

GESNERIACEAE

苦苣苔科 *ku ju tai ke*

Wang Wentsai (王文采)¹, Pan Kaiyu (潘开玉)¹, Li Zhenyu (李振宇)¹;
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Herbs, shrubs, or rarely trees. Leaves opposite or rarely alternate, whorled or basal, rosette forming; exstipulate; usually simple, rarely shallowly to deeply lobed, pinnately or rarely palmately veined. Inflorescences usually cymes, rarely racemes, axillary, often near apex and appearing terminal; usually pedunculate. Flowers perfect, zygomorphic, seldom actinomorphic. Calyx actinomorphic, rarely zygomorphic; usually (4 or)5-divided. Corolla gamopetalous, zygomorphic, rarely actinomorphic; usually 2-lipped. Fertile stamens 2 or 4, then often didynamous, rarely 5, epipetalous; anthers free or coherent, thecae 2, parallel, divergent, or divaricate; staminodes 1–3 or absent. Disc ringlike to cupular, rarely absent. Ovary superior in all Old World taxa [half inferior, or inferior], 1-loculed; gynophore seldom present; placentas (1 or)2, parietal, rarely 2-loculed, placenta 1 per locule and axile; ovules numerous, anatropous. Style 1; stigmas 1 or 2. Fruit usually capsular, loculicidal, septicidal, or circumscissile, rarely a berry, indehiscent. Seeds numerous, fusiform to ellipsoid or ovoid, minute, sometimes with appendages at 1 or both ends, with or without endosperm; embryo straight, cotyledons equal or unequal after germination.

About 133 genera and 3000 species: Africa, Central and South America, E and S Asia, S Europe, Oceania; 56 genera (25 endemic) and 442 species (354 endemic) in China.

A few foreign well-known ornamental species are cultivated in China, including the florist's gloxinia, *Sinningia speciosa* (Loddiges) Hiern, and African violet, *Saintpaulia ionantha* Wendland.

The two ovary carpels may each produce a stigma; these stigmas are \pm fused into a single structure. Some students of Gesneriaceae have considered the stigma to be single and either simple (capitate) or 2-lobed, whereas others consider each of the two stigmas as units. We have maintained the latter usage, but a family-wide investigation of stigma development is needed. The distinction can be blurred, however, because the stigmas may be completely fused into one with a capitate apex (as in *Didymocarpus*) or one of the two carpels or stigmas may be aborted resulting in a single stigma that may or may not be 2-lobed.

Certain characters used in this treatment require some explanation. Disc shape is frequently described as "ringlike," "cupular," or rarely "tubular"; ringlike describes a disc that is shorter than or equalling its diameter, and cupular describes one that is longer than its diameter. Tubular describes a disc which is at least twice as long as wide. The corolla tube diameter measurement is for the widest part, usually the mouth.

Wang Wentsai, Pan Kaiyu, & Li Zhenyu. 1990. Gesneriaceae. In: Wang Wentsai, ed., Fl. Reipubl. Popularis Sin. 69: 125–581.

- 1a. Inflorescences racemose; seeds with scalelike appendages at both ends; flowers sometimes replaced by propagules 56. *Titanotrichum*
- 1b. Flowers solitary or inflorescences cymose (including umbel-like or paniculate cymes), sometimes racemelike and 1-sided; seeds either not appendiculate or with subulate or hairlike appendages at 1 or both ends (unknown in *Calcareoboaea*, *Dayaoshania*, *Gyrogyne*, *Lagarosolen*, *Paraisometrum*, and *Thamnocharis*); flowers never replaced by propagules.
- 2a. Corolla actinomorphic, 4- or 5-lobed; stamens 4 or 5, staminodes absent; seeds unappendaged (unknown in *Thamnocharis*).
- 3a. Corolla suburceolate, tube longer than limb; stamens included, anther thecae divergent, confluent apically; capsule 4-valved 3. *Tengia*
- 3b. Corolla rotate or campanulate, tube 1/3–1 \times limb; stamens equalling corolla or exerted, anther thecae parallel, not confluent; capsule 2-valved.
- 4a. Anthers connate into a tube surrounding style, connectives with long apical projections; disc absent; inflorescences umbel-like cymes; leaves 1 to few 4. *Conandron*
- 4b. Anthers free, connectives without projections; disc ringlike; inflorescences cymes; leaves few to many.
- 5a. Bracts 2, opposite; corolla purple to blue, deeply 4- or 5-lobed, tube rotate; stamens adnate to corolla near base, anthers basifixed; stigma 1, nearly truncate or punctiform; leaf blade base cuneate 1. *Thamnocharis*
- 5b. Bracts 6–9 to numerous, crowded, involucrate; corolla white, 4- or 5-lobed, tube campanulate; stamens adnate to corolla tube near or above middle, anthers dorsifixed; stigmas 2, equal, oblate to 2-lipped; leaf blade base truncate to cordate 2. *Bournea*

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- 2b. Corolla zygomorphic, usually distinctly 2-lipped or rarely actinomorphic; fertile stamens (1 or)2 or 4, staminodes absent or 1–3; seeds appendaged or unappendaged.
- 6a. Fruit indehiscent berries, fleshy to leathery; plants woody herbs or shrubs.
- 7a. Calyx divided from base; corolla campanulate-tubular; stamens 4 49. *Rhynchotechum*
- 7b. Calyx divided only from above middle (in China); corolla funnelform-tubular; stamens 2 (in China) 50. *Cyrtandra*
- 6b. Fruit dehiscent capsule; plants herbaceous to shrubby.
- 8a. Calyx plicate between lobes; corolla tube campanulate, spurred or saccate at base; stamens 4; ovary depressed globose or subglobose.
- 9a. Leaves slightly unequal in a pair; adaxial corolla lip ca. 1/2 as long as abaxial lip; anthers free, thecae not confluent 51. *Gyrogyne*
- 9b. Leaves strongly unequal in a pair, smaller much reduced; adaxial corolla lip as long as abaxial lip; anthers coherent laterally to form a shallow cone, thecae confluent at apex 52. *Stauranthera*
- 8b. Calyx not plicate; corolla tube funnelform to tubular, cylindric, salverform, urceolate, or campanulate, base usually not swollen, rarely saccate, sometimes gibbous abaxially; stamens (1 or)2 or 4; ovary linear to oblong or ovoid, rarely subglobose or globose.
- 10a. Capsule ovoid to depressed globose, shorter than calyx; ovary ovoid to depressed globose; inflorescences cymose, sympodial, or scorpioid, racemose; bract apparently absent or 1; stem leaves 1 to few.
- 11a. Leaves opposite, strongly unequal in a pair, smaller much reduced and sessile; inflorescences apparently without bracts; calyx with many longitudinal secretory canals; staminode 1; ovary 2-loculed; placenta 1, axile 53. *Whytockia*
- 11b. Leaves alternate, or lowest stem leaf only unpaired, adaxial ones usually opposite and equal or nearly so in a pair; bract 1; calyx without secretory canals; staminodes 2, 3, or absent; ovary 1-loculed; placentas 2, parietal.
- 12a. Leaves few, all alternate; inflorescences lax racemes appearing scorpioid; stamens 2 and abaxial, or 4; capsule loculicidal 54. *Rhynchoglossum*
- 12b. Leaves 1 to few, lowest leaf unpaired, those near apex usually opposite; inflorescences scorpioid cymes, dense; stamens 2, adaxial; capsule circumscissile 55. *Epithema*
- 10b. Capsule linear to ovoid, much surpassing calyx, rarely shorter than calyx, then leaves all basal (fruit unknown in *Paraisometrum*); ovary usually linear to oblong, rarely ellipsoid, linear-lanceolate, conical, or ovoid; flowers solitary or inflorescences cymose including paniculate or umbel-like cymes; bracts 2, rarely apparently absent, 1, or 3; leaves basal or on stem, few to many.
- 13a. Fertile stamens 4.
- 14a. Calyx zygomorphic, 2-lipped, adaxial lip undivided, abaxial lip 4-lobed; disc tubular; capsule narrowly ellipsoid 15. *Cathayanthe*
- 14b. Calyx actinomorphic, 5-lobed to 5-sect from base; disc ringlike, rarely cupular or inconspicuous; capsule oblong to linear, rarely conical to ovoid.
- 15a. Plants stemless.
- 16a. Adaxial corolla lip 4-lobed, over 2 × longer than abaxial lip, abaxial lip undivided 8. *Paraisometrum*
- 16b. Adaxial corolla lip 2-lobed, equalling or much shorter than abaxial lip, abaxial lip 3-lobed or 3-sect.
- 17a. Stigma 1.
- 18a. Abaxial corolla lip densely bearded inside; bracts apparently absent; corolla tube tubular; anthers coherent in pairs, thecae divaricate 13. *Corallodiscus*
- 18b. Corolla glabrous to puberulent inside; bracts 2, rarely absent or several; corolla tube campanulate to broadly tubular, sometimes oblique, sometimes saccate at base, throat some-

- times constricted; anthers free or all 4 coherent together, thecae parallel or subparallel.
- 19a. Anthers of all 4 stamens coherent together; capsule oblique in relation to pedicel; adaxial corolla lip distinctly shorter than abaxial 16. *Beccarinda*
- 19b. Anthers free; capsule straight in relation to pedicel; adaxial corolla lip slightly shorter than to as long as abaxial.
- 20a. Ovary oblong; anther thecae parallel, not confluent, seldom horseshoe-shaped, then thecae divaricate and confluent at apex; corolla tube 1–4 × longer than limb; leaf blade base cuneate to subcordate 5. *Oreocharis*
- 20b. Ovary ovoid or conical; anther thecae subparallel, confluent at apex; corolla tube slightly shorter than limb; leaf blade base cuneate to attenuate 18. *Boeica*
- 17b. Stigmas 2.
- 21a. Adaxial corolla lip emarginate to nearly entire.
- 22a. Corolla tube subcampanulate to funnelform-tubular, not swollen; stamens adnate to corolla near base, all or only abaxial ones exerted, anthers free, thecae confluent at apex 6. *Tremacron*
- 22b. Corolla tube narrowly funnelform to cylindrical, slightly gibbous abaxially; stamens adnate to corolla tube above or rarely below middle, usually included, rarely exerted, anthers coherent in pairs, thecae not confluent 9. *Ancylostemon*
- 21b. Adaxial corolla lip 2-lobed to 2-sect from base.
- 23a. Ovary 2-loculed, only adaxial locule fertile; placenta 1, axile; capsule oblique in relation to pedicel; cymes 1–3-flowered 11. *Briggsiopsis*
- 23b. Ovary 1-loculed; placentas 2, parietal; capsule straight in relation to pedicel; cymes 1- to many flowered.
- 24a. Corolla tube narrowly campanulate, gibbous abaxially, (0.7–)1–2(–2.6) cm in diam., abaxial lip 3-lobed 10. *Briggsia*
- 24b. Corolla tube cylindrical to funnelform, broadly tubular, campanulate, urceolate, or salverform, not swollen, slightly gibbous abaxially, or slightly ampliate basally, 0.2–1(–1.2) cm in diam., abaxial lip 3-sect, rarely 3-lobed.
- 25a. Anthers dehiscent longitudinally from arcuate slits; corolla zygomorphic, rarely actinomorphic, tube campanulate, cylindrical, or rarely urceolate or salverform, not swollen 7. *Isometrum*
- 25b. Anthers dehiscent longitudinally, rarely transversely; corolla zygomorphic, tube campanulate-cylindrical to broadly tubular, sometimes ampliate basally, throat sometimes constricted or narrowly funnelform to cylindrical, slightly gibbous abaxially.
- 26a. Corolla purple to blue or white or yellow to red, tube campanulate-cylindrical to broadly tubular, sometimes ampliate basally, throat sometimes constricted, adaxial lip 2-lobed; anthers free; calyx 5-sect from base 5. *Oreocharis*
- 26b. Corolla orange to yellow or white, rarely pink, tube narrowly funnelform to cylindrical, slightly gibbous abaxially, adaxial lip 2-lobed, emarginate, or rarely undivided; anthers coherent in pairs; calyx 5-sect from base to 5-lobed from above middle 9. *Ancylostemon*
- 15b. Plants with a distinct stem.
- 27a. Stigmas 2.
- 28a. Ovary 2-loculed, only adaxial locule fertile; placenta 1, axile; capsule oblique in relation to pedicel; corolla tube tubular-funnelform; cymes 1–3-flowered 11. *Briggsiopsis*
- 28b. Ovary 1-loculed; placentas 2, parietal; corolla tube cylindrical to broadly tubular or narrowly campanulate, sometimes ampliate above; capsule straight in relation to

- pedicel; cymes 1 - to many flowered.
- 29a. Corolla tube cylindric basally, ampliate above, not swollen 12. *Didissandra*
- 29b. Corolla tube narrowly campanulate to broadly tubular, gibbous abaxially.
- 30a. Seeds unappendaged 10. *Briggsia*
- 30b. Seeds with 1 hairlike appendage at each end 46. *Loxostigma*
- 27b. Stigma 1.
- 31a. Calyx zygomorphic, 2-lipped, adaxial lip undivided, abaxial lip 4-lobed; disc tubular; capsule splitting along 1 suture 15. *Cathayanthe*
- 31b. Calyx actinomorphic, 5-sect from base or 5-lobed, segments equal or unequal; disc ringlike, inconspicuous or absent; capsule 2(or 4)-valved.
- 32a. Leaves 1(or 2), apical on stem; leaf blade base cordate to auriculate; anthers dehiscing from fissures or cracks; capsule slightly longer than calyx 14. *Platystemma*
- 32b. Leaves few to many, opposite, rarely whorled, spread along stem or crowded near stem apex; leaf blade base cuneate to attenuate or rounded, rarely cordate; anthers dehiscing longitudinally, poricidally, or transversely; capsule much longer than calyx.
- 33a. Seeds with 1 subulate or hairlike appendage at each end, or with up to 50 appendages at hilar end; corolla tube narrowly tubular to funnelform-tubular or subtubular, longer or much longer than limb, 4–17 mm in diam.; ovary linear; stamens adnate to corolla tube near or above middle, anthers usually coherent in pairs.
- 34a. Corolla white to yellowish, tube subtubular, gibbous abaxially near limb, with 2 arcuate projections abaxially inside; stamens included, thecae confluent at apex; seeds with 1 subulate appendage at each end 45. *Anna*
- 34b. Corolla red to orange, seldom greenish, yellow, or white, tube narrowly tubular to funnelform-tubular, often curved, not swollen, inside sparsely puberulent, sparsely glandular puberulent, glabrous, or with a hair ring; stamens usually exserted, thecae not confluent; seeds with 1 hairlike appendage at each end or up to 50 appendages at hilar end 47. *Aeschynanthus*
- 33b. Seeds unappendaged; corolla tube campanulate, shorter than to slightly longer than limb, 3–9 mm in diam.; ovary ovoid, ellipsoid, or conical; stamens adnate to corolla near or slightly above base, anthers free or all 4 coherent together.
- 35a. All anthers coherent together; capsule oblique in relation to pedicel; leaf blade base cordate to cuneate 16. *Beccarinda*
- 35b. Anthers free; capsule straight in relation to pedicel; leaf blade base cuneate to attenuate.
- 36a. Corolla yellowish, tube slightly longer than limb; anther thecae not confluent; ovary ellipsoid; cymes 3–5-flowered 17. *Leptoboea*
- 36b. Corolla white to pink or blue to purple, tube slightly shorter than limb; anther thecae confluent at apex; ovary ovoid or conical; cymes 1- to many flowered 18. *Boeica*
- 13b. Fertile stamens 2.
- 37a. Plants with a distinct stem.
- 38a. Stigmas 2.
- 39a. Flowers solitary; capsule valves spirally twisted; corolla tube campanulate-tubular, adaxial lip slightly shorter than abaxial 44. *Rhabdothamnopsis*
- 39b. Inflorescences cymes, sometime spikelike or racemelike, 2–10-flowered; capsule valves straight, not twisted; corolla tube slender funnelform, funnelform, or funnelform-tubular, adaxial lip much shorter than abaxial.
- 40a. Bracts forming a globose involucre; corolla tube much longer than limb; leaf blade base attenuate to broadly cuneate; stamens adnate to corolla tube below middle, anthers coherent by adaxial surfaces, thecae divaricate, confluent 26. *Hemiboeopsis*

- 40b. Bracts not forming an involucre; corolla tube longer than limb; leaf blade base cuneate to rounded or cordate; stamens adnate to corolla tube near middle, anthers coherent at apex, thecae parallel, not confluent at apex.
- 41a. Stigmas equal, oblate or semiorbicular, undivided; calyx 5-sect from base; stamens adnate to corolla tube near mouth, slightly exserted 21. *Didymostigma*
- 41b. Stigmas unequal, smaller 1 truncate or triangular, undivided, larger 1 narrowly obtuse, emarginate; calyx 5-lobed; stamens adnate to corolla tube near middle, included.
- 42a. Ovary 1-loculed; placentas parietal; corolla abaxial lip lobes unequal 22. *Pseudochirita*
- 42b. Ovary 2-loculed; placentas axile; corolla abaxial lip lobes subequal 23. *Allostigma*
- 38b. Stigma 1.
- 43a. Subshrubs or rarely lianas, usually epiphytic, less frequently epipetric or terrestrial; seeds with 1 appendage at each end 48. *Lysionotus*
- 43b. Herbs, rarely subshrubs (rarely shrubs outside China), always terrestrial or epipetric; seeds unappendaged.
- 44a. Anthers basifixed, thecae parallel, not confluent at apex; bracts 2, forming a globose to ovoid involucre.
- 45a. Ovary 1-loculed; placenta parietal; capsule dehiscing on both sides; corolla inside glabrous; tube somewhat gibbous abaxially, adaxial lip inconspicuous, much shorter than abaxial lip 24. *Metabriggsia*
- 45b. Ovary 2-loculed, only adaxial locule fertile; placenta axile; capsule dehiscing only adaxially; corolla inside usually with a ring of hairs; tube not swollen, adaxial lip shorter than to nearly as long as abaxial 25. *Hemiboea*
- 44b. Anthers dorsifixed, thecae divaricate, confluent at apex; bracts 2, not forming an involucre, rarely up to 7 and whorled, 1, or absent.
- 46a. Stamens adnate to abaxial side of corolla tube near or above middle; capsule valves straight, not twisted.
- 47a. Stigma abaxial, 2-lobed to undivided 32. *Chirita*
- 47b. Stigma terminal, undivided 35. *Didymocarpus*
- 46b. Stamens adnate to abaxial side of corolla tube near base; capsule valves usually at least slightly twisted.
- 48a. Anthers dehiscing transversely; disc cupular; stigma ligulate; calyx zygomorphic 43. *Trisepalum*
- 48b. Anthers dehiscing longitudinally from straight or arcuate slits; disc inconspicuous or ringlike; stigma capitate, seldom subligulate; calyx actinomorphic, rarely slightly zygomorphic.
- 49a. Leaf blade adaxially woolly to glabrous, abaxially woolly, pannose, or velutinous, hairs interwoven, usually branched; corolla inside glabrous to glandular puberulent; tube longer than to occasionally nearly equalling limb 40. *Paraboea*
- 49b. Leaf blade puberulent to woolly, hairs unbranched; corolla inside bearded, tube shorter than limb 42. *Ornithoboea*
- 37b. Plants stemless.
- 50a. Corolla adaxial lip 4-lobed, abaxial lip undivided.
- 51a. Inflorescences dense umbel-like cymes; corolla tube 4–5 × longer than limb, adaxial lip longer than abaxial; stamens adnate to corolla tube above middle 38. *Calcareoboea*
- 51b. Inflorescences lax cymes; corolla tube shorter than limb, adaxial lip slightly shorter than abaxial; stamens adnate to corolla tube near base 39. *Allocheilos*
- 50b. Corolla adaxial lip 2-lobed, rarely undivided, abaxial lip 3-lobed, rarely 4-lobed.

- 52a. Anthers dehiscing transversely; stigma 1, ligulate; capsule valves spirally twisted 43. *Trisepalum*
- 52b. Anthers dehiscing longitudinally; stigmas 1 or 2, if 1 then usually capitate, globose, disclike, truncate, lamelliform, oblate, or obtrapeziform, rarely linear or subligulate; capsule valves straight or twisted.
- 53a. Corolla adaxial lip undivided.
- 54a. Corolla tube tubular to funnelform-tubular, longer than limb; stamens exerted, anthers basifixed, free or coherent at apex, thecae parallel, not confluent; leaf blade base broadly cuneate to subrounded 29. *Deinocheilos*
- 54b. Corolla tube broadly tubular, nearly equalling limb; stamens included, anthers dorsifixed, coherent by adaxial surfaces, thecae divaricate, confluent at apex; leaf blade base cordate 36. *Gyrocheilos*
- 53b. Corolla adaxial lip 2-lobed.
- 55a. Anthers basifixed or if dorsifixed then stamens slightly exerted, thecae parallel.
- 56a. Anthers dorsifixed, stamens slightly exerted; placentas undivided; inflorescences monochasial cymes, 1- or 2-flowered 20. *Dayaoshania*
- 56b. Anthers basifixed, stamens included; placentas projecting inward, 2-cleft; inflorescences cymes, sometimes umbel-like, 1- to many flowered.
- 57a. Corolla tube 1.5–4 × longer than limb, 3.5–17 mm in diam.; stamens adnate to adaxial side of corolla tube near middle, rarely near base; ovary and capsule linear 19. *Opithandra*
- 57b. Corolla tube shorter than limb, 2–5 mm in diam.; stamens adnate to abaxial side of corolla tube near base; ovary conical to broadly ovoid; capsule narrowly ellipsoid to oblong to ovoid 27. *Petrocosmea*
- 55b. Anthers dorsifixed or nearly so, stamens included, thecae divaricate.
- 58a. Anthers free, thecae not confluent; capsule nearly globose; leaf blade base rounded, peltate 28. *Metapetrocosmea*
- 58b. Anthers coherent, thecae confluent at apex; capsule linear to narrowly ovoid, ellipsoid, or oblong; leaf blade base attenuate to cordate, rarely auriculate or auriculate-peltate.
- 59a. Stigmas 2; corolla lobe apex acute 30. *Lagarosolen*
- 59b. Stigma 1; corolla lobe apex rounded, seldom obtuse or acute.
- 60a. Capsule valves spirally twisted or seldom straight, if straight leaf blade abaxially woolly, pannose, or velutinous, hairs dense, interwoven, usually branched.
- 61a. Capsule valves 4; leaf blade abaxially woolly, pannose, or velutinous, hairs very dense, interwoven, usually branched 40. *Paraboea*
- 61b. Capsule valves 2; leaf blade villous to puberulent, hairs dense, not interwoven or branched 41. *Boea*
- 60b. Capsule valves straight, not twisted; leaf blade abaxially strigose or puberulent to villous, velutinous, or woolly.
- 62a. Corolla tube slightly shorter than to nearly equalling limb, lobes acute 37. *Dolicholoma*
- 62b. Corolla tube longer to much longer than limb, lobes rounded, obtuse, or acute.
- 63a. Ovary ovoid or narrowly ovoid; capsule narrowly ovoid to ellipsoid, equalling to shorter than calyx.
- 64a. Corolla nearly salverform, tube cylindric, adaxial lip slightly shorter than abaxial 31. *Primulina*
- 64b. Corolla tube nearly tubular, adaxial lip slightly to 2–3 × shorter than abaxial 33. *Chiritopsis*
- 63b. Ovary linear; capsule linear to very narrowly ovoid, much surpassing calyx.

- 65a. Corolla tube suburceolate-tubular, 1–2.5 mm in diam., limb indistinctly 2-lipped, adaxial lip slightly shorter than abaxial; lobe apex acute; stamens adnate to abaxial side of corolla tube slightly above base 34. *Petrocodon*
- 65b. Corolla tube funnelform-tubular to campanulate or cylindrical, 2–20 mm in diam., limb 2-lipped; adaxial lip slightly to 1.5–3.5 × shorter than abaxial; lobe apex rounded, rarely obtuse to acute; stamens adnate to abaxial side of corolla tube near or above middle.
- 66a. Stigma abaxial, 2-lobed to undivided 32. *Chirita*
- 66b. Stigma terminal, undivided 35. *Didymocarpus*

1. THAMNOCHARIS W. T. Wang, Acta Phytotax. Sin. 19: 485. 1981.

辐花苣苔属 fu hua ju tai shu

Herbs, perennial, terrestrial, rhizomatous, stemless. Leaves many, basal; leaf blade appressed puberulent, base cuneate. Inflorescences umbel-like, dense, axillary, few-flowered cymes; bracts 2, opposite. Calyx actinomorphic; 4- or 5-sect from base; segments equal. Corolla purple to blue, actinomorphic, inside glabrous; tube rotate, not swollen, ca. 1/3 length of lobes, ca. 3 mm in diam.; limb deeply 4- or 5-lobed; lobe apex rounded to mucronulate. Stamens 4 or 5, adnate to corolla near base, equalling corolla; anthers basifixed, free, thecae parallel, not confluent, dehiscing longitudinally; connective not projecting; staminodes absent. Disc ringlike. Ovary narrowly ovoid, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigma 1, terminal, punctiform to subcapitate, undivided. Capsule straight in relation to pedicel, narrowly ellipsoid, much longer than calyx, dehiscing loculicidally to base; valves 2, straight, not twisted. Seeds unknown.

• One species: endemic to China

Thamnocharis, along with *Bournea* Oliver, *Tengia* W. Y. Chun, and *Conandron* Siebold & Zuccarini, belongs to tribe Ramondiaceae Fritsch as defined by W. T. Wang (Fl. Reipubl. Popularis Sin. 69: 125–140. 1990). The Ramondiaceae are sometimes considered to be primitive in Gesneriaceae. They share (along with *Ramonda* L. C. Richard) actinomorphic corollas and all stamens fertile. Most other Gesneriaceae have zygomorphic corollas with at least one sterile stamen.

1. *Thamnocharis esquirolii* (H. Léveillé) W. T. Wang, Acta Phytotax. Sin. 19: 486. 1981.

辐花苣苔 fu hua ju tai

Oreocharis esquirolii H. Léveillé, Repert. Spec. Nov. Regni Veg. 9: 329. 1911.

Petiole 0.6–4 cm, white appressed puberulent; leaf blade oblong or elliptic to ovate, (1.2–)2.5–5.5 × (0.7–)1.6–2.8 cm, white appressed puberulent, base broadly to narrowly cuneate, margin shallowly crenulate to serrulate, apex broadly acute to rounded; lateral veins 3 or 4 on each side of midrib. Cymes 5–9-flowered;

peduncle 5–9(–10) cm; bracts subulate, 1.5–2 mm. Pedicel (0.6–)4–9(–20) mm. Calyx 4- or 5-sect from base; segments narrowly triangular, 2.2–3 mm. Corolla ca. 8 mm × 1–1.2 cm, outside puberulent; tube ca. 2–3 mm; limb deeply 4- or 5-lobed; lobes lanceolate-oblong, 6–8 × 2–3 mm. Stamens unequal; filaments 2.5–8 mm, sparsely puberulent basally; anthers 1.3–1.8 mm. Ovary ca. 2 mm, puberulent. Style ca. 8 mm, glabrous. Capsule ca. 1.1 cm. Fl. Jul–Aug, fr. Aug.

• Thickets, hilly forests; 1500–1600 m. SW Guizhou (Xingren Xian, Zhenfeng Xian).

2. BOURNEA Oliver, Hooker's Icon. Pl. 23: pl. 2254. 1893 [1894; ser. 4, vol 3].

四数苣苔属 si shu ju tai shu

Herbs, perennial, epipetric or terrestrial, rhizomatous, stemless. Leaves few to many, basal; leaf blade glabrous to appressed puberulent, base truncate to cordate. Inflorescences umbel-like, lax, axillary, many-flowered cymes; bracts 6 to numerous, crowded, involucrate. Calyx actinomorphic; 4- or 5-lobed; segments equal. Corolla white, actinomorphic, inside glabrous; tube campanulate, not swollen, equalling to 1/2 length of lobes, ca. 3 mm in diam.; limb 4- or 5-lobed from near to slightly below middle; lobe apex rounded. Stamens 4 or 5, adnate to corolla tube near or above middle, exerted; anthers dorsifixed, free, thecae parallel, not confluent, dehiscing longitudinally; connective not projecting; staminodes absent. Disc ringlike. Ovary linear, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigmas 2, equal, oblate, undivided or 2-lipped. Capsule straight in relation to pedicel, oblong linear, much longer than calyx, dehiscing loculicidally to base; valves 2, straight, not twisted. Seeds unappendaged.

• Two species: endemic to China.

1a. Leaf blade margin irregularly denticulate, glabrous; petiole spreading puberulent; flowers 5-merous; calyx ca.

2.8 mm, lobes entire 1. *B. leiophylla*

1b. Leaf blade margin entire to repand, appressed puberulent, glabrescent; petiole appressed puberulent; flowers 4-merous; calyx 4–9 mm, lobes sparsely denticulate 2. *B. sinensis*

1. *Bournea leiophylla* (W. T. Wang) W. T. Wang & K. Y. Pan ex W. T. Wang, Fl. Reipubl. Popularis Sin. 69: 135. 1990.
五数苣苔 wu shu ju tai

Oreocharis leiophylla W. T. Wang, Acta Phytotax. Sin. 13: 99. 1975.

Petiole 3–7.5 cm, densely brownish spreading puberulent; leaf blade elliptic-ovate to ovate, 5–8 × 3.6–5.5 cm, glabrous, base nearly cordate to nearly truncate, margin irregularly denticulate, apex acute; lateral veins 5 or 6 on each side of midrib. Cymes 11–13-flowered; peduncle ca. 11 cm; bracts linear-lanceolate, ca. 6 mm, margin dentate to serrate. Fruiting pedicel ca. 1.2 cm. Calyx ca. 2.8 mm, 5-lobed; tube ca. 0.8 mm; lobes linear-lanceolate, ca. 2 mm, margin entire. Corolla ca. 4.4 mm, outside glabrous, 5-lobed from near middle; tube ca. 2.2 mm; lobes oblong, 2–2.5 × ca. 2 mm. Stamens 5, ca. 5.5 mm. Pistil unknown. Capsule ca. 1.5 cm. Fl. Sep, fr. Oct.

• SW Fujian (Liancheng Xian).

2. *Bournea sinensis* Oliver, Hooker's Icon. Pl. 23: pl. 2254. 1893 (1894).
四数苣苔 si shu ju tai

Petiole 1–11(–14.5) cm, densely brown appressed puberulent; leaf blade narrowly to broadly ovate or oblong, 4–18 × 2.5–8 cm, appressed puberulent, glabrescent, base oblique, cordate, margin entire to repand, apex abruptly acuminate to acute; lateral veins 5 or 6 on each side of midrib. Cymes 10–20-flowered; peduncle 14–18(–26) cm; bracts linear-lanceolate, 6–12 mm, margin entire or subentire. Pedicel 1–2 cm. Calyx 4–9 mm, 4-lobed; tube 1.5–2(–3) mm; lobes linear-lanceolate, 2.5–7 mm, margin sparsely denticulate. Corolla white, 5–8 mm, outside glabrous, 4-lobed from below middle; tube 2.5–3 mm; lobes oblong to ovate-oblong, 5–6 × 2–3 mm. Stamens 4, 8–11 mm. Pistil glabrous; ovary 4–7 mm. Style 2–3 mm. Capsule (1–)2–3.5 cm. Fl. Sep–Oct, fr. Oct–Nov and May.

• Streamside rocks, valley forests; 600–1000 m. Guangdong.

3. *TENGIA* W. Y. Chun, Sunyatsenia 6: 279. 1946.

世纬苣苔属 shi wei ju tai shu

Herbs, perennial, epipetric, rhizomatous, stemless. Leaves few to many, basal; leaf blade sparsely appressed puberulent, base cuneate to subrounded. Inflorescences umbel-like, lax, axillary, few-flowered cymes; bracts 2, subopposite. Calyx actinomorphic, 5-sect from base; segments equal. Corolla white to pink or purple, actinomorphic, inside glabrous; tube nearly urceolate, not swollen, longer than limb, 2–5 mm in diam.; limb 5-lobed; lobe apex acute to acuminate. Stamens 5, adnate to corolla near base, included; anthers basifixed, free, thecae divergent, confluent at apex, dehiscing longitudinally; connective with short apical projection; staminodes absent. Disc ringlike. Ovary narrowly ovoid to linear, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigma 1, terminal, punctiform, undivided. Capsule straight in relation to pedicel, fusiform-linear, much longer than calyx, dehiscing loculicidally to base; valves 4, straight, not twisted. Seeds unappended.

• One species: endemic to China.

1. *Tengia scopulorum* W. Y. Chun, Sunyatsenia 6: 281. 1946.
世纬苣苔 shi wei ju tai

Petiole 1–6 cm; leaf blade often asymmetric, elliptic to ovate, rarely obovate, (1.5–)3–6 × (1–)1.5–2.5 cm, adaxially appressed puberulent, glabrescent, abaxially densely appressed puberulent, base cuneate to nearly rounded, margin crenate, apex acute; lateral veins 4 or 5 on each side of midrib. Cymes 5–10-flowered; peduncle 4–6.5 cm, brown puberulent; bracts narrowly lanceolate, 2–5 × 0.5–0.8 mm, glabrous to sparsely pubescent, margin entire. Pedicel 4–12 mm. Calyx segments narrowly triangular, 2.5–3 mm. Corolla 5–11.3 mm, outside sparsely puberulent, glabrescent above middle; tube 3.8–10 mm; limb 5-lobed, lobes triangular, 1.2–3 × 0.5–1 mm. Stamens 2.5–3.5 mm. Pistil 5.5–12 mm; ovary sparsely puberulent. Style 4–9 mm, puberulent. Capsule 0.8–1.5 cm. Fl. Aug, fr. Jul–Aug.

• Shaded, stony cliffs; ca. 300–1200 m. Guizhou, Yunnan.

1a. Corolla white to pink, 5–7 mm, tube 3.8–4 mm, lobes 1.2–3 mm; style 4–5 mm 1a. var. *scopulorum*
1b. Corolla purple, 10.3–11.3 mm, tube 9–10 mm, lobes ca. 1.3 mm; style 7–9 mm 1b. var. *potiflora*

1a. *Tengia scopulorum* var. *scopulorum*

世纬苣苔(原变种) shi wei ju tai (yuan bian zhong)

Corolla white to pink, 5–7 mm; tube 3.8–4 mm; lobes 1.2–3 mm. Style 4–5 mm. Fl. Aug, fr. Jul–Aug.

• Shaded, stony cliffs; ca. 300 m. S Guizhou (Pingba Xian), Yunnan.

1b. *Tengia scopulorum* var. *potiflora* (S. Z. He) W. T. Wang, A. L. Weitzman, & L. E. Skog in A. L. Weitzman et al., Novon 7: 434. 1998.

壶花世纬苣苔 hu hua shi wei ju tai

Tengia potiflora S. Z. He in S. Z. He & X. D. Cong, J. China Pharm. Univ. 23: 269. 1992.

Corolla purple, 1–1.1 cm; tube 9–10 mm; lobes ca. 1.3 mm. Style 7–9 mm. Fl. and fr. Jul.

• Limestone cliffs; ca. 1200 m. Guizhou (Xiuwen Xian).

4. CONANDRON Siebold & Zuccarini, Abh. Math.-Phys. Cl. Königl. Akad. Wiss. 3: 729. 1843.

苦苣苔属 *ku ju tai shu*

Herbs, perennial, terrestrial or epipetric, rhizomatous, stemless. Leaves 1 to few, basal; leaf blade glabrous or nearly so, base broadly cuneate to truncate or cordate. Inflorescences lax, axillary, few- to many-flowered cymes; bracts 2, opposite. Calyx actinomorphic, 5-sect from near base; segments equal. Corolla purple, actinomorphic, inside glabrous; tube rotate, not swollen, ca. 1/2 length of limb, 5–10 mm in diam.; limb 5-lobed, lobe apex acute to rounded. Stamens 5, adnate to corolla near base, exserted; anthers dorsifixed, connate into a tube surrounding style, thecae parallel, not confluent, dehiscing longitudinally; connective with long apical projection; staminodes absent. Disc absent. Ovary ovoid, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigma 1, terminal, depressed globose, undivided. Capsule straight in relation to pedicel, narrowly ellipsoid to narrowly ovoid, ca. 2.5 × longer than calyx, dehiscing loculicidally to base; valves 2, straight, not twisted. Seeds unappendaged.

One species: eastern China and Japan.

1. *Conandron ramondioides* Siebold & Zuccarini, Abh. Math.-Phys. Cl. Königl. Akad. Wiss. 3: 730. 1843.

苦苣苔 *ku ju tai*

Conandron ramondioides var. *taiwanensis* Masamune.

Petiole (0.4–)4–19 cm, glabrous; leaf blade narrowly elliptic to suborbicular, (3–)18–24 × (2–)4.5–14.5 cm, glabrous or glandular puberulent near base, base sometimes oblique, decurrent into petiole wing, broadly cuneate to truncate or cordate, margin irregularly denticulate to dentate, teeth extending down petiole wing, apex acuminate, rarely acute; lateral veins 8–11

on each side of midrib. Cymes 3–23-flowered; peduncle (3–)9–15 cm, glabrescent; bracts linear to narrowly elliptic, 2–4(–10) mm, margin entire, rarely dentate.

Calyx segments narrowly triangular to narrowly lanceolate, 3–7 mm. Corolla 1–1.8 cm in diam., outside glabrous; tube 2–5 mm; limb 5-lobed, lobes triangular-ovate, 6–8 × 3–6 mm. Stamens 5–7 mm. Pistil 5–7 (–9) mm, sparsely glandular. Style 3.5–7 mm. Capsule (5–)7–10 mm. Fl. Jun–Jul, fr. May–Oct.

Streamside rocks, rocky cliffs in forests; 600–1300 m. S Anhui, N Fujian, NE Jiangxi, Taiwan, Zhejiang [Japan].

5. OREOCHARIS Benthham in Benthham & J. D. Hooker, Gen. Pl. 2: 1021. 1876.

马铃苣苔属 *ma ling ju tai shu*

Dasydesmus Craib; *Peranthis* Craib.

