.

Forests; 100–1000 m. NW Guangxi, S Guizhou [N Thailand, N Vietnam].

3c. *Boehmeria zollingeriana* var. *podocarpa* (W. T. Wang) W. T. Wang & C. J. Chen, **comb. nov.**

柄果苎麻 bing guo zhu ma

Basionym: *Boehmeria blinii* var. *podocarpa* W. T. Wang, Acta Bot. Yunnan. 3: 323. 1981; *Pilea wattersii* Hance.

Branchlets and petioles pubescent. Leaves all opposite. Fruiting perianth rhomboid or ± rounded, ca. 1.2 mm, base stipitate. Fl. Mar–Aug, fr. Jul–Oct.

- Forests; 300–1000 m. Taiwan.

4. *Boehmeria clidemioides* Miquel, Pl. Jungh. 1: 34. 1851.

白面苎麻 bai mian zhu ma

Herbs perennial or subshrubs, few branched or well branched, erect or diffuse, 0.7–3 m tall; branchlets strigose. Usually dioecious. Leaves opposite or nearly so on distal branches and unequal in size; stipules lanceolate, 6–8 mm; petiole 2–9.5 cm, pubescent; leaf blade ovate, narrowly ovate, or sublanceolate, 4–14 × 2–7 cm, papery or herbaceous, secondary veins 2 or 3 pairs along midvein, abaxial surface spreading-pilose but appressed pubescent along midvein and lateral veins, adaxial surface strigose and often rough, base rounded or broadly cuneate, margin serrulate or coarsely serrate from basal 1/3, apex acuminate or caudate. Glomerules unisexual, on specialized axillary branches, these usually unbranched but occasionally with a few lateral branches at their base, and always with a tuft of 2–4 small foliage leaves at the apex. Glomerules 2–4 mm in diam. Male flowers 4-merous, sessile; perianth lobes ca. 1.5 mm, sparsely puberulent, connate at base; rudimentary ovule ellipsoid, ca. 0.5 mm. Fruiting perianth tube obovoid, compressed, ca. 1.5 mm, strigose on shoulder, apex 2-toothed. Fl. May–Aug, fr. Aug–Oct. $2n = 28$.

Moist places in forests, forest margins, along streams, often somewhat dry places in disturbed areas, roadsides; 200–2500 m. S Anhui, Fujian, S Gansu, N Guangdong, N Guangxi, Guizhou, Hubei, Hunan, Jiangxi, S Shaanxi, Sichuan, SE Xizang, Yunnan, Zhejiang [Bhutan, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Sikkim, Vietnam].

- 1a. Stem erect; leaves opposite 4a. var. *clidemioides*
 1b. Stem often diffuse; leaves alternate or sometimes opposite in lower part of stems 4b. var. *diffusa*

4a. *Boehmeria clidemioides* var. *clidemioides*

白面苎麻(原变种) bai mian zhu ma (yuan bian zhong)

Boehmeria clidemioides var. *cinerascens* H. Hara; *B. clidemioides* var. *platyphyloides* Yahara; *B. sidifolia* Weddell.

Subshrubs, few branched, 0.7–3 m tall. Leaves opposite or rarely alternate in upper part of branches, base often obtuse or rounded, margin 23–29-serrulate. Fruiting perianth base stipitate or cuneate. Fl. May–Aug, fr. Aug–Oct. $2n = 28$.

Moist places in forests, along streams; 1000–2500 m. NW Guangxi, SE Xizang, Yunnan [Bhutan, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Sikkim, Vietnam].

4b. *Boehmeria clidemioides* var. *diffusa* (Weddell) Handel-Mazzetti, Symb. Sin. 7: 152. 1929.

序叶苎麻 xu ye zhu ma

Boehmeria diffusa Weddell, Arch. Mus. Hist. Nat. 9: 356. 1856; *B. diffusa* var. *strigosa* Weddell.

Herbs perennial or subshrubs, well branched, diffuse or erect, to 1.5 m tall. Leaves alternate or sometimes opposite in lower stems, base often cuneate, margin coarsely 7–13-dentate. Fruiting perianth base often obtuse. Fl. Jun–Aug, fr. Aug–Sep. $2n = 28$.

Forest margins, roadsides, often somewhat dry places in disturbed areas; 200–2400 m. S Anhui, Fujian, S Gansu, N Guangdong, N Guangxi, Guizhou, Hubei, Hunan, Jiangxi, S Shaanxi, Sichuan, N Yunnan, Zhejiang [Bhutan, India, Laos, Myanmar, Nepal, Sikkim, Vietnam].

This variety is very common in China, and it is variable in leaf shape and size.

The plants are used in traditional medicine and as pig feed.

5. *Boehmeria umbrosa* (Handell-Mazzetti) W. T. Wang, Acta Bot. Yunnan. 3: 324. 1981.

阴地苎麻 yin di zhu ma

Boehmeria clidemioides Miquel var. *umbrosa* Handel-Mazzetti, Symb. Sin. 7: 152. 1929; *B. bicuspis* C. J. Chen; *B. pseudotricuspis* W. T. Wang.

Herbs perennial, simple or few branched, 0.4–1.2 m tall; upper stems and branchlets appressed strigose. Dioecious or monoecious. Leaves alternate or sometimes opposite; stipules lanceolate, 6–8 mm; petiole 1.5–8 cm, appressed strigose; leaf blade broadly elliptic or broadly rhombic, 5.2–15 × 4.6–11 cm, herbaceous, secondary veins 2 each side of midvein, both surfaces sparsely appressed strigose, base broadly cuneate or subtruncate, margin coarsely 5–9-dentate from basal 1/3, teeth larger distally, apex tricuspidate, terminal tooth as long as leaf blade proper, lateral teeth 1/2–2/3 as long. Glomerules unisexual and on different plants, on specialized axillary branches, these usually unbranched, 3–11 cm, occasionally with a few lateral branches at their base, and always with a tuft of 2–4 small foliage leaves at the apex. Glomerules 1.5–3 mm in diam. Male flowers 4-merous, sessile; perianth lobes ca. 1.5 mm, sparsely puberulent, connate at base, 2 lobes corniculate near

apex; rudimentary ovule ellipsoid, ca. 0.6 mm. Fruiting perianth obovoid, compressed, ca. 1 mm, strigose on shoulder, base obtuse, 2-toothed. Fl. Aug–Sep, fr. Sep–Oct.

• Forests, along streams, shady and wet places; 1100–2600 m. NW Guangxi, NW Guizhou, W Sichuan, SE Xizang, N Yunnan.

6. *Boehmeria macrophylla* Hornemann, Hort. Bot. Hafn. 2: 890. 1815.

水苕麻 shui zhu ma

Subshrubs or herbs perennial, 1–2(–3.5) m tall; upper stems strigose. Dioecious or monoecious. Leaves opposite, unequal in size; stipules lanceolate, 8–10 mm; petiole 0.8–8 cm, pubescent; leaf blade ovate, suborbicular, elliptic-ovate, or sublanceolate, 6–18 × 3–12 cm, membranous, herbaceous, or rarely papery, secondary veins 2 or 3 pairs along midvein, abaxial surface rugulose, sparsely strigose or patent pubescent along veins, adaxial surface strigose, base rounded or subcordate, sometimes oblique, margin serrulate or denticulate, teeth 2–5 mm, apex acuminate or abruptly cuspidate. Glomerules unisexual, on long spikelike branches, these erect or pendent, usually unbranched, but sometimes with short or long lateral branches from base, glomerules separated or sometimes densely congested; female ones in distal axils, 7–20 cm. Male flowers 4-merous, sessile; perianth lobes ca. 1.5 mm, sparsely puberulent, connate at base; rudimentary ovule ellipsoid, ca. 0.4 mm. Fruiting perianth tube ellipsoid, compressed, ca. 1 mm, smooth, strigose on shoulder, apex 2-toothed. Fl. Jun–Sep, fr. Sep–Jan.

Forests, forest margins, thickets, along streams, roadsides; 100–3000 m. N Guangdong, N and W Guangxi, Guizhou, S Xizang, Yunnan, SE Zhejiang [Bhutan, India, Indonesia, Laos, Myanmar, Nepal, Sikkim, Sri Lanka, Thailand, Vietnam].

The species as a whole is characterized by the opposite leaves, spikelike inflorescences, and fruiting perianth with a rounded base. The varieties are very distinctive and their status needs more detailed assessment.

The fibers are used to make ropes.

- 1a. Leaf blade suborbicular, base cordate, abaxial surface with patent hairs along veins 6c. var. *rotundifolia*
- 1b. Leaf blade not orbicular, base usually not cordate, abaxial surface sparsely strigose or densely canescent.
- 2a. Leaf blade papery, 4.5–7(–10) × 2–4(–6) cm, rugose, adaxial surface stiffly hispid, reticulate veins strongly raised abaxially 6d. var. *scabrella*
- 2b. Leaf blade often herbaceous or membranous, 7–20 × 4–12 cm, slightly rugose, adaxial surface sparsely strigose, reticulate veins slightly raised.
- 3a. Stems and petioles sparsely strigose; leaf blade often membranous, apex long-cuspidate, 1.5–2 cm, abaxial surface sparsely strigose 6a. var. *macrophylla*
- 3b. Stems and petioles densely strigose; leaf blade herbaceous,

apex cuspidate, 0.5–1.2 cm, abaxial surface densely

canescent 6b. var. *canescens*

6a. *Boehmeria macrophylla* var. *macrophylla*

水苕麻(原变种) shui zhu ma (yuan bian zhong)

Boehmeria erythropoda Miquel; *B. macrophylla* var. *dongtousensis* W. T. Wang; *B. platyphylla* D. Don; *B. platyphylla* var. *macrostachya* (Wight) Weddell; *Splitgerbera macrostachya* Wight.

Stems and petioles sparsely strigose. Leaf blade 6.5–18 × 3.2–12 cm, often membranous, abaxial surface appressed strigose, reticulate veins slightly raised, adaxial surface sparsely strigose, apex long-cuspidate, 1.5–2 cm. Female spikes ± branched, nodding at apex. Fl. Jun–Aug, fr. Sep–Jan.

Forest margins, along streams, roadsides; 100–500 m in S China, 1800–3000 m in SW China. N Guangdong, N Guangxi, Guizhou, S Xizang, Yunnan, SE Zhejiang (Dongtuo) [Bhutan, India, Indonesia, Laos, Myanmar, Nepal, Sikkim, Sri Lanka, Thailand, Vietnam].

6b. *Boehmeria macrophylla* var. *canescens* (Weddell) D. G. Long, Notes Roy. Bot. Gard. Edinburgh 40: 129. 1982.

灰绿水苕麻 hui lü shui zhu ma

Boehmeria canescens Weddell, Ann. Sci. Nat., Bot., sér. 4, 1: 28. 1854; *B. platyphylla* var. *canescens* (Weddell) Weddell.

Stems and petioles densely strigose. Leaf blade herbaceous, abaxial surface densely canescent, apex cuspidate, 0.5–1.2 cm. Female spikes thick, with congested glomerules in fruit. Fl. Jul–Aug, fr. Sep–Nov.

Forests, along streams; 400–1000 m. W Guangxi, NW and S Yunnan [Bhutan, N India, Nepal, Sikkim].

6c. *Boehmeria macrophylla* var. *rotundifolia* (D. Don) W. T. Wang in W. T. Wang & C. J. Chen, Fl. Reipubl. Popularis Sin. 23(2): 337. 1995.

圆叶苕麻 yuan ye zhu ma

Boehmeria rotundifolia D. Don, Prodr. Fl. Nepal. 60. 1825; *B. platyphylla* var. *rotundifolia* (D. Don) Weddell.

Leaf blade suborbicular, abaxial surface with patent hairs along veins, base rounded or cordate. Female spikes thin, with distant glomerules. Fl. May–Jun, fr. Jul–Sep.

Forests, along streams; 1700–2100 m. S Xizang, NW Yunnan [India, Nepal].

6d. *Boehmeria macrophylla* var. *scabrella* (Roxburgh) D. G. Long, Notes Roy. Bot. Gard. Edinburgh 40: 129. 1982.

糙叶苕麻 cao ye zhu ma

Urtica scabrella Roxburgh, Fl. Ind., ed. 1832, 3: 581. 1832; *Boehmeria platyphylla* var. *scabrella* (Roxburgh) Weddell.

Leaf blade 4.5–7(–10) × 2–4(–6) cm, papery, abaxial surface with reticulate veins strongly raised, adaxial surface

rugose, stiffly hispid, apex gradually acuminate. Fl. Jun–Aug, fr. Sep–Nov.

Thickets, disturbed places in secondary forests, roadsides; 200–1300 m. N Guangdong, N Guangxi, Guizhou, S Xizang, Yunnan [Bhutan, India, Indonesia, Laos, Nepal, Sikkim, Sri Lanka, Thailand, Vietnam].

7. *Boehmeria pilosiuscula* (Blume) Hasskarl in Teijsmann & Binnendijk, Cat. Hort. Bot. Bogor. 79. 1844.

疏毛苎麻 shu mao zhu ma

Urtica pilosiuscula Blume, Bijdr. Fl. Ned. Ind. 491. 1826; *Boehmeria platyphylla* D. Don var. *pilosiuscula* (Blume) Handel-Mazzetti.

Subshrubs or herbs perennial, prostrate at base, 0.4–0.6 m tall; upper stems densely strigose or velutinous. Monoecious. Leaves opposite, unequal in size; stipules subulate-lanceolate, 5–10 mm; petiole 0.3–6.5 cm, velutinous; leaf blade obliquely ovate or obovate-elliptic, 3–11 × 1.5–6.2 cm, herbaceous, slightly rugulose, secondary veins 3 pairs along midvein, abaxial surface pubescent or velutinous along veins, adaxial surface strigose, base obliquely rounded or obtuse, margin serrulate, apex acuminate or shortly acuminate, serrulate. Glomerules unisexual, in short congested, often unbranched bisexual spike-like shoots, 0.8–2 cm; male glomerules distal. Male flowers 4-merous, sessile or subsessile; perianth lobes ca. 1 mm, sparsely puberulent, connate at base; rudimentary ovule ellipsoid, ca. 0.6 mm. Fruiting perianth narrowly obovoid, compressed, ca. 1 mm, smooth, strigose on shoulder, smooth, apex 2-toothed. Fl. Sep–Oct, fr. Oct–Nov.

Secondary forest margins, along streams, rocks; 700–1500 m. Hainan, Taiwan, Yunnan [Indonesia, Thailand].

8. *Boehmeria lanceolata* Ridley, J. Straits Branch Roy. Asiat. Soc. 57: 94. 1910.

北越苎麻 bei yue zhu ma

Boehmeria tonkinensis Gagnepain.

Small shrubs 1–3 m tall; branches dark purplish brown, strigose. Monoecious. Leaves opposite, slightly unequal in size; stipules lanceolate, 5–8 mm; petiole 0.3–2.5 cm, strigose; leaf blade oblong-obovate or oblong-oblancheolate, 5–12 × 2–3.2 cm, thinly papery, secondary veins 3 or 4 each side of midvein, reticulate veins prominent abaxially, abaxial surface pubescent with strigose veins, adaxial surface slightly rugulose, sparsely strigose, base obtuse or broadly cuneate, margin denticulate, apex acuminate, tip denticulate. Glomerules on axillary spike-like branches, with a few branches from near base, 4–11 cm, often paired at each axil, often bisexual with proximal female glomerules and distal male glomerules; glomerules 2.5–3 mm in diam., 1–3 mm apart. Male flowers 4-merous, subsessile; perianth lobes elliptic, ca. 1 mm, sparsely puberulent, connate at base, cuniculate near apex; rudimentary ovule obovoid, ca. 0.3 mm. Fruiting perianth broadly obovoid, compressed, ca. 1 mm, smooth, strigose on shoulder, base rounded, apex 2-toothed. Fl. Mar–May, fr. Jun–Aug.

Moist open places, secondary forests, near streams; 200–1300 m. Hainan, SE Yunnan [Malaysia, Vietnam].

This species is here newly recorded for China. Hainan and N Vietnam have very similar floras with many species in common, often localized around the Beibu (Tonkin) gulf.

9. *Boehmeria lohuiensis* S. S. Chien, Acta Phytotax. Sin. 8: 355. 1963.

琼海苎麻 qiong hai zhu ma

Small shrubs 1–1.5 m tall; branches light brown, strigose. Dioecious. Leaves opposite, unequal in size; stipules subulate-lanceolate, 8–10 mm; petiole 1–6 cm, strigose; leaf blade elliptic, 8–14 × 3–5.5 cm, secondary veins 2 pairs along midvein, abaxial surface sparsely strigose along veins, adaxial surface glabrous, base cuneate, margin denticulate, apex acuminate. Glomerules on axillary spikelike branches, often with less straight branches from base, ca. 10 cm. Fruiting perianth broadly ovoid, compressed, ca. 1 mm, strigose on shoulder, 2-toothed. Fl. and fr. Sep.

• Moist places, along streams; ca. 200 m. Hainan (Ledong).

10. *Boehmeria formosana* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 281. 1911.

海島苎麻 hai dao zhu ma

Subshrubs or herbs perennial, 0.8–1.5 m tall; stems often simple, 4-angled, upper ones appressed strigose, then glabrescent. Dioecious or sometimes monoecious. Leaves opposite; stipules lanceolate, 4–7 mm; petiole 1.5–13 cm, strigose or glabrescent; leaf blade ovate, oblong-ovate, lanceolate, or linear-lanceolate, 8–15(–23) × 2.5–6.5(–13) cm, herbaceous, secondary veins 3 or 4 each side of midvein, both surfaces sparsely strigose or glabrous, adaxial surface smooth, base obtuse or rounded, margin dentate, apex long acuminate or caudate. Glomerules distant on axillary spikelike flowering shoots, sometimes branched at base, 3.5–9(–16) cm. Male flowers 4-merous, sessile; perianth lobes elliptic, ca. 1 mm, sparsely puberulent, connate at base; rudimentary ovule obovoid, ca. 0.5 mm. Fruiting perianth tube almost without stipe, broadly rhomboid or obovoid, slightly compressed, ca. 1 mm, verrucose, strigose on shoulder, base obtuse or broadly cuneate, almost without stipe, apex 2(–4)-toothed. Fl. Jun–Aug, fr. Aug–Oct.