Herbs, perennial, epipetric, rarely terrestrial, rhizomatous, stemless. Leaves many, basal; leaf blade puberulent to woolly, rarely glabrous or glabrescent, base cuneate to subcordate. Inflorescences sometimes umbel-like, lax or dense, axillary, 1- to many-flowered cymes; bracts 2, rarely apparently absent or 3, opposite, rarely whorled. Calyx actinomorphic, 5-sect from base; segments equal. Corolla purple to blue or white or yellow to red, zygomorphic, inside glabrous or puberulent; tube campanulate-cylindric to broadly tubular, sometimes ampliate basally, throat sometimes constricted, 1–4 × longer than limb, 2–8(–12) mm in diam.; limb slightly 2-lipped to 2-lipped; adaxial lip 2-lobed, slightly shorter than to nearly as long as abaxial lip; abaxial lip 3-lobed to 3-sect, lobes equal or subequal, apex rounded to acute. Stamens 4, adnate to corolla tube near base to near middle, included, rarely exserted; anthers basifixed, rarely dorsifixed, free, thecae parallel, not confluent, seldom horseshoe-shaped, then thecae divaricate and confluent at apex, dehiscing longitudinally, rarely transversely; connective not projecting; staminode 1, adnate to adaxial side of corolla tube, rarely absent. Disc ringlike. Ovary oblong, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigmas 2, equal, oblate, undivided or rarely 2-lobed, or stigma 1, terminal, oblate to capitate, undivided. Capsule straight in relation to pedicel, oblanceolate-oblong to oblong, much longer than calyx, dehiscing loculicidally to base; valves 2, straight, not twisted. Seeds unappendaged.

About 28 species: southern China, Thailand, Vietnam; 27 species in China.

Oreocharis rhytidophylla C. Y. Wu ex H. W. Li, which is compared to and discussed under *O. benthamii* var. *reticulata* Dunn, is omitted from this treatment because it is known only from fruiting specimens and thus cannot be placed in Pan's sectional classification (Acta Phytotax. Sin. 25: 264–293. 1987). Using only vegetative or fruit characters, it cannot be placed definitively in *Oreocharis*, since other genera (e.g., *Tremacron*, *Isometrum*, and *Ancylostemon*) are virtually indistinguishable in those characters.

Oreocharis is related to *Ancylostemon*, *Tremacron*, and *Isometrum*. As noted above, it can be difficult to distinguish these genera, and some species, notably *O. delavayi*, are intermediate between them. *Oreocharis delavayi* has exserted stamens and adaxial corolla lobes much smaller than abaxial ones, characters which relate it to *Tremacron*. However, the stamens that exceed the mouth do not exceed the abaxial lip lobes, and the adaxial lip lobes are larger than those of species of *Tremacron*. Relationships of and limits among these genera need further examination.

1a. Anthers horseshoe-shaped, 1-loculed, transversely dehiscent; cymes umbel-like, 3–7-flowered 27. *O. flavida*

- 1b. Anthers broadly oblong, 2-loculed, longitudinally dehiscent; cymes cymose, rarely nearly umbel-like, (1–)4- to many flowered.
- 2a. Leaf blade nearly as broad as long, broadly ovate to orbicular or nearly rhombic, to 4(–)6 cm; cymes 1–4-flowered.
- 3a. Leaf blade abaxially villous to woolly, 2.5–6 × 2–4.8 cm, margin coarsely dentate to coarsely crenate or serrate, sometimes also denticulate, apex acute, rarely rounded; stamens adnate to corolla 10–12 mm above base 7. *O. dentata*
- 3b. Leaf blade abaxially sparsely to densely pubescent, 1.2–3.2 × 1.4–2.5 cm, margin shallowly crenate to subentire, apex rounded; stamens adnate to corolla 1–3 mm above base.
- 4a. Leaf blade orbicular, 1.2–2.4 × 1.4–2.2 cm, base cordate; peduncle ca. 7.5 cm; corolla 2.7–3.8 cm, tube cylindric, narrowing toward throat; stamens 5–5.5 mm; pistil 2–5 mm 11. *O. rotundifolia*
- 4b. Leaf blade broadly ovate to suborbicular, 2–3.2 × 1.8–2.5 cm, base slightly oblique, rounded to broadly cuneate; peduncle 10–15(–)22 cm; corolla ca. 1.6 cm, tube campanulate-tubular; stamens 15–18 mm; pistil 2–2.5 cm 17. *O. cavaleriei*
- 2b. Leaf blade usually at least 1.5 × longer than broad, lanceolate to elliptic, oblong, ovate, or obovate, rarely broadly ovate then (1.7–)3–17 cm and cymes 1–10-flowered.
- 5a. Corolla tube narrowing toward mouth, usually distinctly 2-lipped, rarely slightly 2-lipped (unknown in *O. amabilis* and *O. obliqua*).
- 6a. Bracts early deciduous, 0.5–2 mm; peduncle translucent to purple-red glandular pubescent, glabrescent.
- 7a. Leaf blade glabrous adaxially; corolla 1.3–1.6 cm, abaxial lip lobes 3–4.5 mm 9. *O. minor*
- 7b. Leaf blade adaxially densely appressed pubescent; corolla 1.6–2.5 cm, abaxial lip lobes 6–8 mm.
- 8a. Pistil glabrous 6. *O. aurantiaca*
- 8b. Pistil glandular pubescent 8. *O. cordatula*
- 6b. Bracts persistent, 1.5–16 mm; peduncle usually brownish pubescent to woolly.
- 9a. Corolla limb slightly 2-lipped; stamens adnate to corolla 7–10 mm above base, filaments flattened, broadest near apex; indument on most of plant jointed villous 14. *O. heterandra*
- 9b. Corolla limb distinctly 2-lipped; stamens adnate to corolla 0.5–6 mm above base, filaments slender or flattened; indument puberulent to woolly, not jointed.
- 10a. Petiole and leaf blade abaxially villous, at least along veins of young leaves; corolla adaxial lobes 1–4 mm.
- 11a. Calyx segments 2–5 mm; corolla adaxial lobes 1–3 mm.
- 12a. Petiole to 9 cm; leaf blade 2–9 × 0.8–3.5 cm; peduncle and bracts rust-brown villous 10. *O. georgei*
- 12b. Petiole to 4 cm; leaf blade 3–15.5 × 1.5–6.5 cm; peduncle and bracts sparsely to densely rust-brown villous and pubescent 16. *O. forrestii*
- 11b. Calyx segments 5–8 mm; corolla adaxial lobes 3.5–4 mm (unknown in *O. obliqua*).
- 13a. Stamens ca. 1 cm, filaments glabrous; peduncle 7.5–10 cm; leaf blade apex acute to acuminate 13. *O. obliqua*
- 13b. Stamens 4–5 mm, filaments white villous or sparsely pubescent near apex; peduncle 12–40 cm; leaf blade apex acute 12. *O. aurea*
- 10b. Petiole and leaf blade abaxially woolly at least along veins; corolla adaxial lobes 4–10 mm.
- 14a. Leaf blade lanceolate, 2.5–4 × longer than broad, abaxially densely rust-brown woolly 5. *O. cinnamomea*
- 14b. Leaf blade lanceolate-oblong to oblong, elliptic, ovate, or obovate, less than 2.5

- longer than broad, abaxially densely pale brown woolly or glabrescent to pubescent between veins, woolly along veins.
- 15a. Leaf blade 1.5–5.5 × 1–2.5 cm.
- 16a. Leaf blade abaxially densely pale brown woolly; bracts 5–12 × 2–6 mm 1. *O. amabilis*
- 16b. Leaf blade abaxially densely brown woolly along veins, pubescent between; bracts 3–4 × 0.5–1 mm 3. *O. nemoralis*
- 15b. Leaf blade 2–15 × 1–7 cm.
- 17a. Corolla white to pale purple, ca. 1.2 cm, outside sparsely puberulent; bracts ovate, 1.5–3.5 mm wide; stamens 4.5–6.5 mm; staminode ca. 1.2 mm 4. *O. magnidens*
- 17b. Corolla purple, 1.6–2.8 cm, outside sparsely pubescent; bracts linear to narrowly ovate, 0.8–2 mm wide; stamens 7–10 mm; staminode 3–3.5 mm 2. *O. auricula*
- 5b. Corolla tube cylindric or gradually ampliate from base to mouth, usually barely to slightly 2-lipped, occasionally distinctly 2-lipped.
- 18a. Leaf blade adaxially with at least some villous indument.
- 19a. Leaf blade with only villous indument on both surfaces, apex acute to acuminate; bract margin sometimes sparsely dentate 13. *O. obliqua*
- 19b. Leaf blade both villous and pubescent, at least abaxially, apex acute to rounded; bract margin entire.
- 20a. Leaf blade margin serrulate or crenate-serrate; bracts 2–3 × 0.5–1 mm; petiole to 14.5 cm; corolla orange-red, outside pubescent; stamens adnate to corolla 4–6 mm above base
19. *O. dasyantha*
- 20b. Leaf blade margin coarsely double crenate or dentate to serrate; bracts 3–8 × 1–2 mm; petiole to 6.5 cm; corolla yellow, outside glabrous or glandular puberulent; stamens adnate to corolla 1–3 mm above base.
- 21a. Leaf blade oblanceolate to narrowly ovate, 3–15.5 × 1.5–6.5 cm, base cuneate to broadly cuneate; lateral veins 7–11 on each side of midrib; bracts 4–8 mm; corolla abaxial lip lobes 3–5 × 2–4 mm; stamens 2.5–4 mm, filaments glabrous; pistil ca. 4 mm 16. *O. forrestii*
- 21b. Leaf blade elliptic to ovate, 1.4–6 × 0.6–3.5 cm, base broadly cuneate to cordate; lateral veins 4 or 5 on each side of midrib; bracts 3–4 mm; corolla abaxial lip lobes 6–9 × 5–7 mm; stamens 10–14 mm, filaments glandular pubescent; pistil ca. 1.4 cm 18. *O. delavayi*
- 18b. Leaf blade adaxially pubescent to puberulent or glabrescent.
- 22a. Leaf blade lanceolate-oblong to oblong, 2.5–5.5 × 1–2.4 cm; bracts 2–6 mm wide 1. *O. amabilis*
- 22b. Leaf blade ovate to elliptic, lanceolate, oblanceolate, or ovate-orbicular, rarely narrowly oblong, (1.7–)3–17 × 0.8–8 cm; bracts 1–2 mm wide.
- 23a. Peduncle red to purple glandular pubescent to villous; leaf blade narrowly oblong to lanceolate, abaxially densely light brown pannose; lateral veins indistinct; corolla limb 2-lipped; stamens ca. 4 mm; pistil 5–8 mm 15. *O. henryana*
- 23b. Peduncle brown to whitish villous or woolly to pubescent, leaf blade ovate, elliptic, lanceolate, oblanceolate, to ovate-orbicular, abaxially villous or woolly, usually also pubescent; lateral veins adaxially distinct or prominent, rarely indistinct; corolla limb slightly or barely 2-lipped; stamens 5–18 mm; pistil 9–25 mm (unknown in *O. obliqua*).

- 24a. Leaf blade adaxially sparsely villous to glabrescent 13. *O. obliqua*
- 24b. Leaf blade adaxially pubescent or pubescent and villous.
- 25a. Corolla yellow; disc 2–4 mm, deeply 5-lobed to 5-sect from base; stamens 1.3–1.8 cm, filaments sparsely pubescent, villous basally, anther connective sparsely pubescent to pubescent.
- 26a. Bracts 5–10 mm; calyx segments 6–12 mm 25. *O. bodinieri*
- 26b. Bracts 2–5 mm; calyx segments 4–7 mm 26. *O. tubicella*
- 25b. Corolla purple to blue, pink, lavender, orange-red, or greenish; disc 0.8–1.3 mm, entire to shallowly 5-lobed; stamens 0.5–1.3 cm, filaments glabrous to pubescent, anther connective glabrous, rarely puberulent.
- 27a. Leaf blade 3–9 × 1.5–4.5 cm; lateral veins indistinct or distinct; petiole to 4.5 cm.
- 28a. Corolla tube 4–7 mm wide, adaxial lip shallowly 2-lobed, lobes 1.2–3 × 2–3 mm; bracts 1.5–5 mm; calyx segments 2–3 mm 22. *O. tubiflora*
- 28b. Corolla tube 7–10 mm wide, adaxial lip 2-lobed from near base, lobes 3–5 × 4–5 mm; bracts 4–9 mm; calyx segments 4–7 mm 23. *O. maximowiczii*
- 27b. Leaf blade (1.7–)3–17 × 1.5–8 cm; lateral veins distinct to prominent; petiole to 14.5 cm.
- 29a. Bracts 2–3 mm; corolla orange-red, tube campanulate; stigmas 2, equal, suborbicular 19. *O. dasyantha*
- 29b. Bracts 4–13 mm; corolla purple to blue, purple red, pinkish, or greenish, tube nearly cylindrical or broadly tubular to narrowly funnelform; stigma 1, disc-shaped.
- 30a. Leaf blade abaxially ± densely appressed pubescent, apex acute to acuminate; corolla 1.8–2.3 cm 20. *O. argyreia*
- 30b. Leaf blade abaxially sparsely to densely pubescent or densely woolly, veins woolly, apex rounded to acute; corolla 0.7–1.6 cm.
- 31a. Bracts 6–12 mm; corolla tube nearly cylindrical, gradually slightly ampliate from base to mouth, adaxial lip 2-lobed from near middle ... 21. *O. xiangguiensis*
- 31b. Bracts 4–8 mm; corolla tube broadly tubular to narrowly funnelform, gradually ampliate from base to mouth, adaxial lip 2-lobed from near base 24. *O. benthamii*

1. *Oreocharis amabilis* Dunn, J. Linn. Soc., Bot. 38: 362. 1908.

马铃苜苔 ma ling ju tai

Petiole to 6.5 cm, brown woolly; leaf blade lanceolate-oblong to oblong, 2.5–5.5 × 1–2.4 cm, adaxially densely appressed pubescent, abaxially densely pale brown woolly, base rounded to truncate, margin crenate, apex obtuse to rounded; lateral veins 6 or 7 on each side of midrib, obscure. Cymes 3–8-flowered; peduncle 15–17 cm, woolly, glabrescent; bracts 2, lanceolate, 5–12 × 2–6 mm, densely woolly to pubescent, margin entire. Pedicel 2–2.5 cm. Calyx segments lanceolate to narrowly ovate, 2.5–5.5 mm, margin entire. Corolla purple, drying yellow, 1.4–2.2 cm, outside glabrous; tube cylindrical, narrowed at mouth, 0.9–1.4 cm; limb 2-

lipped, lobes narrowly ovate, 6–7 × 2–3 mm. Stamens adnate to corolla near base. Style slightly flattened; stigma 1, disc-shaped. Capsule 2.3–3.7 cm, glabrous. Fr. Nov.

• About 1500 m. Yunnan (Mile Xian).

2. *Oreocharis auricula* (S. Moore) C. B. Clarke in A. & C. de Candolle, Monogr. Phan. 5: 64. 1883.

长瓣马铃苜苔 chang ban ma ling ju tai

Petiole to 7 cm, brown woolly; leaf blade sometimes slightly falcate, narrowly to broadly elliptic to ovate or obovate, 2–12 × 1–5 cm, adaxially woolly or sericeous to glabrescent or sparsely hirsute, abaxially pale brown woolly to glabrescent, densely brown woolly along veins, base sometimes oblique, cuneate to cordate, margin serrate to subentire, serrulate to

crenulate, or crenate-dentate, apex rounded to short acuminate; lateral veins 7–10 on each side of midrib, distinct. Cymes 4–11-flowered; peduncle 6–15 cm, sparsely brownish woolly or pubescent; bracts 2, linear to narrowly ovate, 3–10 × 0.8–2 mm, brown woolly or pubescent, margin entire. Pedicel 0.5–2.5 cm. Calyx segments narrowly triangular to lanceolate or narrowly ovate, 2.5–6 mm, margin entire. Corolla purple, 1.6–2.8 cm, outside sparsely pubescent; tube cylindric, narrowed at mouth, 1–1.5 cm × 3–6 mm; limb 2-lipped; adaxial lip 2-sect from base to 2-lobed from middle, all lobes 4–10 × 1.5–4 mm. Stamens adnate to corolla 2–6 mm above base, 7–10 mm; filaments slender, glabrous; anthers broadly oblong, 2-loculed, dehiscing longitudinally, connective glabrous; staminode 1, 3–3.5 mm. Disc 1.6–2 mm, subentire. Pistil 0.8–1.3 cm, glabrous. Stigma 1, disc-shaped. Capsule 2.4–4.5 cm. Fl. May–Sep, fr. Aug–Nov.

• Shady and damp rocks by streams, in valleys, or under forests on slopes; 200–1800 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan (Xiushan Xian).

- 1a. Leaf blade adaxially woolly to glabrescent, margin serrate to subentire; peduncle sparsely brownish woolly; bracts narrowly ovate to narrowly lanceolate, 3–10 × 1–2 mm, brown woolly, calyx segments narrowly triangular to lanceolate, 3–6 mm, outside densely brownish pubescent, apex acuminate 2a. var. *auricula*
 1b. Leaf blade adaxially sparsely hirsute, margin crenate-dentate; peduncle pubescent; bracts linear, 3–4 × ca. 0.8 mm, pubescent; calyx segments narrowly ovate, 2.5–3 mm, outside sparsely puberulent, apex obtuse to rounded 2b. var. *denticulata*

2a. *Oreocharis auricula* var. *auricula*

长瓣马铃苳苔(原变种) chang ban ma ling ju tai (yuan bian zhong)

Didymocarpus auricula S. Moore, J. Bot. 13: 229. 1875; *Chirita sericea* H. Léveillé & Vaniot (1906), not Ridley (1905); *D. sericeus* H. Léveillé (1906), not Ridley (1896); *Oreocharis esquirolii* H. Léveillé (p. 447, not p. 329); *O. leveilleana* Fedde; *O. sericea* H. Léveillé. Leaf blade sometimes slightly falcate, narrowly to broadly elliptic to ovate or obovate, 2–12 × 1–5 cm, adaxially woolly or sericeous to glabrescent, base sometimes oblique, cuneate to cordate, margin serrate to subentire or serrulate to crenulate. Peduncle sparsely brownish woolly; bracts narrowly ovate to narrowly lanceolate, 3–10 × 1–2 mm, brown woolly. Pedicel glabrescent to sparsely woolly. Calyx segments narrowly triangular to lanceolate, 3–6 mm, outside densely brownish pubescent, apex acuminate. Fl. May–Sep, fr. Aug–Nov.

• Shady and damp rocks by streams, in valleys, or under forests on slopes; 200–1800 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan (Xiushan Xian).

Oreocharis sericea has been included by most authors in *O. auricula*. Pan (Acta Phytotax. Sin. 25: 275–276. 1987) recognized *O. sericea*, citing geography as well as differences in indument on the adaxial leaf surface (densely appressed puberulent in *O. auricula* vs. sericeous-villous in *O. sericea*), the amount of lobing of the adaxial corolla lip, and size of those lobes relative to lobes of abaxial corolla lip (adaxial lip lobes divided from the base to below the middle and equalling or nearly equalling those of the abaxial lip vs. adaxial lip lobes divided only to the middle and shorter than those of the abaxial lip respectively). The distributions of these species overlap throughout most of their ranges, and the characters used form continua as well. Therefore, it is difficult, if not impossible, to distinguish these taxa. The best character for distinguishing them appears to be the corolla lobes; however, fruiting specimens cannot be determined. Because of these difficulties we recognize only one species, *O. auricula*.

Oreocharis sericea has frequently been cited as a combination; however, it is not a combination because both *Chirita sericea* H. Léveillé & Vaniot and *Didymocarpus sericeus* H. Léveillé are later homonyms.

2b. *Oreocharis auricula* var. *denticulata* K. Y. Pan, Acta Phytotax. Sin. 25: 276. 1987.

细齿马铃苳苔 xi chi ma ling ju tai

Leaf blade elliptic to obovate, 4–10 × 1.8–4 cm, adaxially sparsely hirsute, base cuneate, margin crenate-dentate. Peduncle pubescent; bracts linear, 3–4 × ca. 0.8 mm, pubescent. Pedicel pubescent. Calyx segments narrowly ovate, 2.5–3 mm, outside sparsely puberulent, apex obtuse to rounded. Fl. Jul.

• Rocks by streams on slopes. Fujian (Yong'an Xian).

3. *Oreocharis nemoralis* W. Y. Chun, Sunyatsenia 6: 288. 1946.

湖南马铃苳苔 hu nan ma ling ju tai

Petiole to 4 cm, densely brown woolly; leaf blade elliptic to ovate, 1.5–3.5(–4) × 1–2.5 cm, adaxially strigose, abaxially densely brown woolly along veins, pubescent between, base slightly oblique, rounded to slightly cordate, margin irregularly serrulate to crenulate-serrate, rarely denticulate, apex obtuse; lateral veins 5 or 6 on each side of midrib, distinct. Cymes 1–5-flowered; peduncle 6–10 cm, sparsely brownish woolly to glabrescent; bracts 2, linear, 3–4 × 0.5–1 mm, brown woolly, margin entire. Pedicel 5–10 mm. Calyx segments linear, 3–5 mm, margin entire. Corolla purple, 1.3–1.5 cm, outside sparsely pubescent; tube cylindric, narrowed at mouth, ca. 10 × 3–4 mm; limb 2-lipped; adaxial lip 2-sect from near base, lobes 4–6 × 1.5–1.6 mm; abaxial lip lobes 2.5–4 × ca. 1.5 mm. Stamens adnate to corolla 4–5 mm above base, ca. 8 mm; filaments slender, glabrous; anthers broadly oblong, 2-loculed, dehiscing longitudinally, connective glabrous; staminode 1, ca. 1.2 mm. Disc ca. 1.5 mm, entire. Pistil

ca. 1.1 cm, glabrous. Stigma 1, disc-shaped. Capsule 2–2.6 cm.

• Hunan.

4. *Oreocharis magnidens* W. Y. Chun ex K. Y. Pan, Acta Phytotax. Sin. 25: 276. 1987.

大齿马铃苳苔 da chi ma ling ju tai

Petiole to 9 cm, densely pale brown woolly; leaf blade obovate to elliptic, 4–15 × 3–7 cm, adaxially villous, abaxially densely pale brown woolly, glabrescent between veins, base sometimes slightly oblique, cuneate to rounded, margin dentate to crenate or serrate, apex obtuse to rounded; lateral veins 5–9 on each side of midrib, distinct. Cymes 2–12-flowered; peduncle 7–20 cm, glandular pubescent to villous; bracts 2, ovate, 5–6 × 1.5–3.5 mm, brown woolly, margin entire. Pedicel 0.7–2.5 cm. Calyx segments ovate, 2.5–3 mm, margin entire. Corolla white to pale purple, ca. 1.2 cm, outside sparsely puberulent; tube cylindrical, narrowed at mouth, 7.5–12 × 2–3.5 mm; limb 2-lipped; adaxial lip 2-sect from near base, all lobes 4–9 × 1–2 mm. Stamens adnate to 2–3 mm above corolla base, 4.5–6.5 mm; filaments slender, glabrous; anthers broadly oblong, 2-loculed, dehiscing longitudinally, connective glabrous; staminode 1, ca. 1.2 mm. Disc ca. 1.5 mm, slightly undulate. Pistil ca. 8 mm, glabrous. Stigma 1, disc-shaped. Capsule 2.6–3.6 cm. Fl. Jul, fr. Oct.

• Cliffs in valleys of montane regions; 1100–1600 m. Guangxi.

5. *Oreocharis cinnamomea* J. Anthony, Notes Roy. Bot. Gard. Edinburgh 18: 200. 1934.

肉色马铃苳苔 rou se ma ling ju tai

Petiole to 11 cm, densely rust-brown woolly; leaf blade lanceolate, 3–16 × 1.2–4 cm, adaxially sparsely short strigose to rarely brown villous, abaxially densely rust-brown woolly, base narrowly cuneate to broadly cuneate, margin irregularly serrate to dentate or crenate, apex acute to acuminate; lateral veins 5–9 on each side of midrib, sometimes indistinct. Cymes 2–16-flowered; peduncle 10–20 cm, brown villous; bracts 2, linear to narrowly triangular, 1.5–5 × 0.5–1 mm, rust-brown villous to sparsely pubescent, margin entire. Pedicel 0.3–3 cm. Calyx segments narrowly oblong to narrowly triangular, 2–4 mm, margin entire. Corolla greenish yellow to deep orange, 1–1.6 cm, outside pubescent; tube cylindrical, narrowed at mouth, 7–10 × 3.2–5 mm; limb 2-lipped; adaxial lip 2-sect from near base, all lobes 4–5 × 0.2–0.4 mm. Stamens adnate to corolla 0.5–1.5 mm above base, 3.5–4 mm; filaments slender, glabrous; anthers broadly oblong, 2-loculed, dehiscing longitudinally, connective glabrous; staminode 1, ca. 1.2 mm. Disc ca. 1.2 mm, subentire. Pistil 4.5–6 mm, glabrous. Stigma 1, disc-shaped. Capsule 2–3 cm. Fl. Jun–Aug, fr. Aug–Sep.

• Dry shaded rocks or tree branches; 2500–3400 m. SW Sichuan (Muli Xian), NW Yunnan.

6. *Oreocharis aurantiaca* Franchet, Bull. Mens. Soc. Linn. Paris 1: 716. 1888.

橙黄马铃苳苔 cheng huang ma ling ju tai

Perantha aurantiaca (Franchet) Pellegrin; *P. forrestii* Craib.

Petiole to 5(–9.5) cm, densely pale brown woolly; leaf blade rhombic-ovate to narrowly elliptic or lanceolate, 2–5.2 (–9.5) × 1–2.5(–4.5) cm, adaxially densely appressed pubescent, abaxially sparsely to densely pale brown woolly, base sometimes oblique, narrowly cuneate to subcordate, margin coarsely crenate to coarsely dentate or serrate, apex acute to rounded rarely nearly acuminate; lateral veins 3–7 on each side of midrib, frequently indistinct. Cymes 2–10-flowered; peduncle 6–16 cm, translucent to purple-red glandular pubescent, glabrescent; bracts 2, deciduous, ovate to linear, 0.5–1 × 0.2–0.5 mm, pubescent, margin entire. Pedicel 0.7–2.5 cm. Calyx segments subulate to narrowly triangular, 1.5–3.5 mm, margin entire.

Corolla deep orange to orange, 1.6–2.5 cm, outside sparsely glandular pubescent; tube cylindrical, narrowed at mouth, 1.4–1.7 cm × 4–6(–8) mm; limb 2-lipped; adaxial lip shallowly 2-lobed, lobes 2.5–4 × 2–3 mm; abaxial lip lobes 7–8 × 1–2 mm. Stamens adnate to corolla 4–10 mm above base, 6–10 mm; filaments slender, glabrous; anthers broadly oblong, 2-loculed, dehiscing longitudinally, connective glabrous; staminode 1, ca. 3 mm. Disc ca. 2 mm, slightly undulate. Pistil 1.2–1.7 cm, glabrous. Stigma 1, disc-shaped. Capsule 2–3.5 cm. Fl. Jul–Sep, fr. Aug–Oct.

• Dry limestone rocks in thickets on slopes; 1000–3400 m. NW Yunnan.

See notes under *Oreocharis cordatula* and *O. minor*.

7. *Oreocharis dentata* A. L. Weitzman & L. E. Skog in A. L. Weitzman et al., Novon 7: 431. 1998.

川西马铃苳苔 chuan xi ma ling ju tai

Petiole to 3.7 cm, epidermis green, densely red-brown long villous; leaf blade broadly ovate to nearly rhombic, 2.5–6 × 2–4.8 cm, adaxially densely whitish pubescent to villous, abaxially red-brown villous to woolly, hairs longer along veins, base sometimes slightly oblique, cuneate to cordate, margin coarsely dentate to coarsely crenate or serrate, sometimes also denticulate, apex acute, rarely rounded; lateral veins 5 or 6 on each side of midrib, distinct. Cymes 1–4-flowered; peduncle 4–9 cm, epidermis reddish brown, translucent to golden villous; bracts 2, narrowly triangular, 3–5 × ca. 1 mm, villous to densely pubescent, margin entire. Pedicel 1.1–2 cm. Calyx segments narrowly triangular, 4–6 mm, margin entire. Corolla (dry) orange, with red lobes, 1.9–2.4 cm, outside densely glandular pubescent, especially on lobes; tube cylindrical, narrowing slightly toward throat, 1.5–1.8 cm × 4–7 mm; limb 2-lipped; adaxial lip shallowly 2-lobed, lobes 3–4

× ca. 2 mm; abaxial lip central lobe ca. 7.5 × 2 mm, lateral lobes ca. 6 × 2.5 mm. Stamens adnate to corolla 1–1.2 cm above base, 7–8 mm; filaments slender, glabrous or pubescent; anthers broadly oblong, 2-loculed, dehiscing longitudinally, connective glabrous or pubescent; staminode 1, ca. 1.2 mm. Disc ca. 2 mm, 5-lobed, undulate. Pistil ca. 1.3 cm, glabrous. Stigma 1, disc-shaped. Capsule 2.8–4 cm. Fl. Sep.

• W Sichuan.

8. *Oreocharis cordatula* (Craib) Pellegrin, Bull. Soc. Bot. France 72: 873. 1925.

心叶马铃苣苔 xin ye ma ling ju tai

Peranthe cordatula Craib, Notes Roy. Bot. Gard. Edinburgh 10: 214. 1918.

Petiole to 8(–13) cm, densely pale brown woolly; leaf blade ovate-lanceolate to narrowly ovate, 3–7.5 × 1.2–2.5 cm, adaxially densely appressed pubescent, abaxially densely pale brown woolly, base sometimes oblique, cuneate to cordate, margin coarsely crenate to coarsely serrate, apex acute to rounded; lateral veins 5 or 6 on each side of midrib, indistinct. Cymes 1–10-flowered; peduncle 5.5–14 cm, translucent to purple-red glandular pubescent; bracts 2, deciduous, ovate to linear, 0.5–1 × 0.2–0.5 mm, pubescent, margin entire. Pedicel 0.7–2 cm. Calyx segments subulate to narrowly triangular, 1.5–3.5 mm, margin entire. Corolla deep orange to yellow, 1.9–2.4 cm, outside sparsely glandular pubescent; tube cylindrical, narrowed at mouth, 1.2–1.4 cm × 4–6(–8) mm; limb 2-lipped; adaxial lip shallowly 2-lobed, lobes 3–4 × 3–5 mm; abaxial lip lobes 6–7 × ca. 2 mm. Stamens adnate to corolla 3–6 mm above base, 8–11 mm; filaments slender, glabrous; anthers broadly oblong, 2-loculed, dehiscing longitudinally, connective glabrous; staminode 1, ca. 0.5 mm. Disc 2–2.5 mm, subentire. Pistil 1–1.2 cm, glandular pubescent. Stigma 1, disc-shaped. Capsule 2–3 cm. Fl. Jun–Aug, fr. Jul–Sep.

• Limestone by streams in valleys and at montane summits; 1900–3200 m. SW Sichuan (Jiulong Xian, Muli Xian, Yanyuan Xian), Yunnan (Zhongdian Xian).

Oreocharis cordatula is very closely related to *O. aurantiaca*, from which it is separated only by the pubescent pistils. In the opinion of Weitzman and Skog, *O. cordatula* deserves, at most, recognition as a variety of *O. aurantiaca*.

9. *Oreocharis minor* (Craib) Pellegrin, Bull. Soc. Bot. France 72: 873. 1925.

小马铃苣苔 xiao ma ling ju tai

Peranthe minor Craib, Notes Roy. Bot. Gard. Edinburgh 10: 213. 1918.

Petiole to 8 cm, densely pale brown woolly; leaf blade rhombic-ovate to elliptic or lanceolate, 1.6–4.8 × 0.6–1.9 cm, adaxially glabrous, abaxially densely pale brown woolly, base cuneate to subcordate, margin coarsely crenate to coarsely dentate or serrate, apex

acute to rounded; lateral veins 4–6 on each side of midrib, indistinct. Cymes 2–8-flowered; peduncle 6–11 cm, translucent to purple-red glandular pubescent; bracts 2, deciduous, ovate to linear, 0.5–2 × 0.2–0.5 mm, pubescent, margin entire. Pedicel 0.6–1.8 cm. Calyx segments triangular to oblong, 2–2.5 mm, margin entire. Corolla yellow, 1.3–1.6 cm, outside sparsely glandular pubescent to glabrescent; tube cylindrical, narrowed at mouth, 1–1.3 cm × 4–6 mm; limb 2-lipped; adaxial lip shallowly 2-lobed, lobes 3–4 × 2–3 mm; abaxial lip lobes 3–4.5 × 1.5–2 mm. Stamens adnate to corolla 1.8–4 mm above base, 3.5–7 mm; filaments slender, glabrous; anthers broadly oblong, 2-loculed, dehiscing longitudinally, connective glabrous; staminode 1, ca. 1.5 mm. Disc ca. 2 mm, shallow denticulate. Pistil 0.8–1.2 cm, glabrous. Stigma 1, disc-shaped. Capsule 2.5–2.8 cm. Fl. May–Aug, fr. Jul–Aug.

• Dry shady rocks on cliffs in valleys; 2800–3100 m. SW Sichuan (Muli Xian), Yunnan (Lijiang Xian).

Oreocharis minor is very closely related to *O. aurantiaca*. Indeed, the only character which separates them is adaxial leaf surface glabrous in the former. In the opinion of Weitzman and Skog, *O. minor* deserves, at most, recognition as a variety of *O. aurantiaca*.

10. *Oreocharis georgei* J. Anthony, Notes Roy. Bot. Gard. Edinburgh 18: 202. 1934.

剑川马铃苣苔 jian chuan ma ling ju tai

Petiole to 9 cm, rust-brown villous; leaf blade narrowly ovate to elliptic or narrowly obovate, 2–9 × 0.8–3.5 cm, adaxially whitish pubescent, with a few rust-brown hairs, abaxially densely rust-brown villous, glabrescent between veins, base cuneate to nearly rounded, margin crenate to dentate or serrate, apex acute to obtuse or acuminate; lateral veins 4–6 on each side of midrib, distinct. Cymes 1–6-flowered; peduncle 3–13 cm, rust-brown villous; bracts 2, linear, 2–5 × 0.5–1 mm, rust-brown villous, margin entire. Pedicel 1–2.4 cm. Calyx segments narrowly lanceolate to ovate or triangular, 2–4 mm, margin entire. Corolla yellow to orange-yellow, 1.4–1.9 cm, outside sparsely glandular pubescent to glabrescent; tube cylindrical, narrowed at mouth, ca. 1 × 0.4–0.7 mm; limb 2-lipped; adaxial lip 2-sect from near base, lobes 2–3 × 1.5–2 mm; abaxial lip lobes 5–6 × 2.5–3 mm. Stamens adnate to corolla 2–3 mm above base, 3–4 mm; filaments slender, glabrescent to glabrous; anthers broadly oblong, 2-loculed, dehiscing longitudinally, connective glabrous; staminode 1, ca. 1 mm. Disc ca. 2 mm, 5-lobed. Pistil 5–7 mm, glabrous. Stigma 1, disc-shaped. Capsule 1.5–3 cm. Fl. Mar–Jun, fr. Jun–Jul.

• Rocks in forests, forest margins; 2300–3400 m. SW Sichuan, NW Yunnan.

11. *Oreocharis rotundifolia* K. Y. Pan, Acta Phytotax. Sin. 25: 280. 1987.

圆叶马铃苣苔 yuan ye ma ling ju tai

Petiole to 4 cm, rust-brown villous; leaf blade orbicular, 1.2–2.4 × 1.4–2.2 cm, adaxially appressed pubescent, abaxially sparsely pubescent, base cordate, margin crenulate, apex rounded; lateral veins 4 or 5 on each side of midrib, distinct. Cymes 1–3-flowered; peduncle ca. 7.5 cm, rust-brown villous; bracts 2, oblong, 2.5–4 × ca. 1.5 mm, rust-brown villous, margin entire. Pedicel ca. 2 cm. Calyx segments oblong, ca. 5 mm, margin entire. Corolla yellow, ca. 1.6 cm, outside pubescent; tube cylindric, narrowing toward throat, ca. 9 × 4 mm; limb 2-lipped; adaxial lip 2-sect from near base, lobes ca. 3.5 × 2.5 mm; abaxial lip lobes 4.5–5.5 × ca. 3 mm. Stamens adnate to corolla 1.2–1.5 mm above base, 5–5.5 mm; filaments slender, pubescent; anthers broadly oblong, 2-loculed, dehiscing longitudinally, connective glabrous; staminode 1, ca. 1 mm. Disc 1–1.5 mm, 5-lobed from near middle. Pistil 2–5 mm; ovary glabrous. Style pubescent; stigma 1, disc-shaped. Capsule ca. 1.5 cm. Fr. Oct.

• Rocks in forests; ca. 2100 m. Yunnan (Pingbian Xian).

12. *Oreocharis aurea* Dunn, Bull. Misc. Inform. Kew 1908: 19. 1908.

黄马铃苣苔 *huang ma ling ju tai*

Petiole to 12 cm, densely brownish villous; leaf blade lanceolate to ovate, 5–15.5 × 3.4–8 cm, adaxially sparsely appressed pubescent and villous or densely pubescent, abaxially appressed pubescent and villous or villous, glabrescent, especially between veins, base sometimes slightly oblique, broadly cuneate to cordate, margin serrate to crenate, often doubly so, apex acute; lateral veins 7–10 on each side of midrib, distinct. Cymes 3–10-flowered; peduncle 12–40 cm, rust-brown villous; bracts 2, lanceolate to narrowly lanceolate, 6–16 × 1–5 mm, rust-brown villous, margin entire or sparsely dentate to serrate. Pedicel 0.5–4.5 cm. Calyx segments lanceolate to linear, 6–10 mm, margin 2- or 3-denticulate or entire. Corolla yellow, 1.2–2.2 cm, outside pubescent; tube cylindric, narrowed at mouth, 0.8–1.4 cm × 3–6 mm; limb 2-lipped; adaxial lip 2-sect from near base, lobes 3.5–4 × 1.5–2 mm; abaxial lip lobes ca. 5–6 × 2.5–3.5 mm. Stamens adnate to corolla 2–5 mm above base, 4–5 mm; filaments flattened to slender, sparsely pubescent near apex or white villous; anthers broadly oblong, 2-loculed, dehiscing longitudinally, connective glabrous; staminode 1, 0.5–2 mm. Disc 1–2 mm, 5-lobed. Pistil 8–10 mm, glabrous to sparsely glandular puberulent. Stigma 1, disc-shaped. Capsule 2.8–3.7 cm. Fl. Aug–Sep, fr. Sep–Oct.

Shady and damp rocks under forests, near streams, or epiphytic; 1400–2400 m. Yunnan [N Vietnam].

1a. Bracts 9–16 × 1.5–5 mm; pedicel 2–4.5 cm; calyx segments margin 2- or 3-denticulate, rarely nearly entire; filaments sparsely pubescent near apex; staminode ca. 0.5 mm 12a. var. *aurea*

1b. Bracts 6–9 × 1–1.5 mm; pedicel 0.5–2 cm; calyx segments margin entire; filaments white villous; staminode ca. 2 mm 12b. var. *cordato-ovata*

12a. *Oreocharis aurea* var. *aurea*

黄马铃苣苔(原变种) *huang ma ling ju tai* (yuan bian zhong)

Bracts lanceolate, 0.9–1.6 cm × 1.5–5 mm, margin sometimes sparsely dentate to serrate. Pedicel 2–4.5 cm. Calyx segments margin 2- or 3-denticulate, rarely nearly entire. Filaments sparsely pubescent near apex; staminode ca. 0.5 mm. Disc ca. 2 mm. Fl. Aug–Sep, fr. Sep–Oct.

Shady and damp rocks under forests or epiphytic; 1400–2400 m. SE Yunnan [N Vietnam].

12b. *Oreocharis aurea* var. *cordato-ovata* (C. Y. Wu ex H. W. Li) K. Y. Pan, A. L. Weitzman, & L. E. Skog in A. L. Weitzman et al., Novon 7: 430. 1998.

卵心叶马铃苣苔 *luan xin ye ma ling ju tai*

Oreocharis cordato-ovata C. Y. Wu ex H. W. Li, Bull. Bot. Res., Harbin 3(2): 7. 1983.

Bracts linear-lanceolate, 6–9 × 1–1.5 mm, margin entire. Pedicel 0.5–2 cm. Calyx segments margin entire. Filaments white villous; staminode ca. 2 mm. Disc ca. 1 mm. Fl. Aug–Sep.

• Rocks by streams in valleys; 1400–1500 m. Yunnan (Xichou Xian).

13. *Oreocharis obliqua* C. Y. Wu ex H. W. Li, Bull. Bot. Res., Harbin 3(2): 6. 1983.

斜叶马铃苣苔 *xie ye ma ling ju tai*

Petiole to 8 cm, brown villous; leaf blade oblique, ovate to elliptic, (3.5–)5.5–14 × 2–5.5 cm, adaxially sparsely villous to glabrescent, abaxially villous, hairs to 3 mm, glabrescent, especially between veins, base usually oblique, cuneate to rounded, margin serrate, apex acute to acuminate; lateral veins 7–11 on each side of midrib, distinct. Cymes (2–)5–10-flowered; peduncle 7.5–10 cm, brown villous; bracts 2, linear, 5–9 × 1–1.5 mm, brownish villous, margin sometimes sparsely dentate. Fruiting pedicel 0.7–2.5 cm. Persistent fruiting calyx segments linear to narrowly lanceolate, 5–8 mm, margin entire. Corolla 1.7–2.4 cm; tube cylindric, narrowed at mouth; adaxial lip 7–9 mm; abaxial lip 2.5–3.5 mm. Stamens adnate to corolla 5–6 mm above base, ca. 1 cm; filaments flattened to slender, glabrous; anthers broadly oblong, 2-loculed, dehiscing longitudinally, connective glabrous; staminode 1, ca. 2 mm. Persistent stigma 1, disc-shaped. Capsule 2.5–3 cm, glabrous.

• In shady and damp mixed forest; 1400–2300 m. Yunnan (Maguan Xian).

14. *Oreocharis heterandra* D. Fang & D. H. Qin in D. Fang, D. H. Qin, & X. H. Lu, Acta Phytotax. Sin. 32: 563. 1994.

异蕊马铃苣苔 *yi rui ma ling ju tai*

Petiole to 4 cm, jointed villous; leaf blade broadly elliptic-ovate to broadly elliptic, 7–10.5 × 4.5–6 cm, adaxially densely appressed jointed villous, abaxially

sparsely jointed villous and densely so along veins, base broadly cuneate to subrounded, margin serrate, apex obtuse to acute; lateral veins 6–8 on each side of midrib. Cymes 5–9-flowered; peduncle 6–13.5 cm, jointed villous; bracts 2, narrowly lanceolate, 5–8 mm, jointed villous. Calyx segments narrowly lanceolate, 5–7 mm, margin entire. Corolla purple-blue, ca. 2.5 cm, outside sparsely glandular puberulent; tube cylindric, narrowed slightly at mouth, ca. 1.5 × 0.5 cm; limb slightly 2-lipped, lobes 8–10 × 3–4 mm. Stamens adnate to corolla 7–10 mm above base, 8–11 mm; filaments flattened, broadest near apex, sparsely glandular puberulent; 2-loculed, dehiscing longitudinally; staminode 1, minute. Disc 4-crenulate. Pistil glabrous. Stigma 1, disc-shaped. Fruit unknown. Fl. Oct.

•Rocks; ca. 1300 m. Guangxi.

Known only from the type collection which was not seen by the authors of this treatment.

15. *Oreocharis henryana* Oliver, Hooker's Icon. Pl. 20: pl. 1944. 1890.

川滇马铃苣苔 chuan dian ma ling ju tai

Oreocharis squamigera H. Léveillé.

Petiole to 10 cm, densely light brown pannose; leaf blade narrowly oblong to lanceolate, 2–8.3 × 1–3.5 cm, adaxially pubescent to densely pubescent, abaxially densely light brown pannose, base cuneate to auriculate, margin irregularly crenate to serrate or dentate, apex acute to obtuse; lateral veins 5–7 on each side of midrib, indistinct. Cymes 4–10-flowered; peduncle 7–18 cm, red to purple glandular pubescent to villous; bracts 2, linear to subulate, often deciduous, 4–5 × 0.3–0.5 mm, villous, margin entire. Pedicel 0.5–4 cm. Calyx segments linear-lanceolate, 3–5 mm, margin entire. Corolla purple to deep purple, 7–11 mm, outside glabrous; tube campanulate, 5–6 × 4–6 mm; limb 2-lipped; adaxial lip 2-sect from near base, all lobes 2–4 × 1.5–3 mm. Stamens adnate to corolla 1–2 mm above base, ca. 4 mm; filaments flattened, glabrous; anthers broadly oblong, 2-loculed, dehiscing longitudinally, connective glabrous; staminode 1, ca. 1 mm. Disc ca. 2 mm, entire. Pistil 5–8 mm, glabrous. Stigma 1, disc-shaped. Capsule 2.2–3.3 cm. Fl. Jul–Sep, fr. Oct.

•Shady and damp rocks in montane regions; 600–3000 m. S Gansu, Sichuan, N Yunnan.

16. *Oreocharis forrestii* (Diels) Skan, Bot. Mag. 143: pl. 8719. 1917.

丽江马铃苣苔 li jiang ma ling ju tai

Roettlera forrestii Diels, Notes Roy. Bot. Gard. Edinburgh 5: 224. 1912.

Petiole to 4 cm, densely rust-brown villous; leaf blade oblanceolate to narrowly ovate, 3–15.5 × 1.5–6.5 cm, adaxially sparsely rust-brown villous and white pubescent, abaxially densely rust-brown villous and white pubescent, base cuneate to broadly cuneate, margin irregularly coarsely double dentate to serrate, apex acute to obtuse; lateral veins 7–11 on each side of

midrib, distinct. Cymes 2–10-flowered; peduncle 4–14 cm, sparsely to densely rust-brown villous and pubescent; bracts 2, linear to linear-lanceolate, 4–8 × 1–2 mm, sparsely rust-brown villous or pubescent, margin entire. Pedicel 0.8–2.8 cm. Calyx segments lanceolate to narrowly lanceolate, 3–5 mm, margin entire. Corolla yellow, 1.5–1.8 cm, outside glandular puberulent; tube broadly cylindric, sometimes narrowed at mouth, 9–11 × 5–8 mm; limb 2-lipped; adaxial lip 2-sect from near base, lobes 1–2 × 1–2 mm; abaxial lip lobes 3–5 × 2–4 mm. Stamens adnate to corolla 1–2 mm above base, 2.5–4 mm; filaments flattened, glabrous; anthers broadly oblong, 2-loculed, dehiscing longitudinally, connective glabrous; staminode 1, ca. 1 mm. Disc ca. 1 mm, entire. Pistil ca. 4 mm, glabrous. Stigma 1, disc-shaped. Capsule 1.5–2.5 cm. Fl. Jul–Aug, fr. Sep–Oct.

•Rocks and tree branches in forests on slopes; 2300–3600 m.

Sichuan (Yanyuan Xian), Yunnan (Lijiang Xian).

17. *Oreocharis cavaleriei* H. Léveillé, Repert. Spec. Nov. Regni Veg. 7: 258. 1909.

贵州马铃苣苔 gui zhou ma ling ju tai

Petiole to 6 cm, brown villous; leaf blade broadly ovate to suborbicular, 2–3.2 × 1.8–2.5 cm, pale brown pubescent, abaxially more densely so, sometimes with darker hairs along veins, base slightly oblique, rounded to broadly cuneate, margin shallowly crenate to subentire, apex rounded; lateral veins ca. 4 on each side of midrib, indistinct. Cymes 1- or 2-flowered; peduncle 10–15(–22) cm, rust-brown villous; bracts 2, lanceolate, 2–4 × ca. 0.5 mm, rust-brown villous, margin entire. Pedicel 1.4–2 cm. Calyx segments linear-lanceolate, 6–8 mm, margin entire. Corolla yellowish basally to reddish near apex (dry), 2.7–3.8 cm, outside pubescent; tube campanulate-tubular, 1.8–2.4 × 1–1.2 cm; limb strongly 2-lipped; adaxial lip 2-sect from base, lobes ca. 8 × 2 mm; abaxial lip lobes 3–4 × 3–4 mm. Stamens adnate to corolla 1–3 mm above base, 1.5–1.8 cm; filaments slender, sparsely pubescent; anthers broadly oblong, 2-loculed, dehiscing longitudinally, connective glabrous; staminode apparently absent. Disc 0.6–1 mm, entire. Pistil 2–2.5 cm, pubescent toward apex. Stigmas 2, flabellate. Capsule 3–4 cm. Fl. and fr. Sep.

•Guizhou (Longli Xian).

18. *Oreocharis delavayi* Franchet, Bull. Mens. Soc. Linn. Paris 1: 715. 1888.

椭圆马铃苣苔 tuo yuan ma ling ju tai

Oreocharis elliptica J. Anthony; *O. elliptica* var. *parvifolia* W. T. Wang & K. Y. Pan ex K. Y. Pan.

Petiole to 6.5 cm, rust-brown villous; leaf blade elliptic to ovate, 1.4–6 × 0.6–3.5 cm, gray pubescent and sparsely rust-brown villous, base sometimes oblique, broadly cuneate to cordate, margin coarsely double crenate to serrate, apex obtuse to acute; lateral veins 4 or 5 on each side of midrib, distinct. Cymes 1–7-flowered; peduncle 4–13 cm, sparsely brown villous; bracts 2, linear to lanceolate, 3–4 × ca. 1 mm, brown

villous, margin entire. Pedicel 0.5–1.5 cm. Calyx segments narrowly lanceolate, 3–4.5 mm, margin entire. Corolla yellow, 1.2–1.8 cm, outside glabrous; tube campanulate-tubular, 6–8 (–10) × 5–6 mm; limb slightly 2-lipped; adaxial lip shallowly 2-lobed, lobes 2–5 × 3–4 mm; abaxial lip lobes 6–9 × 5–7 mm. Stamens adnate to corolla 1–3 mm above base, 1–1.4 cm; filaments slender, glandular pubescent; anthers broadly oblong, 2-loculed, dehiscing longitudinally, connective glabrous; staminode 1, ca. 1 mm. Disc 0.8–1.5 mm, entire. Pistil ca. 1.4 cm, glabrous. Stigma 1, disc-shaped. Capsule 1.8–3.5 cm. Fl. May–Jul, fr. Sep–Oct.

• Shady and damp rocks or tree trunks on slopes or near streams; 2100–3400 m. SW Sichuan, E Xizang, NW Yunnan.

The holotype of *Oreocharis delavayi* from Lankong (*Delavay 127*, P) is extremely similar to *O. elliptica* in both external morphology and floral structure. Leaves vary in size even on a single specimen.

19. *Oreocharis dasyantha* W. Y. Chun, *Sunyatsenia* 6: 287. 1946.

毛花马铃薯苔 *mao hua ma ling ju tai*

Petiole to 14.5 cm, densely pale brown villous or woolly; leaf blade ovate-elliptic to broadly ovate, 6–12 × 4.5–6.5 cm, adaxially gray to brown pubescent or pubescent and villous, abaxially sparsely to densely gray or gray-brown pubescent, brown villous along veins, base often oblique, cuneate to subrounded or cordate, margin serrulate or crenate-serrate, apex acute to rounded; lateral veins 5–7 on each side of midrib, distinct. Cymes 1–8-flowered; peduncle 10–17 cm, pale brown villous; bracts 2, linear to narrowly triangular, 2–3 × 0.5–1 mm, densely villous, margin entire. Pedicel 1–1.8 cm. Calyx segments narrowly lanceolate, 3–6 mm, margin entire. Corolla orange-red, 1.6–2.4 cm, outside pubescent; tube campanulate, 0.9–2 cm × 6–7 mm; limb barely 2-lipped; adaxial lip shallowly 2-lobed, lobes 3–5 (–7) × 4–5 (–8) mm; abaxial lip lobes 7–8 × 5–6 mm. Stamens adnate to corolla 4–6 mm above base, ca. 1.2 cm; filaments slender, pubescent; anthers broadly oblong, 2-loculed, dehiscing longitudinally, connective glabrous; staminode apparently absent. Disc ca. 1 mm, entire. Pistil 1.2–1.3 cm, glabrous. Stigmas 2, equal, suborbicular. Capsule 3.5–4 cm. Fl. Feb, Oct, fr. Oct.

• Hainan.

- 1a. Leaf blade adaxially gray pubescent, base oblique, subrounded to cordate, margin serrulate; petiole to 14.5 cm, densely pale brown villous; cymes 1–3 (or 4)-flowered; corolla 1.7–2.4 cm, tube 1.1–2 cm 19a. var. *dasyantha*
- 1b. Leaf blade adaxially gray to brown pubescent and villous, base sometimes oblique, cuneate to subcordate, margin crenate-serrate; petiole to 6 cm, densely pale brown woolly; cymes 3–8-flowered;

corolla ca. 1.6 cm, tube 9–1.1 mm

..... 19b. var. *ferruginosa*

19a. *Oreocharis dasyantha* var. *dasyantha*

毛花马铃薯苔(原变种) *mao hua ma ling ju tai* (yuan bian zhong)

Petiole to 14.5 cm, densely pale brown villous; leaf blade adaxially gray pubescent, abaxially densely gray pubescent, pale brown villous along veins, base oblique, subrounded to cordate, margin serrulate. Cymes 1–3 (or 4)-flowered. Corolla 1.7–2.4 cm; tube 1.1–2 cm. Fruit unknown. Fl. Feb.

• Hainan (Baisha Xian).

19b. *Oreocharis dasyantha* var. *ferruginosa* K. Y. Pan, *Acta Phytotax. Sin.* 25: 283. 1987.

锈毛马铃薯苔 *xiu mao ma ling ju tai*

Petiole to 6 cm, densely pale brown woolly; leaf blade adaxially gray to brown pubescent and villous, abaxially sparsely gray-brown pubescent, brown villous along veins, base sometimes oblique, cuneate to subcordate, margin crenate-serrate. Cymes 3–8-flowered. Corolla ca. 1.6 cm; tube 0.9–1.1 cm.

Capsule 3.5–4 cm. Fl. and fr. Oct.

• Rocks in forests. Hainan (Ding'an Xian).

20. *Oreocharis argyreia* W. Y. Chun in K. Y. Pan, *Acta Phytotax. Sin.* 25: 283. 1987.

紫花马铃薯苔 *zi hua ma ling ju tai*

Petiole to 8 (–13) cm, densely appressed villous; leaf blade elliptic to ovate or linear-lanceolate to oblanceolate, 3.7–16 × 0.8–6.5 cm, ± densely appressed pubescent, base cuneate to subrounded or narrowly cuneate, margin nearly entire, apex acute to acuminate; lateral veins 5–7 on each side of midrib, distinct.

Cymes 2–12-flowered; peduncle 10–20 cm, light brown appressed pubescent; bracts 2, lanceolate, 0.8–1.3 cm × 1.5–2 mm, appressed pubescent or villous, margin entire. Pedicel 0.9–2.5 cm. Calyx segments narrowly lanceolate to narrowly triangular, 6–8 mm, margin entire or several denticulate. Corolla blue-purple to pinkish white or greenish, 1.8–2.3 cm, outside pubescent to glabrescent; tube nearly cylindrical, gradually slightly ampliate from base to mouth, 1.4–2 cm × 3–6 mm; limb slightly 2-lipped; adaxial lip 2-lobed from near middle, lobes 1.5–2 × 1.5–2 mm; abaxial lip lobes 3.5–5.5 × 2.5–3 mm. Stamens adnate to corolla 5–7 mm above base, 6–13 mm; filaments slender, slightly flattened, glabrous; anthers oblong, 2-loculed, dehiscing longitudinally, connective glabrous; staminode 1, ca. 1.2 mm. Disc ca. 1.2 mm, shallowly 5-lobed to subentire. Pistil 0.9–1.8 cm; ovary glabrous or pubescent toward style. Style glabrous or pubescent; stigma 1, disc-shaped. Capsule 3–4.5 cm. Fl. Jun–Oct, fr. Aug–Oct.

• Rocks; 500–700 m. Guangdong, Guangxi.

- 1a. Leaf blade elliptic to ovate, 5.5–16 × 2.7–6.5 cm, base cuneate to subrounded; calyx

segment margin entire; corolla blue-purple to pinkish white, tube 5–6 mm wide; ovary and style glabrous 20a. var. *argyreia*

- 1b. Leaf blade linear-lanceolate to oblanceolate, 3.7–10.1 × 0.8–2.4 cm, base narrowly cuneate; calyx segment margin several denticulate; corolla green, tube ca. 3 mm wide; ovary distally pubescent; style pubescent 20b. var. *angustifolia*

20a. *Oreocharis argyreia* var. *argyreia*

紫花马铃苣苔(原变种) *zi hua ma ling ju tai* (*yuan bian zhong*)

Leaf blade elliptic to ovate, 5.5–16 × 2.7–6.5 cm, base cuneate to subrounded. Calyx segments margin entire. Corolla blue-purple to pinkish white; tube 5–6 mm wide. Pistil glabrous. Fl. Jun–Oct, fr. Aug–Oct.

•Rocks under forests on slopes. Guangdong, Guangxi.

20b. *Oreocharis argyreia* var. *angustifolia* K. Y. Pan, Acta Phytotax. Sin. 25: 285. 1987.

窄叶马铃苣苔 *zhai ye ma ling ju tai*

Leaf blade linear-lanceolate to oblanceolate, 3.7–10.1 × 0.8–2.4 cm, base narrowly cuneate. Calyx segments margin several denticulate. Corolla green; tube ca. 3 mm wide. Ovary distally pubescent. Style pubescent. Fl. Jun–Oct.

•Rocks; 500–700 m. Guangxi (Shangsi Xian).

21. *Oreocharis xiangguiensis* W. T. Wang & K. Y. Pan in K. Y. Pan, Acta Phytotax. Sin. 25: 285. 1987.

湘桂马铃苣苔 *xiang gui ma ling ju tai*

Petiole to 14 cm, light brown pannose; leaf blade oblong elliptic to oblanceolate or narrowly ovate, 5–15.5 × 2.5–7 cm, adaxially sparsely puberulent to pubescent, abaxially sparsely pubescent, brownish woolly along veins, base oblique, rounded to cuneate, margin crenate to serrate, apex obtuse to acute; lateral veins 7–10 on each side of midrib, distinct. Cymes (3–) 5–15(–20)-flowered; peduncle 10–23 cm, densely pubescent; bracts 2, lanceolate to oblong lanceolate, 6–12 × 1–2 mm, pubescent to densely pubescent, margin entire. Pedicel 0.5–1.8 cm. Calyx segments lanceolate, 3–5 mm, margin entire. Corolla purple-red, 1.3–1.6 cm, outside puberulent; tube nearly cylindrical, gradually slightly ampliate from base to mouth, 0.9–1.3 cm × 4–5 mm; limb slightly 2-lipped; adaxial lip 2-lobed from near middle, lobes 2.2–3 × 1.5–2 mm; abaxial lip lobes 4–4.5 × 3–4 mm. Stamens adnate to corolla 1.5–5 mm above base, 5.5–7.5 mm; filaments slender, slightly flattened, glabrescent; anthers broadly oblong, 2-loculed, dehiscing longitudinally, connective glabrous; staminode 1, ca. 0.5 mm. Disc ca. 1.2 mm, entire. Pistil ca. 1.2 cm, glabrous. Stigma 1, disc-shaped, slightly concave. Capsule ca. 3.5 cm. Fl. Aug–Sep, fr. Sep–Oct.

•Rocks on slopes, near roads or by streams in valleys; 800–1400 m. NE Guangxi, S Hunan.

Oreocharis xiangguiensis is closely related to *O. benthamii*, from which it differs in having longer bracts (usually), less flared corolla tube, and adaxial lip lobed only from near middle instead of from base. Weitzman and Skog believe that these characters are rather variable and overlap in both taxa, and they would include *O.*

xiangguiensis in synonymy with *O. benthamii*.

22. *Oreocharis tubiflora* K. Y. Pan, Acta Phytotax. Sin. 25: 287. 1987.

筒花马铃苣苔 *tong hua ma ling ju tai*

Petiole to 4 cm, densely light brown woolly; leaf blade ovate to narrowly elliptic, 3.5–9 × 1.9–4 cm, adaxially densely gray pubescent, abaxially light brown woolly, densely brown woolly along veins, base slightly oblique, cuneate to rounded, margin serrulate to serrate or crenate, apex rounded to acute; lateral veins 5–7 on each side of midrib, indistinct. Cymes 3–8-flowered; peduncle 9–16 cm, sparsely glandular pubescent; bracts 2, linear to lanceolate, 1.5–5 × 1–1.5 mm, pubescent to woolly, margin entire to shallowly dentate. Pedicel 0.6–1.5 cm. Calyx segments lanceolate, 2–3 mm, margin entire. Corolla purple, 1.8–2.2 cm, outside glabrous; tube broadly tubular, gradually ampliate from base to mouth, 1.7–1.9 cm × 4–7 mm; limb barely 2-lipped; adaxial lip shallowly 2-lobed, lobes 1.2–3 × 2–3 mm; abaxial lip lobes 5–7 × 3–5 mm. Stamens adnate to corolla 5–6 mm above base, 1–1.4 cm; filaments slender, glabrous; anthers broadly oblong, 2-loculed, dehiscing longitudinally, connective glabrous; staminode 1, ca. 0.4 mm. Disc 1–1.3 mm, nearly entire. Pistil 1.5–2 cm, glabrous. Stigma 1, disc-shaped. Capsule 2.2–3.5 cm. Fl. Apr–Sep.

•Rocks; 500–700 m. Fujian.

23. *Oreocharis maximowiczii* C. B. Clarke in A. & C. de Candolle, Monogr. Phan. 5: 63. 1883.

大花石上莲 *da hua shi shang lian*

Oreocharis fokiensis Franchet.

Petiole to 4.5 cm, densely brown woolly; leaf blade ovate to lanceolate or elliptic, rarely obovate, 3–9 × 1.5–4.5 cm, adaxially densely pubescent, abaxially densely pubescent, densely brown woolly along veins, base sometimes slightly oblique, cuneate to rounded, margin serrate, apex rounded to acute; lateral veins 6–9 on each side of midrib, distinct or indistinct. Cymes (1–)3–15-flowered; peduncle 4.5–24 cm, sparsely pubescent or brown woolly and glandular pubescent; bracts 2, oblong to lanceolate, 4–9 × 1–2 mm, densely brown woolly, margin entire. Pedicel 0.4–1.5(–3) cm. Calyx segments oblong to lanceolate or ovate, 4–7 mm, margin entire. Corolla pink to lavender, 1.5–2.5 cm, outside glabrous to puberulent; tube narrowly campanulate to broadly tubular, ampliate from base to mouth, 1.3–2 × 0.7–1 cm; limb barely 2-lipped; adaxial lip 2-sect from near base, all lobes 3–5 × 4–5 mm. Stamens adnate to corolla 5–10 mm above base, 8–10 mm; filaments slender, glabrous; anthers broadly oblong, 2-loculed, dehiscing longitudinally, connective glabrous; staminode 1, 0.5(–) 7) mm. Disc ca. 1.2 mm, entire. Pistil often slightly

exserted, 1.6–2.5 cm, glabrous to sparsely puberulent. Stigma 1, disc-shaped. Capsule 4–5 cm. Fl. Apr–Jun, fr. Jun.

•Rocks of slopes, near road and under forests; 200–800 m. Fujian, Jiangxi.

24. *Oreocharis benthamii* C. B. Clarke in A. & C. de Candolle, Monogr. Phan. 5: 63. 1883.

大叶石上莲 da ye shi shang lian

Petiole to 8 cm, densely light brown woolly to pannose; leaf blade elliptic to ovate or ovate-orbicular, (1.7–)3–17 × 1.5–8 cm, adaxially densely pubescent, abaxially densely pubescent to densely woolly, densely brown woolly along veins, base oblique, cordate to cuneate, margin shallowly serrate or crenate to entire, apex rounded to acute; lateral veins 6–9 on each side of midrib, ± prominent. Cymes 8–15-flowered; peduncle 2–22 cm, densely pale brown woolly to pubescent; bracts 2, subulate to linear or narrowly lanceolate, 4–8 × ca. 1 mm, densely pale brown woolly to pubescent, margin entire. Pedicel 0.5–1.5 cm. Calyx segments elliptic-lanceolate to linear, rarely ovate, 4–7 mm, margin entire. Corolla purple to blue, 0.7–1.5 cm, outside pubescent to puberulent; tube broadly tubular to narrowly funnellform, gradually ampliate from base to mouth, 5.5–10 × 3–6 mm; limb slightly 2-lipped; adaxial lip 2-sect from near base, lobes 2.7–4(–5) × 2.4–3.8 mm. Stamens adnate to corolla 0.5–5 mm above base, 5–10 mm; filaments slender, glabrous to pubescent; anthers broadly oblong, 2-loculed, dehiscing longitudinally, connective glabrous to puberulent; staminode 1, ca. 0.2 mm. Disc ca. 0.8 mm, entire. Pistil 9–10 mm, glabrous. Stigma 1, disc-shaped. Capsule 2–3.5 cm. Fl. Apr–Oct, fr. Aug–Nov.

•Rocks in valleys and forests or cliffs; 200–1400 m. Guangdong, Guangxi, SW Hunan, SE Jiangxi.

1a. Leaf blade oblong to ovate, 5.5–14 × 3–8

cm; lateral veins less prominent 26a. var. *benthamii*

1b. Leaf blade ovate-orbicular, 3.9–8 × 2.9–5

cm; lateral veins more prominent 26b. var. *reticulata*

24a. *Oreocharis benthamii* var. *benthamii*

大叶石上莲(原变种) da ye shi shang lian (yuan bian zhong)

Didymocarpus oreocharis Hance.

Leaf blade oblong to ovate, 5.5–14 × 3–8 cm; lateral veins less prominent.

•Rocks; 200–1400 m. Guangdong, Guangxi, SW Hunan, SE Jiangxi.

24b. *Oreocharis benthamii* var. *reticulata* Dunn, J. Linn. Soc., Bot. 38: 362. 1908.

石上莲 shi shang lian

Leaf blade ovate-orbicular, 3.9–8 × 2.9–5 cm; lateral veins more prominent.

•Rocks of hilly regions; 300–1000 m. Guangdong, Guangxi.

Oreocharis rhytidophylla C. Y. Wu ex H. W. Li (Bull. Bot. Res., Harbin 3(2): 9. 1983) is similar to *O. benthamii* var. *reticulata* and differs in having adaxially glabrous, dentate-crenate leaf blades.

Because only one specimen without flowers is known, it cannot be included in the key and its systematic position is uncertain.

25. *Oreocharis bodinieri* H. Léveillé, Bull. Acad. Int. Géogr. Bot. 25: 40. 1915.

毛药马铃苳苔 mao yao ma ling ju tai

Dasydesmus bodinieri (H. Léveillé) Craib.

Petiole to 5 cm, densely brown villous; leaf blade broadly ovate to narrowly ovate, often oblique, 3–9 × 2.2–6.5 cm, appressed pubescent, abaxially densely brown villous along veins, base oblique, cordate to rounded, margin double dentate to serrate, apex acute; lateral veins 5–7 on each side of midrib, distinct.

Cymes 3–10-flowered; peduncle 9–15 cm, light brown villous; bracts 2, narrowly lanceolate, 5–10 × 1–1.5 mm, pubescent, margin entire. Pedicel 0.4–1.7 cm. Calyx segments narrowly triangular to narrowly lanceolate, 6–12 mm, margin entire or sparsely dentate to serrate. Corolla yellow, 1.5–2.3 cm, outside pubescent; tube nearly cylindrical, gradually slightly ampliate from base to mouth, 1.6–1.9 cm × 4–6 mm; limb slightly 2-lipped; adaxial lip 2-lobed from near middle, lobes 1.5–3 × 2–2.2 mm; abaxial lip lobes 3–5 × 3–3.5 mm. Stamens adnate to corolla 2–5.5 mm above base, sometimes slightly exserted, 1.5–1.8 cm; filaments slender, sparsely pubescent, villous basally; anthers oblong, 2-loculed, dehiscing longitudinally, connective sparsely pubescent to pubescent; staminode 1, ca. 1 cm. Disc ca. 4 mm, deeply 5-lobed to 5-sect from base. Pistil 1.6–2.3 cm, glabrous. Stigma 1, disc-shaped. Fruit unknown. Fl. Aug–Oct.

•Shady and damp rocks; 1400–3100 m. S Sichuan, NE Yunnan.

26. *Oreocharis tubicella* Franchet, Bull. Mus. Hist. Nat. (Paris) 5: 249. 1899.

管花马铃苳苔 guan hua ma ling ju tai

Petiole to 6.5 cm, densely brown villous; leaf blade oblique, narrowly to broadly ovate, 3.5–9(–15) × 2–5(–7.5) cm, appressed pubescent, abaxially densely brown villous along veins, base oblique, cordate to rounded, margin coarsely serrate to dentate, sometimes double, apex acute to rounded; lateral veins 4–8 on each side of midrib, distinct. Cymes 1–3(–7)-flowered; peduncle 2.5–10 cm, brown villous; bracts 2, lanceolate to linear, 2–5 × ca. 1 mm, pubescent to brown villous, margin entire. Pedicel 4–15 mm. Calyx segments lanceolate to narrowly triangular, 4–7 mm, margin entire or sparsely dentate to serrate. Corolla yellow, 1.8–2.5 cm, outside pubescent; tube nearly cylindrical, gradually slightly ampliate from base to mouth, 1.3–2.1 cm × 4–6 mm; limb 2-lipped to slightly 2-lipped; adaxial lip 2-lobed from near middle, lobes 1–2 × 1.5–2 mm; abaxial lip lobes 4–5 × 2–3 mm. Stamens adnate to corolla 4–5 mm above base, 1.3–1.5 cm; filaments slender, sparsely pubescent, villous basally; anthers broadly oblong, 2-loculed, dehiscing longitudinally, connective sparsely pubescent; staminode 1, ca. 7 mm. Disc 2–3 mm, deeply 5-lobed to 5-

sect from base. Pistil 1.6–1.9 cm, glabrous. Stigma 1, disc-shaped. Capsule 2.6–3 cm. Fl. Aug–Sep.

• Shady and damp rocks near roads; ca. 1300 m. SW Sichuan, Yunnan (Yanjin Xian).

27. *Oreocharis flavida* Merrill, Philipp. J. Sci. 21: 354. 1922.
黄花马铃薯苔 *huang hua ma ling ju tai*

Petiole to 10 cm, densely brown woolly; leaf blade ovate to broadly ovate, rarely elliptic or obovate, 4–10 × 2–7.2 cm, adaxially densely pubescent, abaxially densely brown woolly, more densely along veins, base cordate to rounded, margin nearly entire to shallowly crenate, apex rounded; lateral veins 4–7 on each side of midrib, distinct. Cymes 3–7-flowered; peduncle 6–23 cm, densely pale brown woolly, glabrescent; bracts 2 (or 3), lanceolate to triangular, ca. 4–7 × 1–2 mm,

sericeous to glabrescent, margin entire. Pedicel 1–2.5 cm. Calyx segments lanceolate, 4–6 mm, margin entire. Corolla pale yellow to orange-yellow, 1.5–1.7 cm, outside sparsely pubescent; tube campanulate, gradually ampliate from base to apex, 1–1.2 cm × 7–8 mm; limb slightly 2-lipped; adaxial lip 2-lobed from near middle, all lobes 3–6 × 3–5 mm. Stamens adnate to corolla 1–5 mm above base, 4–5.5 mm; filaments slender, glabrous; anthers horseshoe-shaped, 1-loculed, dehiscing transversely; staminode 1, ca. 3.2 mm. Disc ca. 2 mm, subentire. Pistil ca. 7 mm, glabrous to sparsely puberulent. Stigmas 2, lobes suborbicular. Capsule 1.5–3(–4) cm × 2–3 mm. Fl. Oct–Dec, fr. Nov–Dec.

• Under forests on slopes; 1000–1900 m. Hainan.

6. **TREMACRON** Craib, Notes Roy. Bot. Gard. Edinburgh 10: 217. 1918.

短檐苔属 *duan yan ju tai shu*

Herbs, perennial, epipetric or terrestrial, rhizomatous, stemless. Leaves many, basal; leaf blade villous to puberulent, base attenuate to cordate. Inflorescences sometimes umbel-like, lax, axillary, 1- to many-flowered cymes; bracts 2, opposite. Calyx actinomorphic, 5-sect from base; segments equal. Corolla yellow to red or white, zygomorphic, inside usually glabrous; tube subcampanulate to funnelform-tubular, not swollen, 5–6 × longer than limb, 3–7 mm in diam.; limb 2-lipped; adaxial lip emarginate to nearly entire, extremely short, extending only slightly beyond mouth; abaxial lip 3-lobed, central lobe longer than laterals, apex rounded. Stamens 4, adnate to corolla near base, all or only abaxial ones exerted; anthers basifixed, free, thecae parallel, divergent at base, confluent at apex, dehiscing longitudinally; connective not projecting; staminode 1, rarely absent, adnate to adaxial side of corolla tube. Disc ringlike. Ovary narrowly oblong, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigmas 2, equal, obovate, undivided, rarely 2-lipped. Capsule straight in relation to pedicel, oblong lanceolate to narrowly oblong, much longer than calyx, dehiscing loculicidally to base; valves 2, straight, not twisted. Seeds unappendaged.

• Seven species: endemic to China.

1a. Corolla red; leaf blade length 3–5 × width 7. *T. rubrum*

1b. Corolla yellow to orange or white; leaf blade length usually less than 2 × width, rarely length to 3 × width.

2a. Cymes 1–3-flowered; peduncle puberulent or puberulent and villous, without glandular hairs, 3–8.5 cm.

3a. Petiole to 7 cm; leaf blade adaxially white puberulent, base cordate; pedicel ca. 1 cm; corolla white,

abaxial lip purplish, 0.6–0.8 cm, tube subcampanulate, urceolate; pistil ca. 4 mm 5. *T. begoniifolium*

3b. Petiole to 2 cm; leaf blade adaxially white villous, base broadly cuneate; pedicel 2–2.5 cm; corolla

orange, ca. 1.2 cm, tube funnelform-tubular; pistil 8.5–10 mm 6. *T. aurantiacum*

2b. Cymes 3–15-flowered; peduncle villous and glandular puberulent and sometimes pubescent, 4–20 cm.

4a. Leaf blade 3–12(–17) × 2–4(–6) cm, margin serrate or double serrate to deeply crenate-serrate, adaxially

white appressed puberulent and sparsely rust-brown villous 1. *T. forrestii*

4b. Leaf blade 1–6 × 1–4 cm, margin crenate to serrate or dentate, adaxially densely white to gray villous, puberulent, or sericeous and pubescent, without rust-brown hairs.

5a. Leaf blade adaxially densely white villous; peduncle 8–11 cm; bracts puberulent 2. *T. urceolatum*

5b. Leaf blade adaxially densely sericeous and pubescent or white puberulent; peduncle 7–20 cm; bracts villous.

6a. Petiole to 1(–2.5) cm; leaf blade adaxially densely sericeous and pubescent, abaxially pubescent,

veins densely long villous; corolla white to greenish white; pistil pubescent to glabrescent

- 3. *T. mairei*
6b. Petiole to 4 cm; leaf blade appressed white puberulent on both surfaces; corolla yellow;
pistil glabrous 4. *T. obliquifolium*

1. *Tremacron forrestii* Craib, Notes Roy. Bot. Gard. Edinburgh 10: 217. 1918.