Secondary forests, thickets, along streams, roadsides; below 100 to 1400 m. S Anhui, Fujian, Guangdong, Guangxi, SE Guizhou, W Hunan, Jiangxi, Taiwan, Zhejiang [Japan].

- 1a. Leaf blade ovate to lanceolate, base obtuse or rounded; petiole 1.5–13 cm; fruiting perianth rhomboid, often with cuneate base 10a. var. *formosana*
- 1b. Leaf blade linear-lanceolate, base cuneate; petiole 1–1.5 cm; fruiting perianth subglobose with obtuse base 10b. var. *stricta*

10a. *Boehmeria formosana* var. *formosana*

海島苎麻(原变种) hai dao zhu ma (yuan bian zhong)

Petiole 1.5–13 cm; leaf blade ovate to lanceolate, 8–23 × 2.5–13 cm, base obtuse or rounded. Achene and surrounding perianth rhomboid, tuberculate, base cuneate, apex 2–4 toothed. Fl. Jun–Aug, fr. Aug–Oct.

Secondary forests, thickets, along streams, roadsides; below 100 to 1400 m. S Anhui, Fujian, Guangdong, Guangxi, SE Guizhou, W Hunan, Jiangxi, Taiwan, Zhejiang [Japan].

10b. *Boehmeria formosana* var. *stricta* (C. H. Wright) C. J. Chen, **comb. nov.**

福州苧麻 fu zhou zhu ma

Basionym: *Boehmeria platyphylla* D. Don var. *stricta* C. H. Wright, J. Linn. Soc., Bot. 26: 487. 1899; *B. formosana* var. *fuzhouensis* W. T. Wang.

Petiole 1–1.5 cm, strigose; leaf blade linear-lanceolate, 9–17 × 2–3.5 cm, base cuneate. Achene and surrounding perianth subglobose, finely reticulate, base obtuse, apex often 4-toothed. Fr. Aug.

- Thickets; ca. 100 m. Fujian, Guangdong, Taiwan, Zhejiang.

11. *Boehmeria hamiltoniana* Weddell, Ann. Sci. Nat., Bot., sér. 4, 1: 199. 1854.

细序苧麻 xi xu zhu ma

Boehmeria platyphylla D. Don var. *hamiltoniana* (Weddell) Weddell.

Shrubs to 2 m tall; branches glabrous. Leaves opposite, unequal in size; stipules subulate-lanceolate, ca. 7 mm; petiole 1.2–7 cm, strigose, glabrous; leaf blade obliquely ovate, oblong, or rarely lanceolate, 8–21 × 3.5–8 cm, herbaceous, secondary veins 2 pairs along midvein, abaxial surface pubescent along veins, adaxial surface sparsely strigose, base broadly cuneate or obliquely subrounded, margin inconspicuously crenulate, apex acuminate. Glomerules unisexual, on long spikelike inflorescences, usually with a few long basal branches, widely separated; male spikes to ca. 6 cm; bisexual or female spikes very slender, to 26 cm. Male flowers 4-merous, subsessile; perianth lobes elliptic, ca. 1.5 mm, sparsely puberulent, connate at base; rudimentary ovule ellipsoid, ca. 0.5 mm. Fruiting perianth ellipsoid, compressed, ca. 1 mm, strigose on shoulder, base sharply cuneate, ± stipitate, apex 2-toothed. Fl. May–Aug, fr. Oct–Dec.

Margins of secondary forests, moist places along streams; ca. 700 m. S Yunnan [Bhutan, Indonesia, NE India, Myanmar, Nepal, Thailand].

12. *Boehmeria tomentosa* Weddell, Ann. Sci. Nat., Bot., sér. 4, 1: 200. 1854.

密毛苧麻 mi mao zhu ma

Boehmeria platyphylla D. Don var. *tomentosa* (Weddell) Weddell.

Shrubs 2–8 m tall; branchlets densely yellowish tomentose. Leaves opposite, unequal in size; stipules lanceolate, ca. 10 mm; petiole 1–8 cm, tomentose; leaf blade suborbicular or orbicular-ovate, 6.5–18.5 × 4.5–15 cm, papery, secondary veins 2 each side of midvein, abaxial surface densely and ferruginous tomentose to densely pubescent, adaxial surface densely strigose, base cordate or subtruncate, margin denticulate, apex shortly acuminate or acuminate. Glomerules unisexual, on long spikelike branches, nodding; male spikes in pairs, in axils of fallen leaves, 5–12 cm; female spikes simple, in axils of current

leaves, 8–16 cm. Male flowers 4-merous, sessile; perianth lobes elliptic, ca. 1.5 mm, sparsely puberulent, connate at base; rudimentary ovule subcolumnar, ca. 0.6 mm. Fruiting perianth obovoid, compressed, 1.5–2 mm, densely strigose on shoulder, base obtuse, apex 2-toothed. Fl. Apr–Jul, fr. Aug–Oct.

Forest margins, along streams; 1500–2400 m. SW Sichuan, NW and S Yunnan [Bhutan, NE India, Nepal, Sikkim].

The fibers are used to make ropes.

13. *Boehmeria dolichostachya* W. T. Wang, Acta Bot. Yunnan. 3: 405. 1981.

长序苧麻 chang xu zhu ma

Subshrubs or small shrubs 0.6–3 m tall; upper stems strigose. Leaves opposite, slightly unequal in size; stipules subulate-triangular, ca. 5 mm; petiole 2–19 cm, strigose or pubescent; leaf blade suborbicular or orbicular-ovate, 6.5–19 × 6–17.5 cm, herbaceous, secondary veins 2 pairs along midvein, abaxial surface densely appressed strigillose or patent pubescent, adaxial surface often sparsely appressed strigose, base cordate or subtruncate, margin coarsely dentate, apex cuspidate or caudate. Glomerules unisexual, distant along long spikelike flowering branches, male branches sometimes branched at base, 5–10 cm; female spikes often unbranched, 10–40 cm. Male flowers 4-merous, sessile; perianth lobes obovate, ca. 1 mm, sparsely puberulent, connate at base; rudimentary ovule obovoid, 0.3–0.5 mm. Fruiting perianth rhomboid-obovoid, compressed, ca. 1.2 mm, strigose on shoulder, base obtuse, apex with very short neck, 2-toothed. Fl. Jul–Sep, fr. Sep–Nov.

• Thickets in hills, moist or disturbed places; 100–1300 m. Guangdong, Guangxi, Guizhou.

The fibers are used to make ropes.

- 1a. Stems and petioles appressed strigose; leaf blade appressed strigillose abaxially 13a. var. *dolichostachya*
- 1b. Stems and petioles patently pubescent; leaf blade patently pubescent abaxially 13b. var. *mollis*

13a. *Boehmeria dolichostachya* var. *dolichostachya*

长序苧麻(原变种) chang xu zhu ma (yuan bian zhong)

Boehmeria holosericea Blume var. *strigosa* W. T. Wang; *B. strigosifolia* W. T. Wang.

Stems and petioles appressed strigose. Leaf blade abaxial surface appressed strigillose. Fl. Aug–Sep, fr. Sep–Oct.

• Partly shaded thickets in limestone hills, disturbed places; 100–1300 m. N Guangdong, Guangxi, Guizhou.

13b. *Boehmeria dolichostachya* var. *mollis* (W. T. Wang) W. T. Wang & C. J. Chen, **comb. nov.**

柔毛苧麻 rou mao zhu ma

Basionym: *Boehmeria strigosifolia* W. T. Wang var. *mollis* W. T. Wang, Guihaia 3: 78. 1983.

Stems and petioles patently pubescent. Leaf blade abaxial surface patently pubescent. Fl. Jul–Sep, fr. Oct–Nov.

• Often moist places, thickets in hills; 500–700 m. Guangdong, Guangxi, Guizhou.

14. *Boehmeria densiglomerata* W. T. Wang, Acta Bot. Yunnan. 3: 408. 1981.

密球苧麻 mi qiu zhu ma

Herbs perennial or subshrubs 0.3–0.5 m tall; stems simple or branched, strigillose along distal 1/2. Leaves opposite, subequal in size; stipules linear, 7–9 mm; petiole dark reddish, 2.5–8 cm, sparsely strigillose; leaf blade suborbicular or orbicular-ovate, 5–9.4 × 5–8 cm, herbaceous, secondary veins 2 or 3 pairs along midvein, abaxial surface purplish and densely appressed strigillose, adaxial surface often sparsely appressed strigillose, base cordate or subcordate, margin coarsely dentate, apex cuspidate or caudate and entire. Glomerules unisexual, densely congested along thick, columnar spikelike branches; bisexual and male branches often branched at base, 2.5–5.5 cm; female branches unbranched. Male flowers 4-merous, sessile; perianth lobes elliptic, ca. 1 mm, sparsely puberulent, connate at base; rudimentary ovule obovoid, 0.06 mm. Fruiting perianth rhomboid-obovoid, compressed, 1–1.3 mm, reticulate, strigose on shoulder, base obtuse, apex with very short neck, 2-toothed. Fl. Jun–Aug, fr. Sep–Oct.

• Forests, thickets, along streams; 200–700(–1200) m. S Fujian, N Guangdong, N Guangxi, Guizhou, SW Hubei, W Hunan, Jiangxi, S Sichuan, SE Yunnan.

15. *Boehmeria japonica* (Linnaeus f.) Miquel, Ann. Mus. Bot. Lugduno-Batavi 3: 131. 1867.

野线麻 ye xian ma

Urtica japonica Linnaeus f., Suppl. Pl. 481. 1782; *Boehmeria grandifolia* Weddell; *B. holosericea* Blume; *B. japonica* var. *appendiculata* (Blume) Yahara; *B. japonica* var. *longispica* (Steudel) Yahara; *B. longispica* Steudel; *B. pilushanensis* Liu & Lu; *B. platyphylla* D. Don var. *macrophylla* Weddell; *B. spicata* var. *duploserrata* C. H. Wright; *B. taiwaniana* Nakai & Satake.

Subshrubs or herbs perennial, simple or few branched, 0.7–1.5 m tall; upper stems and branchlets densely appressed or patent strigose. Dioecious. Leaves opposite, subequal in size; stipules lanceolate, 8–1.2 mm; petiole 6–8 cm, appressed or patent strigose; leaf blade dark green or black when dry, suborbicular, orbicular-ovate, or ovate, 7–17(–26) × 5.5–13(–20) cm, papery, secondary veins 1–3 pairs along midvein, abaxial surface pubescent or sericeous along veins and veinlets, adaxial surface roughish, strigillose, base broadly cuneate, subrounded, or truncate, margin coarsely 7–14-dentate, teeth 6–20 mm, gradually larger distally, distal ones often biserrate, apex sometimes inconspicuously tricuspidate, lateral cusps shorter than terminal one. Glomerules on axillary unbranched, or sometimes few-branched, spikelike branches; male spikes 3–15 cm; female spikes 7–20(–30) cm. Male flowers 4-merous, sessile; perianth lobes elliptic, ca. 1 mm, strigose, connate at base. Fruiting perianth rhomboid-obovoid, compressed, ca. 1.8 mm, smooth, strigose on shoulder, base stipitate or cuneate, apex with short neck, 2-toothed. Fl. Jun–Aug, fr. Sep–Nov.

Forest margins, thickets, along streams in hills and mountains;

300–600 m in N and SE China, 1000–1300 m in SW China. Anhui, Fujian, Guangdong, Guangxi, Guizhou, S Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shandong, Sichuan, Taiwan, SE Yunnan, Zhejiang [Japan].

The fibers are used to make ropes and cloth. The leaves are used agriculturally as fodder and medicinally to relieve internal fever.

The earliest reference to this species is an excellent plate published by Houltuyn (Nat. Hist. 11: 291, pl. 72, f. 2. 1779), but that author did not ascribe any binomial to the plant in question. *Boehmeria japonica* and the following four species in this account, *B. tricuspis*, *B. silvestrii*, *B. spicata* and *B. allophylla*, make up a complex containing intermediate forms, because of which the status of the species remains uncertain.

16. *Boehmeria tricuspis* (Hance) Makino, Bot. Mag. (Tokyo) 26: 387. 1912.

八角麻 ba jiao ma

Boehmeria platyphylla D. Don var. *tricuspis* Hance, J. Bot. 12: 261. 1874; *B. japonica* Miquel var. *platanifolia* Maximowicz; *B. maximowiczii* Nakai & Satake; *B. platanifolia* Franchet & Savatier.

Subshrubs or herbs perennial, simple or few branched, 0.5–1.5 m tall; upper stems and branchlets densely pubescent. Dioecious or monoecious. Leaves opposite or rarely alternate, subequal in size; stipules lanceolate, 7–10 mm; petiole 1.5–6(–10) cm, densely pubescent; leaf blade dark green or black when dry, oblate to 5-angled or oblate to orbicular-ovate, often ovate in upper stems, 8–12(–18) × 7–14(–22) cm, papery, secondary veins 2 pairs along midvein, abaxial surface densely pubescent along veins and veinlets, adaxial surface roughish, densely strigose, base truncate, subcordate, or broadly cuneate, margin coarsely 8–12-dentate, teeth gradually larger distally, often biserrate apically, apex 3-cusped or lobed, tip serrulate. Glomerules on axillary spikelike flowering branches, male branches often branched, 8–17 cm; female spikes distal, unbranched or branched, 5.5–24 cm. Male flowers 4-merous, sessile; perianth lobes elliptic, ca. 1 mm, strigillose, connate at base. Fruiting perianth rhomboid-obovoid, compressed, ca. 1.2 mm, smooth, strigillose on shoulder, base cuneate or stipitate, apex with short neck, 2-toothed. Fl. Jul–Aug, fr. Sep–Oct.

Forest margins, thickets, along streams in hills and mountains; 500–1400 m. Anhui, Fujian, S Gansu, Guangdong, Guangxi, Guizhou, W Hebei, W Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, SE Yunnan, Zhejiang [Japan, Korea].

The high-quality fibers are used to make cloth, paper, and ropes. The leaves are used as fodder and as traditional medicines to relieve internal fever.

17. *Boehmeria silvestrii* (Pampanini) W. T. Wang, Acta Phytotax. Sin. 20: 204. 1982.

赤麻 chi ma

Boehmeria platanifolia Franchet & Savatier var. *silvestrii* Pampanini, Nuovo Giorn. Bot. Ital., n.s., 22: 278. 1915.

Herbs perennial or subshrubs, simple or few branched, 0.6–1 m tall; upper stems and branchlets sparsely strigillose. Dioecious or monoecious. Leaves opposite, unequal or sub-

equal in size; stipules lanceolate, 5–7 mm; petiole 1.5–4(–8) cm, sparsely strigillose; middle leaf blade 5-angled or orbicular-ovate, 5–8(–13) × 4.8–7.5(–13) cm, thinly herbaceous, secondary veins 1–3 each side of midvein, both surfaces sparsely strigillose or abaxial surface sometimes glabrous, base broadly cuneate or subtruncate, apex often 3- or 5-cuspidate, sometimes caudate; upper leaf blade gradually smaller, base broadly cuneate or subrounded, margin 8–10-dentate, denticles gradually larger distally, apex caudate or inconspicuously tricuspidate. Glomerules on axillary, lax, unbranched spikelike flowering branches; male or bisexual ones in proximal axils; female ones in distal axils, 4–11(–20) cm. Male flowers 4-merous, subsessile; perianth lobes boat-shaped to elliptic, ca. 1.5 mm, sparsely strigillose, connate to middle; rudimentary ovule ellipsoid, ca. 0.8 mm. Fruiting perianth rhomboid-obovoid, compressed, ca. 1.5 mm, smooth, strigillose on shoulder, base cuneate or stipitate, apex with short neck, 2-toothed. Fl. Jun–Aug, fr. Sep–Nov.

Forest margins, thickets, along streams in hills and mountains; 100–1400 m in C and N China, 2100–2600 m in SW China. N and W Hebei, W Henan, W Hubei, S Gansu, SE Jilin, S Liaoning, S Shaanxi, E Shandong, Sichuan [Japan, Korea].

The fibers are used to make ropes and cloth.

18. *Boehmeria spicata* (Thunberg) Thunberg, Trans. Linn. Soc. London 2: 330. 1794.

小赤麻 xiao chi ma

Urtica spicata Thunberg in Murray, Syst. Veg., ed. 14, 850. 1784; *Boehmeria gracilis* C. H. Wright; *B. paraspicata* Nakai; *B. tricuspis* var. *unicuspis* Makino.

Herbs perennial or subshrubs, simple or few branched, 0.4–1 m tall; upper stems, branchlets, and petioles sparsely strigillose. Dioecious or monoecious. Leaves opposite, subequal in size; stipules lanceolate, 4–7 mm; petiole 1–7(–10) cm; leaf blade ovate-rhombic or rhombic, 2.5–8(–15) × 2–6(–10) cm, thinly herbaceous, secondary veins 1 or 2 each side of midvein, both surfaces sparsely strigillose or subglabrous, base broadly cuneate, sometimes subrounded, margin coarsely 3–9(–13)-dentate, teeth gradually larger distally. Glomerules on axillary, lax, unbranched spikelike branches; male or bisexual ones in proximal axils, 2–10(–18) cm; female ones in distal axils. Male flowers 4-merous, sessile; perianth lobes boat-shaped to elliptic, ca. 1.2 mm, sparsely strigillose, connate to middle; rudimentary ovule ellipsoid, 0.6–0.8 mm. Fruiting perianth tube rhomboid-obovoid, compressed, 1.2–1.5 mm, strigillose on shoulder, base cuneate or stipitate, apex with short neck, 2-toothed. Fl. May–Aug, fr. Aug–Sep.