短檐苣苔 *duan yan ju tai*

Petiole to 3(–6) cm, densely rust-brown villous; leaf blade narrowly elliptic to ovate or obovate, 3–12(–17) × 2–4(–6) cm, adaxially densely white appressed pubescent and sparsely rust-brown villous, abaxially white rust-brown pubescent, rust-brown villous along veins, base cuneate to attenuate, margin serrate or double serrate to deeply crenate-serrate, apex obtuse to acute. Cymes 4–15-flowered; peduncle 4–20 cm, sparsely brownish villous and glandular puberulent or pubescent; bracts (2–)5–6(–10) × 1–1.7(–4) mm, pubescent. Pedicel 1–2.8 cm. Calyx segments narrowly triangular or narrowly to broadly lanceolate, 2–4 mm, outside sparsely pubescent and villous. Corolla pale yellow to greenish yellow, (5–)8–11 mm; tube subcampanulate, sometimes urceolate, 6–9 × 4–6 mm; adaxial lip ca. 1 mm; abaxial lip lobes semiorbicular, central lobe ca. 2 × 2–3 mm, lateral lobes ca. 1.2 × 2–3 mm. Stamens exserted, 8–11 mm; staminode 1, ca. 2 mm. Pistil 1–1.7 cm, glabrous; ovary 3.5–8 mm. Capsule 2.8–3.8 cm. Fl. Jun–Sep, fr. Aug–Sep.

•Rocks in forests; 2600–4300 m. SW Sichuan, C and NW Yunnan.

2. *Tremacron urceolatum* K. Y. Pan, Acta Phytotax. Sin. 26: 429. 1988.

木里短檐苣苔 *mu li duan yan ju tai*

Petiole to 2 cm, densely pale brown villous; leaf blade broadly ovate, 3–5 × 2.5–4 cm, adaxially densely white villous, abaxially sparsely puberulent, pale brown villous along veins, base cuneate, margin crenate to serrate, apex rounded to obtuse. Cymes ca. 7-flowered; peduncle 8–11 cm, pale brown villous and glandular puberulent; bracts 2–3 × ca. 0.3 mm, puberulent. Pedicel 1.5–3 cm. Calyx segments oblong lanceolate, ca. 2.5 mm, outside puberulent. Corolla yellow, ca. 1 cm; tube subcampanulate, ca. 8 × 6–7 mm; adaxial lip ca. 0.3 mm; abaxial lip lobes rounded, central lobe ca. 2 × 2 mm, lateral ones ca. 1 × 2 mm. Stamens exserted, 7–10 mm; staminode 1, ca. 0.8 mm. Pistil ca. 7 mm, glabrous; ovary ca. 5.5 mm. Fruit and seeds unknown. Fl. Jul.

•*Pinus yunnanensis* forests; ca. 2600 m. Sichuan (Muli Xian).

3. *Tremacron mairei* Craib, Notes Roy. Bot. Gard. Edinburgh 10: 218. 1918.

东川短檐苣苔 *dong chuan duan yan ju tai*

Oreocharis mairei H. Léveillé.

Petiole to 1(–2.5) cm, densely brown villous; leaf blade lanceolate-ovate to broadly ovate, 1–4.5 × 1–2.5 cm, adaxially densely sericeous and pubescent, abaxially

pubescent, densely long villous along veins, base cuneate to rounded, margin dentate or crenate-serrate, apex acute to rounded. Cymes 3–10-flowered; peduncle 7–18 cm, sparsely villous and glandular pubescent; bracts 2.5–4 × 1–1.5 mm, villous. Pedicel 0.7–2.3 cm. Calyx segments narrowly lanceolate to narrowly triangular, 2.5–4 mm, outside villous. Corolla white to greenish white, 1–1.2 cm; tube subcampanulate, sometimes urceolate, 8–9 × 4.5–6 mm; adaxial lip 0.5–1 mm; abaxial lip ca. 3 mm, lobes rounded, central lobe 1–1.5 mm, lateral ones 0.4–1 mm. Abaxial 2 or all stamens exserted, 0.7–1.3 cm; staminode 1, 1–2 mm. Pistil ca. 1.4 cm, pubescent to glabrescent; ovary 4–7 mm. Capsule 2–3 cm. Fl. Jul–Aug, fr. Sep.

•Rocks; 1800–2600 m. Yunnan (Dongchuan Xian).

4. *Tremacron obliquifolium* K. Y. Pan, Acta Phytotax. Sin. 26: 429. 1988.

狭叶短檐苣苔 *xia ye duan yan ju tai*

Petiole to 4 cm, brownish villous; leaf blade ovate to narrowly ovate, 2–6 × 1.5–3.5 cm, white to gray appressed puberulent, base oblique, broadly cuneate to cuneate, margin crenate to serrate, rarely dentate, apex obtuse to acute. Cymes 6–9-flowered; peduncle 13–20 cm, pale brown villous and glandular puberulent; bracts 2–5 × ca. 1 mm, villous. Pedicel 1–1.5 cm. Calyx segments linear, 2.5–3 mm, outside puberulent. Corolla yellow, 8–9 mm; tube subcampanulate, 6–8 × 3–5 mm; adaxial lip 0.5–1 mm; abaxial lip lobes semiorbicular, ca. 1 mm. Abaxial stamens exserted, ca. 1.1 cm, adaxial ones equalling corolla, ca. 6 mm; staminode 1, ca. 0.3 mm. Pistil ca. 6 mm, glabrous; ovary ca. 4 mm. Capsule 2–2.5 cm. Fl. Jul–Aug.

•Rocks; 1500–1800 m. SW Sichuan (Muli Xian, Yanyuan Xian).

5. *Tremacron begoniifolium* H. W. Li, Bull. Bot. Res., Harbin 3(2): 12. 1983.

景东短檐苣苔 *jing dong duan yan ju tai*

Petiole to 7 cm, densely white puberulent; leaf blade broadly ovate to orbicular, 1.3–3.5 × 1–3 cm, densely white puberulent, base cordate, margin coarsely crenate to crenate-serrate, apex rounded. Cymes 1–3-flowered; peduncle 3–8.5 cm, densely white puberulent; bracts 2–4 × 0.5–1 mm, sparsely pubescent to pilose. Pedicel ca. 1 cm. Calyx segments linear-lanceolate to ovate-oblong, 2–3.5 mm, outside sparsely pubescent to pilose. Corolla white, purplish on abaxial lip, 6–8 mm; tube subcampanulate, urceolate, ca. 5 × 4 mm; adaxial lip ca. 1 mm; abaxial lip ca. 2 mm, lobes ovate-elliptic. Stamens exserted, 6–7.5 mm; staminode 1, ca. 1 mm. Pistil ca. 5.5 mm, glabrous; ovary ca. 4 mm. Capsule ca. 2.5 cm. Fl. Sep, fr. Nov.

•Rocks in evergreen broad-leaved forests; 2100–2800 m. Yunnan (Jingdong Xian).

6. *Tremacron aurantiacum* K. Y. Pan, Acta Phytotax. Sin. 26: 431. 1988.

橙黄短檐苣苔 cheng huang duan yan ju tai

Petiole to 2 cm, brown villous; leaf blade ovate to sub-orbicular, 3–4 × 2–3 cm, adaxially white villous, abaxially densely puberulent, densely pale brown villous along veins, base broadly cuneate, margin shallowly crenate to crenate-serrate, apex obtuse to rounded. Cymes 1–3-flowered; peduncle 3–5 cm, puberulent and sparsely villous; bracts ca. 1.5 mm, brown villous. Pedicel 2–2.5 cm. Calyx segments narrowly oblong, ca. 2 mm, outside sparsely villous. Corolla orange-yellow, ca. 1.2 cm; tube funnellform-tubular, ca. 9 × 4 mm; adaxial lip ca. 1 mm; abaxial lip lobes rounded, ca. 3 mm. Stamens exerted, abaxial ca. 1.3 cm, adaxial ca. 1.6 cm; staminode apparently absent. Pistil 1–1.5 cm, glabrous; ovary 8.5–10 mm. Fruit unknown. Fl. Aug.

•Rocky slopes; ca. 1000 m. S Sichuan (Mabian Xian, Pingshan Xian).
7. *Tremacron rubrum* Handel-Mazzetti, Symb. Sin. 7: 877. 1936.

红短檐苣苔 hong duan yan ju tai

Petiole to 4 cm, yellow-brown villous; leaf blade elliptic-lanceolate, 3–15 × 1–3(–5) cm, sericeous-strigose, abaxially pale yellow villous along veins, base narrowly cuneate, margin shallowly crenate-serrate, apex acute to obtuse. Cymes 5–15-flowered; peduncle 7–13 cm, pubescent and glandular pubescent, rust-brown villous; bracts 4–5 × ca. 1 mm, pubescent. Pedicel 0.5–3 cm. Calyx segments lanceolate, 3–4 mm, outside densely pubescent. Corolla red, 7–10 mm; tube funnellform-tubular, 4–6 × 3–5 mm; adaxial lip ca. 1 mm; abaxial lip ca. 1.5 mm, central lobe ovate-triangular, lateral lobes semiorbicular, apex rounded. Stamens exerted, 1–1.5 cm; staminode 1. Pistil 7–12 mm, sparsely glandular pubescent; ovary 5–9 mm. Immature capsule ca. 3.2 cm. Fl. Sep–Oct.

•Yunnan (Dayao Xian).

The above description is adapted from the protologue and photographs of type specimens.

7. *ISOMETRUM* Craib, Notes Roy. Bot. Gard. Edinburgh 11: 250. 1919.

金盏苣苔属 jin zhan ju tai shu

Herbs, perennial, epipetric or terrestrial, rhizomatous, stemless. Leaves many, basal; leaf blade puberulent to villous, tomentose, or glabrescent, base narrowly cuneate to cordate. Inflorescences cymes, rarely umbel-like, lax or rarely dense, axillary, 2- to many flowered; bracts 2(or 3), opposite, rarely whorled. Calyx actinomorphic, 5-sect from base; segments equal. Corolla white to purple or pink, rarely yellow, zygomorphic, rarely actinomorphic, inside glabrous or sparsely puberulent, rarely pilose on lobes; tube campanulate, cylindrical, rarely urceolate or salverform, not swollen, 1–4 × longer than limb, 3–11 mm in diam.; limb slightly 2-lipped; adaxial lip 2-lobed from near middle, shorter than to nearly equalling abaxial lip; abaxial lip 3-sect from base, lobes equal or subequal, apex rounded, sometimes crenulate. Stamens 4, adnate to corolla tube near base, rarely to or above middle, included; anthers basifixed, coherent in pairs, rarely free, thecae divergent at base, not or rarely confluent at apex, dehiscing longitudinally from arcuate slits; connective not projecting; staminode 1, adnate to adaxial side of corolla tube. Disc ringlike. Ovary narrowly oblong to oblong or ovoid, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigmas 2, equal, oblate, undivided. Capsule straight in relation to pedicel, narrowly oblong to oblanceolate, much longer than calyx, dehiscing loculicidally to base; valves 2, straight, not twisted. Seeds unappendaged.

•Fourteen species: endemic to China.

1a. Corolla tube 1–2 × longer than broad; pistil glabrous.

2a. Corolla puberulent outside; leaf blade adaxially densely brown villous, abaxially densely brown long woolly

..... 2. *I. glandulosum*

2b. Corolla glabrous outside; leaf blade adaxially puberulent, puberulent-strigillose, or sparsely brown villous, abaxially puberulent to pubescent or sparsely villous.

3a. Stamens free, anther thecae confluent; leaf blade margin lobed, lobes triangular, deeply serrate to

dentate; lateral veins 7–13 on each side of midrib; bract and sepal margin sparsely dentate .. 1. *I. eximium*

3b. Stamens coherent in pairs, anther thecae not confluent; leaf blade margin serrate, at least near apex; lateral veins 3–5 on each side of midrib; bract and sepal margin entire.

4a. Petiole to 1.5 cm; leaf blade base cuneate; peduncle villous, glabrescent; corolla tube

campanulate; pistil 6–7 mm 3. *I. fargesii*

4b. Petiole to 8.3 cm; leaf blade base cordate; peduncle puberulent and glandular puberulent; corolla

tube urceolate; pistil 3.8–4 mm 4. *I. nanchuanicum*

- 1b. Corolla tube 1.5–5 × longer than broad; pistil glabrous or puberulent to pubescent.
- 5a. Leaf blade margin lobulate.
- 6b. Corolla tube campanulate-tubular to narrowly campanulate; petiole to 2 cm.
- 7a. Leaf blade 1–1.8 cm wide; corolla 1–1.5 cm, adaxial lip lobes ca. 2 × 5 mm; stamens 6–8.5 mm, filaments sparsely puberulent to glabrous; pistil glabrous 6. *I. farreri*
- 7b. Leaf blade 2–3 cm wide; corolla 1.6–2 cm, adaxial lip lobes 4–6 × 3–4 mm; stamens 3–4 mm, filaments glabrous; pistil pubescent 7. *I. giraldii*
- 6b. Corolla tube nearly cylindrical; petiole to 4 cm.
- 8a. Leaf blade oblanceolate, 1.5–5 × 0.8–1.5 cm, margin lobes subentire to shallowly crenulate; lateral veins 3–5 on each side of midrib; peduncle 4–6 cm; bract 1.8–2 mm 14. *I. pinnatilobatum*
- 8b. Leaf blade narrowly elliptic to ovate or elliptic, 2.7–10.5 × 2.3–5.5 cm, margin lobes crenate-dentate or crenate; lateral veins 5–8 on each side of midrib; peduncle 4–20 cm; bract 3–5 mm.
- 9a. Corolla tube 2–2.7 mm in diam., adaxial lip ca. 5 mm, abaxial lip ca. 5.5 mm; stamens 3.5–4 mm; pistil glabrous; leaf blade base cuneate 12. *I. primuliflorum*
- 9b. Corolla tube 3–3.5 mm in diam., adaxial lip ca. 3.5 mm, abaxial lip ca. 3 mm; stamens 5–6 mm; pistil glandular puberulent; leaf blade base narrowly cuneate 13. *I. sichuanicum*
- 5b. Leaf blade margin subentire or sinuous to coarsely crenate-dentate.
- 10a. Petiole to 8 cm.
- 11a. Corolla white, minutely pilose outside; leaf blade 3–4.5 cm 5. *I. leucanthum*
- 11b. Corolla pink to purple-red or pale purple to purple, glandular puberulent or sparsely glandular pubescent, sometimes only basally; leaf blade (2–)4–14 cm.
- 12a. Petiole densely brown villous to lanate; leaf blade abaxially rust-brown villous, base narrowly cuneate to truncate; lateral veins 6–10 on each side of midrib; pedicel 1–2.2 cm; corolla 0.8–2 cm, tube narrowly urceolate, ca. 3 mm in diam., lobes 1–2 mm; stamens 4–5 mm; pistil glabrous 9. *I. lancifolium*
- 12b. Petiole densely white pubescent; leaf blade abaxially pubescent, base rounded to cordate; lateral veins 4–6 on each side of midrib; pedicel 4–7 mm; corolla 2.3–3.7 cm, tube campanulate-tubular, 7–11 mm in diam.; lobes 4–7(–11) mm; stamens 7–10 mm; pistil sparsely pubescent near apex 11. *I. lungshengense*
- 10b. Leaves sessile or petiole to 2 cm.
- 13a. Calyx segments 4–6 mm; leaf blade base narrowly cuneate to subtruncate 7. *I. giraldii*
- 13b. Calyx segments 2–3.5 mm; leaf blade base narrowly cuneate or cuneate.
- 14a. Leaf blade sessile, 1.5–3.7 × 1–1.8 cm, margin irregularly dentate above middle; pistil ca. 4 mm 10. *I. villosum*
- 14b. Petiole to 2 cm; leaf blade 3–8 × 1.5–3.5 cm, margin crenate to lobulate; pistil 9–10 mm.
- 15a. Petiole to 1 cm; leaf blade both surfaces gray pubescent, veins abaxially brown villous; lateral veins abaxially prominent; peduncle 4–17 cm; bracts 3.5–5 mm; adaxial corolla lobes ca. 2 mm, abaxial lobes ca. 4 mm; stamens 6–8.5 mm; pistil glabrous 6. *I. farreri*
- 15b. Petiole to 2 cm; leaf blade adaxially gray appressed pubescent, abaxially brown villous; lateral veins indistinct; peduncle 5.5–10 cm; bracts ca. 2.5 mm; all corolla lobes 3–5 mm; stamens 3.5–4.5 mm; pistil puberulent to subglabrous 8. *I. crenatum*

1. *Isometrum eximium* W. Y. Chun ex K. Y. Pan, Acta Phytotax. Sin. 26: 432. 1988.

多裂金盞苣苔 duo lie jin zhan ju tai

Petiole to 6 cm, brownish villous; leaf blade lanceolate to ovate, obovate, or elliptic, 5–16 × 3–5(–7) cm, sparsely brown villous, base cuneate to rounded,

margin lobulate, lobes triangular, deeply serrate to dentate, apex acute; lateral veins 7–13 on each side of midrib, distinct. Peduncle 4–15(–25) cm, brown villous; bracts 6–7 mm, sparsely brown villous, margin sparsely dentate. Pedicel 0.5–3 cm. Calyx segments narrowly triangular to lanceolate, 4–6 mm, margin sparsely dentate. Corolla pale yellow to deep orange, 1.4–1.9 cm,

outside glabrous; tube narrowly campanulate, sometimes urceolate, 7–8 × 3–5 mm; limb 5-lobed, lobes equal, obovate, 6–7 × 3–4 mm. Stamens 4–6 mm; filaments glabrous to sparsely puberulent; anthers free, thecae confluent; staminode ca. 0.2 mm. Pistil 6–8 mm, glabrous; ovary ca. 4 mm. Capsule 1.2–2.7 cm. Fl. Jun–Aug, fr. Aug.

• Rocks under slope forests; 2800–3000 m. SW Sichuan.

2. *Isometrum glandulosum* (Batalin) Craib, Notes Roy. Bot. Gard. Edinburgh 11: 267. 1919.

短檐金盏苣苔 duan yan jin zhan ju tai

Didissandra glandulosa Batalin, Trudy Imp. S. Peterburgsk. Bot. Sada 12: 175. 1892.

Petiole to 1 cm, densely brownish woolly; leaf blade lanceolate-ovate, 1.5–4.5 × 1.1–3 cm, adaxially densely brownish villous, abaxially densely brown long woolly, base cuneate, margin serrate-crenate, apex acute to obtuse; lateral veins 5 or 6 on each side of midrib, obscured by indument. Peduncle ca. 12 cm, brown villous and glandular pubescent; bracts ca. 5 mm, rust-brown villous. Pedicel 1–3.5 cm. Calyx segments lanceolate, entire, ca. 3.5 mm. Corolla pale purple, ca. 1.2 cm, outside glandular pilose; tube tubular to subcampanulate, 8–10 × 3–4.5 mm; limb 5-lobed, lobes subequal, broadly ovate to rounded, 2–4 mm. Stamens 4–5 mm; filaments sparsely glandular pilose; anthers coherent in pairs, thecae confluent; staminode ca. 0.5 mm. Pistil 5–10 mm, glabrous; ovary 3–7 mm. Style 2–3 mm. Capsule ca. 2 cm. Fl. and fr. Aug.

• Gansu, NW Sichuan.

3. *Isometrum fargesii* (Franchet) B. L. Burtt, Notes Roy. Bot. Gard. Edinburgh 23: 92. 1960.

城口金盏苣苔 cheng kou jin zhan ju tai

Didissandra fargesii Franchet, Bull. Mens. Soc. Linn. Paris, sér. 2, 15: 123. 1899.

Petiole to 1.5 cm, rust-brown villous; leaf blade obovate to narrowly oblong, sometimes oblique, 2–7.2 × 1.2–3 cm, adaxially puberulent-strigillose, abaxially puberulent, brown pubescent along veins, base cuneate, margin serrate near apex, apex rounded to obtuse; lateral veins 4 or 5 on each side of midrib, distinct to indistinct. Peduncle 3.5–10 cm, rust-brown villous, glabrescent; bracts 2–4 mm, rust-brown villous, margin entire. Pedicel 1–3 cm. Calyx segments lanceolate to triangular, 2.5–3 mm, margin entire. Corolla purple, 5–8 mm, outside glabrous; tube campanulate, 4–7 × 4–6.6 mm; lobes rounded, 1–2 × 3–4 mm. Stamens 3–5 mm; filaments glabrous; anthers coherent in pairs, thecae not confluent; staminode ca. 2 mm. Pistil 6–7 mm, glabrous; ovary 3.5–4 mm. Capsule 1.8–2.3 cm. Fl. Aug.

• Shady, damp rocks; 600–1000 m. Sichuan (Chengkou Xian).

4. *Isometrum nanchuanicum* K. Y. Pan & Z. Y. Liu, Acta Phytotax. Sin. 33: 100. 1995.

南川金盏苣苔 nan chuan jin zhan ju tai

Petiole to 8.3 cm, brown pubescent; leaf blade ovate, 2.2–6 × 1.2–3.6 cm, adaxially gray puberulent, abaxially brown puberulent, base cordate, margin serrate, apex rounded; lateral veins 3–5 on each side of midrib, distinct. Peduncle 8.8–11.5 cm, brown puberulent and glandular puberulent; bracts 4–5 mm, brown puberulent, margin entire. Pedicel 1.2–3 cm.

Calyx segments lanceolate, 3–4 mm, margin entire.

Corolla yellow (when dry), 8–9 mm, outside glabrous; tube urceolate, 6–7 × 5–6.5 mm; adaxial lip lobes oblong, ca. 2.2 × 2 mm; abaxial lip lobes broadly ovate, ca. 1.2 × 1.4 mm. Stamens 4–5.5 mm; filaments glabrous; anthers coherent in pairs, thecae not confluent; staminode ca. 0.7 mm. Pistil 3.8–4 mm, glabrous; ovary 2.8–3 mm. Capsule ca. 2.7 cm. Fl. Aug.

• Streamside rocks; 700–800 m. Sichuan (Nanchuan Xian).

5. *Isometrum leucanthum* (Diels) B. L. Burtt, Notes Roy. Bot. Gard. Edinburgh 23: 92. 1960.

白花金盏苣苔 bai hua jin zhan ju tai

Didissandra leucantha Diels, Repert. Spec. Nov. Regni Veg. Beih. 12: 487. 1922.

Petiole to 8 cm, brown villous and white puberulent; leaf blade subovate, 3–4.5 × 2–3.2 cm, appressed pubescent, abaxially brown villous along veins, margin coarsely crenate-dentate. Peduncle 14–18 cm, brown villous and puberulent. Pedicel 2–4 cm. Calyx segments oblong, ca. 4 mm. Corolla white, ca. 2.3 cm, outside minutely pilose; tube ca. 15 × 6–8 mm; lobes triangular-ovate, 5–6 mm. Stamens 4–7 mm; filaments glabrous. Ovary 6–7 mm. Fruit unknown.

• Forests on slopes; ca. 3900 m. W Sichuan (Baiyu Xian, Batang Xian).

We have not seen any specimens of *Isometrum leucanthum*. The above description is adapted from the protologue. This species differs from others in *Isometrum* in its long petiole and white corolla.

6. *Isometrum farreri* Craib, Notes Roy. Bot. Gard. Edinburgh 11: 250. 1919.

金盏苣苔 jin zhan ju tai

Petiole to 1 cm, brown hirsute to villous; leaf blade rhombic-ovate to obovate or elliptic, 1.5–3.7 × 1–1.8 cm, gray pubescent, abaxially brown villous along veins, base cuneate, margin crenate to lobulate, apex rounded to acute; lateral veins 4–6 on each side of midrib, abaxially prominent. Peduncle 4–17 cm, rust-brown villous, glabrescent; bracts 3.5–5 mm, brown villous to pubescent, margin entire. Pedicel 0.5–4 cm. Calyx segments narrowly triangular to oblong, 2–3.5 mm, margin entire to shallowly lobed. Corolla purple-pink to orange-pink, 1–1.5 cm, outside sparsely glandular to sparsely pubescent; tube campanulate-tubular, ca. 9–11 × 3–8 mm; all lobes semi-orbicular, adaxial lobes ca. 2 × 5 mm; abaxial lobes ca. 4 × 5 mm. Stamens 6–8.5 mm; filaments sparsely puberulent to glabrous; anthers coherent in pairs, thecae not confluent;

staminode 0.5–1 mm. Pistil ca. 9 mm, glabrous; ovary 4–5 mm. Capsule 1.9–2.5 cm. Fl. Aug, fr. Nov.

•Rocks on slopes; ca. 800 m. S Gansu, SW Shaanxi (Mian Xian), N Sichuan (Nanping Xian).

7. *Isometrum giraldii* (Diels) B. L. Burtt, Notes Roy. Bot. Gard. Edinburgh 23: 92. 1960.

毛蕊金盞苣苔 *mao rui jin zhan ju tai*

Didissandra giraldii Diels, Bot. Jahrb. Syst. 36(Beibl. 82): 98. 1905.

Petiole to 2 cm, densely rust-brown villous; leaf blade oblong ovate, 3–5.5 × 2–3 cm, gray appressed pubescent and rust-brown villous, abaxially densely rust-brown villous along veins, base narrowly cuneate to subtruncate, margin coarsely dentate-serrate to lobulate, apex acute to rounded; lateral veins 4 or 5 on each side of midrib, abaxially prominent. Peduncle 6–15 cm, glandular pubescent and rust-brown villous; bracts 4–7 mm, brown villous, margin entire. Pedicel 1–3 cm. Calyx segments narrowly triangular to lanceolate, 4–6 mm, margin entire. Corolla purple-red to deep pink, 1.6–2 cm, outside glandular puberulent to pubescent; tube narrowly campanulate, 7–9 × 4–5 mm; all lobes oblong, subequal, 4–6 × 3–4 mm. Stamens 3–4 mm; filaments glabrous; anthers coherent in pairs, thecae not confluent; staminode ca. 0.4 mm. Pistil 3–10 mm, pubescent; ovary 2–8 mm. Capsule 1.5–2.5 cm. Fl. Jul.

•Rocks near roads; ca. 1100 m. S Shaanxi.

8. *Isometrum crenatum* K. Y. Pan, Acta Bot. Yunnan. 8: 27. 1986.

圆齿金盞苣苔 *yuan chi jin zhan ju tai*

Petiole to 2 cm, densely brown villous; leaf blade elliptic, 2–3 × 1–1.6 cm, adaxially gray appressed pubescent, abaxially brown villous, base cuneate, margin crenulate, apex obtuse to rounded; lateral veins 3–4 on each side of midrib, indistinct. Peduncle 5.5–10 cm, brown villous and glandular puberulent; bracts ca. 2.5 mm, brown villous, margin entire. Pedicel ca. 1.5 cm. Calyx segments lanceolate, ca. 3 mm, margin entire. Corolla pale purple-red, ca. 1.4 cm, outside sparsely puberulent; tube campanulate-tubular to urceolate, ca. 9 × 3–3.6 mm; all lobes obovate, 3–5 × 2.5–3 mm. Stamens 3.5–4.5 mm; filaments glabrous; anthers coherent in pairs, thecae not confluent; staminode ca. 0.3 mm. Pistil ca. 1 cm, puberulent to glabrescent; ovary ca. 5 mm. Fruit unknown. Fl. Jun.

•Rocks; ca. 1300 m. Hubei (Zhuxi Xian).

9. *Isometrum lancifolium* (Franchet) K. Y. Pan, Acta Bot. Yunnan. 8: 30. 1986.

紫花金盞苣苔 *zi hua jin zhan ju tai*

Petiole to 8 cm, densely brown villous to woolly; leaf blade oblong to narrowly lanceolate or ovate, 2–14 × 0.9–3.7 cm, adaxially pale brown villous and puberulent to glabrescent, abaxially rust-brown villous, base narrowly cuneate to truncate, margin sinuous to irregularly serrate, dentate, sparsely denticulate, or subentire, apex acute to obtuse; lateral veins 6–10 on each side of midrib, distinct or indistinct. Peduncle 5–22 cm, brown villous or glandular puberulent and villous; bracts 4–12 mm, brown villous to pubescent, margin entire. Pedicel 1–2.2 cm. Calyx segments lanceolate, 2–5 mm, margin entire. Corolla pale purple to purple, 0.8–2 cm, outside glandular pubescent, sometimes only near base; tube narrowly urceolate, 6–11 × ca. 3 mm; adaxial lip lobes oblong, 1–4 × 1.5–2.5 mm; abaxial lip lobes suborbicular, 1.7–4 × 1–2.5 mm. Stamens 4–10 mm; filaments glabrous, rarely pubescent; anthers coherent in pairs, thecae not confluent; staminode ca. 1 mm. Pistil 5–10 mm, glabrous; ovary 3–8 mm. Capsule 1.6–3.5 cm. Fl. Jul–Sep, fr. Sep.

•Shady, damp rocks in forests; 1100–2800 m. NW Sichuan.

- 1a. Corolla 1.6–2 cm, adaxial lip nearly as long as abaxial; stamens 8–10 mm; pistil ca. 1 cm; leaf blade adaxially puberulent 9c. var. *tsingchengshanicum*
- 1b. Corolla 0.8–1.2 cm, adaxial lip distinctly longer than abaxial; stamens 4–5 mm; pistil 5–6 mm; leaf blade adaxially pale brown villous and puberulent or sparsely brown villous to glabrescent.
 - 2a. Peduncle 5–20 cm; petiole to 8 cm; leaf blade narrowly lanceolate to ovate-elliptic, 3.5–14 × 2–3.7 cm, base cuneate to truncate; lateral veins distinct 9a. var. *lancifolium*
 - 2b. Peduncle 6–9 cm; petiole to 2.5 cm; leaf blade oblong to oblanceolate, 2–4 × 0.9–1.5 cm, base narrowly cuneate; lateral veins indistinct 9b. var. *mucronatum*

9a. *Isometrum lancifolium* var. *lancifolium*

紫花金盞苣苔(原变种) *zi hua jin zhan ju tai* (yuan bian zhong)

Didissandra lancifolia Franchet, Nouv. Arch. Mus. Hist. Nat., sér. 2, 10: 63. 1887–1888; *Ancylostemon lancifolius* (Franchet) B. L. Burtt; *A. purpureus* B. L. Burtt & R. Davidson.

Petiole to 8 cm; leaf blade narrowly lanceolate to ovate-elliptic, 3.5–14 × 2–3.7 cm, adaxially pale brown villous and puberulent to glabrescent, abaxially brown villous, base cuneate to truncate, margin sinuous to irregularly serrulate or dentate; lateral veins distinct. Peduncle 5–22 cm, brown villous. Pedicel glandular

puberulent and rust-brown villous. Corolla 0.8–1.2 cm; tube 6–8 mm; adaxial lip distinctly longer than abaxial; adaxial lip lobes oblong, 1–1.2 × 1.5–2 mm; abaxial lip lobes suborbicular, 1.7–2 × 1–2 mm. Stamens 4–5 mm; filaments glabrous. Pistil 5–6 mm; ovary 3–4 mm. Fl. Jul–Sep, fr. Sep.

• Shady, damp rocks in forests; 1100–1300 m. W Sichuan.

9b. *Isometrum lancifolium* var. *mucronatum* K. Y. Pan, Acta Bot. Yunnan. 8: 30. 1986.

汶川金盏苣苔 wen chuan jin zhan ju tai

Petiole to 2.5 cm; leaf blade oblong to oblanceolate, 2–4 × 0.9–1.5 cm, adaxially sparsely brown villous to glabrescent, abaxially densely brown villous, base narrowly cuneate, margin sparsely denticulate; lateral veins indistinct. Peduncle 6–9 cm, densely brown villous. Pedicel glandular puberulent and rust-brown villous. Corolla 0.8–1.2 cm; tube 6–8 mm; adaxial lip distinctly longer than abaxial; adaxial lip lobes oblong, 1–1.2 × 1.5–2 mm; abaxial lip lobes suborbicular, 1.7–2 × 1–2 mm. Stamens 4–5 mm; filaments glabrous. Pistil 5–6 mm; ovary 3–4 mm. Fr. Aug.

• Shady, damp cliffs; 2200–2800 m. Sichuan (Wenchuan Xian).

9c. *Isometrum lancifolium* var. *tsingchengshanicum* W. T. Wang & K. Y. Pan in K. Y. Pan, Acta Bot. Yunnan. 8: 30. 1986.

狭叶金盏苣苔 xia ye jin zhan ju tai

Petiole to 7 cm; leaf blade lanceolate to narrowly oblong, 4–13.5 × 2–4 cm, adaxially puberulent, abaxially rust-brown villous and pubescent, base cuneate to truncate, margin subentire or sinuous to shallowly serrulate or dentate; lateral veins distinct. Peduncle 7–20 cm, glandular puberulent and villous. Pedicel glandular puberulent and villous. Corolla 1.6–2 cm; tube ca. 1.1 cm; adaxial lip nearly as long as abaxial, all lobes oblong, 3–4 × 2–2.5 mm. Stamens 8–10 mm; filaments glabrous to pubescent. Pistil ca. 1 cm; ovary 7–8 mm. Fl. Aug, fr. Nov.

• Steep cliffs; ca. 1200 m. Sichuan (Guan Xian).

10. *Isometrum villosum* K. Y. Pan, Acta Bot. Yunnan. 8: 31. 1986.

柔毛金盏苣苔 rou mao jin zhan ju tai

Leaves sessile; leaf blade obovate to oblanceolate, 3–8 × 1.5–3.5 cm, adaxially sparsely brown villous to glabrescent, abaxially rust-brown villous, brown villous along veins, base narrowly cuneate, margin irregularly dentate in apical half, apex obtuse; lateral veins 4 or 5 on each side of midrib, indistinct. Peduncle 5–8 cm, rust-brown villous; bracts ca. 3 mm, brownish villous, margin entire. Pedicel 5–8 mm. Calyx segments lanceolate, ca. 3 mm, margin entire. Corolla white to

purple, 1.3 (–2) cm, outside glabrescent; tube narrowly urceolate, 8(–14) × ca. 3 mm; adaxial lip 4(–6) mm, lobes orbicular, 1.7(–2.5) × ca. 2 mm; abaxial lip 3.2(–4) mm, lobes oblong, 2.5(–3) × ca. 2 mm. Stamens 4–6 mm; filaments glabrous; anthers coherent in pairs, thecae not confluent; staminode ca. 0.8 mm. Pistil ca. 4 mm, glabrous; ovary ca. 3 mm. Capsule ca. 3.5 cm. Fl. Apr–May.

• Rocks; 600–1600 m. Sichuan (Shizhu Xian).

11. *Isometrum lungshengense* (W. T. Wang) W. T. Wang & K. Y. Pan in K. Y. Pan, Fl. Reipubl. Popularis Sin. 69: 187. 1990.

龙胜金盏苣苔 long sheng jin zhan ju tai

Opithandra lungshengensis W. T. Wang, Acta Phytotax. Sin. 13: 102. 1975.

Petiole to 8 cm, densely white pubescent; leaf blade elliptic-obovate to ovate, (2–)4–8.7 × (1.2–)3–5.7 cm, adaxially white appressed villous, abaxially pubescent, base rounded to cordate, margin shallowly serrate to serrate, apex obtuse; lateral veins 4–6 on each side of midrib, distinct. Peduncle 4–9 cm, spreading villous; bracts 5–6 mm, white villous, margin entire. Pedicel 4–7 mm. Calyx segments narrowly lanceolate to narrowly triangular, 4–9 mm, margin entire. Corolla pink to purple-red, 2.3–3.7 cm, outside sparsely glandular puberulent; tube campanulate-tubular, 1.8–3 × 0.7–1.1 cm; all lobes suborbicular, 4–7(–11) × ca. 6 mm. Stamens 7–10 mm; filaments glandular puberulent near apex; anthers coherent in pairs, thecae not confluent; staminode 0.4–2 mm. Pistil (1.2–)2.5–3.5 cm, sparsely pubescent near apex; ovary (0.7–)1.3–2.5 cm. Capsule 2.8–4.5 cm. Fl. Sep–Oct.

• Rocks near roads and in forests; 700–1500 m. Guangxi (Longsheng Xian, Lingui Xian).

12. *Isometrum primuliflorum* (Batalin) B. L. Burtt, Notes Roy. Bot. Gard. Edinburgh 23: 93. 1960.

羽裂金盏苣苔 yu lie jin zhan ju tai

Didissandra primuliflora Batalin, Trudy Imp. S. Peterburgsk. Bot. Sada 14: 176. 1895.

Petiole to 4 cm, very densely brown woolly; leaf blade narrowly elliptic to ovate, 5–10.5 × 2.7–5.5 cm, adaxially grayish white pubescent and villous, abaxially gray pubescent and brown villous, especially along veins, base cuneate, margin lobulate, lobes crenate-dentate, apex acute to obtuse; lateral veins 5 or 6 on each side of midrib, indistinct. Peduncle 4–20 cm, glandular puberulent and brown villous; bracts 3–5 mm, villous, margin entire. Pedicel 0.5–2 cm. Calyx segments narrowly lanceolate, 4–5 mm, margin entire. Corolla pale purple, 0.9–1.4 cm, outside glandular puberulent; tube nearly cylindrical, 7–10 × 2–2.7 mm;

adaxial lip ca. 5 mm, lobes elliptic, ca. 3×1.5 –2 mm; abaxial lip ca. 5.5 mm, lobes obovate-spatulate, ca. 5×1.5 –2 mm. Stamens 3.5–4 mm; filaments glabrous; anthers coherent in pairs, thecae not confluent; staminode ca. 1.1 mm. Pistil 6–7 mm, glabrous; ovary 3.5–4.5 mm. Capsule 1.5–2.2 cm. Fl. Jul.

• Shady, damp rocks; 2000–2800 m. NW Sichuan.

13. *Isometrum sichuanicum* K. Y. Pan, Acta Bot. Yunnan. 8: 33. 1986.

四川金盞苣苔 si chuan jin zhan ju tai

Petiole to 4 cm, densely rust-brown villous; leaf blade narrowly elliptic to elliptic, 2.7 – 10×2.3 – 4.5 cm, adaxially appressed pubescent, abaxially pubescent and rust-brown villous, base narrowly cuneate, margin lobulate, lobes crenate, apex acute; lateral veins 5–8 on each side of midrib, distinct. Peduncle 11–14 cm, rust-brown villous and glandular pubescent; bracts 3.5–4 mm, villous, margin entire. Pedicel 1.2–2.5 cm. Calyx segments narrowly lanceolate, 4–5 mm, margin entire. Corolla purple, ca. 1.3 cm, outside glandular puberulent; tube nearly cylindrical, ca. 10×3 – 3.5 mm; adaxial lip ca. 3.5 mm; abaxial lip ca. 3 mm, all lobes suborbicular, 2–2.5 mm. Stamens 5–6 mm; filaments glabrous;

8. *PARAISOMETRUM* W. T. Wang in A. L. Weitzman et al., Novon 7: 431. 1998.