Forest margins, thickets, grasslands, by ditches in hills and mountains; 100–1600 m. Anhui, Fujian, S Gansu, Guizhou, N and W Hebei, W Henan, Hubei, NW Hunan, Jiangsu, Jiangxi, SE Jilin, S Liaoning, Nei Mongol, S Shaanxi, E Shandong, Shanxi, Sichuan, Zhejiang [Japan, Korea].

The fibers are used to make ropes, cloth, and paper.

19. *Boehmeria allophylla* W. T. Wang, Acta Bot. Yunnan. 3: 412. 1981.

异叶苧麻 yi ye zhu ma

Herbs perennial, ca. 0.7 m tall, sparsely strigillose. Monoecious. Leaves alternate on upper stems or opposite on lower stems. Alternate leaves: stipules lanceolate, 4–6 mm; petiole 0.4–2 cm, sparsely strigillose; leaf blade elliptic, 2.7–7.5 × 1–3 cm, thinly herbaceous, abaxial surface pubescent, adaxial surface long appressed hirsute, apex acuminate. Opposite leaves unequal in size; petiole 2.4–3.8 cm, sparsely strigillose; leaf blade elliptic or broadly rhombic, 8–11 × 4–5.5 cm, secondary veins 2 each side of midvein, base broadly cuneate, margin minutely serrulate, teeth 1–2.5 mm, apex tricuspidate. Glomerules on axillary, lax, unbranched spikelike flowering branches; male or bisexual ones in proximal axils, 3–8 cm; female ones in distal axils. Male flowers 4-merous, subsessile; perianth lobes boat-shaped to elliptic, ca. 1 mm, sparsely strigillose, connate to middle; rudimentary ovule ellipsoid, ca. 0.8 mm. Female flowers: perianth tube narrowly ellipsoid, compressed, ca. 0.5 mm, strigillose on shoulder, 2-toothed at apex. Fl. Aug.

• Along streams; ca. 200 m. Guangxi (Lingyun).

20. *Boehmeria polystachya* Weddell, Ann. Sci. Nat., Bot., sér. 4, 1: 200. 1854.

歧序苧麻 qi xu zhu ma

Boehmeria tibetica C. J. Chen.

Herb or shrubs 1–1.5 m tall. Often monoecious, sometimes dioecious. Stems simple or branched distally; upper stems, branches and petioles densely puberulent. Leaves opposite, slightly unequal in size; stipules narrowly lanceolate, 8–12 mm, free; petiole 3–8 cm; leaf blade light green when dry, elliptic-ovate or ovate, 7–20 × 4–12 cm, herbaceous, secondary veins 3 or 4 pairs each side of midvein, tertiary veins many, transversely parallel, abaxial surface strigillose, adaxial surface often densely pubescent, base cordate or rounded, margin serrate, apex acuminate. Glomerules many flowered, 4–5 mm in diam., on axillary, irregularly spreading, much rebranched specialized flowering shoots, bisexual shoots lax, to 8 cm; female shoots in distal axils, congested, to 13 cm. Male flowers 4-merous, sessile; perianth lobes elliptic, ca. 1.2 mm, densely puberulent, connate at base; rudimentary ovule ellipsoid, ca. 0.5 mm. Fruiting perianth tube rhomboid-obovoid, compressed, 1–1.2 mm, strigillose on shoulder, base cuneate, apex long necked, 4-toothed. Fl. Jul–Aug, fr. Sep–Oct.

Forests, along streams; 2100–2700 m. SE Xizang [Bhutan, N India, Nepal, Sikkim].

21. *Boehmeria conica* C. J. Chen, Wilmot-Dear & Friis, sp. nov.

锥序苧麻 zhui xu zhu ma

Type: China. Yunnan: “Szemao” [Simao], A. Henry 12070 (holotype, K).

Boehmeriae poystachyae similis sed foliis latissime ovatis ut maximum sequi (nec circa duplo) longioribus quam latioribus, ad basin semper rotundato-truncatis (nec cuneatis), ad apicem abrupte (nec sensim) acuminatis, ramulis lateralibus inflorescentiae non ramosis, glomerulis femineis parvis paucifloris et fructu late ovoideo ut maximum 1.3-plo (nec circa

duplo) longiore quam latiore ad basin semper rotundato (nec protracto) differt.

Shrubs large, to 3 m tall, dioecious; branches 4-angled; branches and petioles sparsely appressed strigillose, glabrescent. Leaves opposite, subequal in size; stipules narrowly triangular, 3–4 × 1.5–5 mm, connate at base; petiole 4–12 cm; leaf blade light green abaxially, dark green adaxially when dried, ovate-orbicular to suborbicular, rarely broadly ovate, sometimes obliquely ovate, 8–17 × 6.5–14 cm, herbaceous, basal veins extending into apical 1/5 of leaf blade, secondary veins 3 or 4 each side of midvein, reticulate veins slightly raised abaxially, abaxial surface subglabrous, adaxial surface sparsely appressed strigose, glabrescent; base cordate, rounded truncate or broadly cuneate, margin crenate, apex cuspidate to shortly acuminate, rarely acuminate, tip entire. Glomerules 5–10-flowered, on axillary, regularly spreading branches along specialized flowering shoots 5–8 cm; branches simple, spikelike, progressively and regularly shorter toward apex of shoot. Male flowers 4-merous, sessile; perianth lobes elliptic, ca. 1.2 mm, sparsely puberulent, connate to middle. Fruiting perianth tube broadly ovoid, compressed, ca. 0.8 mm, sparsely strigillose on shoulder, base ± rounded, apex with very short neck. Fl. Oct–Mar, fr. Apr–Jun.

Forests, shady wet places in ravines; 1200–2000 m. SE Xizang, Yunnan [NE India (Bengal)].

This new species is named for its small inflorescences, with unbranched lateral branches which become progressively shorter toward the inflorescence apex, thereby giving a conic appearance. Chinese material has hitherto been confused with *Boehmeria polystachya*, which can be distinguished from *B. conica* by its narrower leaves with serrate margins and many transversely parallel secondary veins, much more irregular and rebranched inflorescences, and narrowly rhomboid-obovoid fruiting perianth tube with a cuneate base.

22. *Boehmeria siamensis* Craib, Bull. Misc. Inform. Kew 1916: 269. 1916.

八棱麻 ba leng ma

Boehmeria Chiangmaiensis Yahara; *B. spirei* Gagnepain.

Shrubs or small trees, simple or branched distally, 1–3 m tall, to 1.5 cm in diam.; upper stems, branches, and petioles sparsely or densely strigose. Dioecious or monoecious. Buds ovoid, 2–5 mm; scales triangular-ovate. Leaves opposite, subequal in size; stipules lanceolate, 7–10 mm; petiole 0.3–1.2 cm; leaf blade light green when dry, narrowly ovate, elliptic, or rarely oblong, 5–15 × 2–8 cm, thickly papery, secondary veins 3 or 4 each side of midvein, abaxial surface with reticulate vein prominent, both surfaces sparsely appressed strigose, base subcordate or rounded, slightly oblique, margin serrulate, apex acuminate or shortly acuminate. Glomerules on axillary, densely congested, spikelike shoots, simple in distal part of twigs or in groups of 2 or more in axils of fallen leaves; male ones in lower axils, 4–6 cm; female ones in distal axils; bracts scarious, ovate, ca. 3 mm. Male flowers 4-merous, sessile; perianth lobes elliptic, 1.8–2 mm, densely puberulent, connate to middle; rudimentary ovule obovoid, ca. 0.4 mm. Fruiting perianth tube fusiform or narrowly rhomboid-obovoid, compressed, 1.8–2 mm, patent puberulent all over, base cuneate, apex long necked, 2- or 3-toothed. Fl. Mar–Apr, fr. Sep–Oct.

Secondary forests, sunny thickets; 400–1800 m. W Guangxi, S Guizhou, S Yunnan [Laos, Myanmar, Thailand, Vietnam].

The fibers are used to make ropes.

23. *Boehmeria ingjiangensis* W. T. Wang, Acta Bot. Yunnan. 3: 414. 1981.

盈江苕麻 ying jiang zhu ma

Shrubs ca. 3 m tall; branches inconspicuously 4-angled, glabrous but strigillose at nodes. Leaves opposite, subequal in size; stipules triangular-lanceolate, 7–10 mm; petiole 1.5–3 cm, strigillose or glabrescent; leaf blade lanceolate, 15–19 × 4–5 cm, herbaceous, secondary veins 3 pairs along midvein, both surfaces glabrous, but sparsely appressed strigillose on veins, adaxial surface smooth, base rounded, slightly oblique, margin finely serrulate, apex long acuminate, tip serrulate. Glomerules on axillary, lax, spikelike shoots, each dichotomously forked at lowermost glomerule; male not known, female ones 10–16 cm. Fruiting perianth narrowly rhomboid-obovoid, compressed, ca. 1.2 mm, sparsely appressed puberulent on shoulder, base cuneate, stipitate, apex 2-toothed. Fl. Oct.

• Secondary forests; ca. 300 m. SW Yunnan.

24. *Boehmeria penduliflora* Weddell ex D. G. Long, Notes Roy. Bot. Gard. Edinburgh 40: 130. 1982.

长叶苕麻 chang ye zhu ma

Boehmeria macrophylla D. Don, Prodr. Fl. Nepal. 60. 1825, not Hornemann (1815), nor (Thunberg) Siebold & Zuccarini (1846).

Shrubs erect, sometimes with trailing branches, 1.5–4.5 m tall; branchlets 4-angled, 4-grooved, often densely strigillose. Dioecious or monoecious. Leaves opposite, slightly unequal in size; stipules narrowly triangular-lanceolate, 1.3–1.8 cm; petiole 0.6–3 cm, often strigillose; leaf blade lanceolate or linear-lanceolate, 5–29 × 1.5–6.4 cm, thickly papery, secondary veins 3 or 4 pairs along midvein, abaxial surface sparsely or densely pubescent along veins, adaxial surface often strongly rugose, glabrous or sparsely strigillose, but roughened, base obtuse, rounded, or subcordate, margin minutely serrulate, teeth revolute, apex long acuminate or caudate. Glomerules on spikelike flowering shoots; female glomerules congested, 4–8 mm in diam.; male spikes often in pairs, in proximal axils, shorter than female spikes; female spikes unbranched, in distal axils, nodding, 4–32 cm. Male flowers 4-merous, sessile; perianth lobes elliptic, ca. 1.2 mm, sparsely puberulent, connate at base; rudimentary ovule ellipsoid, ca. 0.5 mm. Fruiting perianth tube narrowly cuneate, oblanceolate or fusiform, compressed, 1–2.2 mm, sparsely strigillose on shoulder, base with stipe ca. 1.2 mm, 2-toothed at apex of very short neck; achenes oblong-ovoid, ca. 0.5 mm, base long stipitate. Fl. Apr–Jun, fr. Jul–Oct.

Forest margins, along streams, thickets, valleys; 500–2000 m. SW Guangxi, SW Guizhou, SW Sichuan, SE Xizang, Yunnan [Bhutan, N India, Laos, Nepal, Myanmar, Sikkim, Thailand, Vietnam].

25. *Boehmeria densiflora* W. J. Hooker & Arnott, Bot. Beechey Voy. 271. 1838.

密花苕麻 mi hua zhu ma

Boehmeria hwaliensis Liu & Lu; *B. penduliflora* Weddell ex D. G. Long var. *lochooensis* (Weddell) W. T. Wang; *B. platyphylla* D. Don var. *lochooensis* Weddell.

Shrubs 1–2 m tall, dioecious or monoecious; branches often densely strigose. Dioecious or monoecious. Leaves opposite, subequal in size; stipules lanceolate, 5–8 mm, free or sometimes connate at base; petiole 0.5–2.5 cm, often strigillose; leaf blade ovate to ovate-lanceolate, 5–19(–24) × 2–4(–6.4) cm, thinly papery, secondary veins 2 or 3 each side of midvein, abaxial surface pubescent along veins, adaxial surface sometimes slightly rugose, densely appressed strigillose, base ob-

tuse or broadly cuneate, margin flattened serrulate, apex acuminate. Glomerules on specialized axillary spikelike shoots; male shoots often paired, in proximal axils in monoecious plants, 3–10 cm; female spikes solitary, nodding, 4–18 cm. Male flowers 4-merous, sessile; perianth lobes elliptic, ca. 1.3 mm, sparsely puberulent, connate at base. Fruiting perianth fusiform or oblanceolate, compressed, 1–1.5 mm, sparsely strigillose on shoulder, base with stipe ca. 0.8 mm, apex with very short neck, attenuate, 2-toothed, stigma 0.7–1 mm. Fl. Apr–May; fr. Jun–Sep.

River banks, exposed rocky slopes, roadsides; 100–1200 m. Guangdong, Taiwan [Japan, Philippines].

13. CHAMABAINIA Wight, Icon. Pl. Ind. Orient. 6: 11. 1853.

微柱麻属 wei zhu ma shu

Chen Jiarui (陈家瑞 Chen Chia-jui); Ib Friis, C. Melanie Wilmot-Dear

Herbs perennial, diffuse, without stinging hairs. Leaves opposite; stipules persistent, paired, interpetiolar, free, reflexed at flowering; leaf blade 3-veined, margin serrate; cystoliths punctiform. Inflorescences axillary, sessile, glomerules of unisexual flowers (plants monoecious or dioecious); male glomerules distal; female ones proximal, or sometimes mixed in middle. Male flowers: perianth lobes (3 or)4, connate at middle, valvate, gibbous or mucronate below apex; stamens (3 or)4; filaments inflexed in bud; rudimentary ovary clavate. Female flowers: perianth tubular, slightly compressed, mouth contracted, apex often minutely 2–4-toothed, in fruit enlarged; staminodes absent. Ovary included; style short; stigma ovoid, fimbriate, persistent; ovule orthotropous. Achene enclosed by thin marcescent perianth; pericarp crustaceous and lustrous. Seeds with endosperm; cotyledons ovate.

One species: tropical and subtropical E Asia.

1. *Chamabainia cuspidata* Wight, Icon. Pl. Ind. Orient. 6: 11, t. 1981. 1853.

微柱麻 wei zhu ma

Boehmeria squamigera Weddell; *Chamabainia cuspidata* var. *denticulosa* W. T. Wang & C. J. Chen; *C. cuspidata* var. *morii* (Hayata) W. T. Wang; *C. morii* Hayata; *C. squamigera* Weddell.

Herbs erect, ascending, or procumbent, 12–60 cm tall, producing slender, filiform basal overwintering stolons 10–20 cm. Stems often purplish, simple or branched, stems, branches, and petioles strigose, sometimes with mixed long pillose hairs. Leaves opposite, subequal in size at same node; stipules obliquely ovate, triangular, oblong, or lanceolate, 3–6 mm, membranous, apex mucronate; petiole 2–15 mm; leaf blade ovate, rhombic-ovate, or rarely narrowly ovate, 1–6.5 × 0.5–3

cm, herbaceous, secondary veins 2 or 3 each side of midvein, abaxial surface strigose and sometimes mixed hispid on veins, adaxial surface sparsely appressed hispid, base cuneate to rounded, margin with 3–13(–19) denticles from basal 1/3, apex often cuspidate, sometimes acuminate or acute. Glomerules 3–10 mm in diam. Male flowers: pedicel 2–3 mm; perianth lobes 1.5–2 mm, connate to middle, puberulent apically. Achene and surrounding perianth tube obovoid, 1–1.2 mm, strigillose on shoulder, often truncate at top. Fl. Jun–Aug, fr. Aug–Nov.

Forest margins, thickets, valleys, along streams, rocks; 1000–2900 m. Fujian, Guangxi, Guizhou, SW Hubei, Hunan, W Jiangxi, Sichuan, Taiwan, SE Xizang, Yunnan [Bhutan, India, Indonesia, Myanmar, Nepal, Sikkim, Sri Lanka, Vietnam].

The variation in this species is too continuous to justify the maintenance of var. *denticulosa* and var. *morii*. The plants are used in Chinese medicine to relieve abdominal pain.

14. POUZOLZIA Gaudichaud-Beaupré, Voy. Uranie, Bot. 503. 1830.

雾水葛属 wu shui ge shu

Chen Jiarui (陈家瑞 Chen Chia-jui); Ib Friis, C. Melanie Wilmot-Dear

Shrubs, subshrubs, or herbs, without stinging hairs. Leaves alternate or rarely opposite; stipules often persistent, lateral, free; leaf blade 3-veined or triplinerved, margin serrate, dentate, or entire; cystoliths punctiform. Glomerules axillary or rarely at nodes along rachis of spikes, bisexual or rarely unisexual (plants monoecious or dioecious); bracts and bracteoles small. Male flowers: perianth lobes (3 or)4 or 5, connate ca. 1/2 of length, valvate, apex concave; stamens as many as perianth lobes; filaments inflexed in bud; rudimentary ovary present. Female flowers: perianth tubular, often ovoid, beaked, constricted, apex 2–4-toothed. Ovary included; style present; stigma filiform, villous along 1 side, deciduous with style; ovule orthotropous. Achene pericarp often crustaceous, lustrous, enclosed by marcescent, always accrescent, and often ribbed, rarely winged, perianth. $2n = 20, 22, 24, 26, 32$.

About 37 species: pantropical; four species (one endemic) in China.

Some woody taxa are used as sources of fiber.

- 1a. Herbs or subshrubs; leaves often opposite, margin entire 4. *P. zeylanica*
 1b. Shrubs or small trees; leaves alternate, margin serrate or dentate.
 2a. Leaves abaxially appressed white or silvery tomentose.
 2b. Leaves abaxially pubescent 1. *P. sanguinea*
 3a. Male perianth lobes 3; leaf blade abaxially snow white tomentose 3. *P. niveotomentosa*
 3b. Male perianth lobes 4; leaf blade abaxially silvery tomentose 2. *P. calophylla*

1. *Pouzolzia sanguinea* (Blume) Merrill, J. Straits Branch Roy. Asiat. Soc. 84(Spec. No.): 233. 1921.