弥勒苣苔属 mi le ju tai shu

Herbs, perennial, rhizomatous, stemless. Leaves many, basal; leaf blade pubescent to woolly, base cuneate to broadly cuneate. Inflorescences lax, axillary, few-flowered cymes; bracts 2, opposite. Calyx actinomorphic, 5-sect from base; segments equal. Corolla purple, zygomorphic, inside minutely puberulent on lobes; tube funnelform-tubular, not swollen, longer than limb, 3–5 mm in diam.; limb 2-lipped; adaxial lip 4-lobed; over $2 \times$ longer than abaxial lip; abaxial lip undivided, apex rounded to acute. Stamens 4, adnate to corolla tube above middle, included; anthers basifixed, coherent in pairs by adaxial surfaces, thecae parallel, not confluent, dehiscing longitudinally; connective not projecting; staminode 1, adnate to adaxial side of corolla tube. Disc ringlike. Ovary linear, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigma 1, terminal, depressed capitate, undivided. Fruit and seeds unknown.

• One species: endemic to China.

1. *Paraisometrum mileense* W. T. Wang in A. L. Weitzman et al., Novon 7: 434. 1998.

弥勒苣苔 mi le ju tai

Petiole 0.2–4.2 cm, brownish woolly; leaf blade elliptic to oblong elliptic, 2 – 4.8×1.2 – 1.8 cm, adaxially densely appressed white pubescent, abaxially densely brownish woolly, margin obtusely denticulate, apex obtuse to rounded. Peduncle 6.5–12 cm, densely brownish pubescent; bracts lanceolate-linear, 7 – 10×1.2 – 3 mm.

anthers coherent in pairs, thecae not confluent; staminode ca. 1 mm. Pistil 5.5–7 mm, glandular puberulent; ovary 3.5–5.5 mm. Capsule ca. 2.5 cm. Fl. Jun.

• Shady, damp streamside rocks; 2200–2500 m. Sichuan (Maowen Xian, Heishui Xian).

14. *Isometrum pinnatilobatum* K. Y. Pan, Acta Bot. Yunnan. 8: 34. 1986.

裂叶金盞苣苔 lie ye jin zhan ju tai

Petiole to 3.5 cm, brownish villous; leaf blade oblanceolate, 1.5 – 5×0.8 – 1.5 cm, adaxially grayish white pubescent, abaxially pale brown pubescent, base cuneate, margin lobulate, lobes subentire to shallowly crenulate, apex acute; lateral veins 3–5 on each side of midrib, distinct. Peduncle 4–6 cm, brown villous and glandular puberulent; bracts 1.8–2 mm, brown villous, margin entire. Pedicel 0.8–1.2 cm. Calyx segments lanceolate, 2.5–3 mm, margin entire. Corolla blue-purple, 1.2–1.4 cm, outside sparsely pubescent; tube nearly cylindrical, ca. 8×3 – 4 mm; adaxial lip ca. 5 mm, lobes orbicular, ca. 2.5 mm; abaxial lip ca. 4 mm, lobes orbicular, 3–3.5 mm. Stamens 2.5–3 mm; filaments glabrous; anthers coherent in pairs, thecae not confluent; staminode 0.8–1.2 mm. Pistil ca. 5.5 mm, glabrous; ovary ca. 3 mm. Fruit unknown. Fl. May.

• Stony cliffs near roads; 500–1200 m. SW Hubei, SE Sichuan.

Calyx segments lanceolate-linear, 3 – 5.3×0.8 – 1 mm, outside densely tomentose. Corolla 1.6–1.8 cm; tube 1.3–1.4 cm; adaxial lip 3 – $4 \times$ ca. 8.5 mm, lobes triangular, central 2 ca. 1.2 mm, lateral 2 ca. 1.6×2 mm; abaxial lip deltoid, ca. 2.2×3 mm. Stamens ca. 6 mm, glabrous; staminode ca. 0.8 mm. Pistil ca. 1 cm, glabrous; ovary ca. 9 mm. Fruit unknown. Fl. Feb.

• SE Yunnan (Mile Xian).

9. *ANCYLOSTEMON* Craib, Notes Roy. Bot. Gard. Edinburgh 11: 233. 1919.

直瓣苣苔属 zhi ban ju tai shu

Herbs, perennial, epipetric or rarely terrestrial, rhizomatous, stemless. Leaves many, basal; leaf blade puberulent to villous, rarely glabrescent, base cuneate to subcordate. Inflorescences lax, axillary, 1–10-flowered cymes; bracts 2, opposite. Calyx actinomorphic, 5-sect from base to 5-lobed from above middle; segments equal to subequal. Corolla orange to yellow or white, rarely pink, zygomorphic, inside glabrous to puberulent, rarely pilose near base; tube narrowly funnelliform to cylindric, slightly gibbous abaxially, longer than limb, 3–8 mm in diam.; limb 2-lipped to slightly 2-lipped; adaxial lip 2-lobed, emarginate, or rarely undivided, shorter than abaxial lip; abaxial lip 3-sect from base, lobes equal or central longer than laterals, apex rounded or rarely acute. Stamens 4, adnate to corolla tube above or rarely below middle, included or rarely exerted; anthers basifixed, coherent in pairs, thecae divergent, not confluent, dehiscing longitudinally; connective not projecting; staminode 1, adnate to adaxial side of corolla tube. Disc ringlike or rarely cupular. Ovary narrowly oblong, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigmas 2, equal, 2-lipped, undivided. Capsule straight in relation to pedicel, oblong lanceolate to oblanceolate, much longer than calyx, dehiscing loculicidally to base; valves 2, straight, not twisted. Seeds unappendaged.

• Twelve species: endemic to China.

Ancylostemon flabellatus C. Y. Wu ex H. W. Li (Bull. Bot. Res., Harbin 3(2): 16. 8. 1983) is not included in the treatment because it is known only from fruiting specimens and cannot be definitively placed in Pan's classification (Fl. Reipubl. Popularis Sin. 69: 190–203. 1990). Its placement in *Ancylostemon* is uncertain since other genera (e.g., *Tremacron*, *Isometrum*, and *Oreocharis*) are virtually indistinguishable using vegetative or fruit characters.

1a. Calyx 5-sect from base or near base, tube to 1 mm.

2a. Leaf blade adaxially with only 1 kind of hairs, white puberulent or sparsely brown villous, often glabrescent; corolla 1.1–2 cm.

3a. Leaf blade 1.1–4.4 × 0.7–1.8 cm; lateral veins 3–5 on each side of midrib; peduncle 3–8 cm; bracts 2–4 mm, glabrous to sparsely villous 1. *A. humilis*

3b. Leaf blade 3–12 × 1–3.2 cm; lateral veins 7 or 8 on each side of midrib; peduncle 12–27 cm; bracts 6–18 mm, brownish pannose 2. *A. notochlaenus*

2b. Leaf blade adaxially with at least 2 kinds of hairs, both villous and puberulent to pubescent or villous; corolla 1.5–3 cm.

4a. Corolla pink; leaf blade margin serrate, base usually oblique, cuneate; peduncle sparsely puberulent; bracts apparently absent 4. *A. ronganensis*

4b. Corolla orange to yellow; leaf blade margin coarsely dentate-serrate or crenate to lobulate, base cuneate

to cordate; peduncle brown villous, sometimes also puberulent; bracts 2–8 mm.

5a. Corolla adaxial lip 2-lobed; bracts linear to oblong, 2–5 × 0.7–1.2 mm; calyx segment margin entire; disc ca. 2.5 mm, subentire 3. *A. mairei*

5b. Corolla adaxial lip emarginate; bracts narrowly oblong to lanceolate or oblanceolate, 3–8 × 1.5–3 mm; calyx segment margin dentate, rarely subentire; disc 1–1.5 mm, 5-lobed 9. *A. saxatilis*

1b. Calyx 5-lobed from below to above middle, tube at least 2 mm.

6a. Petiole to 1 cm; leaf blade rhombic to rhombic-ovate; lateral veins 2 or 3 on each side of midrib, inconspicuous, margin shallowly crenate to denticulate 10. *A. rhombifolius*

6b. Petiole to 2–12(–14) cm; leaf blade ovate to broadly ovate, elliptic, lanceolate, or oblong, rarely ovate-

rhombic; lateral veins 3–7 on each side of midrib, conspicuous, margin coarsely to double serrate, crenate, or dentate to lobulate, rarely merely crenate to dentate or serrate.

7a. Leaf blade adaxially densely puberulent; peduncle spreading pubescent 8. *A. bullatus*

7b. Leaf blade adaxially both puberulent and villous, at least sparsely so along veins; peduncle villous, sometimes also pubescent.

8a. Corolla limb slightly 2-lipped, all lobes subequal; petiole, peduncle, and calyx segments bristly-villous, sometimes also puberulent.

9a. Leaf blade ovate, ca. 3.5 × 2 cm; petiole ca. 2 cm; calyx 10–11 mm 11. *A. vulpinus*

9a. Leaf blade broadly ovate, 4–5.5 × 3–4.8 cm; petiole to 7.5 cm; calyx 5–8 mm .. 12. *A. trichanthus*

- 8b. Corolla limb 2-lipped, abaxial lip at least 2 × longer than adaxial lip; petiole, peduncle, and calyx segments villous, sometimes also pubescent or puberulent.
- 10a. Corolla adaxial lip 2-lobed; petiole to 4 cm; leaf blade 2.2–4 × 2–3 cm, margin crenate to dentate or serrate, not lobulate; peduncle 4–7 cm, brown villous 7. *A. gamosepalus*
- 10b. Corolla adaxial lip undivided to emarginate; petiole to 12(–14) cm; leaf blade 2.5–16 × 1.5–9 cm, margin coarsely dentate to serrate or crenate, to lobulate or nearly so; peduncle 2.4–15(–22) cm, brown villous and pubescent or puberulent.
- 11a. Leaf blade margin coarsely dentate-serrate or crenate to nearly lobulate; corolla adaxial lip 1–3 mm wide, abaxial lip ca. 1 cm, lobes ovate-orbicular or broadly ovate 9. *A. saxatilis*
- 11b. Leaf blade margin coarsely double dentate to double serrate or lobulate, lobes dentate to serrate; corolla adaxial lip 4–7 mm wide, abaxial lip 7–8 mm, lobes oblong to obovate.
- 12a. Stamens 6–15 mm, filaments sparsely puberulent; disc ca. 1 mm, entire; calyx lobes 2–5 × 1–2 mm; bracts linear to narrowly triangular, 4–7 × 0.7–1.5 mm . 5. *A. convexus*
- 12b. Stamens 5–6 mm, filaments glabrous; disc 2–5 mm, 5-lobed; calyx lobes 1–2.5 × 1.5–3 mm; bracts narrowly oblong to obovate, 4–7 × 1–2 mm 6. *A. aureus*

1. *Ancylostemon humilis* W. T. Wang, Acta Phytotax. Sin. 13: 100. 1975.

矮直瓣苣苔 ai zhi ban ju tai

Ancylostemon saxatilis (Hemsley) Craib var. *microcalyx* (Hemsley) Craib; *Didissandra saxatilis* Hemsley var. *microcalyx* Hemsley.

Petiole to 5.5 cm, rust-brown villous; leaf blade elliptic to lanceolate, 1.1–4.4 × 0.7–1.8 cm, adaxially sparsely brown villous, glabrescent, abaxially pubescent, densely rust-brown villous abaxially along veins, base cuneate to subcordate, margin crenate to serrate; lateral veins 3–5 on each side of midrib, adaxially indistinct, abaxially conspicuous. Peduncle 3–8 cm, brown villous and sometimes glandular pubescent; bracts linear to oblong or elliptic, 2–4 × ca. 1 mm, glabrous to sparsely villous. Calyx 5-sect from base; segments oblong to triangular, 1.5–2 mm, outside sparsely pubescent, glabrescent, margin entire. Corolla yellow-white, 1.1–1.5 cm; limb 2-lipped; adaxial lip ca. 2 mm, 2-lobed, lobes thickened at apex; central lobe of abaxial lip subovate, ca. 3.5 mm, lateral ones narrowly ovate, ca. 1.8 mm. Adaxial stamens included, ca. 9 mm, abaxial ones exerted, 5–8 mm; filaments glabrous; staminode ca. 3.5 mm. Disc ca. 1.3 mm, subentire. Pistil 8–10.5 mm, glabrous. Capsule 2–4 cm. Fl. Jul.

• Stones in forests and damp limestone hills; ca. 2100 m. W Hubei, SE Sichuan.

2. *Ancylostemon notochlaenus* (H. Léveillé & Vaniot) Craib, Notes Roy. Bot. Gard. Edinburgh 11: 266. 1919.

贵州直瓣苣苔 gui zhou zhi ban ju tai

Didissandra notochlaena H. Léveillé & Vaniot in H. Léveillé, Compt. Rend. Assoc. Franç. Avancem. Sci. 34: 425. 1906; *Didymocarpus notochlaena* (H. Léveillé & Vaniot) H. Léveillé; *Oreocharis notochlaena* (H. Léveillé & Vaniot) H. Léveillé.

Petiole to 8 cm, densely brownish pannose; leaf blade lanceolate to narrowly oblong, 3–12 × 1–3.2 cm, adaxially white puberulent, abaxially densely brownish pannose, base often oblique, subrounded to subcordate, margin crenulate to crenate; lateral veins 7 or 8 on each side of midrib, inconspicuous. Peduncle 12–27 cm, brownish pannose; bracts lanceolate, 6–18 × 1–3 mm, brownish pannose. Calyx 5-sect from near base; segments triangular, ca. 4 mm, outside densely pubescent, margin entire. Corolla orange to yellow, 1.5–2 cm; limb 2-lipped; adaxial lip 0.5–1 mm, 2-lobed, lobes orbicular, ca. 1 × 1 mm; abaxial lip ca. 3 mm, lobes oblong, 2–5 × ca. 4 mm. Stamens included, 6–7 mm; filaments glabrous; staminode ca. 2 mm. Disc 1–1.7 mm, 5-lobed. Pistil 7–11 mm, glabrous. Fruit unknown. Fl. Sep–Oct.

• Shady, damp cliffs in forests. Guizhou (Guiyang Xian).

3. *Ancylostemon mairei* (H. Léveillé) Craib, Notes Roy. Bot. Gard. Edinburgh 11: 267. 1919.

滇北直瓣苣苔 dian bei zhi ban ju tai

Petiole to 6 cm, rust-brown villous and pubescent; leaf blade elliptic to oblong, 1.5–8 × 1.1–3 cm, adaxially densely gray villous and sparsely brown villous and pubescent or sparsely villous to puberulent, abaxially white pubescent and densely brown villous or villous to

puberulent, base cuneate to cordate, margin crenate to lobulate with lobes crenate; lateral veins 4 or 5 on each side of midrib, inconspicuous or conspicuous abaxially. Peduncle 4–10 cm, brown villous; bracts linear to oblong, 2–5 × 0.7–1.2 mm, brown villous. Calyx 5-sect from base; segments oblong to narrowly lanceolate, 3–6 mm, outside brown villous, margin entire. Corolla orange to yellow, 1.5–2.5 cm; limb 2-lipped; adaxial lip ca. 4 mm, 2-lobed, lobes suborbicular, 1.5–3 × 1.5–2 mm; abaxial lip 6–7 mm, lobes obovate, 4–6 × 2–3.5 mm. Stamens included, 0.8–1.3 cm; filaments glabrous; staminode ca. 3 mm. Disc ca. 2.5 mm, subentire. Pistil 0.7–1.4 cm, glabrous. Capsule 2–3.4 cm. Fl. Jun–Jul.

• Rocks; 1500–3200 m. Sichuan, NE Yunnan.

The varieties of *Ancylostemon mairei* are very difficult to distinguish, and Weitzman and Skog believe that they should not be recognized.

- 1a. Leaf blade elliptic to ovate, 1.2–5 × 1–2.7 cm, margin crenate to lobulate with lobes crenate, adaxially densely gray villous and sparsely brown villous and pubescent, abaxially white pubescent and densely brown villous; lateral veins inconspicuous 3a. var. *mairei*
1b. Leaf blade ovate or obovate to elliptic, 2–8 × 1.1–3 cm, margin crenate, adaxially sparsely villous to puberulent, abaxially villous to puberulent; lateral veins conspicuous abaxially 3b. var. *emeiensis*

3a. *Ancylostemon mairei* var. *mairei*

滇北直瓣苣苔(原变种) dian bei zhi ban ju tai (yuan bian zhong)

Didymocarpus mairei H. Léveillé, Repert. Spec. Nov. Regni Veg. 11: 301. 1912.

Petiole to 5 cm; leaf blade elliptic to ovate, 1.2–5 × 1–2.7 cm, adaxially densely gray villous and sparsely brown villous and pubescent, abaxially white pubescent and densely brown villous, margin crenate to lobulate with lobes crenate; lateral veins inconspicuous. Fl. Jun–Jul.

• Rocks in forests; 3000–3200 m. NE Yunnan.

3b. *Ancylostemon mairei* var. *emeiensis* K. Y. Pan, Acta Phytotax. Sin. 26: 434. 1988.

峨眉直瓣苣苔 e mei zhi ban ju tai

Petiole to 6 cm; leaf blade ovate or obovate to elliptic, 2–8 × 1.1–3 cm, adaxially sparsely villous to puberulent, abaxially villous to puberulent, margin crenate; lateral veins conspicuous abaxially. Fl. Jun.

• Shady, damp rocks; 1500–2100 m. Sichuan (Emei Xian).

4. *Ancylostemon ronganensis* K. Y. Pan, Acta Phytotax. Sin. 26: 436. 1988.

融安直瓣苣苔 rong an zhi ban ju tai

Petiole to 2.8 cm, densely brownish villous; leaf blade elliptic to elliptic-ovate, 2.5–7.5 × 1.8–4.2 cm,

appressed villous and puberulent, base oblique, cuneate, margin serrate; lateral veins 5–7 on each side of midrib, conspicuous. Peduncle 10–11 cm, sparsely puberulent; bracts apparently absent. Calyx 5-sect from base; segments narrowly lanceolate, ca. 2.5 mm, outside pubescent, margin entire. Corolla pink, 2.8–3 cm; limb 2-lipped; adaxial lip 6–7 mm, 2-lobed, lobes oblong, ca. 6.5 × 4 mm; abaxial lip 1–1.2 cm, lobes oblong, 5–7 × 4–5 mm. Stamens included, 5–9 mm; filaments glabrous; staminode ca. 1 mm. Disc ca. 1 mm, entire. Pistil 1.5–2.3 cm, glabrous. Fruit unknown. Fl. Jul.

• Rocks in valleys. Guangxi (Rong'an Xian).

5. *Ancylostemon convexus* Craib, Notes Roy. Bot. Gard. Edinburgh 11: 235, 267. 1919.

凸瓣苣苔 tu ban ju tai

Petiole to 12 cm, rust-brown villous; leaf blade ovate, 2.5–16 × 2–9 cm, adaxially white puberulent and sparsely rust-brown villous, abaxially white puberulent and sparsely rust-brown villous, rust-brown villous along veins, base often oblique, rounded to cordate, margin double serrate to lobulate, lobes dentate to serrate; lateral veins 4–7 on each side of midrib, conspicuous. Peduncle 2.4–12 cm, rust-brown villous and sparsely white puberulent; bracts linear to narrowly triangular, 4–7 × 0.7–1.5 mm, sparsely rust-brown villous. Calyx 4–9 mm, 5-lobed from below to above the middle; lobes lanceolate to ovate, 2–5 mm, outside sparsely villous and pubescent, margin dentate or entire. Corolla orange to orange-yellow, 2–2.5 cm; limb 2-lipped; adaxial lip rounded, 2–4.5 × 4–7 mm, undivided to emarginate; abaxial lip 7–8 mm, lobes obovate, 4.5–6 × 3–5 mm. Stamens included or very slightly exerted, 0.6–1.5 cm; filaments sparsely puberulent; staminode ca. 2.5 mm. Disc ca. 1 mm, entire. Pistil 0.9–1.8 cm, glabrous. Capsule 3.5–5 cm. Fl. May–Aug, fr. Jul–Oct.

• Shady, damp cliffs, rocks, and trees; 2500–3400 m. Yunnan (Dali Xian).

6. *Ancylostemon aureus* (Franchet) B. L. Burt, Notes Roy. Bot. Gard. Edinburgh 22: 305. 1958.

凹瓣苣苔 ao ban ju tai

Petiole to 11(–14) cm, densely brown villous and gray pubescent; leaf blade broadly ovate to oblong ovate or elliptic, 3.5–11 × 1.5–7 cm, adaxially densely white puberulent and sparsely brown villous, abaxially densely white pubescent, sparsely brown villous along veins, base often oblique, broadly cuneate to cordate, margin coarsely double dentate to double serrate or lobulate, lobes dentate to serrate; lateral veins 4–6 on each side of midrib, conspicuous. Peduncle 5–15(–22) cm, pubescent and sparsely brown villous; bracts narrowly oblong to obovate, 4–7 × 1–2 mm, pubescent to villous. Calyx 7–10 mm, 5-lobed from above middle; lobes broadly triangular to ovate, 1–2.5 mm, outside white puberulent to pubescent and brown villous, margin irregularly dentate. Corolla orange to yellow, 2.2–2.8 cm; limb 2-lipped; adaxial lip rounded, 1.5–3 ×

4–4.5 mm, emarginate to undivided; abaxial lip ca. 7 mm, lobes oblong to obovate-oblong, central lobe 5–7 × 5–5.5 mm, lateral lobes 4–5 × 4–5 mm. Stamens included, 5–6 mm; filaments glabrous; staminode 1–3 mm. Disc 2–5 mm, 5-lobed. Pistil 1.3–2.1 cm, glabrous or pubescent. Capsule (1.3–)2.5–5 cm. Fl. May–Oct, fr. Aug–Oct.

• Rocks and on trees in moist shady forests; 2800–3600 m. Yunnan.

1a. Leaf blade broadly ovate or oblong ovate, 3.5–11 × 2.5–7.5 cm; pistil glabrous; cymes 1–6-flowered 6a. var. *aureus*

1b. Leaf blade elliptic, 4–10 × 1.5–4 cm; pistil pubescent; cymes 1- or 2-flowered 6b. var. *angustifolius*

6a. *Ancylostemon aureus* var. *aureus*

凹瓣苣苔(原变种) ao ban ju tai (yuan bian zhong)
Roettlera aurea Franchet, Bull. Mus. Hist. Nat. (Paris) 5: 250. 1899; *Ancylostemon concavum* Craib; *Didymocarpus aureus* (Franchet) Diels.

Leaf blade broadly ovate to oblong ovate, 3.5–11 × 2.5–7 cm. Cymes 1–6-flowered. Pistil glabrous. Fl. May–Oct, fr. Aug–Oct.

• Rocks in forests; 3100–3600 m. NW Yunnan.

6b. *Ancylostemon aureus* var. *angustifolius* K. Y. Pan, Acta Phytotax. Sin. 26: 434. 1988.

窄叶直瓣苣苔 zhai ye zhi ban ju tai
Leaf blade elliptic, 4–10 × 1.5–4 cm. Cymes 1- or 2-flowered. Pistil pubescent. Fl. Jul.

• Rocks or on trees in forests; ca. 2800 m. Yunnan (Zhenkang Xian).

7. *Ancylostemon gamosepalus* K. Y. Pan, Acta Phytotax. Sin. 26: 434. 1988.

黄花直瓣苣苔 huang hua zhi ban ju tai

Petiole to 4 cm, densely brown villous; leaf blade ovate, 2.2–4 × 2–3 cm, adaxially puberulent and white to pale brown villous, abaxially puberulent, brown villous along veins, base cuneate to rounded, margin crenate to dentate or serrate; lateral veins 4 or 5 on each side of midrib, conspicuous. Peduncle 4–7 cm, brown villous; bracts linear to narrowly triangular, ca. 3 × 1 mm, brown villous. Calyx 5–6 mm, 5-lobed from to above middle; lobes ovate-triangular, 2–2.5 mm, outside brown villous, margin dentate. Corolla orange, 2.5–3.5 cm; limb 2-lipped; adaxial lip 3–5 mm, 2-lobed, lobes suborbicular, 1–2 × 1–2 mm; abaxial lip 6–9 mm, lobes obovate, 5–8 × 5–6.5 mm. Stamens included, 6–7 mm; filaments glabrous; staminode ca. 1.5 mm. Disc ca. 1.5 mm, entire. Pistil 1.5–2.5 cm, glabrous. Capsule ca. 3.2 cm. Fl. Jul.

• Shady, damp rocks; 1700–2500 m. S and C Sichuan.

8. *Ancylostemon bullatus* W. T. Wang & K. Y. Pan in W. T. Wang, Guihaia 12: 289. 1992.

泡叶直瓣苣苔 pao ye zhi ban ju tai
Petiole to 3 cm, densely deep brown villous; leaf blade ovate to ovate-rhombic, 2–3.4 × 1.5–2.9 cm, adaxially

densely puberulent, abaxially densely white puberulent, deep brown villous along veins, base broadly cuneate to rounded, margin double dentate, teeth obtuse; lateral veins 4 or 5 on each side of midrib, conspicuous. Peduncle 3.5–6.5 cm, spreading pubescent; bracts linear to narrowly triangular, 2.8–3.2 × ca. 0.7 mm, puberulent. Calyx ca. 4 mm, 5-lobed from middle; lobes triangular, ca. 2 mm, outside puberulent, margin denticulate. Corolla orange, ca. 2.4 cm; limb 2-lipped; adaxial lip ca. 4.5 × 5 mm, indistinctly 2-lobed, lobes subsemiorbicular, ca. 0.8 × 1 mm; abaxial lip ca. 6.5 × 5.6 mm, central lobe obovate-oblong, ca. 6.5 × 2.5 mm, lateral lobes oblong, ca. 5 × 2.5 mm. Stamens included, adaxial ones ca. 8.5 mm, abaxial ones ca. 4.5 mm; filaments glabrous; staminode ca. 0.6 mm. Disc ca. 1.8 mm, entire. Pistil ca. 1.9 cm, glabrous. Fruit unknown. Fl. Jun.

Grassy areas with shrubs on limestone hills; ca. 2000 m. Yunnan (Luoping Xian).

9. *Ancylostemon saxatilis* (Hemsley) Craib, Notes Roy. Bot. Gard. Edinburgh 11: 266. 1919.

直瓣苣苔 zhi ban ju tai

Didissandra saxatilis Hemsley, J. Linn. Soc., Bot. 26: 227. 1890; *Didymocarpus saxatilis* (Hemsley) H. Léveillé.

Petiole to 6(–10) cm, densely brown villous; leaf blade lanceolate to broadly ovate or oblong, 2.5–9 × 1.5–5.5 cm, adaxially densely white puberulent and sparsely rust-brown villous, abaxially white puberulent and pubescent, rust-brown villous along veins, base often oblique, cordate to cuneate, margin coarsely dentate-serrate or crenate to nearly lobulate; lateral veins 4–7 on each side of midrib, conspicuous. Peduncle 4–11 cm, brown villous and pale brown puberulent; bracts narrowly oblong to lanceolate or oblanceolate, 3–8 × 1.5–3 mm, brown villous and pubescent. Calyx 4–7 mm, 5-lobed from below to near middle, rarely 5-sect from near base; lobes ovate to lanceolate, 2–3 mm, outside sparsely puberulent and rust-brown villous to glabrescent, margin dentate, rarely subentire. Corolla yellow, 1.9–3.5 cm; limb 2-lipped; adaxial lip rounded, 1–3 × 1–3 mm, emarginate; abaxial lip ca. 10 × 8 mm, central lobe ovate-orbicular, 4.5–10 × 3–6.5 mm, lateral lobes broadly ovate, 4–6 × ca. 3 mm. Stamens included, 4–8 mm; filaments glabrous to puberulent; staminode ca. 4 mm. Disc 1–1.5 mm, 5-lobed. Pistil 1.5–2.2 cm, pubescent. Capsule (2–)3–5(–7) cm. Fl. Jun–Aug, fr. Jul–Aug.

• Shady, damp rocks in forests; 1600–3100 m. S Gansu, NW Hubei, SE Sichuan.

10. *Ancylostemon rhombifolius* K. Y. Pan, Acta Phytotax. Sin. 26: 435. 1988.

菱叶直瓣苣苔 ling ye zhi ban ju tai
Petiole to 1 cm, rust-brown villous; leaf blade rhombic to rhombic-ovate, 1.5–3 × 1.2–1.8 cm, adaxially densely gray pubescent, abaxially puberulent, rust-brown villous along veins, base broadly cuneate to

rounded, margin shallowly crenate to denticulate; lateral veins 2 or 3 on each side of midrib, inconspicuous. Peduncle 3.5–4 cm, rust-brown villous and puberulent; bracts oblong lanceolate, 3–3.5 × ca. 1 mm, rust-brown villous. Calyx ca. 4 mm, 5-lobed from below middle to 5-sect from near base; lobes ovate-lanceolate, ca. 2.2 mm, outside rust-brown villous, margin entire. Corolla yellow, ca. 2.1 cm; limb slightly 2-lipped, all lobes subequal, oblong, ca. 4 × 2.8 mm. Stamens included, 3.5–5 mm; filaments glabrous; staminode ca. 1 mm. Disc ca. 1.5 mm, 5-lobed. Pistil ca. 1.3 cm, glabrous. Capsule ca. 2.5 cm. Fl. Jul.

• Rocks near roads; ca. 2700 m. Sichuan (Meigu Xian).

11. *Ancylostemon vulpinus* B. L. Burt & R. Davidson, Notes Roy. Bot. Gard. Edinburgh 21: 217. 1954.

狐毛直瓣苣苔 hu mao zhi ban ju tai

Petiole ca. 2 cm, densely bristly-villous; leaf blade ovate, ca. 3.5 × 2 cm, adaxially densely white puberulent and villous, sparsely brown villous along veins, abaxially white puberulent, densely brown villous along veins, base rounded to cordate, margin irregularly lobulate; lateral veins 3–5 on each side of midrib, conspicuous. Peduncle 5–7 cm, densely brown bristly-villous; bracts lanceolate to ovate-lanceolate, 5–8 × 1–2 mm, brown villous. Calyx 1–1.1 cm, 5-lobed from above middle; lobes triangular, 3–4 mm, outside sparsely brown bristly-villous, margin sometimes sparsely dentate. Corolla ca. 1.7 cm; limb slightly 2-lipped, all lobes subequal, oblong to obovate, 1.5–5 × 2–4 mm. Stamens included, 4–5 mm; filaments gla-

brous; staminode 1–2 mm. Disc 2.5–3 mm, 2–5-lobed. Pistil 1.3–1.5 cm, glabrous. Capsule ca. 1.2 cm.

• Yunnan (Dayao Xian).

We have not seen specimens of this species; the above description is based on the protologue and photographs of specimens.

Ancylostemon vulpinus differs from other species of *Ancylostemon* in having the calyx 5-lobed from above the middle and segments triangular-acuminate, corolla 2 times longer than calyx, longer villous outside, 5-lobed, lobes equal, and indistinctly ampliate at abaxial side.

12. *Ancylostemon trichanthus* B. L. Burt & R. Davidson, Notes Roy. Bot. Gard. Edinburgh 21: 218. 1954.

毛花直瓣苣苔 mao hua zhi ban ju tai

Petiole to 7.5 cm, brown bristly-villous and white puberulent; leaf blade broadly ovate, 4–5.5 × 3–4.8 cm, adaxially white puberulent and sparsely brown bristly-villous, abaxially white puberulent, base rounded to cordate, margin irregularly lobulate, lobes crenulate; lateral veins 4 or 5 on each side of midrib, conspicuous. Peduncle 5–7 cm, sparsely brown bristly-villous; bracts lanceolate to ovate-lanceolate, 2–6 × 1–2 mm, brown bristly-villous and puberulent. Calyx 5–8 mm, 5-lobed from middle; lobes triangular, 2.5–4 mm, outside sparsely brown bristly-villous, margin sometimes denticulate. Corolla yellow, 1.7–2 cm; limb slightly 2-lipped, all lobes subequal, obovate, ca. 4 × 3 mm. Stamens included, 2–4 mm; filaments glabrous; staminode ca. 1 mm. Disc ca. 2.2 mm, 2-denticulate. Pistil ca. 1.1 cm, glabrous. Capsule ca. 2 cm. Fl. Sep.

• Yunnan (Dayao Xian).

The above description is based on the protologue and a photograph of the holotype.

10. BRIGGSIA Craib, Notes Roy. Bot. Gard. Edinburgh 11: 236. 1919.

粗筒苣苔属 cu tong ju tai shu

Herbs, perennial, epipetric, epiphytic, or terrestrial, rhizomatous, stemmed or stemless. Stems simple, rarely branched. Leaves few to many, basal or on stem and opposite or rarely alternate, crowded near apex or spread along stem, equal to unequal in a pair; leaf blade base cuneate to attenuate or cordate, rarely peltate. Inflorescences lax, axillary, sometimes subumbel-like, 1- to many-flowered cymes; bracts 2 or rarely 3, opposite, rarely whorled. Calyx actinomorphic, 5-sect from base, rarely 5-lobed from middle; segments equal, rarely unequal. Corolla blue, purple, to red or orange to white, usually spotted within, zygomorphic, inside glabrous to pubescent or glandular puberulent; tube narrowly campanulate, gibbous abaxially, 2–3 × longer than limb, (0.7–)1–2(–2.6) cm in diam.; limb 2-lipped; adaxial lip 2-lobed, rarely 2-sect from base, 3 × to slightly shorter than abaxial lip; abaxial lip 3-lobed, lobes equal or subequal, apex obtuse to rounded, truncate, or acute. Stamens 4, adnate to corolla tube near base, rarely to near or above middle, included; anthers basifixed, coherent in pairs at apex, thecae divergent, not confluent or confluent at apex, dehiscing longitudinally; connective not projecting; staminode 1 or absent, adnate to adaxial side of corolla tube. Disc ringlike. Ovary linear to narrowly oblong, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigmas 2, equal, 2-lipped, undivided. Capsule straight in relation to pedicel, narrowly lanceolate-oblong to oblanceolate, much longer than calyx, dehiscing loculicidally to base; valves 2, straight, not twisted. Seeds unappendaged.

About 22 species: Bhutan, China, India, Myanmar, Sikkim, Vietnam; 21 species in China.

The delimitations of *Briggsia* and *Loxostigma* are somewhat problematic. Three species in this treatment (*B. kurzii*, *B. longicaulis*, and *B. dongxingensis*) are rather unlike others, and Weitzman and Skog believe that they probably belong in *Loxostigma*. Arguments by Burt (Notes Roy. Bot. Gard. Edinburgh 34: 101–106. 1975), which appeared before the publication of *B. longicaulis*, and *B. dongxingensis*, appear to support this placement. *Loxostigma* is somewhat intermediate between *Briggsia* and *Lysionotus*, which are generally placed in different tribes. These

three species of *Briggsia* have stems and herbaceous leaves as in *Loxostigma*, and only the lack of seed appendages supports their placement in *Briggsia*.

- 1a. Leaf blade and petioles glabrous; anthers ovoid.
 - 2a. Leaf blade base peltate or rounded to nearly cuneate, margin entire to shallowly serrate; calyx segments 8–11 × 2–5 mm; peduncle sparsely brownish villous, rarely glabrescent 4. *B. longipes*
 - 2b. Leaf blade base cuneate, margin crenate-serrate; calyx segments 4–7 × 1.5–3 mm; peduncle glabrous to glabrescent 5. *B. mihieri*
- 1b. Leaf blade and petioles puberulent to woolly at least along veins; anthers globose or reniform.
 - 3a. Stems to 60 cm; leaves spread along stem or clustered near stem apex, unequal to equal in a pair; anthers globose.
 - 4a. Leaves mostly clustered near stem apex, equal to subequal in a pair; peduncle 1.2–6.2 cm; corolla glabrous inside; stamens adnate to corolla 4–5 mm above base, 2.5–3 cm 1. *B. kurzii*
 - 4b. Leaves spread along stem, unequal in a pair; peduncle 4–10.5 cm; corolla sparsely pubescent inside on adaxial lip; stamens adnate to corolla 1–2 cm above base, 1.2–1.8 cm.
 - 5a. Calyx segments unequal; petiole 0.5–12 cm; cymes 1–12-flowered; pedicel 0.8–2.5 cm; corolla adaxial lip 4–6 mm, abaxial lip 10–19 mm; style 13–15 mm 2. *B. longicaulis*
 - 5b. Calyx segments equal; petiole 0.5–2.8 cm; cymes 1–4-flowered; pedicel 0.4–0.7 cm; corolla adaxial lip ca. 1.1 cm, abaxial lip 7–9 mm; style 7–11 mm 3. *B. dongxingensis*
 - 3b. Plants stemless; leaves basal; anthers reniform.
 - 6a. Pistil and capsule glabrous.
 - 7a. Adaxial stamens ca. 4.5 mm, abaxial stamens ca. 6.5 mm; leaf blade 1.5–2.2 × 0.8–1.2 cm; corolla ca. 1.8 × 0.7 cm, pilose outside 11. *B. humilis*
 - 7b. Adaxial stamens 8–20 mm, abaxial stamens 12–23 mm; leaf blade 2–19 × 1–6 cm; corolla 1.8–4.2 × 0.9–2 cm, glabrous to pubescent outside.
 - 8a. Bracts 3–5 mm wide, bract and calyx margin subentire or sparsely dentate; staminode ca. 3 mm 13. *B. chienii*
 - 8b. Bracts 0.5–3 mm wide, bract and calyx margin entire; staminode 0.4–1 mm.
 - 9a. Calyx segments broadly ovate, 8–10 × 4–5 mm; corolla pubescent outside, adaxial lobes ca. 5 mm wide 12. *B. latiseipala*
 - 9b. Calyx segments lanceolate to ovate or elliptic, 3–7 × 1–3 mm; corolla glandular puberulent to sparsely pubescent outside, adaxial lobes 2–4 mm wide.
 - 10a. Corolla glabrous outside, adaxial lip 6–9 mm, lobes oblong, 4–6 mm; stamens 2–2.3 cm; bracts pubescent to puberulent inside; calyx segments obscurely 3-veined 9. *B. stewardii*
 - 10b. Corolla glandular pubescent outside, adaxial lip 2–5 mm, lobes semiorbicular, 1–4 mm; stamens 0.8–1.5 cm; bracts glabrous inside; calyx segments veins indistinct.
 - 11a. Corolla purple; leaf blade base cuneate to cordate; adaxial stamens adnate to corolla 1 cm above base, filaments pale yellow villous near base, glabrescent near apex 10. *B. mairei*
 - 11b. Corolla yellow to deep orange, rarely bud purple-blue; leaf blade base attenuate to broadly cuneate; adaxial stamens adnate to corolla 2.5–4 mm above base, filaments glabrous to sparsely puberulent.
 - 12a. Calyx segments 3–3.5 mm; leaf blade apex obtuse to acute, adaxially densely rust-brown villous, abaxially densely rust-brown woolly and villous; peduncle (3–)6–13 cm; bracts linear to narrowly triangular 6. *B. aurantiaca*
 - 12b. Calyx segments 4–7 mm; leaf blade apex acute, adaxially white or gray appressed puberulent or pubescent, abaxially appressed white or

- gray
pubescent, veins and sometimes margin brown villous; peduncle
5.5–23 cm; bracts lanceolate or oblanceolate.
- 13a. Leaf blade base attenuate, margin serrulate; corolla margin
sometimes flushed darker, not striate or spotted inside; bracts
pubescent outside; filaments glabrous 7. *B. longifolia*
- 13b. Leaf blade base often slightly oblique, narrowly to broadly
cuneate,
margin serrate to serrate-crenate, sometimes doubly so; corolla
inside
purple-red to orange or brown spotted or striate; bracts rust-
brown
villous outside; filaments sparsely puberulent 8. *B. muscicola*
- 6b. Pistil glandular puberulent to glandular pubescent; capsule glabrescent to glandular pubescent.
- 14a. Leaf blade 1–2.2 × 0.7–1.2 cm; corolla adaxial lip 1.5–3.5 mm, abaxial lip 4–7 mm.
- 15a. Leaf blade base shallowly cordate; cymes 1–3-flowered; peduncle 7–9 cm; bracts 3–4
mm; stamens 14–17 mm 11. *B. humilis*
- 15b. Leaf blade base cuneate; cymes 1-flowered; peduncle 5–6.5 cm; bracts 1–2 mm;
stamens 4.5–6.5 mm 21. *B. parvifolia*
- 14b. Leaf blade (1.2–)2–15 × (0.8–)1–8 cm; corolla adaxial lip 4–9 mm, abaxial lip 8–20 mm.
- 16a. Bracts 8–14 × 3–5 mm; calyx segments 2–5 mm wide; bract and calyx margin
subentire or
sparsely dentate; leaf blade adaxially pilose 13. *B. chienii*
- 16b. Bracts 2–10 × 0.6–3 mm, margin entire; calyx segments 1–3 mm wide, margin entire,
rarely sparsely dentate; leaf blade appressed pubescent to villous, not pilose.
- 17a. Bracts inside pubescent to sparsely pubescent; calyx segments margin sparsely
dentate;
leaf blade surfaces appressed puberulent 20. *B. pinfaensis*
- 17b. Bracts inside glabrous; calyx segments margin entire; leaf blade surfaces
pubescent to villous.
- 18a. Cymes 1-flowered; leaf blade ovate to rhombic-ovate, margin shallowly
serrate;
abaxial corolla lobes 10–12 mm 15. *B. agnesiae*
- 18b. Cymes 1–5(–8)-flowered; leaf blade ovate to narrowly elliptic, lanceolate, or
oblanceolate, margin dentate to serrate or crenate, sometime double, but not
shallow; abaxial corolla lobes 4–10 mm.
- 19a. Corolla glabrous outside, lobes narrowly triangular; pistil ca. 9 mm;
leaf blade adaxially puberulent and sparsely rust-brown villous;
peduncle sparsely rust-brown villous and glandular pubescent .. 16. *B. acutiloba*
- 19b. Corolla glabrescent to pubescent, lobes semiorbicular to oblong,
narrowly lanceolate, elliptic-ovate, or broadly triangular; pistil 1.6–3.4
mm; leaf blade adaxially pubescent or villous, but only 1 type of hair;
peduncle villous to pubescent, but only 1 type of hair.
- 20a. Petiole 1–3 cm, densely puberulent; peduncle 4–9(–11) cm,
pubescent; bracts and calyx pubescent outside; corolla glabrous
inside 17. *B. speciosa*
- 20b. Petiole 1–8(–13) cm, villous; peduncle 3.5–20 cm, villous; bracts
and
calyx villous outside; corolla sparsely pubescent, glandular
pubescent,
or pubescent inside.
- 21a. Staminode ca. 0.5 mm; leaf blade 2.6–5.5(–8) × 1.5–3(–5.5)
cm, abaxially pubescent; lateral veins adaxially
inconspicuous;
bracts 6–10 mm 19. *B. elegantissima*

- 21b. Staminode 1–3 mm; leaf blade 2–15 × 1.2–8 cm, abaxially pubescent, villous along veins; lateral veins adaxially conspicuous or prominent; bracts 2–7 mm.
 22a. Leaf blade with at least some rust-brown villous hairs on both surfaces, apex rounded to obtuse; calyx segments veins indistinct; staminode 2.5–3 mm 14. *B. forrestii*
 22b. Leaf blade surfaces white pubescent, apex obtuse to acute; calyx segments obscurely 3–5-veined; staminode 1–2.2 mm 18. *B. rosthornii*

1. *Briggsia kurzii* (C. B. Clarke) W. E. Evans, Notes Roy. Bot. Gard. Edinburgh 16: 133. 1928.

粗筒苣苔 *cu tong ju tai*

Didymocarpus? kurzii C. B. Clarke, Commelyn. Cyrtandr. Bengal. 96. 1874; *Briggsia amabilis* (Diels) Craib; *B. amabilis* var. *taliensis* Craib; *Chirita kurzii* (C. B. Clarke) C. B. Clarke; *Didissandra amabilis* Diels; *Loxostigma kurzii* (C. B. Clarke) B. L. Burt; *Roettlera kurzii* (C. B. Clarke) Kuntze.

Stems 12–30(–40) cm, sparsely pubescent. Leaves mostly opposite at stem apex, basal leaves usually small, equal to subequal in a pair; petiole absent to 1.5(–3) cm, sparsely pubescent to puberulent; leaf blade oblanceolate to obovate or lanceolate to ovate, (0.5–)4–14 × (0.3–)2–6 cm, adaxially sparsely appressed pubescent, abaxially nearly glabrous, sparsely pubescent along veins, base sometimes oblique, narrowly cuneate, to rounded, margin irregularly serrate, apex acuminate to obtuse; lateral veins 5–7 on each side of midrib, conspicuous. Cymes 1- or 2-flowered; peduncle 1.2–6.2 cm, pubescent; bracts 2(or 3), lanceolate to linear, 2–5 × 0.5–1.5 mm, outside sparsely pubescent, inside glabrous, margin entire. Calyx segments lanceolate to narrowly triangular, 1–1.8 cm × 2–3 mm, outside sparsely pubescent, margin entire to sparsely denticulate, veins indistinct. Corolla yellow to orange, rarely white, inside abaxial lip purple to brown spotted, 3.8–5 cm, outside very sparsely pubescent, glabrescent, inside glabrous; tube 2.8–3.8 × 1.5–2 cm; adaxial lip ca. 8 mm, lobes semiorbicular, 4–6 × 5–8 mm, apex rounded; abaxial lip ca. 1 cm, lobes semiorbicular, central lobe 5–10 × 5–8 mm, lateral lobes 2.8–8 × 4–7 mm, apex obtuse to rounded. Adaxial stamens adnate to corolla ca. 4 mm above base, ca. 2.5 cm, abaxial ones adnate to corolla ca. 5 mm above base, ca. 3 cm; filaments glabrous; anthers globose, thecae not confluent or confluent; staminode ca. 2 mm. Pistil 1.8–2.4 cm; ovary pubescent. Style 7–12 mm, sparsely pubescent. Capsule 3.5–4.5 cm, glabrescent. Fl. Jun–Sep, fr. Aug–Oct.

Rocks of grassy slopes, epiphytic in montane forests; 1800–3500 m. SW Sichuan, NW Yunnan [Bhutan, Myanmar, Sikkim].

Briggsia amabilis and *Loxostigma kurzii* were both recognized in FRPS, but this study shows that they are conspecific.

2. *Briggsia longicaulis* W. T. Wang & K. Y. Pan in K. Y. Pan, Acta Phytotax. Sin. 26: 450. 1988.

长茎粗筒苣苔 *chang jing cu tong ju tai*

Stems to 60 cm, glabrous to very sparsely puberulent. Leaves opposite, rarely alternate, spread along stem, unequal in a pair; petiole 0.5–12 cm, sparsely appressed villous, glabrescent; leaf blade ovate to obovate, rarely lanceolate, 4–15.5 × 2.4–8.4 cm, adaxially sparsely appressed strigose to pubescent, abaxially nearly glabrous, sparsely appressed pubescent along veins base sometimes oblique, cuneate to rounded, margin irregularly serrate, apex acuminate to acute; lateral veins 7–10 on each side of midrib, conspicuous. Cymes 1–12-flowered; peduncle 5.5–10.5 cm, sparsely glandular pubescent; bracts 2(or 3), lanceolate to oblong, 3–8 × 1–2 mm, outside sparsely pubescent, inside glabrous, margin entire to sparsely denticulate. Calyx segments lanceolate to narrowly ovate, 0.7–1.4 cm × 1–4 mm, outside pubescent to villous, margin entire, veins indistinct. Corolla white, inside purple spotted, 3–4.5 cm, outside sparsely pubescent, inside sparsely pubescent on adaxial lip; tube 2.6–3.4 × 1–1.5 cm; adaxial lip 4–6 mm, lobes semiorbicular, 3–4 × ca. 6 mm, apex rounded; abaxial lip 1–1.9 cm, lobes semiorbicular, ca. 4 × 4–5 mm, apex rounded. Adaxial stamens adnate to corolla ca. 1 cm above base, ca. 1.5 cm, abaxial ones adnate to corolla ca. 1.2 cm above base, ca. 1.5 cm; filaments glabrous; anthers globose, thecae not confluent. Pistil 2.6–2.8 cm; ovary pubescent. Style 1.3–1.5 cm, sparsely pubescent to puberulent. Capsule 5.5–7 cm, glabrescent. Fl. Aug, fr. Oct.

• Shady and damp places under forests of slopes; 2200–2500 m. Sichuan (Butuo Xian, Kangding Xian).

3. *Briggsia dongxingensis* W. Y. Chun ex K. Y. Pan, Acta Phytotax. Sin. 26: 451. 1988.

东兴粗筒苣苔 *dong xing cu tong ju tai*

Stems 20–60 cm, densely pubescent. Leaves opposite, spread along stem, unequal in a pair; petiole 0.5–2.8 cm, densely villous; leaf blade elliptic to ovate or obovate, 4.5–16 × 2.3–7 cm, adaxially appressed puberulent to pubescent, abaxially pubescent, villous along veins, base oblique, cuneate, sometimes rounded on 1 side, margin denticulate to serrate, apex acuminate to acute; lateral veins 6–10 on each side of midrib, conspicuous. Cymes 1–4-flowered; peduncle 4–10 cm, pubescent; bracts 2, lanceolate to narrowly oblong, 2–4 × 0.5–1.2

mm, pubescent, margin entire. Calyx segments lanceolate to narrowly so, 5–9 × 1–1.5 mm, outside pubescent to villous, margin entire, veins indistinct. Corolla yellow, inside spotted or not, 4–5 cm, outside sparsely pubescent, inside sparsely pubescent only on lobes of adaxial lip; tube 3.1–4.2 × 1.5–1.7 cm; adaxial lip ca. 1.1 cm, lobes semiorbicular, 5–6 × 5–7 mm, apex rounded; abaxial lip 7–9 mm, lobes semiorbicular, 4–7 × ca. 5 mm, apex rounded. Adaxial stamens adnate to corolla 1.5–2 cm above base, ca. 1.2 cm, abaxial ones adnate to corolla 1.5–1.8 cm above base, ca. 1.8 cm; filaments sparsely glandular pubescent near apex or glabrous; anthers globose, thecae not confluent or confluent; staminode ca. 1.5 mm. Pistil 2.7–3 cm; ovary glabrous. Style 7–11 mm, glandular pubescent. Fruit unknown. Fl. Aug–Oct.

Shaded dense forest near streams. Guangxi (Dongxing Xian) [N Vietnam].

4. *Briggsia longipes* (Hemsley ex Oliver) Craib, Notes Roy. Bot. Gard. Edinburgh 11: 262. 1919.

盾叶粗筒苣苔 *dun ye cu tong ju tai*

Didissandra longipes Hemsley ex Oliver, Hooker's Icon. Pl. 24: pl. 2379. 1895.

Plants stemless or stems to 6 cm tall, glabrous. Leaves basal or crowded; petiole (1–)3.2–9 cm, glabrous; leaf blade narrowly obovate to elliptic to broadly ovate, (3–)5–13.5 (–15.5) × (1.6–)3–7.2 cm, glabrous, base peltate or rounded to nearly cuneate, margin entire to shallowly serrate, apex obtuse to acute; lateral veins 4 or 5 on each side of midrib, abaxially slightly prominent. Cymes 1–5(–7)-flowered; peduncle (7–)14–23 cm, sparsely brownish villous, rarely glabrescent; bracts 2, linear to narrowly triangular, 2–4 × 0.5–1 mm, glabrous, margin entire. Calyx segments lanceolate to ovate or obovate, 8–11 × 2–5 mm, outside sparsely gray villous to glabrous, margin entire, veins indistinct. Corolla pale purple, inside often spotted, (3.3–)4–5 cm, outside puberulent, inside puberulent; tube 2.2–3.8 × 1.1–1.8 cm; adaxial lip 5–7 mm, lobes semiorbicular, 3–4 × ca. 7 mm, apex rounded; abaxial lip ca. 1 cm, lobes oblong to semiorbicular, ca. 6 × 4 mm, apex obtuse. Adaxial stamens adnate to corolla ca. 9 mm above base, ca. 8 mm, abaxial ones adnate to corolla ca. 8 mm above base, ca. 1.2 cm; filaments glabrous; anthers ovoid, thecae not confluent; staminode ca. 0.8 mm. Pistil ca. 3 cm; ovary pubescent. Style 0.7–2 cm, glabrous. Capsule 3.5–5.5 cm, glabrescent. Fl. Sep–Dec, fr. Dec, May.

• Forests on damp rocks and crevices of rocks; 1000–1800 m. Guangxi (Longlin Xian), SE Yunnan.

5. *Briggsia mihieri* (Franchet) Craib, Notes Roy. Bot. Gard. Edinburgh 11: 262. 1919.

革叶粗筒苣苔 *ge ye cu tong ju tai*

Didissandra mihieri Franchet, Bull. Mens. Soc. Linn. Paris 1: 450. 1885; *Briggsia fritschii* (H. Léveillé &

Vaniot) Craib; *Didissandra fritschii* H. Léveillé & Vaniot; *Didymocarpus fritschii* (H. Léveillé & Vaniot) H. Léveillé; *D. mihieri* (H. Léveillé & Vaniot) H. Léveillé.

Plants stemless or stems to 5 cm tall, glabrous. Leaves basal or crowded; petiole 1–9(–11) cm, glabrous; leaf blade narrowly obovate to obovate or elliptic, (1–)2.5–6(–12) × 1–3 (–6) cm, glabrous, base cuneate, margin irregularly crenate to serrate, apex rounded to acute; lateral veins 3 or 4 on each side of midrib, inconspicuous on both surfaces. Cymes 1–5-flowered; peduncle (5–)8–17 cm, glabrous to glabrescent; bracts 2, linear to narrowly triangular or lanceolate, 1–3 × 0.5–1.5 mm, glabrous, margin entire. Calyx segments narrowly ovate to narrowly triangular, 4–7 × 1.5–3 mm, outside glabrous to glabrescent, margin entire, obscurely 3-veined. Corolla blue-purple or pale purple to pale yellow, inside usually brownish spotted, (3.2–)4–6 cm, outside glabrous to sparsely glandular pubescent, inside sparsely puberulent; tube 2.1–4 × 1.4–1.8(–2.6) cm; adaxial lip 6–9 mm, lobes semiorbicular, 3–7 × 6–9 mm, apex rounded; abaxial lip ca. 1.4 cm, lobes semiorbicular, 6–7 × 7–8 mm, apex obtuse to rounded. Adaxial stamens adnate to corolla ca. 8 mm above base, ca. 1.6 cm, abaxial ones adnate to corolla ca. 1.2 cm above base, ca. 1.7 cm; filaments sparsely glandular pubescent; anthers ovoid, thecae not confluent; staminode ca. 1 mm. Pistil ca. 2.5 cm; ovary pubescent. Style 1.4–2 mm, glabrescent to sparsely pubescent. Capsule 3.4–7 cm, glabrescent. Fl. Sep–Oct, fr. Nov.

• Shady, damp rocks; 600–1710 m. Guangxi (Longlin Xian), Guizhou, S Sichuan.

6. *Briggsia aurantiaca* B. L. Burtt, Notes Roy. Bot. Gard. Edinburgh 21: 237. 1955.

黄花粗筒苣苔 *huang hua cu tong ju tai*

Plants stemless. Petiole 1.5–4 cm, densely rust-brown woolly and villous; leaf blade elliptic to ovate or obovate, rarely subrhombic, 2–12 × 1.3–5.5 cm, adaxially densely rust-brown villous, abaxially densely rust-brown woolly and villous, base cuneate, margin irregularly crenate to serrate, apex obtuse to acute; lateral veins 5–7 on each side of midrib, conspicuous on both surfaces. Cymes 1–8-flowered; peduncle (3–)6–13 cm, densely rust-brown villous; bracts 2, linear to narrowly triangular, 3–6 × 0.5–1.5 mm, outside rust-brown villous, inside glabrous, margin entire. Calyx segments lanceolate to ovate, 3–3.5 × 1–1.5 mm; tube rust-brown villous, margin entire, veins indistinct. Corolla orange to yellow, inside abaxial lip purple-red to pink, orange, or brown spotted, 1.8–2.5 cm, outside sparsely pubescent, inside glabrous; tube 1.2–1.9 × 0.9–1.4 cm; adaxial lip ca. 4 mm, lobes semiorbicular, ca. 2 × 2 mm, apex rounded; abaxial lip 7–10 mm, lobes oblong, 3–4 × ca. 3 mm, apex obtuse. Adaxial stamens

adnate to corolla ca. 4 mm above base, ca. 1 cm, abaxial ones adnate to corolla ca. 2 mm above base, ca. 1.3 cm; filaments glabrous; anthers reniform, thecae not confluent; staminode ca. 0.4 mm. Pistil 1.5–1.8 cm, glabrous. Style 2–4.5 mm. Capsule 2.8–4.3 cm, glabrous. Fl. and fr. Jun–Jul.

• Rock crevices; 2800–3700 m. SE Xizang.

7. *Briggsia longifolia* Craib, Notes Roy. Bot. Gard. Edinburgh 11: 238. 1919.

长叶粗筒苣苔 *chang ye cu tong ju tai*

Plants stemless. Petiole 2–6 cm, gray to brownish pubescent; leaf blade narrowly elliptic to oblanceolate, 4–19 × 1–3 cm, adaxially gray appressed puberulent, abaxially grayish appressed pubescent, brownish villous along veins, base attenuate, margin serrulate, apex acute; lateral veins 4–7 on each side of midrib, adaxially visible, abaxially slightly prominent. Cymes 2–10-flowered; peduncle 5.5–22 cm, sparsely brownish villous to pubescent; bracts 2, oblanceolate, 2–6(–10) × 1–2 mm, outside pubescent, inside glabrous, margin entire. Calyx segments narrowly ovate, 5–7 × 2–3 mm, outside sparsely brownish pubescent, margin entire, veins indistinct. Corolla yellow to deep orange, margin sometimes flushed darker, not spotted, or bud purple-blue, 2.2–3.6 cm, outside sparsely glandular puberulent, inside sparsely glandular puberulent; tube (1–) 1.8–2.3 × 0.8–1.6 cm; adaxial lip 2–5 mm, lobes semiorbicular, 2–4 × ca. 4 mm, apex obtuse to rounded; abaxial lip 0.8–1.2 cm, lobes semiorbicular, 4–7 × 3.5–4.5 mm, apex obtuse to rounded. Adaxial stamens adnate to corolla ca. 2.5 mm above base, ca. 1.2 cm, abaxial ones adnate to corolla ca. 3 mm above base, ca. 1.5 cm; filaments glabrous; anthers reniform, thecae confluent; staminode ca. 1 mm. Pistil 1.4–1.7 cm, glabrous. Style ca. 5 mm. Capsule 4–6 cm, glabrous. Fl. Aug–Sep, fr. Sep–Oct.

Forests, on trees, under forests on slopes; 1000–3100 m. S Gansu, N Sichuan, W Yunnan [N Myanmar].

- 1a. Cymes 2–5-flowered; pedicel brownish villous and sparsely glandular pubescent; corolla yellow to deep orange, margin sometimes flushed darker, not spotted 7a. var. *longifolia*
1b. Cymes ca. 10-flowered; pedicel rust-brown villous, never glandular pubescent; corolla in bud purple-blue 7b. var. *multiflora*

7a. *Briggsia longifolia* var. *longifolia*

长叶粗筒苣苔(原变种) *chang ye cu tong ju tai* (yuan bian zhong)

Cymes 2–5-flowered. Pedicel brownish villous and sparsely glandular pubescent. Corolla yellow to deep orange, margin sometimes flushed darker, not spotted. Fl. Aug–Sep, fr. Sep–Oct.

On trees in evergreen broad-leaved forests; ca. 2400 m. W Yunnan [N Myanmar].

Specimens from Myanmar frequently have ten or more flowers.

7b. *Briggsia longifolia* var. *multiflora* S. Y. Chen ex K. Y. Pan, Acta Phytotax. Sin. 26: 453. 1988.

多花粗筒苣苔 *duo hua cu tong ju tai*

Cymes ca. 10-flowered. Pedicel rust-brown villous, never glandular pubescent. Corolla in bud purple-blue.

• Slopes under forests among grasses; 1000–1900 m. S Gansu, N Sichuan.

8. *Briggsia muscicola* (Diels) Craib, Notes Roy. Bot. Gard. Edinburgh 11: 264. 1919.

藓丛粗筒苣苔 *xian cong cu tong ju tai*

Didissandra muscicola Diels, Notes Roy. Bot. Gard. Edinburgh 5: 225. 1912.

Plants stemless. Petiole 1.5–8(–15) cm, densely rust-brown villous; leaf blade narrowly elliptic to lanceolate, (4.5–) 6–16 × (1.3–) 2–4.2 cm, adaxially densely white appressed pubescent, abaxially appressed white pubescent, rust-brown villous along veins and margin, base often slightly oblique, narrowly to broadly cuneate, margin serrate to serrate-crenate, sometimes doubly so, apex acute; lateral veins 6–10 on each side of midrib, conspicuous on both surfaces. Cymes (2 or) 3–8-flowered; peduncle 8–23 cm, rust-brown villous and glandular pubescent; bracts 2, lanceolate, 0.5–1.3 × 1–2 mm, outside rust-brown villous, inside glabrous, margin entire. Calyx segments lanceolate, 4–7 × 1–2 mm, outside sparsely white pubescent and rust-brown villous, margin entire, veins indistinct. Corolla yellow to orange, inside purple-red to orange or brown spotted or striate, 1.7–3.4 cm, outside sparsely puberulent, inside glandular pubescent; tube 1.4–2 × (0.9–) 1.2–1.8 cm; adaxial lip 2–4 mm, lobes semiorbicular, 1.5–2 × ca. 3 mm, apex rounded to acute; abaxial lip 7–9 mm, lobes oblong, 2–4 × ca. 5 mm, apex acute to rounded. Adaxial stamens adnate to corolla ca. 3.5 mm above base, 1–1.2 cm, abaxial ones adnate to corolla ca. 5 mm above base, ca. 1.2 cm; filaments sparsely puberulent; anthers reniform, thecae confluent; staminode ca. 1 mm. Pistil 1–2.8 cm, glabrous. Style 2–7 mm. Capsule 4–6.5 cm, glabrous. Fl. May–Aug, fr. May–Dec.

Forests on rocks or trees; 2400–3500 m. SE Xizang, NW Yunnan

[Bhutan, N India, Myanmar].

9. *Briggsia stewardii* W. Y. Chun, Sunyatsenia 6: 303. 1946.

广西粗筒苣苔 *guang xi cu tong ju tai*

Plants stemless. Petiole to 4 cm, densely brownish villous; leaf blade elliptic to ovate or obovate, 5–15 × 2.5–5 cm, pale yellow appressed pubescent and villous, abaxially yellowish to brownish pubescent along veins, base narrowly cuneate to attenuate, margin irregularly, coarsely crenate-serrate, apex rounded to acute; lateral veins 5–9 on each side of midrib, conspicuous on both surfaces. Cymes 3–6-flowered; peduncle 9–13 cm, sparsely pubescent to glabrescent; bracts 2, linear to oblanceolate, 3–4 × 0.7–

1 mm, pubescent to puberulent, margin entire. Calyx segments elliptic to lanceolate, 3–3.5 × 1.2–2 mm, outside sparsely pubescent, margin entire, obscurely 3-veined. Corolla blue to pale purple, inside purplish spotted, 3–4 cm, outside glabrous, inside glabrous; tube 2–2.3 × 1.3–1.5 cm; adaxial lip 6–9 mm, lobes oblong, 4–6 × ca. 2.5 mm, apex rounded; abaxial lip 1.2–1.3 cm, lobes oblong, ca. 6 × 5 mm, apex rounded. Adaxial stamens adnate to corolla ca. 3 mm above base, ca. 2 cm, abaxial ones adnate to corolla ca. 2 mm above base, ca. 2.3 cm; filaments sparsely glandular pubescent; anthers reniform, thecae confluent; staminode ca. 0.5 mm. Pistil 2.2–2.8 cm, glabrous. Style 5–10 mm. Fruit unknown. Fl. Sep.

• Shady, damp forests; ca. 300 m. Guangxi (Sanjiang Xian).

10. *Briggsia mairei* Craib, Notes Roy. Bot. Gard. Edinburgh 11: 239. 1919.

东川粗筒苣苔 *dong chuan cu tong ju tai*

Plants stemless. Petiole 3.5–9.5 cm, densely brown villous; leaf blade sometimes oblique, ovate to elliptic, 4–8(–14) × 2–4.2 cm, adaxially yellow to gray pilose, abaxially sparsely pubescent, brown villous along veins, base cuneate to cordate, margin dentate to serrate, apex acute; lateral veins 6–8 on each side of midrib, adaxially conspicuous, abaxially prominent. Cymes 1–5-flowered; peduncle 4.5–21 cm, sparsely to densely brownish villous; bracts 2, lanceolate to obovate, 3–6 × 2–3 mm, outside brownish villous, inside glabrous, margin entire. Calyx segments lanceolate to ovate, 4–6 × 1.5–3 mm, outside brownish villous, margin entire, veins indistinct. Corolla purple, inside spotted, 3–4.2 cm, outside glandular puberulent, denser basally, inside glandular puberulent, more densely so on adaxial lip; tube 2–2.8 × 1–1.4 cm; adaxial lip 2–5 mm, lobes semiorbicular, ca. 1 × 3 mm, apex rounded; abaxial lip 1–1.5 cm, lobes semiorbicular, 4–7.5 × 4–6 mm, apex rounded. Adaxial stamens adnate to corolla ca. 1 cm above base, ca. 8 mm, abaxial ones adnate to corolla ca. 5 mm above base, ca. 1.5 cm; filaments pale yellow villous near base, glabrescent near apex; anthers reniform, thecae confluent; staminode unknown. Pistil ca. 2.2 cm, glabrous. Style 7–8 mm. Capsule ca. 5.5 cm, glabrous. Fl. Jul–Oct, fr. Sep.

• Slopes under forests; 2600–3000 m. Yunnan (Dongchuan Xian).

11. *Briggsia humilis* K. Y. Pan, Acta Phytotax. Sin. 26: 453. 1988.

小粗筒苣苔 *xiao cu tong ju tai*

Plants stemless. Petiole 1.5–3 cm, densely rust-brown villous; leaf blade ovate-elliptic, 1.5–2.2 × 0.8–1.2 cm, adaxially densely pale yellow appressed villous, abaxially densely rust-brown villous, base shallowly cordate, margin serrulate, apex obtuse; lateral veins 5 or 6 on each side of midrib, adaxially immersed, forming channels, abaxially prominent. Cymes 1–3-

flowered; peduncle 7–9 cm, sparsely rust-brown puberulent; bracts 2, oblong, 3–4 × ca. 1 mm, densely rust-brown villous, margin entire. Calyx segments lanceolate, ca. 4 × 1 mm, outside rust-brown villous, margin entire, veins indistinct. Corolla pale purple, inside yellow spotted, ca. 1.8 cm, outside pilose, inside pubescent; tube ca. 1.2 × 0.7 cm; adaxial lip ca. 3.5 mm, lobes suborbicular, ca. 1.6 × 1.5 mm, apex truncate; abaxial lip ca. 7 mm, lobes ovate, ca. 4 × 3.3 mm, apex obtuse to rounded. Adaxial stamens adnate to corolla ca. 1.5 mm above base, ca. 4.5 mm, abaxial ones adnate to corolla ca. 2 mm above base, ca. 6.5 mm; filaments glandular pubescent; anthers reniform, thecae confluent; staminode ca. 1 mm. Pistil ca. 8 mm, glabrescent. Style ca. 1.5 mm. Capsule 6–8.5 cm, glabrous. Seeds unknown. Fl. Aug.

• Rocks by streams under forests; ca. 1300 m. W Hubei.

12. *Briggsia latisepala* W. Y. Chun ex K. Y. Pan, Acta Phytotax. Sin. 26: 454. 1988.

宽萼粗筒苣苔 *kuan e cu tong ju tai*

Plants stemless. Petiole 1–5 cm, densely rust-brown woolly; leaf blade elliptic to narrowly ovate, 4.5–6 × 2–3.5 cm, adaxially brownish appressed puberulent, abaxially pubescent, rust-brown woolly along veins, base broadly cuneate to rounded, margin crenate-serrate to dentate, apex rounded; lateral veins ca. 4 on each side of midrib, inconspicuous. Cymes 1- or 2-flowered; peduncle 9.5–18 cm, rust-brown woolly; bracts 2, oblong, ca. 7 × 2 mm, outside rust-brown woolly, inside glabrous, margin entire. Calyx segments broadly ovate, 8–10 × 4–5 mm, outside rust-brown woolly only on midvein, margin entire, veins indistinct. Corolla purple, not spotted, ca. 4 cm, outside pubescent, inside glabrous; tube ca. 3 × 1–1.3 cm; adaxial lip ca. 6.6 mm, lobes orbicular, ca. 3 × 5 mm, apex rounded; abaxial lip ca. 1 cm, lobes ovate to obovate, 7–8 × 6–8 mm, apex rounded. Adaxial stamens adnate to corolla ca. 8 mm above base, ca. 1.4 cm, abaxial ones adnate to corolla ca. 5 mm above base, ca. 2 cm; filaments glabrous; anthers reniform, thecae not confluent; staminode ca. 0.9 mm. Pistil ca. 2 cm, glabrous. Style 3.5–4 mm. Fruit unknown. Fl. Sep.

• Shady slopes. Zhejiang (Yunhe Xian).

13. *Briggsia chienii* W. Y. Chun, Sunyatsenia 6: 300. 1946.

浙皖粗筒苣苔 *zhe wan cu tong ju tai*

Plants stemless. Petiole 1–6 cm, densely rust-brown villous; leaf blade elliptic to ovate, lanceolate, or falcate, 4–15 × 2–6 cm, adaxially gray pilose, abaxially appressed gray pubescent, densely rust-brown villous along veins, base cuneate to broadly cuneate, margin crenate-serrate, apex obtuse to acute; lateral veins 6–8 on each side of midrib, adaxially inconspicuous, abaxially prominent. Cymes 1–5-flowered; peduncle 11–20 cm, sparsely rust-brown villous; bracts 2, narrowly lanceolate to oblanceolate, 8–14 × 3–5 mm,

outside densely rust-brown villous, inside glabrous, margin subentire or sparsely dentate. Calyx segments ovate to lanceolate, 5–8 × 2–5 mm, outside rust-brown villous, margin sparsely dentate or subentire, veins indistinct. Corolla purple-red or purple, inside purple spotted, 3.5–4.2 cm, outside sparsely pubescent, inside glabrous; tube (1.8–)2.8–3 × 1.7–2 cm; adaxial lip 5–6 mm, lobes oblong, 4–5 × ca. 4 mm, apex obtuse; abaxial lip 1–1.5 cm, lobes oblong, 4–7 × ca. 5 mm, apex rounded. Adaxial stamens adnate to corolla ca. 4 mm above base, 1.6–2 cm, abaxial ones adnate to corolla ca. 6 mm above base, 1.2–1.7 cm; filaments sparsely puberulent; anthers reniform, thecae not confluent; staminode ca. 3 mm. Pistil 2–2.5 cm; ovary glabrous. Style ca. 8 mm, sparsely puberulent. Capsule 5–6.5 cm, glabrous. Fl. and fr. Sep–Oct.

• Damp rocks and among grasses; 500–1000 m. S Anhui, E Jiangxi, SW Zhejiang.

14. *Briggsia forrestii* Craib, Notes Roy. Bot. Gard. Edinburgh 11: 237. 1919.

云南粗筒苣苔 yun nan cu tong ju tai

Plants stemless. Petiole 1–7 cm, rust-brown villous; leaf blade ovate to broadly elliptic, 5–15 × 2.5–8 cm, adaxially sparsely rust-brown villous, abaxially sparsely pubescent, rust-brown villous along veins, base oblique, broadly cuneate to rounded, margin dentate to serrate, apex rounded to obtuse; lateral veins 5–8 on each side of midrib, prominent. Cymes 1–3 (or 4)-flowered; peduncle 8–17 cm, rust-brown villous, denser and longer near base; bracts 2, lanceolate, 3–4 × ca. 1 mm, outside rust-brown villous, inside glabrous, margin entire. Calyx segments lanceolate, 4–5 × 1–2 mm, outside rust-brown villous, margin entire, veins indistinct. Corolla purple-red, inside darker striate, 4.3–5.2 cm, outside sparsely glandular pubescent, inside glandular pubescent; tube 2.5–3.4 × 1.2–1.6 cm; adaxial lip 8–9 mm, lobes oblong, 4–5 × 4–7 mm, apex rounded to truncate; abaxial lip 1.5–2 cm, lobes elliptic-ovate, 6–9 × 5–7 mm, apex rounded. Adaxial stamens adnate to corolla ca. 4 mm above base, 1.8–2 cm, abaxial ones adnate to corolla ca. 3 mm above base, 2–2.2 cm; filaments glandular pubescent; anthers reniform, thecae confluent; staminode 2.5–3 mm. Pistil 1.6–3.4 cm, densely glandular pubescent. Style 2–10 mm. Capsule 2.5–5.5 cm, glabrescent. Fl. Jun and Sep, fr. Oct and May.

• Damp, shady rocks; 1600–3000 m. Yunnan (Ruili Xian).

15. *Briggsia agnesiae* (Forrest) Craib, Notes Roy. Bot. Gard. Edinburgh 11: 263. 1919.

灰毛粗筒苣苔 hui mao cu tong ju tai

Didissandra agnesiae Forrest, Notes Roy. Bot. Gard. Edinburgh 8: 334. 1915.

Plants stemless. Petiole 1–3 cm, densely rust-brown puberulent; leaf blade ovate to rhombic-ovate, 1.2–5 × 0.8–2.2 cm, adaxially densely gray appressed pubescent, abaxially densely gray appressed pubescent, rust-brown

pubescent along veins, base cuneate, margin shallowly serrate, apex acute to obtuse; lateral veins 3 or 4 on each side of midrib, adaxially inconspicuous, abaxially conspicuous. Cymes 1-flowered; peduncle 6–8 (–15) cm, sparsely rust-brown glandular puberulent; bracts 2, linear, 4–7 × ca. 1 mm, outside gray puberulent, inside glabrous, margin entire. Calyx segments narrowly lanceolate to lanceolate, 6–10 × 2–3 mm, outside sparsely rust-brown glandular puberulent, margin entire, veins indistinct. Corolla purple-red, not spotted, 3.5–4.5 cm, outside glandular puberulent, inside glabrous; tube 1.8–2.5 × 1.8–2.4 cm; adaxial lip ca. 9 mm, lobes triangular, ca. 3 × 4 mm, apex acute; abaxial lip 1.2–1.5 cm, lobes triangular, 10–12 × 5–8 mm, apex acute.

Adaxial stamens adnate to corolla ca. 3 mm above base, 1.3–1.8 cm, abaxial ones adnate to corolla ca. 3 mm above base, 1.8–2 cm; filaments pubescent; anthers reniform, thecae not confluent; staminode ca. 3.5 mm. Pistil 1.6–2.4 cm, densely glandular pubescent. Style 8–9 mm. Capsule ca. 5 cm, sparsely glandular puberulent to glabrescent. Fl. and fr. Jul.

• Rocks under shrubs; ca. 2500 m. Sichuan (Muli Xian), Yunnan (Yongsheng Xian).

16. *Briggsia acutiloba* K. Y. Pan, Acta Phytotax. Sin. 26: 455. 1988.

尖瓣粗筒苣苔 jian ban cu tong ju tai

Plants stemless. Petiole 2–5 cm, densely rust-brown villous; leaf blade elliptic, 3–6 × 1–2.2 cm, adaxially puberulent and sparsely rust-brown villous, abaxially puberulent to pilose, rust-brown villous along veins, base cuneate, margin crenate-serrate, apex rounded; lateral veins 5–7 on each side of midrib, adaxially conspicuous, abaxially prominent. Cymes ca. 4-flowered; peduncle 5–13 cm, sparsely rust-brown villous and glandular pubescent; bracts 2, lanceolate, 3–6 × ca. 1 mm, outside rust-brown villous, inside glabrous, margin entire. Calyx segments lanceolate, ca. 5 × 2.5 mm, outside sparsely rust-brown villous, margin entire, obscurely 3-veined. Corolla drying yellow, not spotted, ca. 3 cm, outside glabrous, inside glabrous; tube ca. 2 × 1.3 cm; adaxial lip ca. 6 mm, lobes narrowly triangular, ca. 2.5 × 2 mm, apex acute; abaxial lip ca. 1 cm, lobes narrowly triangular, ca. 5 × 3.5 mm, apex acute. Adaxial stamens adnate to corolla 5–6 mm above base, ca. 1 cm, abaxial ones adnate to corolla ca. 5 mm above base, ca. 1.5 cm; filaments sparsely pubescent; anthers reniform, thecae not confluent; staminode ca. 1.5 mm. Pistil ca. 9 mm, glandular puberulent. Style ca. 2 mm. Fruit unknown. Fl. Sep.