Sichuan, Taiwan, S Xizang, Yunnan [Bhutan, N India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Sikkim, Thailand, Vietnam].

红雾水葛 hong wu shui ge

Shrubs 0.5–3 m tall; stems reddish; branchlets densely or sparsely strigose, upper shoots rarely leafless but with some glomerules at nodes. Leaves alternate; stipules lanceolate, 3–5 mm; petiole (1–)2.6–11(–17) cm; leaf blade lanceolate to rhombic-ovate, (1–)3–19 × (0.9–)1.5–9 cm, papery, secondary veins 2 apical pairs, abaxial surface strigose or densely appressed pubescent, adaxial surface scabrous, sparsely pubescent, base rounded or cuneate, margin 8–14(–19)-dentate, apex acute or acuminate. Glomerules often unisexual on distal nodes, bisexual on proximal nodes, mostly axillary but sometimes forming almost leafless lateral spikes, reddish, 3–7 mm in diam.; bracts narrowly ovate, 2–4 mm. Male flowers: perianth lobes 4, connate to middle, strigose, apex acute. Female flowers: perianth tube ellipsoid or rhomboid, 0.8–1.2 mm, to 2 mm in fruit, pubescent, inconspicuously ribbed, 3- or 4-toothed. Achenes gray-yellow, ovoid, slightly compressed, 1–1.6 mm. Fl. Apr–Jul, fr. Jul–Aug.

1b. *Pouzolzia sanguinea* var. *elegans* (Weddell) Friis, Wilmot-Dear & C. J. Chen, **comb. nov.**

雅致雾水葛 ya zhi wu shui ge

Basionym: *Pouzolzia elegans* Weddell in Candolle, Prodr. 16(1): 230. 1869; *Boehmeria delavayi* Gagnepain; *B. elegantula* (W. W. Smith & Jeffrey) Handel-Mazzetti; *P. elegans* var. *delavayi* (Gagnepain) W. T. Wang; *P. elegans* var. *formosana* H. L. Li; *P. elegantula* W. W. Smith & Jeffrey.

Leaf blade rhombic-ovate, rhombic, or elliptic, 1–4(–7) × 0.7–3(–3.4) cm, papery or subleathery, both surfaces scabrous and appressed strigose, base broadly cuneate to obtuse, margin 3–8-dentate distally, apex acute. Glomerules unisexual or bisexual. Achenes ellipsoid or ovoid, ca. 1 mm.

• Thickets, dry valleys; 300–400 m in Guizhou and Taiwan, 1300–2300 m in SW China. Guizhou, SW Sichuan, Taiwan, SE Xizang, NW Yunnan.

Warm evergreen broad-leaved forests, thickets, edges of woods, dry valleys, roadsides; 300–2300 m. Guangxi, Guizhou, Hainan, Sichuan, Taiwan, S Xizang, Yunnan [Bhutan, N India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Sikkim, Thailand, Vietnam].

2. *Pouzolzia calophylla* W. T. Wang & C. J. Chen, Acta Phytotax. Sin. 17(1): 108. 1979.

美叶雾水葛 mei ye wu shui ge

Pouzolzia elegans has been recognized here at varietal rank under *P. sanguinea* because there are intermediates in leaf shape and leaf margin characters in Taiwan, Yunnan, and Nepal, and there is only partial geographic separation from *P. sanguinea*.

Pouzolzia argenteonitida W. T. Wang; *P. ovalis* var. *fulgens* Weddell; *P. sanguinea* (Blume) Merrill var. *fulgens* (Weddell) Hara.

- 1a. Leaf blade lanceolate to ovate, 3–19 × 1.5–6 cm, margin with 8–19 teeth on each side; apex acuminate 1a. var. *sanguinea*
 1b. Leaf blade rhombic-ovate or elliptic, rarely ovate, 1–4(–7) × 0.7–3(–4) cm, margin with 3–8 teeth each side, apex acute 1b. var. *elegans*

Shrubs 1.5–4 m tall; branchlets densely appressed or, sometimes, patently strigose, seldom lateral superior shoots leafless, but with some glomerules at nodes. Leaves alternate; stipules lanceolate, 5–7 mm; petiole 0.4–1.6 cm; leaf blade lanceolate, rarely narrowly ovate, 2.5–13 × 0.7–4(–5) cm, papery, secondary veins 2 or 3 each side of midvein toward apex, abaxial surface silvery tomentose, densely appressed sericeous with strigose hairs on veins, adaxial surface glabrous or subglabrous, base cuneate or obtuse, margin (4–)8–18(–37)-dentate, apex acuminate to cuspidate. Glomerules unisexual or bisexual, 3–8 mm in diam.; bracts narrowly ovate or triangular, 0.6–2 mm; female glomerules without spinescent bracts. Male flowers: perianth lobes 4, connate 1/2 of length, strigose, apex acute to cuspidate. Female perianth tube fusiform or obovoid, 1–1.2 mm, ca. 2 mm in fruit, pubescent, inconspicuously ribbed, 3-toothed. Achenes gray-brown, ovoid or subellipsoid, slightly compressed, 1–1.2 mm. Fl. Jul–Aug, fr. Aug–Oct.

1a. *Pouzolzia sanguinea* var. *sanguinea*

红雾水葛(原变种) hong wu shui ge (yuan bian zhong)

Urtica sanguinea Blume, Bijdr. Fl. Ned. Ind. 501. 1826; *Boehmeria nepalensis* Weddell; *Pouzolzia ovalis* Miquel; *P. sanguinea* var. *nepalensis* (Weddell) Hara; *P. viminea* (Wallich) Weddell.

Evergreen, broad-leaved forests, thickets, valleys; 1600–2800 m. SE Xizang, NW Yunnan [Bhutan, NE India, Myanmar, Nepal].

Leaf blade ovate to lanceolate, 3–14(–19) × 1.5–4(–6) cm, papery, abaxial surface sparsely or densely pubescent, base rounded or cuneate. Glomerules axillary, sometimes also on leafless lateral shoots. Achenes ovoid, ca. 1.6 mm. Fl. May–Jun. Fl. May–Jun, fr. Jul–Aug.

This species and *Pouzolzia sanguinea* differ clearly in leaf indumentum (as indicated in the key) and merit the rank of distinct species.

Warm evergreen broad-leaved forests, thickets on slopes, edges of woods, dry valleys, roadsides; 300–2300 m. Guangxi, Guizhou, Hainan,

Pouzolzia calophylla is variable in trichomes on branchlets, number of teeth on leaf margins, and veins on the abaxial leaf surface. It seems, therefore, impossible to maintain *P. argenteonitida*, which is treated here as a synonym.

3. *Pouzolzia niveotomentosa* W. T. Wang, Acta Bot. Yunnan. 3: 13. 1981.

雪毡雾水葛 xue zhan wu shui ge

Pouzolzia spinosobracteata W. T. Wang.

Shrubs 2–4 m tall; branchlets sparsely strigose. Leaves alternate; stipules lanceolate, 6–9 mm, ciliate; petiole 0.6–1.2 cm; leaf blade narrowly ovate or narrowly elliptic, 8.5–14 × 3–6.2 cm, thinly papery, secondary veins 2 apical pairs, abaxial surface densely snow white tomentose, adaxial surface glabrous or subglabrous, base rounded or obtuse, margin denticulate, apex shortly acuminate or acute. Glomerules unisexual or bisexual, 7–9 mm in diam.; female glomerules 2–4 mm, in fruit 10–14 mm in diam.; bracts ovate, ca. 1 mm, membranous. Male flowers: pedicel 1.5–3 mm; perianth lobes 3, connate to middle, strigose, apex hornlike, cuspidate; some undeveloped male flowers and especially their pedicels in mature glomerules specialized into aculei, unequal, 3–12 mm, puberulent. Female perianth tube fusiform, narrowly ovoid, ca. 1.6 mm, ca. 2.2 mm in fruit, pubescent, 3-ribbed, 3-toothed. Achenes brown, narrowly ovoid, slightly compressed, 2–2.2 mm. Fl. Jun–Jul, fr. Aug–Sep.

• Thickets, dry valleys; 300–1300 m. S Sichuan, N Yunnan.

We believe that *Pouzolzia spinosobracteata* is based on material which developed abnormally because of insect damage.

4. *Pouzolzia zeylanica* (Linnaeus) Bennett, Pl. Jav. Rar. 67. 1838.

雾水葛 wu shui ge

Herbs perennial, erect or ascending, rarely prostrate, almost simple or few branched at base, 12–40 cm tall; rootstock often tuberous; branches sometimes with short branchlets, strigillose. Leaves often opposite, sometimes alternate on lower or upper stems; stipules triangular, 2–6 mm; petiole 0.2–1.8 cm; leaf blade ovate or broadly ovate, lanceolate or narrowly lanceolate, usually 1.2–9 × (0.6–)0.8–3 cm, smallest ones on short branchlets, herbaceous, secondary vein 1 or 2 pairs, abaxial surface sparsely or sometimes densely strigillose or strigose along veins, adaxial surface glabrous or sparsely strigillose; base cuneate to rounded, rarely subcordate, margin entire, apex subobtuse, acuminate, or shortly so. Glomerules often bisexual, 2.5–5 mm in diam., bisexual ones in nodes of proximal leaves, female in distal axils; bracts triangular, 2–3 mm, ciliate. Male flowers: perianth lobes 4, narrowly oblong or oblong-oblancoate, connate to middle, 1.2–1.5 mm, puberulent, apex acute or cuspidate. Female perianth tube ellipsoid or rhombic, 0.8–1 mm, 1.5–1.8 mm in fruit, puberulent, inconspicuously ca. 9-ribbed or 4-winged, apex 2-toothed. Achenes white, light to dark yellow or light brown, ovoid, 1–1.2 mm. Fl. Jul–Aug, fr. Aug–Oct.

Grasslands, thickets by streams, wet places, sunny and somewhat

moist places by rice fields; 100–800(–1300) m. S Anhui, Fujian, S Gansu, Guangdong, Guangxi, Hubei, Hunan, Jiangxi, Sichuan, Taiwan, E and S Yunnan, W Zhejiang [India, Indonesia, Japan, Kashmir, Malaysia, Myanmar, Nepal, Papua New Guinea, Pakistan, Philippines, Sri Lanka, Thailand, Vietnam; Australia, Maldives, Polynesia, Yemen (Socotra); introduced in Africa and the New World].

- 1a. Stems erect, to ca. 60 cm; leaves all alternate, leaf blade lanceolate or narrowly lanceolate, to 9 cm 4c. var. *angustifolia*
- 1b. Stems erect, ascending or prostrate; leaves often opposite on lower part of stems, leaf blade ovate or broadly ovate, 0.5–4 cm.
 - 2a. Stems erect or ascending, few-branched; leaves ovate, 1.2–3.8 × 0.6–2.6 cm, smallest near stem apex 4a. var. *zeylanica*
 - 2b. Stems prostrate, much branched; leaves narrowly ovate to lanceolate, 0.5–1 cm 4b. var. *microphylla*

4a. *Pouzolzia zeylanica* var. *zeylanica*

雾水葛(原变种) wu shui ge (yuan bian zhong)

Parietaria zeylanica Linnaeus, Sp. Pl. 2: 1052. 1753; *Pouzolzia indica* (Linnaeus) Gaudichaud-Beaupré; *P. indica* var. *alienata* (Linnaeus) Weddell; *Urtica alienata* Linnaeus.

Stems erect or ascending, few-branched. Leaves opposite or alternate on lower part of stems, leaf blades ovate, 1.2–3.8 × 0.6–2.6 cm, smallest near stem apex.

Grasslands, thickets by streams, sunny and somewhat moist places by rice fields; 300–800(–1300) m. S Anhui (Huang Shan), Fujian, S Gansu, Guangdong, Guangxi, Hubei, Hunan, Jiangxi, Sichuan, E and S Yunnan, W Zhejiang [India, Indonesia, Japan, Kashmir, Malaysia, Myanmar, Nepal, Papua New Guinea, Pakistan, Philippines, Sri Lanka, Thailand, Vietnam; Australia, Maldives, Polynesia, Yemen (Socotra); introduced in Africa and the New World].

4b. *Pouzolzia zeylanica* var. *microphylla* (Weddell) W. T. Wang in W. T. Wang & C. J. Chen, Fl. Reipubl. Popularis Sin. 23(2): 365. 1995.

多枝雾水葛 duo zhi wu shui ge

Pouzolzia indica subvar. *microphylla* Weddell in Candolle, Prodr. 16(1): 221. 1869; *Parietaria cochinchinensis* Loureiro.

Stems prostrate, much branched, to 2 m. Leaves opposite on lower part of stem, alternate nearer stem apex; uppermost leaf blades narrowly ovate to lanceolate, 0.5–1 cm.

Grasslands on hills or plains, sunny and somewhat moist places by rice fields; 100–500 m. Fujian, Guangdong, Guangxi, S Jiangxi, Taiwan, SE Yunnan [Asia].

4c. *Pouzolzia zeylanica* var. *angustifolia* (Wight) C. J. Chen, **comb. nov.**

狭叶雾水葛 xia ye wu shui ge

Basionym: *Pouzolzia angustifolia* Wight, Icon. Pl. Ind.

Orient. 6: 43, t. 2100, f. 39. 1853; *P. indica* (Linnaeus) Gaudichaud-Beaupré var. *angustifolia* (Wight) Weddell.

Stems erect, ca. 60 cm tall. Leaves all alternate; leaf blade lanceolate or narrowly lanceolate, 2.5–9 × 0.8–3 cm, herba-

ceous, abaxial surface strigose along veins, adaxial surface glabrous. Fl. May–Jul, fr. Jul–Sep.

Wet places; 100–300 m. S Guangdong, S Guangxi [Indonesia, Malaysia].

15. GONOSTEGIA Turczaninow, Bull. Soc. Imp. Naturalistes Moscou 19(2): 509. 1846.

糯米团属 nuo mi tuan shu

Chen Jiarui (陈家瑞 Chen Chia-jiu); Ib Friis, C. Melanie Wilmot-Dear

Hyrtanandra Miquel; *Memoralis* Buchanan-Hamilton.

Herbs perennial or subshrubs, sometimes diffuse, without stinging hairs. Leaves opposite or sometimes alternate in upper stems; stipules often persistent, lateral, intrapetiolar, free; leaf blade 3(–5)-veined, margin entire; cystoliths punctiform. Inflorescences axillary, glomerules of male and female flowers or unisexual (plants monoecious or dioecious); bracts small, membranous. Male flowers subglobose, apex abruptly truncate; perianth (3 or)4 or 5, usually free, valvate, segments angled, transversely crested or villous; stamens as many as perianth lobes; filaments inflexed in bud; rudimentary ovary present. Female flowers: perianth tubular, often ovoid and beaked, constricted and 2–4-toothed at apex; staminodes absent. Ovary included; style present; stigma filiform, villous along 1 side, deciduous with style; ovule orthotropous. Achene enclosed by marcescent, always accrescent, and often longitudinally winged or ribbed perianth; pericarp often crustaceous, lustrous. $2n = 26$.

About three species: tropics and subtropics of Asia and Australia; three species in China.

Some authorities include *Gonostegia* within *Pouzolzia*.

1a. Leaves alternate in upper stem, becoming smaller and denser; female perianth tube 2(or 3)-winged 1. *G. pentandra*

1b. Leaves all opposite; female perianth tube 10–12-winged.

2a. Leaf blade narrowly lanceolate, rarely narrowly ovate or elliptic, (1.2–)3–10 × (0.7–)1.2–2.8 cm; male perianth lobes 5; herbs prostrate or suberect 2. *G. hirta*

2b. Leaf blade ovate, elliptic, rarely lanceolate, 0.4–3 × 0.2–0.8 cm; male perianth lobes (3 or)4; herbs ascending 3. *G. parvifolia*

1. *Gonostegia pentandra* (Roxburgh) Miquel, Ann. Mus. Bot. Lugduno-Batavi 4: 302. 1868–1869.

五蕊糯米团 wu rui nuo mi tuan

Urtica pentandra Roxburgh, Fl. Ind., ed. 1832, 3: 583. 1832; *Gonostegia pentandra* var. *akoensis* (Yamamoto) Masamune; *G. pentandra* var. *hypericifolia* (Blume) Masamune; *Memoralis pentandra* (Roxburgh) Weddell; *M. pentandra* var. *hypericifolia* (Blume) Weddell; *Pouzolzia hypericifolia* Blume; *P. pentandra* (Roxburgh) Bennett; *P. pentandra* var. *hypericifolia* (Blume) Masamune.

Herbs prostrate or ascending, often ± pendent at apex, or subshrubs to 50 cm tall, monoecious. Stems 4-angled, strigillose on ridges. Leaves opposite in lower stems, alternate in upper ones, becoming smaller and denser, stipules broadly ovate, ca. 1 mm; subsessile; leaf blade: in lower stem linear-lanceolate or oblong-elliptic, 0.9–5 × 0.5–1(–1.5) cm (in upper stem lanceolate or narrowly ovate, 0.6–4 cm), thinly papery; 3-veined, base rounded or subcordate, apex acuminate or acute. Glomerules bisexual, in upper stems. Male flowers: pedicel 2–3.5 mm; buds 2 mm in diam.; perianth lobes (4 or)5. Female flowers sessile: perianth tube ellipsoid, ca. 2 mm, longitudinally 2(or 3)-winged, apex indistinctly 2(or 3)-toothed. Achene black, ovoid, ca. 1.5 mm.

Moist places; 100–300 m. Guangdong, Guangxi, Hainan, Taiwan, Yunnan [Bangladesh, India, Indonesia, Myanmar, Pakistan, Papua New Guinea, Philippines Thailand, Vietnam].

2. *Gonostegia hirta* (Blume ex Hasskarl) Miquel, Ann. Mus. Bot. Lugduno-Batavi 4: 303. 1868–1869.