• Shady and damp rocks; 2200–2300 m. Yunnan (Yuxi Xian).

17. *Briggsia speciosa* (Hemsley) Craib, Notes Roy. Bot. Gard. Edinburgh 11: 264. 1919.

鄂西粗筒苣苔 e xi cu tong ju tai

Didissandra speciosa Hemsley in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 228. 1890; *Didymocarpus speciosus* (Hemsley) H. Léveillé.

Plants stemless. Petiole 1–3 cm, densely grayish to brownish puberulent; leaf blade narrowly elliptic to oblanceolate or ovate, 3–6(–8) × 0.8–2.3(–3.2) cm, white appressed pubescent, base often oblique, narrowly cuneate, margin serrate, apex acute; lateral veins 4 or 5 on each side of midrib, adaxially inconspicuous, abaxially slightly more conspicuous. Cymes 1–5-flowered; peduncle 4–9(–11) cm, brown pubescent; bracts 2, linear to lanceolate, 3–8 × 1–3 mm, outside appressed pubescent, inside glabrous, margin entire. Calyx segments lanceolate to ovate, 3–6 × 1–3 mm, outside brownish pubescent, margin entire, veins indistinct. Corolla purple-red, inside abaxial lip with 2 yellow or purple spots, 3.8–5.3 cm, outside glabrescent to sparsely pubescent, inside glabrous; tube 2.9–3.6 × 1.3–1.9 cm; adaxial lip 5–9 mm, lobes oblong to broadly triangular, 4–8 × 2–7 mm, apex obtuse to acute; abaxial lip 1.2–1.7 cm, lobes oblong to broadly triangular or semiorbicular, 4–10 × 4–7 mm, apex obtuse to acute. Adaxial stamens adnate to corolla ca. 0.5 mm above base, 1.5–2.4 cm, abaxial ones adnate to corolla ca. 1 mm above base, 2–3 cm; filaments sparsely pubescent; anthers reniform, thecae not confluent; staminode 3–4 mm. Pistil 1.6–2.5 cm; ovary glandular pubescent. Style 2–3 mm, glandular puberulent. Capsule 6–6.8 cm, glabrescent. Fl. Jun–Aug, fr. Jul–Sep.

• Shady, damp rocks on slopes; 300–1600 m. W Hubei, SW Hunan, E Sichuan.

18. *Briggsia rosthornii* (Diels) B. L. Burtt, Notes Roy. Bot. Gard. Edinburgh 22: 306. 1958.

川鄂粗筒苣苔 *chuan e cu tong ju tai*

Plants stemless. Petiole 1–8(–13) cm, densely rust-brown to yellowish villous; leaf blade ovate to lanceolate, rarely elliptic, 2–13 × 1.2–7 cm, white pubescent, abaxially rust-brown villous along veins, base sometimes oblique, cordate to cuneate, margin crenate to serrate, sometimes double so, apex obtuse to acute; lateral veins 3–7 on each side of midrib, conspicuous. Cymes 1–4(–8)-flowered; peduncle 3.5–20 cm, rust-brown glandular villous; bracts 2, lanceolate to linear, 2–7 × 1–3 mm, outside rust-brown villous, inside glabrous, margin entire. Calyx segments lanceolate, rarely elliptic to obovate or lobed, 3–9 × 1.2–3 mm, outside villous, margin entire, obscurely 3–5-veined. Corolla white to pale pink, purple, or purple-red, inside deep red or purple-red spotted, 2.8–5 cm, outside sparsely pubescent, inside sparsely pubescent; tube 2.3–3.3 × 1–2 cm; adaxial lip 4–8 mm, lobes semiorbicular to narrowly lanceolate, 1–6 × (1–)2–6 mm, apex obtuse; abaxial lip 1.1–2 cm, lobes oblong, 7–9 × 5–8 mm, apex obtuse. Adaxial stamens adnate to corolla ca. 4 mm above base, 1–1.5 cm, abaxial ones adnate to corolla 4–5 mm above base, 1.4–2 cm;

filaments pubescent; anthers reniform, thecae confluent; staminode 1–2.2 mm. Pistil ca. 2 cm, glandular puberulent. Style 2–5 mm. Capsule 5–6.5 cm, sparsely puberulent to glabrescent. Fl. Aug–Sep, fr. Sep–Oct.

• Shady, damp rocks under bamboo forests; 1000–2300 m. Guizhou, Hubei, Sichuan, Yunnan.

- 1a. Cymes 1-flowered; peduncle 7–9.3 cm 18b. var. *crenulata*
- 1b. Cymes 1–4(–8)-flowered; peduncle 3.5–20 cm.
 - 2a. Corolla ca. 2.8 × 1–1.5 cm, lobe apex acute 18d. var. *xingrenensis*
 - 2b. Corolla 3.2–5 × 1.5–2 cm, lobe apex obtuse.
 - 3a. Leaf blade ovate to lanceolate, rarely elliptic, 2–13 × 1.2–7 cm; peduncle 3.5–20 cm; corolla pale pink to purple or purple-red, inside deep red or purple-red spotted, upper lip 2-lobed, lobes semiorbicular, ca. 2 × 1–1.2 mm 18a. var. *rosthornii*
 - 3b. Leaf blade ovate, 3.3–7.5 × 1.6–2.3 cm; peduncle 16.3–18.6 cm; corolla white, inside purple spotted, upper lip 2-sect from base, lobes suborbicular, 5–6 × ca. 6 mm 18c. var. *wenshanensis*

18a. *Briggsia rosthornii* var. *rosthornii*

川鄂粗筒苣苔(原变种) *chuan e cu tong ju tai* (yuan bian zhong)

Didissandra rosthornii Diels, Bot. Jahrb. Syst. 29: 574. 1900; *Briggsia hians* W. Y. Chun.

Leaf blade ovate to lanceolate, rarely elliptic, 2–13 × 1.2–7 cm. Cymes 1–4(–8)-flowered; peduncle 3.5–20 cm. Corolla pale pink to purple or purple-red, inside deep red or purple-red spotted, 3.2–5 cm; tube 2.3–3.3 × 1.5–2 cm; adaxial lip 4–8 mm, 2-lobed, lobes semiorbicular, ca. 2 × 1–1.2 mm, apex obtuse. Fl. Aug–Sep, fr. Sep–Oct.

• Shady, damp rocks under forests; 1000–2000 m. Guizhou, Hubei, Sichuan.

18b. *Briggsia rosthornii* var. *crenulata* (Handel-Mazzetti) K. Y. Pan, Fl. Reipubl. Popularis Sin. 69: 223. 1990.

贞丰粗筒苣苔 *zhen feng cu tong ju tai*

Briggsia crenulata Handel-Mazzetti, Sinensia 5: 20. 1934.

Leaf blade ovate, 2.8–4.7 × 2.3–3.7 cm. Cymes 1-flowered; peduncle 7–9.3 cm. Corolla pale pink to purple or purple-red, inside deep red or purple-red spotted, ca. 3.3 cm; tube ca. 3 × 1.5–1.6 cm; adaxial lip ca. 6 mm, 2-sect from base, lobes suborbicular, 1–2.5 × (1–)2–3 mm, apex obtuse. Fl. Oct.

• Guizhou (Zhenfeng Xian).

18c. *Briggsia rosthornii* var. *wenshanensis* K. Y. Pan, Acta Phytotax. Sin. 26: 456. 1988.

文山粗筒苣苔 wen shan cu tong ju tai

Leaf blade ovate, 3.3–7.5 × 1.6–2.3 cm. Cymes 1–3-flowered; peduncle 16.3–18.6 cm. Corolla white, inside purple spotted, ca. 3.9 cm; tube ca. 3 × 1.5–1.9 cm; adaxial lip ca. 6 mm, 2-sect from base, lobes suborbicular, 5–6 × ca. 6 mm, apex obtuse. Fl. and fr. Sep.

• Rocks among bamboo; ca. 2300 m. Yunnan (Wenshan Xian).

18d. *Briggsia rosthornii* var. *xingrenensis* K. Y. Pan, Acta Phytotax. Sin. 26: 456. 1988.

锈毛粗筒苣苔 xiu mao cu tong ju tai

Leaf blade narrowly ovate, 3.7–6.3 × 1.6–3 cm. Cymes 2–4-flowered; peduncle 10–20 cm. Corolla pale pink to purple or purple-red, inside deep red or purple-red spotted, ca. 2.8 cm; tube ca. 3 × 1–1.5 cm; adaxial lip ca. 6 mm, 2-lobed, lobes narrowly lanceolate, 1–2.5 × (1–)2–3 mm, apex acute.

• Guizhou (Xingren Xian).

19. *Briggsia elegantissima* (H. Lévillé & Vaniot) Craib, Notes Roy. Bot. Gard. Edinburgh 11: 265. 1919.

紫花粗筒苣苔 zi hua cu tong ju tai

Didissandra elegantissima H. Lévillé & Vaniot in H. Lévillé, Compt. Rend. Assoc. Franç. Avancem. Sci. 34: 425. 1906; *Didymocarpus elegantissimus* (H. Lévillé & Vaniot) H. Lévillé.

Plants stemless. Petiole 1.5–5.5(–7.5) cm, densely brown villous; leaf blade elliptic to ovate, 2.6–5.5(–8) × 1.5–3(–5.5) cm, adaxially densely brownish gray appressed pubescent, abaxially brownish gray appressed pubescent, base cuneate to rounded, margin crenate-serrate, apex acute to rounded; lateral veins 4 or 5 on each side of midrib, adaxially inconspicuous, abaxially prominent. Cymes 1–4-flowered; peduncle 10–20 cm, brownish villous; bracts 2, lanceolate, 6–10 × 1–2 mm, outside villous, inside glabrous, margin entire. Calyx segments narrowly lanceolate, 4–8 × 1.3–2 mm, outside brownish villous, margin entire, veins indistinct. Corolla purple, inside abaxial lip purple spotted, 2.6–3.4(–4.6) cm, outside pubescent, inside pubescent; tube 2.2–2.7(–3) × 0.7–1(–1.8) cm; adaxial lip 4–5 mm, lobes oblong, 3–4 × ca. 2 mm, apex rounded; abaxial lip 1–1.4 cm, lobes oblong, ca. 7 × 5 mm, apex rounded, shallowly crenulate. Adaxial stamens adnate to corolla ca. 3 mm above base, ca. 1.7 cm, abaxial ones adnate to corolla ca. 1.5 mm above base, ca. 2.3 cm; filaments pubescent; anthers reniform, thecae not confluent; staminode ca. 0.5 mm. Pistil ca. 2 cm, glandular pubescent. Style 4–5 mm. Capsule 6–6.5 cm, glabrescent. Fl. and fr. Aug.

• Damp, rocky cliffs; ca. 600 m. Guizhou (Pingfa Xian, Dushan Xian).

20. *Briggsia pinfaensis* (H. Lévillé) Craib, Notes Roy. Bot. Gard. Edinburgh 11: 264. 1919.

平伐粗筒苣苔 ping fa cu tong ju tai

Didissandra pinfaensis H. Lévillé, Repert. Spec. Nov. Regni Veg. 9: 328. 1911.

Plants stemless. Petiole 1.5–5.5 cm, densely brownish to rust-brown villous; leaf blade elliptic to ovate, 3.2–9 × 2–4 cm, gray to brown appressed puberulent, base cuneate, margin undulate, crenate-serrate, apex acute to rounded; lateral veins 5–7 on each side of midrib, adaxially inconspicuous, abaxially prominent. Cymes 1–4-flowered; peduncle 6.5–25 cm, brownish villous; bracts 2, linear to narrowly lanceolate, 4–6 × 0.6–1 mm, outside villous, inside pubescent to sparsely pubescent, margin entire. Calyx segments lanceolate, 5–7 × 1–2 mm, outside puberulent, margin sparsely dentate, veins indistinct. Corolla blue-purple, inside purple spotted, 2.8–4 cm, outside pubescent, inside glabrous; tube 2–2.5 × 1–1.6 cm; adaxial lip 4–5 mm, lobes oblong to broadly triangular, 2–2.5 × 3–3.5 mm, apex rounded to truncate; abaxial lip 0.8–1.2 cm, lobes oblong to suborbicular, 6–7 × 4–6 mm, apex rounded, erose.

Adaxial stamens adnate to corolla ca. 6 mm above base, ca. 1.5 cm, abaxial ones adnate to corolla ca. 5 mm above base, ca. 1.8 cm; filaments sparsely glandular pubescent; anthers reniform, thecae not confluent; staminode unknown. Pistil 1.4–2 cm, glandular pubescent. Style 3–4 mm. Immature capsule 4–5 cm, glandular pubescent. Fl. Aug.

• Guizhou (Pingfa Xian).

21. *Briggsia parvifolia* K. Y. Pan, Acta Phytotax. Sin. 26: 457. 1988.

小叶粗筒苣苔 xiao ye cu tong ju tai

Plants stemless. Petiole 0.5–1.8(–2.4) cm, brownish villous; leaf blade elliptic to ovate, 1–2 × 0.7–1.2 cm, densely brownish gray appressed pubescent, base cuneate, margin crenate-serrate, apex acute to rounded; lateral veins 3–5 on each side of midrib, adaxially inconspicuous, abaxially prominent. Cymes 1-flowered; peduncle 5–6.5 cm, rust-brown villous; bracts 2, linear to narrowly lanceolate, 1–2 × 0.7–1 mm, outside sparsely rust-brown puberulent, inside puberulent, margin entire. Calyx segments lanceolate to ovate, 2.5–3 × 0.8–1 mm, outside rust-brown villous, margin entire, veins indistinct. Corolla drying yellow, inside abaxial lip striate, 2–2.8 cm, outside glandular puberulent, inside glabrous; tube 1.5–2.1 × 0.6–1 cm; adaxial lip ca. 1.5 mm, lobes semiorbicular, ca. 1 × 2 mm, apex rounded; abaxial lip 4–5 mm, lobes obovate, 3–4 × ca. 5 mm, apex rounded, entire. Adaxial stamens adnate to corolla ca. 1 mm above base, ca. 1.4 cm, abaxial ones adnate to corolla ca. 0.4 mm above base, ca. 1.7 cm; filaments sparsely glandular pubescent; anthers reniform, thecae not confluent; staminode ca. 1 mm. Pistil 1.1–1.2 cm, glandular pubescent. Style ca. 1.5 mm. Fruit unknown.

• Guizhou.

11. BRIGGSIOPSIS K. Y. Pan, Acta Phytotax. Sin. 23: 216. 1985.

筒花苣苔属 tong hua ju tai shu

Herbs, perennial, epipetric, rhizomatous, stemless or short and simple stemmed. Leaves few, basal or crowded above; leaf blade villous, base rounded to cordate. Inflorescences lax, axillary, 1–3-flowered cymes; bracts 2, opposite. Calyx actinomorphic, 5-sect from base; segments equal. Corolla white, zygomorphic, inside glabrous; tube tubular-funnelform, slightly gibbous abaxially toward limb, much longer than limb, 1.2–1.5 cm in diam.; limb 2-lipped; adaxial lip 2-lobed, slightly shorter than abaxial lip; abaxial lip 3-lobed, lobes subequal, apex rounded. Stamens 4, adnate to corolla tube below middle, included; anthers basifixed, coherent in pairs, thecae subparallel, not confluent, dehiscing longitudinally; connective not projecting; staminode 1, adnate to adaxial side of corolla tube. Disc ringlike. Ovary oblong, 2-loculed, only adaxial locule fertile; placenta 1, axile. Stigmas 2, equal, obovate, undivided. Capsule oblique in relation to pedicel, oblong, much longer than calyx, dehiscing loculicidally to above base; valves 2, straight, not twisted. Seeds unappendaged.

• One species: endemic to China.

1. Briggsiopsis delavayi (Franchet) K. Y. Pan, Acta Phytotax. Sin. 23: 217. 1985.

筒花苣苔 tong hua ju tai

Didissandra delavayi Franchet, Bull. Mus.

Hist. Nat. (Paris) 5: 250. 1899; *Briggsia*

beauverdiana (H. Léveillé) Craib; *B. delavayi* (Franchet)

W. Y. Chun; *Didissandra beauverdiana* H. Léveillé.

Plants stemless or stems to 4 cm. Petiole 2.5–14 cm,

densely gray appressed villous; leaf blade ovate to

suborbicular, 4–12 × 3.2–7.5 cm, gray villous, base

rounded to cordate, margin entire to repand, apex

rounded. Peduncle 6–12 cm, gray villous; bracts linear

to lanceolate, 3–6 mm. Calyx segments linear to lanceolate, 5–13 × 1–2 mm, outside gray villous.

Corolla white, inside purple striate, 4–4.5 cm, outside

white villous; tube 2.5–3.5 × 1.2–1.5 cm; adaxial lip ca.

7 mm; abaxial lip ca. 1.1 cm, all lobes suborbicular, 4–5

mm. Adaxial stamens ca. 1 cm, abaxial ones ca. 1.3 cm;

staminode ca. 1.8 mm. Pistil ca. 2.3 cm, glabrous. Style

ca. 1.5 cm. Capsule ca. 1.2 cm. Fl. Aug.

• Shady, damp rocks in montane regions; 200–1500 m. Guizhou (Xishui Xian), S Sichuan, NE Yunnan (Yanjin Xian).

12. DIDISSANDRA C. B. Clarke in A. & C. de Candolle, Monogr. Phan. 5: 65. 1883.

漏斗苣苔属 lou dou ju tai shu

Raphiocarpus W. Y. Chun.

Herbs, rarely shrubs or subshrubs, perennial, epipetric or terrestrial, rhizomatous. Stems simple or branched. Leaves 2 to few, on stem, opposite, often crowded at stem apex, equal to strongly unequal in a pair; leaf blade puberulent to villous or glabrous, base cuneate to cordate. Inflorescences lax or dense, axillary, 1–10-flowered cymes; bracts 2 or apparently absent, opposite. Calyx actinomorphic, 5-sect from base to 5-lobed; segments equal. Corolla white to yellow, orange-red, purple, or blue-purple, zygomorphic, inside glabrous to sparsely glandular pubescent; tube narrowly cylindrical to cylindrical basally, ampliate above, not swollen, 4–5 × longer than limb, 0.6–1.5 cm in diam.; limb 2-lipped; adaxial lip 2-lobed, longer than to much shorter than abaxial lip; abaxial lip 3-lobed, lobes equal or subequal, apex rounded. Stamens 4, adnate to corolla tube near or above middle, included; anthers basifixed, coherent in pairs, thecae divergent, not confluent or confluent, dehiscing longitudinally; connective not projecting; staminode absent or 1, adnate to adaxial side of corolla tube. Disc ringlike. Ovary linear, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigmas 2, equal or unequal, oblong to deltoid, undivided or 2-lobed. Capsule straight in relation to pedicel, linear to narrowly oblong, much longer than calyx, dehiscing loculicidally to base; valves 2, straight, not twisted. Seeds unappendaged.

About 31 species: China, Indonesia, Malaysia, Thailand, Vietnam; five species in China.

1a. Leaves 1 pair, strongly unequal; petiole absent to 3 mm; calyx 5-lobed from below to above middle, tube at least 3 mm; stigmas unequal, adaxial undivided, oblong, ca. 2 mm, abaxial 2-lobed, obovate, ca.

3 mm 5. *D. sesquifolia*

1b. Leaves 2 or more pairs, equal to slightly unequal in each pair; petiole 0.3–6 cm; calyx 5-sect from base or near base, tube to 1 mm; stigmas equal, oblong to deltoid.

2a. Stem and peduncle glabrous to pubescent, glabrescent; calyx 2.5–6 mm; corolla yellow or white, often flushed purple, 1–4.9 cm.

- 3a. Corolla white, often flushed purple, 1.2–1.5 cm; bracts 1–2 × ca. 0.5 mm; calyx 2.5–3 × ca. 1 mm; stems glabrous to very sparsely puberulent; leaf blade with both surfaces glabrous 1. *D. sinica*
- 3b. Corolla yellow, 3.5–4.9 cm; bracts ca. 3–6 × 1–3 mm; calyx 4–6 × 1–3 mm; stems pubescent to puberulent, glabrescent, leaf blade adaxially sparsely puberulent to strigose, abaxially glabrous to sparsely puberulent, veins sparsely pubescent to sparsely villous 2. *D. longipedunculata*
- 2b. Stem and peduncle villous to woolly, sometimes also puberulent or glabrescent; calyx 6–15 mm; corolla purple, purple-blue, or orange-red to yellow, 3–7 cm.
- 4a. Cymes 5–10-flowered; peduncle 3–10(–12) cm; bracts deciduous, broadly ovate to orbicular, 15–25 × 15–30 mm, margin irregularly dentate to subentire; corolla pale-purple or rusty lilac to purple; ovary pubescent, style glandular puberulent 4. *D. begoniifolia*
- 4a. Cymes 1–3-flowered; peduncle 1.5–4.3 cm; bracts persistent, lanceolate to oblong or oblanceolate, 2–4 × ca. 1 mm, margin entire; corolla orange-red to yellow; ovary and style glabrous 3. *D. macrosiphon*

1. *Didissandra sinica* (W. Y. Chun) W. T. Wang, Acta Phytotax. Sin. 13: 97. 1975.

无毛漏斗苣苔 wu mao lou dou ju tai

Raphiocarpus sinicus W. Y. Chun, Sunyatsenia 6: 275. 1946.

Shrubs to subshrubs. Stems 1–1.5 m, glabrous to very sparsely puberulent. Leaves spread along stem, equal to unequal in a pair; petiole 3–13 mm; leaf blade narrowly elliptic to obovate, 5–17 × 1.4–6.3 cm, glabrous, base slightly oblique, cuneate to rounded, margin indistinctly to distinctly serrulate, apex acuminate to caudate-acuminate. Cymes 1–5-flowered; peduncle 2–6 mm, sparsely puberulent to sparsely pubescent; bracts 2, persistent, oblanceolate to linear-lanceolate, 1–2 × ca. 0.5 mm, margin entire. Calyx 5-sect from base; segments lanceolate, 2.5–3 × ca. 1 mm. Corolla white, often flushed purple, 1.2–1.5 cm; tube ca. 8 mm; adaxial lip ca. 3 mm; abaxial lip ca. 6 mm. Adaxial stamens 4–5.5 mm, abaxial ones 5–6.5 mm; anther thecae not confluent; staminode absent. Pistil 6–8 mm; ovary glabrous. Style 1.5–2 mm, sparsely glandular puberulent; stigmas deltoid, ca. 0.2 mm. Capsule 2–5 cm. Fl. Jul–Aug, fr. Jul–Oct.

• Fertile soil in shady and damp places under forests; 400–2400 m. S Guangxi.

Many specimens of *Didissandra sinica* are labelled as having come from Guangdong, but that part of Guangdong is now in Guangxi.

2. *Didissandra longipedunculata* C. Y. Wu ex H. W. Li, Bull. Bot. Res., Harbin 3(2): 17. 1983.

长梗漏斗苣苔 chang geng lou dou ju tai

Herbs to subshrubs. Stems to 1 m, pubescent to puberulent, glabrescent. Leaves mostly near stem apex, equal, rarely unequal in a pair; petiole 0.5–2.5 cm; leaf blade lanceolate to ovate or obovate, 7–17 × 3–6.5 cm, adaxially sparsely puberulent to strigose, abaxially glabrous to sparsely puberulent, sparsely pubescent to sparsely villous along veins, base slightly oblique,

cuneate to subcordate, margin serrulate to entire, apex acuminate. Cymes 3–7-flowered; peduncle 1.5–6.5 cm, glandular puberulent to pubescent; bracts 2, persistent, lanceolate to ovate, ca. 3–6 × 1–3 mm, margin entire. Calyx 5-sect from base; segments ovate to lanceolate or oblong, 4–6 × 1–3 mm. Corolla yellow, 3.5–4.9 cm; tube 3–3.5 cm; adaxial lip 5–7 mm; abaxial lip 1–1.3 cm. Adaxial stamens 6–9 mm, abaxial ones 1.2–1.5 cm; anther thecae confluent; staminode absent. Pistil 2.4–3.5 cm, sparsely pubescent to glandular puberulent. Style 1.2–1.7 cm; stigmas oblong, 1–2 mm. Capsule 3–4.5 cm. Fl. Sep–Oct, fr. Oct.

• Shady and damp places under forests or by streams; 1400–1700 m. SE Yunnan (Pingbian Xian).

3. *Didissandra macrosiphon* (Hance) W. T. Wang, Acta Phytotax. Sin. 13: 98. 1975.

长筒漏斗苣苔 chang tong lou dou ju tai

Chirita macrosiphon Hance, Ann. Sci. Nat. Bot., sér. 5, 5: 231. 1866; *Didissandra aurea* (Dunn) B. L. Burt; *Loxostigma aureum* Dunn; *Didymocarpus microsiphon* (Hance) H. Léveillé; *Roettlera macrosiphon* (Hance) Kuntze.

Herbs. Stems to 30 cm, densely villous to woolly. Leaves mostly spread along stem, equal to unequal in a pair; petiole 0.5–6 cm; leaf blade ovate to broadly ovate, rarely elliptic or obovate, 5–17 × 3–8(–10.8) cm, villous to pubescent, base oblique, broadly cuneate to subcordate, margin serrate to serrulate, apex obtuse to acuminate. Cymes 1–3-flowered; peduncle 1.5–4.3 cm, villous, glabrescent; bracts 2, persistent, lanceolate to oblong or oblanceolate, 2.5–4 × ca. 1 mm, margin entire. Calyx 7–10 mm, 5-sect from near base; segments narrowly lanceolate, 6–9 × 1–1.5 mm. Corolla orange-red to yellow, 5.5–7 cm; tube 4–4.5 cm; adaxial lip 0.8–1.5 cm; abaxial lip 1.2–2.5 cm. Adaxial stamens 1.1–1.3 cm, abaxial ones 1.4–1.6 cm; anther thecae confluent; staminode absent. Pistil 4–5 cm,

glabrous. Style 2.2–2.5 cm; stigmas oblong, 1.5–2 mm. Capsule 3–5 cm. Fl. Jul–Aug, fr. Aug–Oct.

• Shady and damp rocks under forests; 200–800 m. SW Guangdong, SE Guangxi.

4. *Didissandra begoniifolia* H. Léveillé, Repert. Spec. Nov. Regni Veg. 11: 495. 1913.

大苞漏斗苣苔 da bao lou dou ju tai

Chirita chlamydata W. W. Smith; *Loxostigma begoniifolium* (H. Léveillé) J. Anthony.

Herbs. Stems to 1.7 m, densely villous and puberulent. Leaves mostly spread along stem, equal to unequal in a pair; petiole 0.6–6.5 cm; leaf blade ovate, rarely obovate, 6–23 × 2.5–11.5 cm, densely villous to pubescent, base oblique, narrowly cuneate to cordate, margin serrate to subentire, apex acuminate. Cymes 5–10-flowered; peduncle 3–10(–12) cm, villous; bracts 2, deciduous, broadly ovate to orbicular, 1.5–2.5 × 1.5–3 cm, margin irregularly dentate to subentire. Calyx 5-sect from base; segments lanceolate to narrowly oblong, 0.7–1.5 cm × ca. 1–2 mm. Corolla pale-purple or rusty lilac to purple, 3–6 cm; tube 2.5–4 cm; adaxial lip 5–8 mm; abaxial lip 0.9–2 cm. Adaxial stamens 8–10 mm, abaxial ones ca. 1.5 cm; anther thecae confluent; staminode absent. Pistil 3.2–3.6 cm; ovary pubescent. Style ca. 1 cm, glandular puberulent; stigmas oblong, 1–2.4 mm. Capsule (3–)6.5–7.5 cm. Fl. Aug–Sep, fr. Sep–Oct.

• Crevices of rocks under thickets on slopes; 1200–2100 m. W Guangxi, Guizhou, W Hubei, SE Yunnan.

5. *Didissandra sesquifolia* C. B. Clarke, Hooker's Icon. Pl. 18: pl. 1797. 1888.

大叶罂 da ye luo

Didymocarpus sesquifolius (C. B. Clarke) H. Léveillé.

Herbs. Stems 12–38 cm, sparsely villous, glabrescent. Leaves 2, at stem apex, strongly unequal; petiole absent to 3 mm; leaf blade ovate to very broadly ovate, 8.5–29 × 5.2–21 cm and (1–)3–6.5 × (0.6–)2–4.6 cm, pubescent to villous, base rounded to cordate, margin serrate to dentate-serrate, often doubly so, apex obtuse to acuminate. Cymes 1- or 2(–4)-flowered; peduncle 0.5–1(–3.5) cm, densely villous; bracts 2, often deciduous, lanceolate to oblanceolate, 4–5 × 0.5–2, margin entire. Calyx 1–2 cm, 5-lobed from below to above middle; lobes lanceolate to broadly triangular, 3–14 × 2–3 mm. Corolla purple to purple-blue, 4.8–7 cm; tube 3.5–5.7 cm; adaxial lip 8–10 mm; abaxial lip ca. 1.2–1.5 cm. Adaxial stamens 0.9–1.1 cm, abaxial ones 1.2–1.6 cm; anther thecae confluent; staminode 1, ca. 0.6 mm. Pistil 2.8–3.4 cm; ovary sparsely villous to puberulent. Style 6–7 mm, sparsely pubescent, glabrescent; adaxial stigma oblong, ca. 2 mm, abaxial stigma obovate, ca. 3 mm, 2-lobed. Capsule 5.5–7 cm. Fl. Jul–Aug, fr. Aug–Oct.

• Under forests, near roads, cliffs in montane regions; 900–1600 m. SW Sichuan.

13. CORALLODISCUS Batalin, Trudy Imp. S.-Peterburgsk. Bot. Sada 12: 176. 1892.

珊瑚苣苔属 shan hu ju tai shu

Herbs, perennial, epipetric, rhizomatous, stemless. Leaves many, basal; leaf blade glabrous to densely woolly, base narrowly to broadly cuneate, rarely subrounded. Inflorescences lax or dense, axillary, rarely subumbel-like, 1- to many-flowered cymes; bracts apparently absent. Calyx actinomorphic, 5-sect from near base to 5-lobed from near middle; segments equal. Corolla blue to purple, seldom yellow to white, zygomorphic, inside densely bearded on abaxial lip; tube tubular, not swollen, much longer than limb, 1–7 mm in diam.; limb 2-lipped; adaxial lip 2-lobed, usually distinctly shorter than abaxial lip; abaxial lip 3-lobed, lobes subequal, rarely unequal, apex rounded to obtuse. Stamens 4, adnate to corolla tube above base or rarely above middle, included or rarely slightly exerted; anthers dorsifixed, coherent in pairs, thecae divaricate, confluent, dehiscing longitudinally; connective not projecting; staminode 1, adnate to adaxial side of corolla tube. Disc ringlike. Ovary oblong, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigma 1, terminal, capitate, emarginate. Capsule straight in relation to pedicel, narrowly oblong to linear, rarely ovoid, much longer than calyx, dehiscing loculicidally or sometimes septocidally to base; valves 2, straight, not twisted. Seeds unappendaged.

Three to five species: Bhutan, China, N India, Nepal, Sikkim, Thailand; three species in China.

1a. Cymes 1-flowered; leaf blade abaxially densely white to grayish woolly; peduncle 1–6 cm; capsule ovoid 3. *C. conchifolius*

1b. Cymes (1–)4–15(–30)-flowered, if 1-flowered, then leaf blade abaxially only along veins rust-brown woolly; peduncle (1–)3–17 cm; capsule ovoid to narrowly linear, if ovoid, then leaf blade abaxially densely rust-brown woolly.

2a. Capsule ovoid to oblong, rarely narrowly oblong; leaf blade rhombic-lanceolate to lanceolate, rarely ovate,

1.6–11 × 0.8–4 cm, adaxially glabrous, rarely rust-brown woolly near base of midrib; peduncle densely

rust-brown woolly 1. *C. kingianus*

2b. Capsule narrowly oblong; leaf blade broadly obovate to elliptic, rhombic, ovate, flabellate, or oblong, (0.5–)1–5(–8) × (0.4–)0.8–3(–3.7) cm, adaxially glabrous to densely villous; peduncle glabrescent to brownish woolly, glabrescent 2. *C. lanuginosus*

1. *Corallodiscus kingianus* (Craib) B. L. Burt, Gard. Chron., ser. 3, 122: 212. 1947.

卷丝苣苔 *juan si ju tai*

Didissandra kingiana Craib, Notes Roy. Bot. Gard. Edinburgh 11: 259. 1919; *Corallodiscus grandis* (Craib) B. L. Burt; *D. grandis* Craib; *D. rufa* King ex J. D. Hooker, not C. B. Clarke.

Petiole to 5.5 cm, adaxially glabrous, rarely rust brown centrally, abaxially densely rust-brown woolly; leaf blade rhombic-lanceolate to lanceolate, rarely ovate, 1.6–11 × 0.8–4 cm, flat to bullate, adaxially glabrous, rarely rust-brown woolly near base of midrib, abaxially densely rust-brown woolly, margin subentire to crenulate, rarely serrulate, apex narrowly acute to acute, seldom obtuse or acuminate; lateral veins 4 or 5 on each side of midrib, adaxially impressed, abaxially prominent. Cymes (5–)7–20-flowered; peduncle (3.5–)4.5–17 cm, densely rust-brown woolly. Calyx 4–5 mm, outside densely rust-brown woolly. Corolla purplish to blue and white, inside with 2 deep brown spotted striae on abaxial lip, (1–)1.3–16 (–1.8) cm, outside glabrous; tube 8–12 × 3–7 mm; adaxial lip lobes 1–3 mm; lobes abaxial lip 3–5 mm. Adaxial stamens 3–4 mm, abaxial ones 5–6 mm; staminode ca. 1.5 mm. Pistil glabrous; ovary ca. 3 mm. Style 3–6 mm. Capsule ovoid to oblong, rarely narrowly oblong, 6–10(–20) mm. Fl. Jun–Sep, fr. Jun–Sep.

Rocks on slopes or in forests; 2800–4800 m. S Qinghai, SW Sichuan, S Xizang, NW Yunnan [Bhutan, Sikkim].

Corallodiscus kingianus and *C. grandis* are treated as a single species because the large number of specimens now available shows that the variation between them is continuous and correlates with elevation throughout their range. Corolla and pedicel length and number of flowers per inflorescence tend to decrease with increasing elevation. Calyx indumentum becomes denser with greater elevation.

2. *Corallodiscus lanuginosus* (Wallich ex R. Brown) B. L. Burt, Gard. Chron., ser. 3, 122: 212. 1947.

西藏珊瑚苣苔 *xi zang shan hu ju tai*

Didymocarpus lanuginosus Wallich ex R. Brown, On Cyrtandreae 118. 1839; *Corallodiscus bullatus* (Craib) B. L. Burt; *C. cordatulus* (Craib) B. L. Burt; *C. flabellatus* (Craib) B. L. Burt; *C. flabellatus* var. *leiocalyx* W. T. Wang; *C. flabellatus* var. *luteus* (Craib) K. Y. Pan; *C. flabellatus* var. *puberulus* K. Y. Pan; *C. flabellatus* var. *sericeus* (Craib) K. Y. Pan; *C. labordei* (Craib) B. L. Burt; *C. lineatus* (Craib) B. L. Burt; *C. luteus* (Craib) B. L. Burt; *C. mengtzeanus* (Craib) B. L. Burt; *C. patens* (Craib) B. L. Burt; *C. plicatus* (Franchet) B. L. Burt; *C. plicatus* var. *lineatus* (Craib)

K. Y. Pan; *C. sericeus* (Craib) B. L. Burt; *C. taliensis* (Craib) B. L. Burt; *Didissandra bullata* Craib; *D. cordatula* Craib; *D. flabellata* Craib; *D. labordei* Craib; *D. lanuginosa* (Wallich ex R. Brown) C. B. Clarke; *D. lineata* Craib; *D. lutea* Craib; *D. mengtzeana* Craib; *D. patens* Craib; *D. plicata* Franchet; *D. sericea* Craib; *D. taliensis* Craib; *D. taliensis* f. *robusta* Craib.

Petiole to 4(–5.5) cm, adaxially glabrous to woolly, abaxially gray to brownish woolly to pannose; leaf blade broadly obovate to elliptic, rhombic, ovate, flabellate, or oblong, (0.5–) 1–5(–8) × (0.4–)0.8–3(–3.7) cm, flat to plicate or bullate, adaxially glabrous to densely villous, abaxially brownish pubescent to white to brownish woolly or puberulent to glabrous, margin subentire to crenulate, denticulate, or serrate, apex acute to rounded; lateral veins 3–5(or 6) on each side of midrib, adaxially flat to impressed, abaxially prominent to strongly prominent. Cymes (1–)4–15(–30)-flowered; peduncle (1–)3–17 cm, glabrescent to brownish woolly, glabrescent. Calyx 1.5–3.5 mm, outside glabrous to pubescent, rarely woolly. Corolla blue or purple to white or yellow, inside with or without spots on abaxial lip, (0.6–)0.8–1.4(–1.9) cm, outside glabrous to glabrescent; tube 5.5–10(–13) × 1.5–5.5 mm; adaxial lip lobes 0.6–2 mm; abaxial lip lobes 2–4(–6) mm. Stamens 2–6.5 mm; staminode 0.5–2.2 mm. Pistil glabrous; ovary 2–5 mm. Style 2–8 mm. Capsule narrowly oblong, 0.6–2.5 cm. Fl. Apr–Oct, fr. Jun–Dec.

Rocky slopes, steep cliffs, forest margins, forests; 700–4300 m. N Guangdong, N Guangxi, Guizhou, Hebei, Henan, Hubei, NW Hunan, Shaanxi, Shanxi, Sichuan, Xizang, Yunnan [Bhutan, N India, Nepal, Sikkim, Thailand].