糯米团 nuo mi tuan

Pouzolzia hirta Blume ex Hasskarl in Teijsmann & Binnendijk, Cat. Hort. Bot. Bogor. 80. 1844, based on *Urtica hirta* Blume, Bijdr. Fl. Ned. Ind. 495. 1826, not Swartz (1797); *Driessenia sinensis* H. Léveillé; *Memoralis hirta* (Blume ex Hasskarl) Weddell.

Herbs, sometimes subshrubs, often prostrate, 50–100(–160) cm, monoecious or dioecious. Stems 4-angled distally, pubescent. Leaves opposite, stipules broadly ovate, ca. 2.5 mm; petiole 1–4 mm; leaf blade narrowly lanceolate, rarely narrowly ovate or elliptic, (1.2–)3–10 × (0.7–)1.2–2.8 cm, herbaceous or thinly papery, 3(or 5)-veined, adaxial surface sparsely strigillose or subglabrous, abaxial surface sparsely pubescent along veins or subglabrous, base subcordate or rounded, apex acuminate or acute. Glomerules often bisexual or sometimes unisexual, 2–9 mm in diam. Male flowers: pedicel 1–5 mm; buds ca. 2 mm in diam.; perianth lobes 5, oblanceolate, 2–2.5 mm, apex acute. Female flowers sessile; perianth tube ovoid, ca. 1.6 mm, longitudinally 10-winged, apex 2-toothed. Achene white to black, ovoid, ca. 1.4 mm. Fl. May–Jul, fr. Aug–Sep.

Weedy places, thickets by ditches and rice fields; 100–1000 (–2700) m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, S Henan, Jiangsu, Jiangxi, S Shaanxi, Sichuan, Taiwan, SE Xizang, Yunnan [Asia, Australia].

URTICACEAE

The plants are used agriculturally as fodder for pigs and medicinally as treatment for boils and bone dislocations and fractures.

3. *Gonostegia parvifolia* (Wight) Miquel, Ann. Mus. Bot. Lugduno-Batavi 4: 303. 1868–1869.

台湾糯米团 tai wan nuo mi tuan

Pouzolzia parvifolia Wight, Icon. Pl. Ind. Orient. 6: 39, t. 2092, f. 1. 1853; *Gonostegia matsudae* (Yamamoto) Yamamoto & Masamune; *G. neurocarpa* (Yamamoto) Yamamoto & Masamune; *Memorialis matsudae* Yamamoto; *M. neurocarpa* Yamamoto; *M. parvifolia* (Wight) Weddell.

Herbs or subshrubs ascending, ca. 25 cm, monoecious.

Stems hirsute. Leaves all opposite, stipules broadly triangular-ovate, 1–1.5 mm; petiole absent or nearly so; leaf blade ovate, elliptic, or rarely lanceolate, 0.4–3 × 0.2–0.8 cm, herbaceous, 3-veined, often inconspicuous, both surfaces subglabrous or somewhat hirsute, base rounded or truncate, apex obtuse or slightly acute. Glomerules bisexual, 2–9 mm in diam. Male flowers: pedicel 0.5–1 mm; buds ca. 1.2 mm in diam.; perianth lobes (3 or)4, obovate, ca. 1.1 mm, apex acute. Female flowers shortly pedicellate; perianth tube ovoid-ellipsoid, ca. 1.2 mm, always longitudinally 10–12-ribbed. Achene brownish to black, ovoid, ca. 1 mm. Fl. Apr–Jul, fr. Jul–Aug.

Open wet places at roadsides, grassy places in montane forests; 300–1500 m. Taiwan [Philippines, Sri Lanka].

16. *CYPHOLOPHUS* Weddell, Ann. Sci. Nat., Bot., sér. 4, 1: 198. 1854.

瘤冠麻属 liu guan ma shu

Chen Jiarui (陈家瑞 Chen Chia-ju); Ib Friis, C. Melanie Wilmot-Dear

Shrubs or small trees, without stinging hairs. Leaves opposite; stipules deciduous, lateral, free; leaf blade 3-veined, often bullate-rugose adaxially, margin serrate; cystoliths punctiform. Inflorescences axillary, at proximal nodes of older branches, glomerules globose or semiglobose, of unisexual flowers (plants monoecious or dioecious). Male flowers: perianth lobes 4 or 5, valvate; stamens 4 or 5; filaments inflexed in bud; rudimentary ovary obovoid, tomentose around base. Female flowers: perianth connate into a tube, free from ovary, ventricose, 2- or unequally 4-toothed. staminodes absent. Ovary straight; style present; stigma filiform, recurved, long fimbriate on adaxial side, persistent; ovule orthotropous. Achene enclosed by fleshy perianth, compressed.

Between 15 and 30 species: China (Taiwan), Indonesia, C Malaysia, New Guinea, Philippines, Pacific Islands; one species in China.

1. *Cypholophus moluccanus* (Blume) Miquel, Ann. Mus. Bot. Lugduno-Batavi 4: 303. 1868–1869.

瘤冠麻 liu guan ma

Urtica moluccana Blume, Bijdr. Fl. Ned. Ind. 492. 1826.

Shrubs, tall, monoecious. Branches and petioles densely appressed, gray pubescent. Stipules narrowly lanceolate to linear, 1–2 cm; petiole 2–18.5 cm; leaf blade broadly ovate, 10–27 × 6.5–20 cm, thick papery, 3-veined, lateral veins 4–6 pairs, adaxial surface bullate-rugose, sparsely strigose, abaxial surface

densely appressed strigose, base obliquely rounded or slightly cordate, margin serrulate or crenulate, apex acute to acuminate. Glomerules on previous year's or older branches, semiglobose. Male perianth lobes obovate, apex acute. Female perianth tube obovoid, apex 4-toothed. Achene oblong-obovoid, slightly symmetric, ca. 1.5 mm. Fl. Apr–Jun, fr. Jul–Sep.

Thickets, moist places in forests in valleys; below 200 m. Taiwan (Hualian, Lan Yu) [Indonesia, Philippines; Pacific Islands (Hawaii, Micronesia)].

The fibers are frequently used to make ropes and coarse cloth.

17. *SARCOCHLAMYS* Gaudichaud-Beaupré, Voy. Bonite, Bot., Atlas, t. 89. 1844.

肉被麻属 rou bei ma shu

Chen Jiarui (陈家瑞 Chen Chia-ju); Ib Friis, C. Melanie Wilmot-Dear

Spearotylos C. J. Chen.

Shrubs or small trees, evergreen, without stinging hairs. Leaves alternate, spiral; stipules deciduous, intrapetiolar, 2-cleft; leaf blade 3-veined, margin serrulate; cystoliths punctiform. Inflorescences in axillary pairs, cymose panicles, lateral branches usually few and short, unisexual (plants dioecious); glomerules contiguous, forming dense spikes. Male flowers: perianth lobes 5, connate at base, imbricate; stamens 5; filaments inflexed in bud; rudimentary ovary present. Female flowers: perianth lobes 4 or 5, connate at base, submembranous at anthesis, enlarged and fleshy in fruit, unequal, ventral 1(or 2) lobes smaller, ovate to lanceolate, connate with others at base, dorsal 3(or 4) lobes larger, connate to apex, swelling to ventricose tube, staminodes absent. Ovary without style; stigma sessile, ringlike, with villous hairs; ovule orthotropous. Achene somewhat drupaceous, ovoid to obliquely obovoid, covered but not enclosed by fleshy perianth. Seeds with little endosperm; cotyledons ovate.

One species: tropical Asia from E Himalayas through Thailand to Indonesia.

The discovery of the ringlike stigma in the family Urticaceae (C. J. Chen, Acta Phytotax. Sin. 28: 469. 1990) corrects the mistaken description of a penicillate stigma in the protologue of this genus. This interesting character seems useful in explaining the evolution of the family.

1. *Sarcochlamys pulcherrima* Gaudichaud-Beaupré, Voy. Bonite, Bot., Atlas, t. 89. 1844.

肉被麻 rou bei ma

Sphaerotylos medogensis C. J. Chen.

Small tree or shrubs, 2–6 m tall; branchlets and petioles densely appressed pubescent. Stipules triangular-ovate, 8–10 mm; petiole 2–6 cm; leaf blade lanceolate to narrowly lanceolate, 12–22(–29) × 3–6(–9) cm, thinly leathery, basal-lateral veins reaching to apex, secondary veins 3 or 4 pairs, adaxial

surface dark green, subglabrous, abaxial surface grayish tomentose and appressed pubescent on veins, base broadly cuneate or subrounded, margin serrulate, apex acuminate or long acuminate. Cymose panicles 7–9 cm; glomerules 2–4 mm in diam. Male flowers subsessile, ca. 0.8 mm in diam. Female flowers 0.3–0.5 mm. Achene ca. 0.5 mm. Fl. Apr–Jun, fr. Jun–Sep.

Tropical rain forests, open and damp secondary forests on floodplains; 800–1400 m. SE Xizang (Médog), NW Yunnan (Gongshan) [Bhutan, NE India, Indonesia, Myanmar, Sikkim, Thailand].

18. POIKILOSPERMUM Zippelius ex Miquel, Ann. Mus. Bot. Lugduno-Batavi 1: 203. 1864.

锥头麻属 zhui tou ma shu

Chen Jiarui (陈家瑞 Chen Chia-jiu); Ib Friis, C. Melanie Wilmot-Dear

Conocephalus Blume.

Shrubs or tall, woody climbers, without stinging hairs. Leaves alternate, petiolate; stipules often caducous, intrapetiolar, connate, leathery; leaf blade often large, leathery, often prominently pinnately veined, margin entire; cystoliths in circular groups adaxially, along veins abaxially, either punctiform or linear. Inflorescences of solitary, axillary, dichotomously branched cymes, unisexual (plants dioecious); glomerules capitate, on swollen peduncular receptacles (in *P.* subgen. *Ligulistigma*, continental Asia group), in agglomerations, or free (in *P.* subgen. *Poikilospermum*, E Malaysia group). Male flowers: perianth lobes 2–4, free or slightly connate; stamens 2–4, filaments straight (in *P.* subgen. *Ligulistigma*) or inflexed; rudimentary ovary present. Female flowers: perianth lobes 4, clavate-tubular, decussate-imbricate. Ovary enclosed; style short; stigma capitate or ligulate (in *P.* subgen. *Ligulistigma*); ovule orthotropous. Achene oblong, ellipsoid, or ovoid, slightly compressed, either enclosed by persistent perianth (in *P.* subgen. *Ligulistigma*) or exerted from it; pericarp easily separating into 2 valves. Seeds with little or no endosperm; cotyledons ovate.

About 27 species: from Sino-Himalayan region through Malaysia to the Bismarck Archipelago; three species in China.

The systematic position of *Poikilospermum* is controversial. Morphologically, this genus is rather intermediate between the Moraceae and Urticaceae. Berg (1978) separated it and five other genera from Moraceae to establish a new family, Cecropiaceae. However, *Poikilospermum* has been here treated as a member of Urticaceae on the basis that the ovules of all species of the genus are orthotropous and basally fixed, a characteristic of the Urticaceae.

- 1a. Leaf blade pubescent abaxially, base cuneate or rounded; bracts ca. 2 mm; male perianth glabrous 1. *P. lanceolatum*
 1b. Leaf blade glabrous or subglabrous, base rounded to cordate; bracts 6–10 mm; male perianth pubescent.
 2a. Female inflorescences dichotomously branched 5–6 times; glomerules 1.2–1.8 cm in diam. in fruit; achene ca. 2 mm; stipules 1–2 cm, caducous 2. *P. naucleiflorum*
 2b. Female inflorescences dichotomously branched 1 or 2 times; glomerules 3.5–5 cm in diam. in fruit; achene 3–5 mm; stipules 2–4 cm, persistent 3. *P. suaveolens*

1. *Poikilospermum lanceolatum* (Trécul) Merrill, Contr. Arnold Arbor. 8: 50. 1934.

毛叶锥头麻 mao ye zhui tou ma

Conocephalus lanceolatus Trécul, Ann. Sci. Nat., Bot., sér. 3, 8: 88. 1847.

Branchlets brown when dry; stipular and petiolar scars prominent, pubescent, soon glabrous. Stipules caducous, straight, 2–3 cm; petiole 3–10 cm, pubescent; leaf blade lanceolate or elliptic, 12–30 × 6–17 cm, lateral veins 7–13 pairs, glabrous adaxially, densely pubescent or subglabrous abaxially, base cuneate to rounded, apex acute to acuminate. Male inflorescences dichotomously branched 3–6 times, 3–6 × 2–8 cm; bracts ca. 2 mm; glomerules 3–5 mm in diam. Female inflorescences dichotomously branched 2–3 times, 2–3 × 2–4 cm; bracts as males; glomerules ca. 0.7 cm in diam., in fruit 1–1.5 cm in diam. Male flowers sessile, obpyramidal, ca. 2.5 mm; perianth lobes 4, dark red, glabrous; stamens 4; filaments

straight, short. Female flowers shortly pedicellate, ca. 2 mm; stigma shortly ligulate. Achene oblong-ellipsoid, 3–4 mm, verrucose. Fl. Feb–May, fr. May–Jul.

Monsoon forests, wet places near streams; 700–1800 m. SE Xizang (Médog), SW Yunnan [NE India, Myanmar].

2. *Poikilospermum naucleiflorum* (Roxburgh ex Lindley) Chew, Gard. Bull. Singapore 20: 76. 1963.

大序锥头麻 da xu zhui tou ma

Conocephalus naucleiflorus Roxburgh ex Lindley, Bot. Reg. 14: t. 1203 A & B. 1829; *Urtica naucleiflora* Roxburgh.

Branchlets gray-brown when dry; stipular and petiolar scars very prominent, pubescent, soon glabrous. Stipules caducous, straight, 1–2 cm; petiole 6–10 cm, glabrous; leaf blade broadly ovate or elliptic, 10–22 × 7–15 cm, lateral veins 10–13 pairs, both surfaces glabrous, base rounded or cordate, apex obtuse or acute. Male inflorescences dichotomously branched

5–6 times, 4–7 × 4–8 cm; bracts ca. 8 mm; glomerules 4–6 mm in diam. Female inflorescences dichotomously branched 5–6 times, 5–7 × 6–8 cm; bracts as males; glomerules 1–1.3 cm in diam., 1.2–1.8 cm in diam. in fruit. Male flowers sessile, obovoid, 1–2 mm; perianth lobes 4, pubescent; stamens 4; filaments straight, short. Female flowers pedicellate, ca. 2 mm; stigma shortly ligulate. Achene oblong-obovoid, ca. 2 mm, verrucose. Fl. Mar–May, fr. May–Jul.

Monsoon forests, near streams; ca. 1600 m. SE Xizang (Mêdog) [NE India, Myanmar, Thailand].

This species is here newly recorded for China. The name was incorrectly recorded as "*Conocephalus naucleiformis*" in Index Kewensis and this error has been repeated by various authors.

3. *Poikilospermum suaveolens* (Blume) Merrill, Contr. Arnold Arbor. 8: 47. 1934.

锥头麻 zhui tou ma

Conocephalus suaveolens Blume, Bijdr. Fl. Ned. Ind. 484. 1825; *C. sinensis* C. H. Wright; *Poikilospermum sinense* (C. H. Wright) Merrill.

Branchlets gray-brown when dry; stipular and petiolar scars prominent, pubescent, soon glabrous. Stipules often persistent in upper nodes, strongly crescent-shaped, 2–4 cm; petiole 5–10 cm, glabrous; leaf blade broadly ovate, elliptic, or obovate, 10–35 × 7–23 cm, lateral veins 7–14 pairs, both surfaces glabrous, base broad cuneate, rounded, or cordate, apex obtuse or acute. Male inflorescences dichotomously branched 2–3 times, 3.5–6 × 3–7 cm; bracts boat-shaped, 6–10 mm; glomerules 5–7 mm in diam. Female inflorescences dichotomously branched 1 or 2 times, 4–8 × 5–9 cm; primary peduncle longer than secondary; bracts as males; glomerules 2.5–3.5 cm in diam., 3.5–5 cm in diam. in fruit. Male flowers sessile, obovoid, 1.5–2 mm; perianth lobes 4, apex incurved, pubescent; stamens 4; filaments straight, short. Female flowers: pedicel 3–7 mm; stigma shortly ligulate. Achene oblong-obovoid, 3–5 mm, verrucose. Fl. Apr–May, fr. May–Jun.

Moist places, rain forests, monsoon forests, near streams; 500–600 m. S Yunnan [Borneo, India, Indonesia, Malaysia, Philippines, Thailand, Vietnam].

19. PIPTURUS Weddell, Ann. Sci. Nat., Bot., sér. 4, 1: 196. 1854.

落尾木属 luo wei mu shu

Chen Jiarui (陈家瑞 Chen Chia-ju); Ib Friis, C. Melanie Wilmot-Dear

Trees or shrubs evergreen, without stinging hairs. Leaves alternate; stipules early caducous, intrapetiolar, 2-cleft; leaf blade 3–5-veined, often woolly abaxially, margin crenate-serrate; cystoliths punctiform. Inflorescences axillary, glomerules forming spikes or panicles of unisexual flowers (plants dioecious or rarely monoecious); bracts small. Male flowers: perianth lobes 4 or 5, valvate; stamens 4 or 5; filaments inflexed in bud; rudimentary ovary woolly. Female flowers: perianth tube 4- or 5-dentate, thinly fleshy in fruit; staminodes absent. Ovary enclosed, adnate to perianth; style present; stigma filiform, villous on 1 side, deciduous; ovules erect. Achene closely enclosed by slightly enlarged and somewhat fleshy perianth. Seeds with very little endosperm; cotyledons broad.

About 40 species: China (Taiwan), Indonesia, Japan (Ryukyu Islands), Malaysia; N Australia, Madagascar, Mascarene Islands, Pacific Islands (Hawaii, Polynesia); one species in China.

The fibers are used to make ropes.

1. *Pipturus arborescens* (Link) C. B. Robinson, Philipp. J. Sci., C, 6: 13. 1911.

落尾木 luo wei mu

Urtica arborescens Link., Enum. Hort. Berol. Alt. 2: 386. 1822; *Pipturus asper* Weddell; *P. fauriei* Yamamoto.

Shrubs or small trees, dioecious. Branchlets, petioles, stipules, and abaxial surface of leaves all densely white woolly. Stipules ovate to orbicular, ca. 1 cm; petiole 1.5–5 cm; leaf

blade ovate, 6–20 × 4–11 cm, 3-veined, secondary veins 3 or 4 pairs, fairly prominent abaxially, velutinous along veins adaxially, base rounded or cuneate, margin serrulate, apex acuminate or shortly caudate. Glomerules globular; bracts and bracteoles ovate, 1–2 mm. Male flowers ovate, puberulent. Female perianth tube ovoid, ca. 1 mm, somewhat swollen on one side of base. Fl. Apr–Jun.

Sunny thickets in secondary forests, low hills; 200–500 m. Taiwan (Hualian, Lan Yu) [Japan (Ryukyu Islands), Philippines].

20. OREOCNIDE Miquel, Pl. Jungh. 1: 39. 1851.

紫麻属 zi ma shu

Chen Jiarui (陈家瑞 Chen Chia-ju); Ib Friis, C. Melanie Wilmot-Dear

Villebrunea Gaudichaud-Beaupré.

Shrubs or trees, evergreen, without stinging hairs. Leaves alternate; stipules caducous, lateral, free; leaf blade pinnately veined or 3-veined, margin serrate, denticulate, or entire; cystoliths punctiform. Inflorescences axillary, small, pedunculate, densely capitate clusters of unisexual flowers (plants dioecious); solitary glomerules or pairs of dichotomously branched cymes; bracts small. Male flowers: perianth lobes 3 or 4, valvate; stamens 3 or 4; filaments inflexed in bud; rudimentary ovary obovate-clavate, woolly. Female flowers: perianth tube adnate to ovary, mouth contracted, apex 3- or 4-toothed; staminodes absent; stigma sessile, discoid or peltate,

URTICACEAE

long ciliate hairs along margin; ovule orthotropous. Achene drupaceous, straight, adnate to thinly fleshy perianth, enclosed as base or almost wholly by discoid or cuplike fleshy receptacle. Seeds with endosperm; cotyledons ovate or broad.

About 18 species: tropical and subtropical E Asia and New Guinea; ten species (one endemic) in China.

The fibers are used to make ropes, nets, and coarse cloth.

- 1a. Leaves pinnately veined; male perianth lobes 4.
 - 2a. Leaf margin denticulate or serrulate from basal 1/3 1. *O. rubescens*
 - 2b. Leaf margin entire 2. *O. integrifolia*
- 1b. Leaves 3-veined; male perianth lobes 3.
 - 3a. Leaf margin entire or nearly so.
 - 4a. Leaf margin entire, blade broadly ovate or oblong-ovate, 4–11 cm wide, pubescent abaxially 8. *O. trinervis*
 - 4b. Leaf margin entire or sparsely crenate-serrulate distally, blade narrowly elliptic or elliptic-lanceolate, 1–4 cm wide, glabrous on both surfaces 9. *O. kwangsiensis*
 - 3b. Leaf margin serrate.
 - 5a. Inflorescences almost sessile or pedunculate; achene often verrucose 10. *O. frutescens*
 - 5b. Inflorescences, at least female ones, pedunculate; achene smooth.
 - 6a. Leaves cuspidate or shortly caudate at apex, yellow-green to dark green, mostly somewhat tomentose abaxially, margin often coarsely serrate.
 - 7a. Leaves elliptic, ovate, or obovate; stipules 1–2 cm 3. *O. tonkinensis*
 - 7b. Leaves obovate to oblanceolate; stipules 0.7–1 cm 4. *O. obovata*
 - 6b. Leaves acuminate or caudate-acuminate at apex, green, pubescent or glabrous abaxially, margin serrulate or crenulate.
 - 8a. Branchlets and petioles villous; secondary veins 5–7 pairs 5. *O. serrulata*
 - 8b. Branchlets and petioles appressed puberulent, then glabrescent; secondary veins 2 or 3 pairs.
 - 9a. Leaves membranous, crenulate; female inflorescences 0.4–0.6 cm 6. *O. boniana*
 - 9b. Leaves herbaceous, serrulate; female inflorescences 0.7–1.2 cm 7. *O. pedunculata*

1. Oreocnide rubescens (Blume) Miquel in Zollinger, Syst. Verz. 101. 1854.

红紫麻 hong zi ma

Urtica rubescens Blume, Bijdr. Fl. Ned. Ind. 506. 1826; *U. sylvatica* Blume; *Villebrunea integrifolia* Gaudichaud-Beaupré var. *sylvatica* J. D. Hooker; *V. rubescens* (Blume) Blume; *V. sylvatica* (Blume) Blume.

Small trees or shrubs 2–12 m tall; bark grayish brown or gray; branchlets brown or purplish, hirsute. Stipules linear-lanceolate, 0.6–1.3 cm; petiole 1–5 cm, sparsely hirsute; leaf blade oblong or oblanceolate, 7–25 × 3–8 cm, papery, pinnately veined, secondary veins 6–9 pairs, abaxial surface sparsely hirsute on veins, adaxial surface glabrous, base rounded or broadly cuneate, margin denticulate or serrulate from basal 1/3, apex acuminate or caudate-acuminate. Inflorescences in axils of fallen leaves or on older branches, pedunculate, branched dichotomously 2 or 3 times, 1–2 cm; glomerules 3–4 mm in diam. Male flowers: perianth lobes 4, oblong, connate 1/2 of length, ca. 1.2 mm; rudimentary ovary subclavate. Female flowers ca. 1 mm. Achene conic, ca. 1.2 mm, surrounded by a fleshy discoid cupule at base. Fl. Mar–May, fr. Jul–Dec.

Mixed forests, forest margins in valleys; 400–1600 m. W Guangxi, Hainan, S Yunnan [S India, Indonesia, Malaysia, Myanmar, Sri Lanka, Thailand, Vietnam].

2. Oreocnide integrifolia (Gaudichaud-Beaupré) Miquel, Ann. Mus. Bot. Lugduno-Batavi 4: 306. 1869.

全缘叶紫麻 quan yuan ye zi ma

Villebrunea integrifolia Gaudichaud-Beaupré, Voy.

Bonite, Bot., Atlas, t. 91. 1844; *Oreocnide integrifolia* subsp. *subglabra* C. J. Chen; *Villebrunea sylvatica* Blume var. *integrifolia* Weddell.

Small trees or shrubs 5–20 m tall; bark grayish brown or brown gray; branchlets reddish brown; branchlets and petioles grayish brown velutinous, then glabrescent, or sparsely appressed pubescent. Stipules linear, 1–2 cm; petiole 1–9 cm; leaf blade adaxially green, then light green, becoming grayish green when dry, elliptic, oblong, oblong-lanceolate, or oblanceolate, 8–33 × 3.5–12 cm, papery, 3-veined, basal pair reaching middle margin, secondary veins 8–12 pairs, reticulate, abaxial surface densely villous or sparsely pubescent on veins, or sometimes tomentose, adaxial surface glabrous, base rounded or obtuse, margin denticulate to middle, entire apically, apex caudate to long caudate-acuminate. Inflorescences in axils of fallen leaves or on older branches, dichotomously branched 2 or 3 times, 1.5–2.5 cm; glomerules 4–5 mm in diam. Male flowers: perianth lobes 4, oblong, connate 1/2 of length, ca. 1.2 mm; rudimentary ovary subclavate. Female flowers ca. 1 mm. Achene conic, ca. 1.5 mm, 3- or 4-ribbed, surrounded by a fleshy discoid cupule at base. Fl. Mar–May, fr. Jul–Sep.

Rain forests, valleys; 200–1400 m. W Guangxi, Hainan, SE Xizang, W Yunnan [Bhutan, N India, Indonesia, Laos, Myanmar, Sikkim, Thailand, Vietnam].

3. Oreocnide tonkinensis (Gagnepain) Merrill & Chun, Sunyatsenia 5: 44. 1940.

宽叶紫麻 kuan ye zi ma

Villebrunea tonkinensis Gagnepain, Notul. Syst. (Paris) 4: 131. 1928; *Oreocnide villosa* Metcalfe.

Shrubs, 1–4 m tall; branchlets purplish brown; branchlets, petioles, and abaxial leaf veins densely villous or pubescent, then glabrescent. Stipules linear, 1–2 cm; petiole 1–7 cm; leaf blade abaxially light green or yellow-green, adaxially dark green, rugose, broadly elliptic, ovate, or obovate, 7–19 × 4–9 cm, papery, 3-veined, basal-lateral pair reaching apex, anastomosing with basal pair of secondary veins, secondary veins 2–4 pairs, anastomosing by margin, base rounded or obtuse, margin entire for proximal 1/3, or coarsely serrulate distally, apex caudate or acuminate. Inflorescences in axils of current and older branches, pedunculate, branched dichotomously 2 or 3 times, 1–1.5 cm; glomerules 3–4 mm in diam. Male flowers: perianth lobes 3, ovate, connate 1/2 of length, ca. 1.2 mm; rudimentary ovary subclavate. Female flowers ca. 1 mm. Achene ovoid, ca. 2 mm, smooth, surrounded by a fleshy discoid cupule at base. Fl. Oct–Dec, fr. Apr–Jul.

Thickets, margins of mixed forests; 100–1400 m. SW Guangxi, SE Yunnan [N Vietnam].

This species has a variable leaf indumentum, and maintaining either infraspecific taxa or *Oreocnide villosa* does not seem warranted.

4. *Oreocnide obovata* (C. H. Wright) Merrill, Sunyatsenia 3: 250. 1937.

倒卵叶紫麻 dao luan ye zi ma

Shrubs, rarely climbers, 1.5–3 m tall; branchlets and petioles gray-brown, strigose or pubescent. Stipules linear, 0.7–1 cm; petiole 1–8 cm; leaf blade obovate to oblanceolate, 5–17 × 3.5–8 cm, papery, 3-veined, basal-lateral pair reaching apex, anastomosing with basal pair of secondary veins, secondary veins 2 or 3 (or 4) pairs, adaxially dark green, often rugose, abaxially light green, pubescent, or gray-white tomentose, strigose on veins, base rounded or obtuse, rarely broadly cuneate or subcordate, margin entire in basal 1/3, coarsely serrate apically, apex cuspidate, mucronate, caudate, or rarely emarginate with a mucro. Inflorescences in axils of current and older branches, 2 or 3 times dichotomously branched, 0.8–1.5 cm; glomerules 3–4 mm in diam. Male flowers: perianth lobes (2 or)3, ca. 0.7 mm; rudimentary ovary clavate. Female flowers ca. 1 mm. Achene ovoid, 1–1.2 mm, smooth, surrounded by a white-fleshy discoid cupule at base. Fl. Dec–Feb, fr. May–Aug.

Mixed forests, thickets, near streams, often on limestone; 200–1400 m. W Guangdong, SW Guangxi, S Hunan, SE Yunnan [N Vietnam].

- 1a. Leaf blade obovate to oblanceolate, apex cuspidate, caudate, or rarely mucronate, proximal pair of secondary veins arising from proximal 1/3 of midvein 4a. var. *obovata*
 1b. Leaf blade obtriangular to obovate, apex emarginate-mucronate, proximal pair of secondary veins arising from distal 1/3 of midvein 4b. var. *paradoxa*

4a. *Oreocnide obovata* var. *obovata*

倒卵叶紫麻(原变种) dao luan ye zi ma (yuan bian zhong)

Debregeasia obovata C. H. Wright, J. Linn. Soc., Bot. 26:

492. 1899; *Oreocnide obovata* var. *mucronata* C. J. Chen; *O. tonkinensis* (Gagnepain) Merrill & Chun var. *discolor* Gagnepain; *Villebrunea petelotii* Gagnepain.

Leaf blade obovate to oblanceolate, proximal pair of secondary veins arising from proximal 1/3 of midvein, apex cuspidate, caudate, or rarely mucronate.

Mixed forests, thickets, near streams, often on limestone; 200–1400 m. W Guangdong, SW Guangxi, S Hunan, SE Yunnan [N Vietnam].

4b. *Oreocnide obovata* var. *paradoxa* (Gagnepain) C. J. Chen in W. T. Wang & C. J. Chen, Fl. Reipubl. Popularis Sin. 23(2): 384. 1995.

凹尖紫麻 ao jian zi ma

Villebrunea paradoxa Gagnepain, Notul. Syst. (Paris) 4: 130. 1928.

Leaf blade obtriangular to obovate, proximal pair of secondary veins arising from distal 1/3 of midvein, apex emarginate-mucronate.

Thickets by streams in limestone mountains; 400–1100 m. SW Guangxi [N Vietnam].

5. *Oreocnide serrulata* C. J. Chen, Acta Phytotax. Sin. 21: 474. 1983.

细齿紫麻 xi chi zi ma

Shrubs 3–5 m tall; branchlets and petioles gray-brown, rusty villous. Stipules lanceolate, ca. 1 cm; petiole 1–7 cm; leaf blade abaxially light green or brown, adaxially dark green, becoming dark brown when dry, lanceolate, narrowly ovate, or oblong-lanceolate, 6–23 × 2.5–8 cm, papery, 3-veined, basal-lateral pair reaching apex, anastomosing with proximal pair of secondary veins, secondary veins 5–7 pairs, proximal pair arising from basal 1/4–1/3, abaxial surface rusty velutinous, veins raised, adaxial surface rugose, subglabrous, base rounded, margin finely serrulate, apex long-acuminate or caudate-acuminate. Inflorescences in axils of current and older branches, dichotomously branched 2 or 3 times, 1–2 cm; glomerules 3–4 mm in diam. Male flowers pedicellate, perianth lobes (2 or)3, ca. 0.7 mm; rudimentary ovary clavate. Female flowers ca. 1 mm. Achene ovoid, almost not compressed, ca. 1.5 mm, smooth, almost completely surrounded by a thickly fleshy cupule. Fl. Feb–May, fr. Jun–Nov.

Forests on limestone, thickets; 900–1800 m. SW Guangxi, SE Yunnan [N Vietnam].

6. *Oreocnide boniana* (Gagnepain) Handel-Mazzetti, Sinensia 2: 3. 1931.

膜叶紫麻 mo ye zi ma

Villebrunea boniana Gagnepain, Notul. Syst. (Paris) 4: 129. 1928.

Shrubs ca. 2 m tall; branchlets and petioles dark brown, sparsely appressed pubescent, then glabrescent. Stipules lanceolate, 0.5–0.7 cm; petiole 0.5–1 cm; leaf blade abaxially light green, adaxially dark green, lanceolate, 3–8 × 1–2 cm, membra-

nous, 3-veined, basal-lateral pair reaching middle, anastomosing with proximal pair of secondary veins, secondary veins 2 or 3 pairs, abaxial surface pubescent on veins, adaxial surface subglabrous, base rounded or subcordate, margin entire basally, regularly crenulate apically, apex acuminate or long acuminate. Inflorescences in axils of fallen leaves and older branches, dichotomously branched 1 or 2 times, 0.4–0.6 cm; glomerules 2–3 mm in diam. Male flowers: perianth lobes 3, ca. 0.7 mm; rudimentary ovary clavate. Female flowers ca. 1 mm. Achene ovoid, compressed, ca. 1.5 mm, smooth, surrounded by a fleshy discoid cupule at base. Fl. Mar–May, fr. Jun–Sep.

Shady places in forests on limestone, thickets, valleys; 100–300 m. SE Yunnan [N Vietnam].

7. *Oreocnide pedunculata* (Shirai) Masamune, Prelim. Rep. Veg. Yakusima: 69. 1929.

长梗紫麻 *chang geng zi ma*

Villebrunea pedunculata Shirai, Bot. Mag. (Tokyo) 9: 160. 1895.

Shrubs or small trees 2–5 m tall; bark dark brown; branchlets slender, branchlets, and petioles densely appressed pubescent, then glabrescent. Stipules lanceolate, 0.6–1 cm; petiole 1–4 cm; leaf blade abaxially light green, adaxially dark green, narrowly ovate or lanceolate, 5–15 × 1.2–4.5 cm, herbaceous or thinly papery, 3-veined, basal-lateral pair reaching apex, anastomosing with basal pair of secondary veins, secondary veins 2 or 3 pairs, abaxial surface strigillose on prominent veins, adaxial surface sparsely strigillose, then glabrescent, base rounded, obtuse, or rarely broadly cuneate, margin serrulate, apex acuminate to long caudate-acuminate. Inflorescences in axils of last year's and older branches; female ones dichotomously branched 1 or 2 times, 0.7–1.2 cm; glomerules 2–3 mm in diam. Male flowers: perianth lobes 3, ca. 0.7 mm; rudimentary ovary clavate. Female flowers ca. 1 mm. Achene ovoid, compressed, ca. 1.5 mm, smooth, surrounded by a fleshy discoid cupule at base. Fl. Mar–May, fr. Jun–Oct.

Forest margins, valleys; 100–1200 m. Taiwan [Japan (Ryukyu Islands)].

8. *Oreocnide trinervis* (Weddell) Miquel, Fl. Ned. Ind. 1(1): 196. 1855.

三脉紫麻 *san mai zi ma*

Villebrunea trinervis Weddell, Ann. Sci. Nat., Bot., sér. 4, 1: 195. 1854.

Small trees ca. 4 m tall; branchlets sparsely pubescent. Stipules lanceolate, ca. 0.6 cm; petiole 1.5–12 cm, subglabrous; leaf blade broadly ovate to oblong, 9–20 × 4–11 cm, herbaceous, 3-veined, basal-lateral pair reaching apex, anastomosing with basal pair of secondary veins, secondary veins 2–3 pairs, sparsely pubescent abaxially, base obtuse or broadly cuneate, margin entire, apex long caudate-acuminate, 1–3 cm. Inflorescences in axils of fallen leaves and older branches; female ones dichotomously branched 1 or 2 times, 1.2–3.2 cm; glomerules ca. 3 mm in diam. Male flowers: perianth lobes 3. Female flowers ca. 1 mm. Achene ovoid, compressed, ca. 1.5 mm, surrounded by a fleshy discoid cupule at base. Fl. May.

Tropical rain forests, valleys at low elevations. Taiwan (Lan Yu) [Indonesia, Philippines].

9. *Oreocnide kwangsiensis* Handel-Mazzetti, Sinensia 2: 2. 1931.

广西紫麻 *guang xi zi ma*

Shrubs, 1–3 m tall; branchlets black, zigzagged; branchlets and petioles minutely strigillose. Stipules lanceolate, 0.3–0.4 cm; petiole 0.5–2 cm; leaf blade abaxially green or light blue green, adaxially dark or blue green, narrowly elliptic or elliptic-lanceolate, 2–11 × 1–4 cm, stiffly papery, 3-veined, basal-lateral pair reaching apex, secondary veins 2–3 pairs, indistinct, both surfaces glabrous, base broadly cuneate or subrounded, margin entire or sparsely and inconspicuously crenate-serrulate distally, apex acuminate or caudate-acuminate. Inflorescences in axils of both new and older branches, often dichotomously branched 3 times, 0.5–0.8 cm; glomerules 3–4 mm in diam. Male flowers: perianth lobes 3, ca. 1 mm; rudimentary ovary clavate. Female flowers ca. 1.5 mm. Achene black, ovoid, compressed, 1.5–2 mm, apex truncate, surrounded by a fleshy cupule to middle. Fl. Oct–Mar, fr. May–Oct.

• Thickets, mountains on limestone; ca. 800 m. NW Guangxi, S Guizhou.

10. *Oreocnide frutescens* (Thunberg) Miquel, Ann. Mus. Bot. Lugduno-Batavi 3: 131. 1867.

紫麻 *zi ma*

Shrubs or small trees, 1–3 m tall; branchlets and petioles purplish brown, strigose or pubescent, rarely tomentose, then often glabrescent. Stipules linear-lanceolate, ca. 1 cm; petiole 1–7 cm; leaf blade ovate, narrowly ovate, or obovate, rarely oblanceolate, 3–15 × 1.5–6 cm, herbaceous, sometimes papery, 3-veined, basal-lateral pair reaching apex, anastomosing with basal pair of secondary veins, secondary veins 2–3 pairs, anastomosing by margin, adaxially dark green, sparsely strigillose, sometimes subglabrous, abaxially often gray-white tomentose, or light green, pubescent or strigillose on veins, base rounded or cuneate, margin serrate or dentate from base or sometimes middle, apex acuminate or caudate-acuminate. Inflorescences produced with or before new leaf flush in axils of fallen leaves and older branches, almost sessile clusters or pedunculate dichotomously branched cymes; glomerules 3–5 mm in diam. Male flowers: perianth lobes 3, ovate, connate at base, ca. 1.2 mm; rudimentary ovary subclavate, ca. 0.6 mm. Female flowers ca. 1 mm. Achene ovoid, ca. 1.2 mm, often verrucose, surrounded by a fleshy discoid cupule at base. Fl. Feb–Apr, fr. Jun–Oct.

Forests, margins of mixed forests, open thickets, valleys, roadsides; 300–2500 m. S Anhui, Fujian, SE Gansu, Guangdong, Guangxi, Hubei, Hunan, Jiangxi, S Shaanxi, Sichuan, SE Xizang, Yunnan, Zhejiang [Bhutan, Cambodia, N India, Japan, Laos, Malaysia, Myanmar, Sikkim, Thailand, Vietnam].

The stem fibers are used to make ropes.

- 1a. Female inflorescences sessile; leaf blade often gray-white tomentose abaxially; flowering before or with new leaf flush 10a. subsp. *frutescens*

- 1b. Female inflorescences distinctly pedunculate; leaf blade sparsely pubescent or strigillose abaxially; flowering after leaves have expanded.
- 2a. Leaf blade narrowly obovate to elliptic-oblongate, margin 13–21-serrate distally; peduncle 5–13 mm 10b. subsp. *insignis*
- 2b. Leaf blade ovate, margin 22–27-serrate from base; peduncle 3–8 mm 10c. subsp. *occidentalis*

10a. Oreocnide frutescens subsp. frutescens

紫麻(原亚种) zi ma (yuan ya zhong)

Urtica frutescens Thunberg in Murray, Syst. Veg., ed. 14, 851. 1784; *Boehmeria frutescens* (Thunberg) Thunberg; *B. fruticosa* Gaudichaud-Beaupré; *Morocarpus microcephalus* Benthams; *Oreocnide fruticosa* (Gaudichaud-Beaupré) Handel-Mazzetti; *Villebrunea frutescens* (Thunberg) Blume; *V. frutescens* var. *hirsuta* Pampanini; *V. fruticosa* (Gaudichaud-Beaupré) Nakai; *V. microcephala* (Benthams) Nakai.

Shrubs. Leaf blade ovate to narrowly obovate, sparsely strigillose adaxially, often gray-white tomentose abaxially. Female inflorescences sessile. Fl. Feb–Apr, fr. Jun–Oct.

Margins of mixed forests, open thickets, roadsides; 300–1500 m. S Anhui, Fujian, SE Gansu, Guangdong, Guangxi, Hubei, Hunan, Jiangxi, S Shaanxi, Sichuan, SE Yunnan [Cambodia, Japan, Laos, Malaysia, Myanmar, Thailand, Vietnam].

10b. Oreocnide frutescens subsp. insignis C. J. Chen, Acta Phytotax. Sin. 21: 475. 1983.

细梗紫麻 xi geng zi ma

Shrubs. Leaf blade abaxially light green, narrowly obovate to elliptic-oblongate, abaxial surface sparsely pubescent, adaxial surface glabrous, margin 13–21-serrate distally. Female peduncle 5–13 mm. Fl. Apr–Jun, fr. Jul–Aug.

• Forests, valleys; 500–1000 m. W Guangdong, S Guangxi.

10c. Oreocnide frutescens subsp. occidentalis C. J. Chen, Acta Phytotax. Sin. 21: 475. 1983.

滇藏紫麻 dian zang zi ma

Small tree 3–8 m tall. Leaf blade light green abaxially, ovate, abaxial surface strigillose, adaxial surface sparsely strigillose, margin 22–27-serrate from base. Female peduncle 3–8 mm. Fl. Apr–May, fr. Jul–Nov.

Along streams in forests; (800–)1400–2500 m. SE Xizang, Yunnan [Bhutan, N India, Sikkim].

21. DEBREGEASIA Gaudichaud-Beaupré, Voy. Bonite, Bot., Atlas, t. 90. 1844.

水麻属 shui ma shu

Chen Jiarui (陈家瑞 Chen Chia-jui); Ib Friis, C. Melanie Wilmot-Deard

Leucocnides Miquel; *Missiessya* Weddell; *Morocarpus* Siebold & Zuccarini (1846), not Boehmer (1760).

Shrubs or small trees, without stinging hairs. Leaves alternate, petiolate; stipules deciduous, intrapetiolar, connate, membranous, 2-cleft; leaf blade thinly papery or papery, 3-veined, often snow white or silvery tomentose abaxially, margin serrulate; cystoliths punctiform. Inflorescences axillary, densely capitate clusters of unisexual flowers (plants monoecious or dioecious); glomerules solitary or pairs of dichotomously branched cymes. Male flowers: perianth lobes (3 or)4(or 5), slightly connate, valvate, often depressed-globose in bud, stamens (3 or)4(or 5); filaments inflexed in bud; rudimentary ovary obovoid, woolly at base. Female flowers: perianth tube obovoid or jug-shaped, mouth contracted, very minutely 3- or 4-toothed, in fruit often enlarged, fleshy, and adnate to ovary, rarely membranous and free; staminodes absent; style short; stigma penicillate, with tuft of long hairs; ovule orthotropous. Achenes somewhat drupaceous, obovoid, slightly compressed, closely enclosed by often fleshy, adnate perianth. Seeds with endosperm; cotyledons small, broad.

About six species: mainly in tropics and subtropics of E Asia, one species in N Africa and one in E Australia; all six species in China.

The stem fibers are used to make ropes and fishing nets, and the fruits are edible and used to make wine.

- 1a. Leaves broadly ovate, elliptic, or cordate; fruit enclosed by membranous perianth.
- 2a. Leaves usually elliptic; branches without leaf scars, spreading hirtellous 1. *D. elliptica*
- 2b. Leaves broadly ovate or cordate; branches with leaf scars, appressed pubescent.
- 3a. Branches with fleshy, scale-like protuberances or warts; inflorescences to 3 cm; leaf margin denticulate, secondary veins in 3–5 pairs 2. *D. squamata*
- 3b. Branches without protuberances or warts; inflorescences often more than 5 cm; leaf margin sinuate-dentate, secondary veins in 5–8 pairs 3. *D. wallichiana*
- 1b. Leaves lanceolate, sometimes narrowly ovate or oblong; fruit enclosed by succulent perianth.
- 4a. Branches spreading pubescent; at least some inflorescences on current year's branches; flowering August to December 4. *D. longifolia*
- 4b. Branches usually appressed pubescent; all inflorescences on branches of previous seasons; flowering February to April.
- 5a. Leaves densely snow white tomentose abaxially, faintly fine veined; inflorescences often sessile 6. *D. saeneb*
- 5b. Leaves gray tomentose abaxially, distinctly fine veined; inflorescences usually pedunculate 5. *D. orientalis*

1. *Debregeasia elliptica* C. J. Chen, Acta Phytotax. Sin. 21: 477. 1983.

椭圆叶水麻 tuo yuan ye shui ma

Shrubs or small trees, 2–4 m tall; trunk to 12 cm d.b.h. Branchlets gray-green, turning brown, without leaf scars; branchlets and petioles densely, spreading hirtellous. Stipules narrowly ovate, 7–8 mm, 2-cleft to middle; petiole 4–7(–13.5) cm; leaf blade adaxially dark green, elliptic, 7–17 × 4.5–8 cm, thinly papery, 3-veined, lateral ones arcuate, reaching to distal 1/4, anastomosing with secondary veins 3 or 4 on each side distally, abaxial surface snow white tomentose, sparsely appressed strigose on veins, adaxial surface sparsely appressed strigose or subglabrous, sometimes rugose, base broadly cuneate or rounded, margin finely denticulate, apex acuminate or shortly acuminate. Female cymes borne on current and previous years' branches, 2–4-dichotomously branched, 1.5–3 × 1.5–3.5 cm; peduncle 1–2.5 cm, spreading hirtellous; glomerules globose, 2.5–3 mm in diam.; bracts narrowly ovate to lanceolate, 0.5–0.7 mm, membranous, densely pubescent abaxially. Female flowers sessile, obovoid, ca. 0.7 mm; perianth tube membranous, 3-ribbed, 3-denticulate at apex. Achene ca. 1 mm, enclosed by membranous perianth but not adnate to it. Fl. Aug–Sep, fr. Oct–Dec.

Mixed forests in limestone mountains; 100–1900 m. SW Guangxi, SE Yunnan [N Vietnam].

2. *Debregeasia squamata* King ex J. D. Hooker, Fl. Brit. India 5: 591. 1888.

鳞片水麻 lin pian shui ma

Debregeasia spiculifera Merrill.

Shrubs, 1–2 m tall, monoecious. Branches stout, leaf scars conspicuous; branchlets greenish, aging brown, branchlets and branches with fleshy, spreading scale-like protuberances or warts and mixed appressed hairs; protuberances fleshy, ± recurved, 2–5 mm, hairs of branchlets and stipules reddish brown, appressed. Stipules lanceolate, 7–8 mm, 2-cleft in distal 1/3; petiole 2.5–7(–14) cm; leaf blade abaxially greenish gray, adaxially dark green, ovate or cordate, 6–16(–22) × 4–12(–18) cm, thinly papery, 3-veined, lateral ones arcuate, reaching to distal 1/4, anastomosing with lowest of secondary veins 3–5 on each side distally, abaxial surface thinly tomentose, adaxial surface sparsely appressed strigose, sometimes rugose, sparsely appressed pubescent on veins, base rounded or cordate, margin denticulate, apex shortly acuminate. Inflorescences borne on current and previous years' branches, 2–3-dichotomously branched, 1–3 cm; peduncle ca. 0.5 cm, spreading hirtellous; glomerules globose, 3–4 mm in diam.; bracts triangular-lanceolate, 0.6–1 mm, membranous, densely pubescent abaxially. Male flowers shortly pedicellate, globose in bud, ca. 1.2 mm in diam.; perianth lobes 3(or 4), broadly ovate, puberulent abaxially, connate at middle, acute; rudimentary ovary stipitate, obovoid, ca. 0.6 mm. Female flowers sessile, obovoid, ca. 0.6 mm; perianth tube membranous, 4-ribbed, 4-denticulate at apex. Achene ca. 1 mm, enclosed by membranous perianth but not adnate to it. Fl. Aug–Oct, fr. Oct–Dec(–Jan).

Thickets, valleys, shady, wet places; 100–1500 m. SW Fujian,

Guangxi, Guangdong, S Guizhou, Hainan, S Yunnan [Malaysia, Thailand, Vietnam; N Borneo].

3. *Debregeasia wallichiana* (Weddell) Weddell, Monogr. Urtic. 464. 1857.

长序水麻 chang xu shui ma

Missiessya wallichiana Weddell, Ann. Sci. Nat., Bot., sér. 4: 195. 1854; *Debregeasia ceylanica* J. D. Hooker; *D. leucophylla* Weddell; *Morocarpus ceylanicus* (J. D. Hooker) Kuntze; *M. wallichianus* (Weddell) Blume.

Shrubs or small trees to 6 m tall, monoecious; trunk to 8 cm d.b.h.; bark brown. Branchlets stout, leaf scars conspicuous, 3–4 mm, smooth; branchlets and petioles appressed pubescent. Leaves crowded at apex of branchlets; stipules large, oblong-lanceolate, 12–20 × 2.5–5 mm, 2-cleft at apex; petiole 3–15 cm; leaf blade adaxially dark green, broadly ovate to orbicular, 7–18 × 6–16 cm, thinly papery, 3-veined, lateral ones straight, reaching to middle, anastomosing with lowest of secondary veins 5–8 on each side from middle of leaf, abaxial surface thinly white tomentose, sparsely appressed pubescent on veins, adaxial surface subglabrous or sparsely appressed strigose, sometimes rugose, base broadly cuneate, rounded or cordate, margin sinuate-dentate, apex shortly caudate or shortly acuminate. Inflorescences borne on current and previous years' branches, 3–7-dichotomously branched, 3.5–7.5 × 3–6.5 cm; peduncle 2.5–6.5 cm, spreading hirtellous; glomerules globose, 3–5 mm in diam.; bracts membranous, of male ones narrowly obovate to oblong-lanceolate, 0.5–0.8 mm, of female ones subcordate, 1–1.3 mm, densely pubescent abaxially. Male flowers shortly pedicellate, obovoid in bud 1 mm in diam.; perianth lobes 5, broadly ovate, glabrous abaxially, connate at the middle, apex acute; rudimentary ovary stipitate, obovoid, ca. 0.6 mm. Female flowers sessile, obovoid, ca. 0.7–0.8 mm; perianth tube membranous, 4-ribbed, 4-denticulate at apex. Achene ca. 1.3–1.5 mm, enclosed by membranous perianth but not adnate to it. Fl. May–Aug, fr. Jul–Sep.

Subtropical forests, slopes of limestone mountains; ca. 800 m. S Yunnan (Mengla) [E Bangladesh, Bhutan, Cambodia, India, N Myanmar, Nepal, Sikkim, Sri Lanka, Thailand].

4. *Debregeasia longifolia* (N. L. Burman) Weddell in Candolle, Prodr. 16(1): 235. 1869.

长叶水麻 chang ye shui ma

Urtica longifolia N. L. Burman, Fl. Indica, 197 [“297”]. 1768; *Conocephalus niveus* Wight; *Debregeasia dichotoma* (Blume) Weddell; *D. libera* Chien & C. J. Chen; *D. velutina* Gaudichaud-Beaupré; *Morocarpus dichotomus* (Blume) Blume; *M. longifolius* (N. L. Burman) Blume; *M. velutinus* Blume; *Urtica angustata* Blume; *U. dichotoma* Blume.

Shrubs or small trees 3–6 m tall, dioecious or monoecious. Branchlets slender, reddish or purplish brown; branchlets and petiole densely spreading hirtellous. Stipules oblong-lanceolate, 6–10 mm, 2-cleft in distal 1/3; petiole 1–4 cm; leaf blade adaxially dark green, oblong- or obovate-lanceolate, sometimes linear or narrowly ovate, 7–18(–23) × 1.5–5(–6.5) cm, papery, sometimes thinly so, 3-veined, lateral ones straight, reaching to

middle, secondary veins 5–8(–10) on each side from basal 1/3, anastomosing at margin, abaxial surface thinly greenish gray or gray-white tomentose, densely hirtellous on veins, adaxial surface sparsely appressed strigose, sometimes rugose, base rounded or subcordate, rarely broadly cuneate, margin finely serrulate or denticulate throughout, apex acuminate. Inflorescences borne on current and previous years' branches, 2–4-dichotomously branched, 1–2.5 cm; peduncle 0.3–3 cm, spreading hirtellous; glomerules globose, 3–4 mm in diam.; bracts triangular-ovate, ca. 1 mm, membranous. Male flowers shortly pedicellate, obovoid in bud, 1.2–1.5 mm in diam.; perianth lobes 4, broadly ovate, puberulent abaxially, connate at middle, apex acute; rudimentary ovary sessile, obovoid, ca. 0.5 mm. Female flowers sessile, obovoid, ca. 0.8 mm; perianth tube membranous, 4-denticulate at apex. Achene reddish or orange, ca. 1–1.5 mm, enclosed by fleshy perianth and adnate to it. Fl. Aug–Dec, fr. Sep–Feb.

Shady, moist places by streams, forests in mountain valleys; 500–3200 m. W Hubei, SE Gangsu, W Guangdong, Guangxi, Guizhou, S Shaanxi, Sichuan, S Xizang, Yunnan [E Bangladesh, Bhutan, Cambodia, India, Indonesia, Laos, Malaysia, N Myanmar, Nepal, Philippines, Sikkim, Sri Lanka, Thailand, Vietnam].

This species is very common in SW China; its morphology is variable, especially in leaf shape and petiole length. The plant fibers are of high quality.

5. *Debregeasia orientalis* C. J. Chen, *Novon* 1: 56. 1991.

水麻 shui ma

Shrubs 1–4 m tall, often dioecious, rarely monoecious. Branchlets slender, branchlets and petioles dark reddish, often appressed pubescent or subglabrous. Stipules oblong-lanceolate, 6–8 mm, 2-cleft at apex; petiole 0.3–1 cm; leaf blade adaxially dark green, oblong- to linear-lanceolate, sometimes linear, 5–18(–25) × 1–2.5(–3.5) cm, papery or thinly so, 3-veined, lateral ones straight, reaching to middle, secondary veins 3–5 on each side from middle of leaf, anastomosing at margin, abaxial surface thinly greenish gray or gray-white tomentose, sparsely appressed pubescent on distinct veins, adaxial surface sparsely appressed strigose, often rugose, base rounded or broadly cuneate, margin finely serrulate or denticulate, apex acuminate. Inflorescences borne always on previous years' branches, often flowering before leaf flush, 1–2-dichotomously branched or solitary, 0.5–1.5 cm; peduncle 0–1.5 cm, appressed pubescent; glomerules globose, 3–5 mm in diam.; bracts obovate, ca. 2 mm, membranous. Male flowers shortly pedicellate, oblate in bud, 1.2–1.5 mm in diam.; perianth lobes (3 or)4, triangular-ovate, sparsely puberulent abaxially, connate at

base, apex acute; rudimentary ovary sessile, obovoid, ca. 0.5 mm. Female flowers sessile, obovoid, ca. 0.7 mm; perianth tube membranous, glabrous, 4-denticulate at apex. Achene orange, ca. 1 mm, enclosed by fleshy perianth and adnate to it. Fl. Feb–Apr, fr. May–Sep.

Shady, moist places by streams, in mountain valleys; 300–2800 m. Hubei, Hunan, S Gangsu, Guangxi, Guizhou, S Shaanxi, Sichuan, Taiwan, SE Xizang, Yunnan [Bhutan, India, Japan, Nepal].

This species is very common in eastern China; it is a source of high-quality fiber.

6. *Debregeasia saeneb* (Forsskål) Hepper & Wood, *Kew Bull.* 38: 86. 1983.

柳叶水麻 liu ye shui ma

Rhus saeneb Forsskål, *Fl. Aegypt.-Arab.* 206. 1775; *Boehmeria salicifolia* D. Don; *Debregeasia bicolor* (Roxb.) Weddell; *D. salicifolia* (D. Don) Rendle; *Urtica bicolor* Roxburgh.

Shrubs or small trees 2–5 m tall, often dioecious. Branches dark purplish, young branchlets and petioles sparsely spreading hirtellous and mixed snow white tomentose. Stipules oblong-lanceolate, 6–10 mm, 2-cleft at apex, tomentose along veins abaxially; petiole 0.5–3 cm; leaf blade adaxially green, oblong to linear-lanceolate, sometimes linear, 5–15 × 1.5–4 cm, thinly papery or papery, 3-veined, lateral ones straight, reaching to middle, secondary veins 4–6 on each side from middle of leaf, anastomosing at margin, abaxial surface thickly snow-white tomentose, fine veins invisible, sometimes sparsely appressed pubescent on main and secondary veins, adaxial surface sparsely appressed strigose, sometimes rugose, base rounded, margin finely serrulate, apex acuminate. Inflorescences borne always on previous years' branches, often flowering before leaf flush, 1–2-dichotomously branched or solitary, 0.5–1 cm; peduncle 0–0.5 cm, appressed pubescent; glomerules globose, 4–6 mm in diam.; bracts obovate, ca. 2.5 mm, membranous. Male flowers shortly pedicellate, flattened in bud, 1.2–1.5 mm in diam.; perianth lobes (3 or)4, triangular-ovate, densely white tomentose abaxially, connate at base, apex acute; rudimentary ovary sessile, obovoid, ca. 0.5 mm. Female flowers sessile, obovoid, ca. 0.7 mm; perianth tube membranous, glabrous, 4-denticulate at apex. Achene orange, ca. 1 mm, stipitate at base, enclosed by fleshy perianth and adnate to it. Fl. Mar–Apr, fr. May–Jul.

Shady, moist places by streams, forests in mountain valleys; 1700–2300 m. SW Xinjiang, S Xizang [Afghanistan, Kashmir, Nepal; Iran, Yemen, Ethiopia].

22. *LEUCOSYKE* Zollinger & Moritz in Zollinger, *Syst. Verz.* 76. 1846.

四脉麻属 si mai ma shu

Chen Jiarui (陈家瑞 Chen Chia-jiu); Ib Friis, C. Melanie Wilmot-Dear

Small trees or shrubs, without stinging hairs. Leaves alternate (or opposite outside Flora area), often distichous, petiolate; stipules caducous, intrapetiolar, connate, membranous, 2-lobed or entire; leaf blade papery, 3(–5)-veined, often tomentose abaxially, base asymmetric, margin crenate-serrate or entire; cystoliths punctiform. Inflorescences axillary, pedunculate, densely globose clusters of unisexual flowers (plants often dioecious); glomerules solitary or in dichotomous cymes. Male flowers: perianth lobes 4 or 5, valvate; stamens 4 or 5; rudimentary ovary ovoid, glabrous or woolly. Female flowers: perianth small, cupular, 4 or 5-lobed or -

toothed, adnate to base of ovary. staminodes absent. Ovary obliquely ovoid, stigma sessile, penicillate, with tuft of long hairs; ovule orthotropous; Achene somewhat drupaceous, slightly compressed, with \pm fleshy pericarp. Seeds with thin endosperm; cotyledons elliptic.

About 35 species: tropical Asia and Pacific Islands; one species in China.

1. *Leucosyke quadrinervia* C. B. Robinson, Philipp. J. Sci., C, 6: 29. 1911.

四脉麻 si mai ma

Small trees or shrubs evergreen, to 7 m tall; bark dark brown. Branches often zigzagged, each node with an annular scar; young branchlets, stipules, and petioles densely appressed pubescent, glabrescent. Stipules lanceolate, 2–2.5 cm; petiole 0.5–1.5 cm; leaf blade adaxially green, obliquely ovate to obliquely elliptic, 5–16 \times 2.7–7 cm, papery, 3–5-veined at base, secondary veins 2–3 each side of midvein, adaxial surface

strigillose, appressed strigillose on veins, thinly gray woolly tomentose on veinlet meshes, base obliquely rounded, margin crenate-serrulate, apex shortly acuminate or acute. Cymes 0.5–1.5 cm; peduncle appressed pubescent; glomerules 4–7 mm, in fruit to 1.5 cm in diam. Male flowers: perianth lobes 4, narrowly ovate, 1.5–2 mm, connate at base, strigillose near apex; rudimentary ovary woolly at base. Achene broadly ovoid, 1.5–2 mm. Fl. Mar–May, fr. Jul–Aug.

Mixed rain forests, along streams; below 200 m. Taiwan (Lan Yu, Lu Dao) [Philippines].

The stem fibers are used to make ropes and sacks.

23. MAOUTIA Weddell, Ann. Sci. Nat., Bot., sér. 4, 1: 193. 1854.

水丝麻属 shui si ma shu

Chen Jiarui (陈家瑞 Chen Chia-ju); Ib Friis, C. Melanie Wilmot-Dear

Shrubs or small trees without stinging hairs. Leaves alternate; stipules caducous, intrapetiolar, membranous, deeply 2-lobed; leaf blade papery, 3-veined, often tomentose abaxially, margin dentate or crenate-serrate; cystoliths punctiform. Glomerules axillary, in loose cymose panicles of unisexual flowers (plants monoecious or dioecious); bracts and bracteoles scarious. Male flowers: perianth lobes 5, valvate; stamens 5; rudimentary ovary small, ovoid, densely woolly. Female flowers: perianth minute or absent, 2-lobed, connate at base asymmetrically to shallow cupular pocket, adnate to base of ovary; staminodes absent. Ovary straight, stigma sessile, penicillate-capitate; ovule orthotropous. Achene trigonous-ovoid, with \pm fleshy epicarp and bony endocarp. Seeds with little endosperm; cotyledons elliptic.

About 15 species: tropical and subtropical Asia and Pacific Islands; two species in China.

The stem fibers are used to make ropes and cloth.

- 1a. Branchlets and petioles spreading hirtellous; leaf margin dentate 1. *M. puya*
1b. Branchlets and petioles densely, snow white tomentose; leaf margin crenulate 2. *M. setosa*

1. *Maoutia puya* (W. J. Hooker) Weddell, Ann. Sci. Nat., Bot., sér. 4, 1: 194. 1854.

水丝麻 shui si ma

Boehmeria puya W. J. Hooker, Hooker's J. Bot. Kew Gard. Misc. 3: 316. 1851; *B. esquirolii* H. Léveillé; *B. nivea* var. *crassifolia* C. H. Wright.

Shrubs 1–2 m tall, monoecious. Branchlets zigzagged, branchlets and petiole spreading, brown or gray-brown hirtellous. Stipules linear-lanceolate, 7–15 mm, 2-cleft; petiole 1–6 cm; leaf blade elliptic or ovate, 5–15 \times 3–7 cm, secondary veins 2–4 on each side from distal 1/3, sparsely appressed strigose, adaxially rugose, thickly, snow white tomentose abaxially, base broadly cuneate or rounded, margin coarsely dentate, apex acuminate. Cymes in pairs, 3–5 cm; glomerules lax, 2–3 mm in diam.; bracts triangular or lanceolate, membranous. Male flowers shortly pedicellate, obovoid in bud, 1 mm in diam.; perianth lobes 5, ovate, connate at middle, apex acuminate; rudimentary ovary trigonous-ovoid, ca. 0.4 mm. Female flowers sessile; perianth lobes 2, minute, unequal, \pm connate at base, enclosing base of ovary. Achene ovoid-trigonous, ca. 1.2 mm, appressed strigillose. Fl. Jun–Aug, fr. Sep–Oct.

Thickets, valleys, dry slopes or shady, wet places; 400–2000 m.

Guangxi, Guizhou, SW Sichuan, SW Xizang, Yunnan [Bhutan, NE India, Nepal, Sikkim, Vietnam].

Fiber from the stem bast is of high quality due to its strength, sheen, and length; a single fiber may be 18 cm long. The fibers are used to make cloth, fishing nets, and paper.

2. *Maoutia setosa* Weddell, Ann. Sci. Nat., Bot., sér. 4, 1: 194. 1854.

兰屿水丝麻 lan yu shui si ma

Shrubs 1–2 m tall, monoecious. Branchlets and petioles densely snow white tomentose and mixed hirtellous. Leaves often crowded at apex of stem and branches; stipules lanceolate, ca. 7–8 mm, 2-cleft to middle; petiole 1.5–8 cm; leaf blade ovate to suborbicular, 12–19 \times 4.6–14.7 cm, secondary veins 3 or 4 on each side in distal 1/3, velutinous along veins adaxially, thickly snow white tomentose and appressed strigose abaxially, base obtuse to rounded, margin finely crenulate, apex acuminate. Cymes in pairs, 1.5–4 cm; glomerules lax, 2–3 mm in diam.; bracts elliptic-spatulate, membranous. Achene ovoid-ellipsoid, ca. 1 mm, appressed strigillose. Fl. May–Jul, fr. Aug–Oct.

Thickets, along streams, valleys; below 200 m. Taiwan (Lan Yu, Lu Dao) [Japan (Ryukyu Islands), Philippines].

24. PARIETARIA Linnaeus, Sp. Pl. 2: 1052. 1753.

墙草属 qiang cao shu

Chen Jiarui (陈家瑞 Chen Chia-ju); Ib Friis, C. Melanie Wilmot-Dear

Freirea Gaudichaud-Beaupré.

Herbs, annual or perennial, without stinging hairs. Leaves alternate; stipules absent; leaf blade 3-veined or triplinerved, margin entire; cystoliths punctiform. Inflorescences axillary, clusters or cymes of unisexual or bisexual flowers (plants monoecious); bracts calyxlike. Bisexual flowers: perianth lobes 3 or 4, linear, valvate. Male flowers: perianth lobes 3 or 4; rudimentary ovary minute. Female flowers: perianth lobes 3 or 4, connate to a tube at base, much shorter than male lobes. staminodes absent. Ovary straight, free from perianth; style short or absent; stigma penicillate or spatulate; deciduous, ovule orthotropous. Achene ovoid, slightly compressed, with lustrous and crustaceous pericarp, enclosed by dry persistent perianth. Seeds with endosperm; cotyledons oblong-ovate.

About 20 species: temperate and subtropical regions; one species in China.

1. Parietaria micrantha Ledebour, Icon. Pl. 1: 7. 1829.

墙草 qiang cao

Parietaria coreana Nakai; *P. debilis* var. *micrantha* (Ledebour) Weddell; *P. lusitanica* Linnaeus subsp. *chersonensis* (Lang) Chrtek var. *micrantha* (Ledebour) Chrtek.

Herbs weakly annual, diffuse, 10–40 cm tall, strigillose. Petiole slender, 0.4–2 cm; leaf blade ovate or ovate-cordate, 0.5–3 × 0.4–2.2 cm, membranous, secondary vein 1 on each side of basal midvein, sparsely pubescent abaxially, base rounded or subcordate, apex acute or obtuse. Flowers ca. 1.5 mm in diam., in small clusters; bracts green, linear, simple at base of pedicel or 3 basally connate and subtending base of perianth, covered with glandular hairs, in fruit enlarged to 1.5

mm. Bisexual flowers: pedicel 0.6 mm; perianth lobes 4, brown-green, oblong-ovate, membranous; stamens 4; stigma penicillate. Female flowers pedicellate or sessile; perianth lobes 4, connate into a campanulate tube, light brown, thinly membranous; lobes deltoid. Achenes black, ovoid, 1–1.3 mm, very smooth, lustrous. Fl. Jun–Jul, fr. Aug–Oct.

Shady, wet places, rocky mountain slopes, grasslands, wall of villages; 700–3500(–4000) m. Anhui, Beijing, S Gansu, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shanxi, Sichuan, Xinjiang, Xizang, Yunnan [Bhutan, N India, Japan, Korea, Mongolia, Nepal, Russia (Siberia), Sikkim; N Africa, C and SW Asia, Oceania, South America].

The plants are used as medicines to draw out pus and reduce swelling.

25. DROGUETIA Gaudichaud-Beaupré, Voy. Uranie, Bot. 505. 1830.

单蕊麻属 dan rui ma shu

Chen Jiarui (陈家瑞 Chen Chia-ju); Ib Friis, C. Melanie Wilmot-Dear

Herbs, without stinging hairs. Stems ascending. Leaves alternate or opposite; stipules persistent, lateral, free; leaf blade ovate, 3-veined or triplinerved, margin serrate; cystoliths punctate. Inflorescences axillary, androgynous (plants monoecious), sessile, glomerules crowded on broad, campanulate, dentate involucre. Male flowers numerous on margin of the involucre; perianth lobe 1, often split and unequally 3-lobed or 3-toothed; stamen 1; rudimentary ovary absent. Female flowers 1 or 2, in center of involucre; perianth absent; staminodes absent. Ovary straight; stigma filiform, papillose-hispid, almost persistent; ovule orthotropous. Achene compressed ovoid, woolly or glabrous, enclosed by involucre. Seeds with endosperm; cotyledons elliptic.

Seven species: mostly in Africa, one species in subtropical and tropical regions of NE Africa and Asia; one species in China.

1. Droguetia iners (Forsskål) Schweinfurth subsp. **urticoides** (Wight) Friis & Wilmot-Dear, Nordic J. Bot. 7: 126. 1987.

单蕊麻 dan rui ma

Forsskaolea urticoides Wight, Icon. Pl. Ind. Orient. 6: 11, t. 1982. 1853 [“*Forskolea*”]; *Boehmeria parvifolia* Weddell; *Droguetia urticoides* (Wight) Weddell.

Herbs perennial, 20–40 cm tall. Stems spreading hirtellous, sometimes also strigillose. Leaves opposite; stipules triangular, 3–4 mm, membranous, mucronate; petioles 0.4–3.8 cm; leaf blade ovate or rhombic-ovate, 3–6.5 × 1.8–3.6 cm, herbaceous, secondary veins 2 each side of midvein, sparsely appressed hispid adaxially, strigose and sometimes mixed hispid on veins abaxially, base cuneate, margin crenate-denticulate in basal 1/3, apex often cuspidate, sometimes acute. Glomerules

in axils of upper stem, 3–6 mm in diam.; involucre 2 mm, densely white woolly at base adaxially, 5-denticulate at apex. Male flowers often 7, surrounding 1 female flower; pedicel short; perianth lobe 1, boat-shaped, elliptic, ca. 2 mm, mucronate. Female flower 1, in center of glomerule, ca. 1.5 mm; stigma 2.8–3.5 mm. Female glomerule of 2–5 flowers borne in axils of lower stem; involucre narrowly ovoid, 1.6–1.8 mm, apex slightly contracted, 5-denticulate, similar to female perianth tube in *Boehmeria*, densely puberulent outside 1.5–2 mm, each involucre with 1 female flower. Achenes ovoid, angled, 1–1.5 mm. Fl. Sep, fr. Sep–Dec.

Forest margins, valleys; 1500–2500 m. C and S Taiwan, SW Yunnan [NE India, Indonesia (Java)].

Droguetia iners subsp. *iners* occurs in Africa.

URTICACEAE