As presently delimited, *Corallodiscus lanuginosus* includes seven taxa recognized in FRPS (Fl. Reipubl. Popularis Sin. 69: 233–245. 1990). Morphological variation in the present delimitation of *C. lanuginosus* includes indumentum (amount and type), leaf blade shape, size, margin, and texture, and flower number and size. The extent of this variation accounts for more than a few taxa previously described. However, in reexamining of all of these taxa, it became clear that the variation in all of these characters is continuous and is not correlated with the variation in other characters. For this reason it was impossible to clearly delimit previously recognized taxa. Thus, we recognize one, highly variable species, but further studies are needed to understand the variation.

The specimens from Xizang (Gyirong, Nyalam) and W Yunnan (Baoshan) differ from those of other areas in having the leaves entire or subentire, ovate or rarely obovate, flat or very rarely slightly plicate, submembranous or thin papery, and glabrous or nearly so adaxially. They probably represent a subspecies of *Corallodiscus lanuginosus* or an independent species.

3. *Corallodiscus conchifolius* Batalin, Trudy Imp. S. Peterburgsk. Bot. Sada 12: 176. 1892.

小石花 *xiao shi hua*

Corallodiscus forrestii (Anthony) B. L. Burt;

Didissandra forrestii J. Anthony.

Petiole to 5 mm, adaxially glabrescent, abaxially white to grayish pubescent; leaf blade obovate to rhombic-ovate, elliptic, or suborbicular, 6–12 × 3–8 mm, flat to plicate, adaxially glabrescent, abaxially densely white to grayish woolly, margin subentire to crenate, apex acute to rounded; basal venation palmate, veins 3–7; lateral veins to 4 on each side of midrib, adaxially impressed, abaxially prominent. Cymes 1-flowered; peduncle 1–6 cm, densely grayish pubescent to

glabrescent. Calyx 2–5 mm, outside grayish woolly.

Corolla purple-blue to pale or deep blue, 6.5–12 mm, outside sparsely puberulent; tube 5–9 × 1–3.2 mm; adaxial lip lobes 1–2 mm; abaxial lip lobes 1.5–3 mm. Adaxial stamens ca. 2 mm, abaxial ones 4–5 mm; staminode 0.4–1 mm. Pistil glabrous; ovary ca. 3 mm. Style 3–4 mm. Capsule ovoid, 6–7 mm. Fl. Jun–Sep, fr. Jul–Sep.

• Crevices of rocks or near roads in montane regions; 2100–3300 m. S Gansu, NW Sichuan, SE Xizang (Zayü Xian), NW Yunnan.

14. PLATYSTEMMA Wallich, Pl. Asiat. Rar. 2: 41. 1831.

堇叶苣苔属 jin ye ju tai shu

Herbs, perennial, epipetric, rhizomatous. Stems simple. Leaves 1(or 2), on stem, apical; leaf blade pubescent, base cordate to auriculate. Inflorescences lax, axillary, 1–3(–6)-flowered cymes; bracts apparently absent. Calyx actinomorphic, 5-sect from near base; lobes equal. Corolla purple-red, zygomorphic, inside glabrous, outside oblique, campanulate, not swollen, shorter than limb, 3–5 mm in diam.; limb 2-lipped; adaxial lip 2-lobed, distinctly shorter than abaxial lip; abaxial lip 3-lobed, lobes subequal, apex rounded. Stamens 4, adnate to corolla tube very near base, included; anthers basifixed, coherent in pairs, thecae divaricate, confluent, dehiscing from fissures or cracks; connective not projecting; staminode 1, adnate to adaxial side of corolla tube. Disc ringlike. Ovary ovoid, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigma 1, terminal, capitate, undivided. Capsule straight in relation to pedicel, ovoid-oblong, slightly longer than calyx, dehiscing loculicidally to base; valves 2, straight, not twisted. Seeds unappendaged.

One species: Bhutan, China, N India, Nepal.

1. *Platystemma violoides* Wallich, Pl. Asiat. Rar. 2: 42. 1831.

堇叶苣苔 jin ye ju tai

Stems 3–9(–12) cm, sparsely white pubescent to glabrescent. Leaf blade broadly ovate, 1.5–8 × 1.8–8 cm, adaxially white appressed pubescent, abaxially sparsely white pubescent, base cordate to auriculate, margin coarsely dentate, apex broadly acute to obtuse; lateral veins subpalmate, 3–6 on each side of midrib. Peduncle 1–4 cm, sparsely glandular pubescent; bracts subulate, 1–3 × 0.5–1 mm. Calyx 2.7–3.7 mm; tube ca. 0.7 mm; segments ovate-oblong, 2–3 × 1–1.5 mm,

outside sparsely puberulent to glabrous. Corolla purple-red, throat spotted adaxially, adaxial lobes yellow with purple spots, 0.7–1.3 cm; tube ca. 3 mm; limb distinctly 2-lipped; adaxial lip 3.5–4.5 mm, lobes ovate, 2–2.5 × 2–3 mm; abaxial lip 5–8 mm, lobes ovate, 3–5.5 × 3–3.5 mm. Filaments 1–2 mm; staminode ca. 0.25 mm. Pistil exerted, glabrous; ca. 3 mm. Style 6.5–10 mm. Capsule partially enclosed in persistent calyx, 5–7 mm.

Shady and damp rocks in valleys or dry cliffs; 2300–3200 m. S Xizang (Nyalam Xian) [Bhutan, N India, Nepal].

15. CATHAYANTHE W. Y. Chun, Sunyatsenia 6: 282. 1946.

扁蒴苣苔属 bian shuo ju tai shu

Herbs, perennial, epipetric, rhizomatous, stemless. Leaves few, basal; leaf blade sericeous to pubescent, base cuneate. Inflorescences lax, axillary, 1- or 2-flowered cymes; bracts apparently absent. Calyx zygomorphic, 2-lipped; adaxial lip undivided; abaxial lip 4-lobed. Corolla purplish, zygomorphic, inside pubescent to sparsely pilose; tube tubular, slightly gibbous abaxially toward limb, much longer than limb, 7–10 mm in diam.; limb 2-lipped; adaxial lip 2-lobed, shorter than abaxial lip; abaxial lip 3-lobed, lobes subequal, apex rounded. Stamens 4, adnate to corolla tube near middle, included; anthers basifixed, coherent in pairs, thecae divaricate, confluent at apex, dehiscing longitudinally; connective not projecting; staminode absent. Disc tubular. Ovary narrowly ellipsoid, 1-loculed; placentas 2, parietal, projecting inward and divaricate. Stigma 1, terminal, subcapitate, divided on 1 side. Capsule straight in relation to pedicel, narrowly ellipsoid, slightly longer than calyx, dehiscing loculicidally to base, splitting along 1 suture, straight, not twisted. Seeds unappendaged.

• One species: endemic to China.

1. *Cathayanthe biflora* W. Y. Chun, Sunyatsenia 6: 283. 1946.

扁蒴苣苔 bian shuo ju tai

Petiole 2.5–14 cm; leaf blade oblanceolate to obovate or elliptic, 4.5–12 × 2–6.2 cm, adaxially whitish to brownish sericeous, abaxially appressed pubescent, margin subentire, apex slightly obtuse; lateral veins 4 or 5 on each side of midrib. Peduncle 7–12 cm, brownish

pubescent; bracts narrowly lanceolate, ca. 5 × 1 mm. Calyx 1.2–1.4 cm; tube 2–4.5 mm; adaxial lip linear to narrowly triangular, 5–9 mm; abaxial lip 4-lobed from above to near middle, lobes triangular, 3.5–8 mm, outside pubescent. Corolla 2.5–5 cm, outside sparsely pilose; tube ca. 2.5 cm; lobes suborbicular; adaxial lip lobes ca. 4 mm; abaxial lip lobes ca. 6 mm. Adaxial

stamens ca. 1.3 cm, abaxial ones ca. 1.4 cm; filaments glandular pilose. Pistil included; ovary ca. 6 mm. Style ca. 3 cm, glandular puberulent. Capsule ca. 1.6 cm. Fl. Apr–Jan, fr. Jan–Sep.

• Damp rocks by streams in valleys; ca. 2400 m. Hainan.

16. BECCARINDA Kuntze, Revis. Gen. Pl. 2: 470. 1891.

横蒴苣苔属 heng shuo ju tai shu

Petrodoxa J. Anthony; *Slackia* Griffith.

Herbs, rarely subshrubs, perennial, epipetric or terrestrial, rhizomatous, stemless or simple stemmed. Leaves many, basal or on stem, equal to subequal in a pair; leaf blade strigose to villous or glabrescent, base cordate to cuneate. Inflorescences often umbel-like, lax, axillary, 1- to few-flowered cymes; bracts 2, opposite. Calyx actinomorphic, 5-sect from base; segments equal. Corolla blue-purple to red, zygomorphic, inside glabrous, outside oblique, campanulate, not swollen, shorter than to nearly equalling limb, 3–9 mm in diam.; limb 2-lipped; adaxial lip 2-lobed, distinctly shorter than abaxial lip; abaxial lip 3-lobed, lobes equal or central lobe longer, apex rounded to obtuse. Stamens 4, adnate to corolla near or slightly above base, included; anthers basifixed, all 4 coherent together, thecae subparallel, slightly divergent at base, confluent at apex, dehiscent poricidally; connective not projecting; staminode 1 or absent, adnate to adaxial side of corolla tube. Disc ringlike or inconspicuous. Ovary ovoid, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigma 1, terminal, capitate, undivided. Capsule oblique in relation to pedicel, narrowly ovoid to very narrowly oblong, much longer than calyx, dehiscent loculicidally to base; valves 2, straight, not twisted. Seeds unappendaged.

About seven species: China, Myanmar, N Vietnam; five species in China.

- 1a. Peduncle 1.2–4 cm; leaf blade 1–3.5 × 0.6–2.2 cm, margin crenulate-serrate to subentire; lateral veins 3 or 4 on each side of midrib; bracts 1–2 × ca. 0.5 mm; anthers ca. 0.5 mm; pistil sparsely puberulent; capsule 6–10 mm 5. *B. minima*
- 1b. Peduncle (5–)7–17 cm; leaf blade 2.5–12 × 1.5–8.5 cm, margin crenate to dentate, denticulate, or serrate; lateral veins 4–6 on each side of midrib; bracts 2–6 × 2–5 mm; anthers 1.4–2.5 mm; pistil glabrous (unknown in *B. paucisetulosa*); capsule 1.5–2.7 cm (unknown in *B. paucisetulosa*).
- 2a. Plants with stems 12–20 cm, leaves crowded near stem apex; most of plant covered with purple-red hairs; leaf blade apex acute; bracts elliptic 4. *B. erythrotricha*
- 2b. Plants stemless or with stems to 10 cm, leaves basal or alternate and spaced along stem; most of plant with whitish, yellowish, or brownish hairs; leaf blade apex acute to rounded; bracts ovate or broadly ovate.
- 3a. Leaf blade 2.5–4 × 3–3.5 cm, adaxially sparsely minutely bristly, abaxially minutely bristly along veins and margin; calyx segments outside sparsely villous; anthers ca. 2.5 mm 2. *B. paucisetulosa*
- 3b. Leaf blade 3–12 × 1.5–8.5 cm, adaxially hirsute or strigose, abaxially less densely so; calyx segments outside pubescent or sparsely pubescent; anthers 1.4–1.5 mm.
- 4a. Leaf blade ovate to orbicular, base cordate, rarely rounded, whitish to brownish hirsute; plant with whitish to brownish hairs 1. *B. tonkinensis*
- 4b. Leaf blade elliptic to ovate, base rounded to broadly cuneate, rarely subcordate, short strigose; plant with white or yellowish hairs 3. *B. argentea*

1. *Beccarinda tonkinensis* (Pellegrin) B. L. Burtt, Notes Roy. Bot. Gard. Edinburgh 22: 64. 1955.

横蒴苣苔 heng shuo ju tai

Slackia tonkinensis Pellegrin, Bull. Soc. Bot. France 73:

428. 1926; *Beccarinda sinensis* (W. Y. Chun) B. L.

Burtt; *Slackia sinensis* W. Y. Chun.

Herbs, perennial, stemless. Leaves basal; petiole (2–)4–13 cm; leaf blade ovate to orbicular, 3–12 × 2.5–8.5 cm, adaxially whitish to brownish hirsute, abaxially short whitish to brownish hirsute, base cordate, rarely rounded, margin coarsely crenate, apex rounded to obtuse; lateral veins 5 or 6 on each side of midrib.

Peduncle (5–)7–17 cm, brownish hirsute; bracts broadly ovate, 3–5 × 3–4 mm, outside nearly glabrous, inside pubescent to hirsute. Calyx segments ovate to obovate, 2–4.5 × 1.5–2.5 mm, outside sparsely pubescent. Corolla blue-purple, (0.7–)1–1.6 cm, outside sparsely puberulent; tube ca. 5 mm; adaxial lip lobes ca. 3 mm; ones of abaxial lip ca. 5 mm. Filaments ca. 3 mm; anthers ca. 1.5 mm. Pistil glabrous; ovary ca. 2 mm. Style ca. 6 mm. Capsule 1.5–2.5 cm. Fl. Apr–Jun, fr. May–Sep.

Rocks on forested slopes; 700–2400 m. Guangxi, S Guizhou, S Sichuan, SE Yunnan [N Vietnam].

2. *Beccarinda paucisetulosa* C. Y. Wu ex H. W. Li, Bull. Bot. Res., Harbin 3(2): 14. 1983.

少毛横蒴苣苔 shao mao heng shuo ju tai

Herbs, perennial, stemless. Leaves basal; petiole 2.5–4.5 cm; leaf blade ovate, 2.5–4 × 3–3.5 cm, adaxially sparsely setulose, abaxially setulose along veins and margin, base cordate, margin crenate, apex rounded; lateral veins 4 or 5 on each side of midrib. Peduncle 8–12 cm, tawny villous; bracts broadly ovate, ca. 4 × 5 mm, sparsely villous. Calyx segments narrowly ovate, ca. 5 × 2.5–3 mm, outside sparsely villous. Corolla purple, ca. 9 mm, outside sparsely puberulent; tube ca. 4 mm; adaxial lip lobes ca. 2.5 mm; abaxial lip lobes ca. 5 mm. Filaments ca. 3 mm; anthers ca. 2.5 mm. Ovary ca. 2 mm. Style ca. 4 mm. Fruit unknown. Fl. May.

• Forest margins; ca. 2100 m. SE Yunnan (Jinping Xian).

3. *Beccarinda argentea* (J. Anthony) B. L. Burtt, Notes Roy. Bot. Gard. Edinburgh 22: 63. 1955.

饰岩横蒴苣苔 shi yan heng shuo ju tai

Petrodora argentea J. Anthony, Notes Roy. Bot. Gard. Edinburgh 18: 203. 1934.

Herbs, perennial. Stemless or stems to 10 cm. Leaves basal or alternate and spread along stem; petiole 2–8 cm; leaf blade elliptic to ovate, 3.5–10 × 1.5–6 cm, adaxially white short strigose, abaxially sparsely short strigose, base rounded to broadly cuneate, rarely subcordate, margin crenate to dentate or serrate, apex acute to rounded; lateral veins 5 or 6 on each side of midrib. Peduncle (3–)6–11 cm, yellowish pubescent; bracts ovate, 4–6 × 2–4 mm, short strigose. Calyx segments lanceolate to narrowly ovate, 3–4 × 1.2–2 mm, outside pubescent. Corolla purple to purple-red, 1.2–1.8 cm, outside sparsely pubescent; tube 5–6 mm; adaxial

lip 3–5 mm; abaxial lip 0.9–1.1 cm. Filaments ca. 3 mm; anthers ca. 1.4 mm. Pistil glabrous; ovary ca. 2 mm. Style 4–6 mm. Capsule 1.5–3 cm. Fl. Mar, fr. Jun.

• Rocks under forests in valleys; 1200–1600 m. SE Yunnan.

4. *Beccarinda erythrotricha* W. T. Wang in W. T. Wang & K. Y. Pan, Bull. Bot. Res., Harbin 2(2): 121. 1982.

红毛横蒴苣苔 hong mao heng shuo ju tai

Subshrubs or herbs, perennial. Stems 12–20 cm. Leaves alternate, often crowded near stem apex; petiole 1.6–9 cm; leaf blade elliptic to ovate, 6.4–8.4 × 3–4.8 cm, sparsely villous or hirsute, abaxially densely purple-red pubescent along midrib and lateral veins, base broadly cuneate to nearly rounded, margin serrate to denticulate, apex acute; lateral veins 5 or 6 on each side of midrib. Peduncle 7–16 cm, purple-red villous to hirsute; bracts elliptic, 2–5 × ca. 2 mm, sparsely brownish villous to hirsute. Calyx segments narrowly ovate to lanceolate, 3.2–5 × 1.5–1.8 mm, outside reddish hirsute to sparsely pubescent. Corolla purplish, ca. 1.7 cm, outside sparsely pubescent; tube ca. 5 mm; adaxial lip lobes ca. 2 mm; abaxial lip ca. 1.1 cm, central lobe ca. 7 mm, lateral lobes ca. 3 mm. Filaments ca. 2.2 mm; anthers ca. 1.6 mm. Pistil glabrous; ovary ca. 2.5 mm. Style ca. 4.5 mm. Capsule 2–3.1 cm. Fl. Jun–Oct, fr. Jan–Jun.

• Dense forests; 1400–1700 m. SE Yunnan (Pingbian Xian).

Burtt (Notes Roy. Bot. Gard. Edinburgh 22: 64. 1955) recognized this species as new but did not describe it.

5. *Beccarinda minima* K. Y. Pan, Acta Phytotax. Sin. 26: 437. 1988.

小横蒴苣苔 xiao heng shuo ju tai

Herbs, perennial, stemless. Leaves basal; petiole 1–4 cm; leaf blade elliptic to ovate, 1–3.5 × 0.6–2.2 cm, adaxially sparsely villous, abaxially sparsely pubescent, base often oblique, broadly cuneate to subcordate, margin crenulate-serrate to subentire, apex acute to rounded; lateral veins 3 or 4 on each side of midrib. Peduncle 1.2–4 cm, sparsely pubescent; bracts ovate, 1–2 × ca. 0.5 mm, pubescent to glabrous. Calyx segments lanceolate to narrowly oblong, 1.5–2 × ca. 0.5 mm, outside sparsely pubescent. Corolla purple-blue to white, ca. 8 mm, outside glabrous; tube ca. 4 mm; adaxial lip ca. 2 mm; abaxial lip ca. 4 mm. Filaments 2.5–3 mm; anthers ca. 0.5 mm. Pistil sparsely puberulent; ovary ca. 1 mm. Style ca. 3 mm. Capsule 6–10 mm. Fl. May–Jul, fr. Jul.

• Damp limestone cliffs; 400–1200 m. E Guangxi.

17. LEPTOBOEA Bentham in Bentham & J. D. Hooker, Gen. Pl. 2: 1025. 1876.

细蒴苣苔属 xi shuo ju tai shu

Subshrubs, terrestrial, not rhizomatous. Stems branched. Leaves few, opposite, often crowded on short branches, equal to subequal in a pair; leaf blade pilose to pubescent, base cuneate to broadly cuneate. Inflorescences umbel-like, lax, axillary, 3–5-flowered cymes; bracts 2, opposite. Calyx actinomorphic, 5-sect from base; segments equal. Corolla yellowish, zygomorphic, inside glabrous; tube campanulate, not swollen, slightly longer than limb, 3–5 mm in diam.; limb indistinctly 2-lipped; adaxial lip 2-lobed, nearly as long as abaxial lip; abaxial lip 3-lobed, lobes subequal, apex rounded. Stamens 4, adnate to corolla near base, included; anthers basifixed, free, thecae subparallel, not confluent, dehiscing poricidally; connective not projecting; staminode 1, adnate to adaxial side of corolla tube.

Disc absent. Ovary ellipsoid, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigma 1, terminal, capitate, undivided. Capsule straight in relation to pedicel, linear, much longer than calyx, dehiscent loculicidally to base; valves 2, straight, not twisted. Seeds unappendaged.

About three species: Bhutan, China, N India, Myanmar, Sikkim, Thailand; one species in China.

1. *Leptoboea multiflora* (C. B. Clarke) C. B. Clarke in A. & C. de Candolle, Monogr. Phan. 5: 165. 1883.

细蒴苣苔 *xi shuo ju tai*

Championia multiflora C. B. Clarke, Commelyn. Cyrtandr. Bengal. 99. 1874.

Stems to at least 30 cm. Petiole 0.5–2.2(–6) cm; leaf blade elliptic to ovate, 2.5–11(–17) × (1.3–)2.6–7.5 cm, adaxially appressed pilose, especially along veins, abaxially appressed pubescent, especially along veins, margin shallowly serrate, apex acute to acuminate; lateral veins 9–12 on each side of midrib. Peduncle 1–4

cm, puberulent; bracts linear to subulate, 1–4 × 0.2–1 mm, puberulent. Pedicel puberulent, often bracteolate. Calyx segments linear to narrowly triangular, 1.5–2 × 0.2–0.4 mm. Corolla 6–9 mm, outside glabrous; tube 4–5 mm; lobes subequal, suborbicular to oblong, 2–3 × 4–6 mm. Stamens 2.5–4.5 mm; staminode ca. 0.5 mm. Ovary 1.8–2 mm, sparsely puberulent. Style 6–7 mm, glabrous. Capsule 2–3.5 cm. Fl. Jul, fr. Aug–Dec.

Dense forests on slopes; 1000–1300 m. S and SW Yunnan [Bhutan, NE India, Myanmar, Sikkim].

18. **BOEICA** C. B. Clarke, Commelyn. Cyrtandr. Bengal. 118. 1874.

短筒苣苔属 *duan tong ju tai shu*

Boeicopsis H. W. Li.

Subshrubs or herbs, perennial, epipetric or terrestrial, rhizomatous, sometimes stoloniferous, stemmed or seldom stemless. Leaves few to many, on stem and alternate, ± crowded near stem apex or basal; leaf blade puberulent to densely woolly or glabrescent, base cuneate to attenuate. Inflorescences lax, sometimes umbel-like, axillary, 1- to many-flowered cymes; bracts 2 and opposite, rarely several and whorled. Calyx actinomorphic, 5-sect from base; segments equal. Corolla white to pink or blue to purple, zygomorphic, inside glabrous or puberulent; tube campanulate, not swollen, sometimes saccate at base, slightly shorter than limb, 3–7 mm in diam.; limb slightly 2-lipped; adaxial lip 2-lobed, slightly shorter than to as long as abaxial lip; abaxial lip 3-lobed, lobes equal or subequal, apex rounded to acute. Stamens 4, adnate to corolla near base, included; anthers basifixed, free, thecae subparallel, confluent at apex, dehiscent longitudinally, poricidally, or transversely; connective not projecting; staminode 1, adnate to adaxial side of corolla tube. Disc ringlike or inconspicuous. Ovary ovoid or conical, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigma 1, terminal, capitate, undivided. Capsule straight in relation to pedicel, linear to narrowly oblong, much longer than calyx, dehiscent loculicidally to base; valves 2, straight, not twisted. Seeds unappendaged.

About 12 species: Bhutan, S China, N India, Myanmar, N Vietnam; seven species in China.

- 1a. Style with 2 broad and flat winglike appendages; petiole and leaf blade hirsute adaxially; corolla tube saccate at base; ovary glabrous 7. *B. yunnanensis*
- 1b. Style unappendaged; petiole and leaf blade villous, woolly, or puberulent adaxially; corolla tube not swollen; ovary sparsely puberulent to villous.
- 2a. Cymes 1-flowered; lateral veins 4–6 on each side of midrib; plants always stemless; corolla 10–12 mm; anthers dehiscent longitudinally 3. *B. guileana*
- 2b. Cymes 3- to many flowered; lateral veins 7–16 on each side of midrib; plants with stems (0.5–)4–30 cm; corolla 3–6 mm; anthers dehiscent poricidally or transversely (unknown in *B. fulva*).
- 3a. Pedicels 10–20 mm; stems 0.5–7 cm; bracts 4–7 mm.
- 4a. Leaf blade broadly elliptic or ovate to obovate, 3.5–10 × 2.8–5.5 cm, adaxially villous, base cuneate to rounded, margin serrulate to serrate; lateral veins 7–9 on each side of midrib 2. *B. stolonifera*
- 4b. Leaf blade ovate-elliptic, 8–20 × 3–11 cm, adaxially appressed puberulent, base attenuate, margin coarsely serrate; lateral veins 10–13 on each side of midrib 4. *B. ferruginea*
- 3b. Pedicels 0.4–2.5 mm; stems 6–14 cm; bracts 1–5 mm.
- 5a. Leaf blade margin irregularly shallowly denticulate, adaxially woolly, glabrescent; peduncle 10–15 cm 6. *B. fulva*

- 5b. Leaf blade margin serrate, adaxially densely puberulent or sparsely villous; peduncle 3.5–10 cm.
- 6a. Leaf blade adaxially sparsely villous, abaxially sparsely villous, veins densely villous; lateral veins 8–11 on each side of midrib; anthers dehiscing poricidally; peduncle densely villous . 1. *B. porosa*
- 6b. Leaf blade adaxially densely puberulent, abaxially woolly; lateral veins 14–16(–20) on each side of midrib; anthers dehiscing transversely; peduncle pubescent 5. *B. multinervia*

1. *Boeica porosa* C. B. Clarke in A. & C. de Candolle, Monogr. Phan. 5: 136. 1883.

孔药短筒苣苔 kong yao duan tong ju tai

Boeica tonkinensis (Kraenzlin) B. L. Burtt;

Didymocarpus tonkinensis (Kraenzlin) Handel-Mazzetti;

Oreocharis tonkinensis Kraenzlin.

Subshrubs. Stems 10–30 cm, densely villous. Petiole 0.5–2.8 cm, densely villous; leaf blade obovate to elliptic, 4.5–18 × 3.5–6.5 cm, adaxially sparsely villous, abaxially sparsely villous, densely villous along veins, base sometimes oblique, cuneate to rounded, margin serrate, apex acute to broadly acute; lateral veins 8–11 on each side of midrib. Cymes 3- to many flowered; peduncle 3.5–8 cm, densely villous; bracts 2, sometimes several, linear to oblong, 1.5–5 mm. Pedicel 0.8–2.5 mm. Calyx segments narrowly lanceolate to elliptic, 4–5 × 1–1.3 mm, outside densely villous, margin entire to dentate. Corolla white to pinkish, 3–7 mm, outside glabrescent; tube not swollen, 1–1.5 mm; lobes suborbicular, 2–5 × 2.5–4 mm. Filaments 0.6–1.5 mm, glabrous; anthers dehiscing poricidally; staminode ca. 0.3 mm. Disc ringlike. Pistil puberulent and glandular puberulent; ovary conical, 1.2–1.5 mm. Style unappendaged, 1.4–3 mm. Capsule 2–2.8 cm. Fl. Jun–Aug, fr. Aug.

Rocks in forests on slopes; 800–1200 m. SE Yunnan [Myanmar, N Vietnam].

2. *Boeica stolonifera* K. Y. Pan, Acta Phytotax. Sin. 26: 439. 1988.

匍茎短筒苣苔 pu jing duan tong ju tai

Herbs. Stems 0.5–7 cm, densely hirsute and woolly. Petiole 1–4.5 cm, densely villous; leaf blade broadly elliptic or ovate to obovate, 3.5–10 × 2.8–5.5 cm, adaxially villous, abaxially villous and puberulent, densely villous along veins, base cuneate to rounded, margin serrulate to serrate, apex acute to obtuse; lateral veins 7–9 on each side of midrib. Cymes 5–15-flowered; peduncle 3.5–7.5 cm, densely villous; bracts 2, linear to narrowly triangular or obovate-oblong, 4–6 mm. Pedicel 1–2 cm. Calyx segments lanceolate to linear, 2–6 × ca. 1 mm, outside villous, margin sparsely dentate to entire. Corolla bluish, ca. 4.5 mm, outside puberulent; tube not swollen, 1–1.5 mm; lobes suborbicular, ca. 3.2 × 3 mm. Filaments ca. 1 mm, glabrous; anthers dehiscing poricidally; staminode ca. 0.5 mm. Disc ringlike. Ovary ovoid, 2–2.3 mm, sparsely puberulent to glabrescent. Style unappendaged, 2.2–4.2 mm, glabrous. Capsule 1.8–2.2 cm. Fl. May–Jul, fr. Jul. Shady and damp forests; 200–900 m. SE Guangxi [N Vietnam].

3. *Boeica guileana* B. L. Burtt, Notes Roy. Bot. Gard. Edinburgh 35: 371. 1977.

紫花短筒苣苔 zi hua duan tong ju tai

Herbs, stemless. Petiole 1–3 cm, densely villous; leaf blade elliptic to obovate or ovate, 2–6 × 1.1–3.2 cm, villous and puberulent, abaxially more densely villous along veins, base cuneate to rounded, margin serrate to double serrate, apex acute to rounded; lateral veins 4–6 on each side of midrib. Cymes 1-flowered; peduncle 2.5–5.5 cm, villous; bracts 2, linear, 2.5–3 mm. Pedicel 1–2 cm. Calyx segments lanceolate to linear, 3–5 × ca. 1 mm, outside villous, margin entire. Corolla blue-purple, 1–1.2 cm, outside puberulent; tube not swollen, 1.5–2.5 mm; adaxial lip 2-lobed from middle, lobes oblong, 5–7 × 4–5 mm; abaxial lip 3-sect from base, lobes obovate-oblong to spatulate, 1–1.1 cm × 4.5–6 mm. Filaments 2.5–3.5 mm, sparsely puberulent; anthers dehiscing longitudinally; staminode apparently absent. Disc ringlike. Ovary conical, 2–3.5 mm, villous. Style unappendaged, 4–7 mm, pubescent to puberulent. Capsule 0.7–1.4 cm. Fl. and fr. Jul.

• Damp rocks in forests in steep ravines or on cliffs; 200–700 m. Hong Kong.

4. *Boeica ferruginea* Drake del Castillo, Bull. Soc. Philom. Paris, sér. 8, 2: 129. 1890.

锈毛短筒苣苔 xiu mao duan tong ju tai

Herbs. Stems 4–6 cm, woolly to villous or pilose. Petiole 3–5 cm, densely villous; leaf blade ovate-elliptic, 8–20 × 3–11 cm, adaxially appressed puberulent, abaxially sparsely woolly to glabrescent, woolly to villous along veins, base attenuate, margin coarsely serrate, apex acute; lateral veins 10–13 on each side of midrib. Cymes many flowered; peduncle 5–8 cm, villous; bracts 2, oblong, 6–7 mm. Pedicel 1–2 cm. Calyx segments linear-lanceolate, 1–4 × 0.4–0.7 mm, outside villous, margin sparsely dentate. Corolla 5–6 mm, outside sparsely pubescent; tube not swollen, ca. 2 mm; adaxial lip slightly shorter than abaxial, lobes ca. 2 mm. Filaments ca. 1.5 mm, glabrous; anthers dehiscing poricidally; staminode ca. 0.2 mm. Disc ringlike. Ovary conical, 1.5–2 mm, sparsely pubescent. Style unappendaged, 4–7 mm, glabrescent. Capsule ca. 2 cm. In shady and damp areas of dense forests; 300–1200 m. SE Yunnan (Jinping Xian) [N Vietnam].

5. *Boeica multinervia* K. Y. Pan, Acta Phytotax. Sin. 26: 439. 1988.

多脉短筒苣苔 duo mai duan tong ju tai

Herbs. Stems 6–14 cm, woolly. Petiole 1.5–2.5 cm, woolly; leaf blade ovate to obovate, 5.5–11 × 2.8–5.2 cm, adaxially densely puberulent, abaxially woolly, base oblique, cuneate, margin serrate, apex acute; lateral veins 14–16(–20) on each side of midrib. Cymes 10–20-flowered; peduncle 6–10 cm, pubescent; bracts 2, linear to obovate-oblong, 3–4 mm. Pedicel ca. 0.5 mm. Calyx segments linear-lanceolate, ca. 3 × 0.4 mm, outside puberulent, margin entire. Corolla ca. 6 mm, outside glabrescent; tube not swollen, ca. 2.2 mm; adaxial lip lobes ca. 1.6 mm; abaxial lip lobes narrowly ovate, ca. 2 mm. Filaments ca. 1 mm, glabrous; anthers dehiscing transversely; staminode ca. 0.2 mm. Disc inconspicuous. Ovary conical, ca. 1.5 mm, sparsely puberulent. Style unappendaged, ca. 8 mm, glabrous. Fruit unknown. Fl. Aug.

• Hilly regions; 400–500 m. SW Yunnan (Yingjiang Xian).

6. *Boeica fulva* C. B. Clarke, Commelyn. Cyrtandr. Bengal. 119. 1874.

短筒苣苔 *duan tong ju tai*

Herbs. Stems to at least 15 cm, woolly, glabrescent. Petiole 0.6–6.5 cm, woolly; leaf blade lanceolate-elliptic to oblanceolate, 10–17 × 4.5–6.5 cm, adaxially woolly, glabrescent, abaxially densely woolly, base narrowly cuneate to rounded, margin irregularly shallowly denticulate, apex acute to acuminate; lateral veins 11–16 on each side of midrib. Cymes many flowered; peduncle 10–15 cm, woolly, glabrescent; bracts 2, linear, 1–5 mm. Pedicel 0.4–1 mm. Calyx segments narrowly triangular to linear-lanceolate, 1–2.5 mm, outside puberulent to woolly, margin entire. Corolla purple, ca. 4 mm; tube not swollen. Filaments

ca. 1.5 mm. Ovary conical, ca. 1.5 mm, puberulent. Style unappendaged, 1–1.5 mm, glabrous. Capsule 7–10 mm.

Montane regions; 1300–1400 m. SE Xizang (Zay Xian) [Bhutan, NE India].

7. *Boeica yunnanensis* (H. W. Li) K. Y. Pan, Fl. Reipubl. Popularis Sin. 69: 260. 1990.

翼柱短筒苣苔 *yi zhu duan tong ju tai*

Boeicopsis yunnanensis H. W. Li, Acta Bot. Yunnan. 4: 245. 1982.

Subshrubs. Stems to 12 cm, densely villous. Petiole 1–2 cm, densely hirsute; leaf blade ovate to ovate-elliptic, 6.5–7.5 × 4–5 cm, adaxially hirsute, abaxially pubescent, densely hirsute along veins, base broadly cuneate to rounded, margin serrate, apex acute to broadly acute; lateral veins ca. 6 on each side of midrib. Cymes ca. 9-flowered; peduncle 5.5–6.5 cm, densely villous to hirsute; bracts 2, linear-lanceolate, to 5 mm. Pedicel ca. 5 mm. Calyx segments linear-lanceolate, ca. 5 × 1 mm, outside hirsute to villous, margin minutely serrulate. Corolla 5–6.5 mm, outside glabrous; tube saccate at base, ca. 3 mm; lobes subequal, suborbicular, ca. 2 × 2 mm. Filaments ca. 1.5 mm, glabrous; anthers dehiscing poricidally; staminode ca. 1 mm. Disc inconspicuous. Pistil glabrous; ovary ovoid, ca. 1.2 mm. Style with 2 broad and flat winglike appendages, ca. 2.5 mm. Fruit unknown. Fl. Jun.

• Grassy areas under forests on slopes; ca. 1300 m. SE Yunnan (Maguan Xian).

19. OPITHANDRA B. L. Burtt, Bailey 4: 162. 1956.

后蕊苣苔属 *hou rui ju tai shu*

Schistolobos W. T. Wang.

Herbs, perennial, epipetric or terrestrial, rhizomatous, stemless. Leaves few to many, basal; leaf blade puberulent to woolly or velutinous, base cuneate to cordate. Inflorescences often umbel-like, lax, axillary, 1- to many-flowered cymes; bracts 2, opposite. Calyx actinomorphic, 5-sect from base to deeply 5-lobed; segments equal. Corolla pink to purple, zygomorphic, inside glabrous to sparsely puberulent or glandular puberulent; tube tubular to funnelliform, rarely nearly salverform or cylindric, not swollen, sometimes slightly gibbous abaxially, 1.5–4 × longer than limb, 3.5–17 mm in diam.; limb distinctly or indistinctly 2-lipped; adaxial lip 2-lobed, usually distinctly shorter than, rarely nearly as long as abaxial lip; abaxial lip 3-lobed, lobes equal or subequal, apex rounded to acute. Stamens 2, adnate to adaxial side of corolla tube near middle, rarely near corolla base, included; anthers basifixed, free or coherent at apex, thecae parallel, not confluent, dehiscing longitudinally from straight or arcuate slits; connective not projecting; staminodes (1–)3 or absent, adnate to adaxial, lower, or adaxial and abaxial sides of corolla tube. Disc ringlike or cupular. Ovary linear, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigmas 2, equal, oblate, undivided, or 1, terminal, capitate, undivided or 2-lipped. Capsule straight in relation to pedicel, linear, much longer than calyx, dehiscing loculicidally to base; valves 2, straight, not twisted. Seeds unappendaged.

Ten species: China, Japan; nine species in China.

1a. Corolla lobes lobed 9. *O. pumila*

1b. Corolla lobes entire.

2a. Anthers oblong or oblong ovoid with straight slits; corolla mouth 3–3.5 mm in diam.

3a. Corolla tube nearly cylindric, puberulent outside, adaxial lip ca. 1 cm; leaf blade thick leathery, strongly bullate; pistil ca. 5.5 mm, stigma 1 4. *O. fargesii*

- 3b. Corolla tube tubular or nearly so, glabrous outside, adaxial lip 1–6 mm; leaf blade papery, nearly flat; pistil 6.5–14 mm; stigmas 1 or 2.
- 4a. Calyx segments ca. 2 mm; corolla to 1 cm, adaxial lip ca. 1 mm, abaxial lip ca. 2.8 mm; anthers coherent at apex; pistil exerted; stigma 1; lateral veins 4 or 5 on each side of midrib; bracts subulate 3. *O. acaulis*
- 4b. Calyx segments 3.5–5 mm; corolla at least 1.6 cm, adaxial lip 4–6 mm, abaxial lip 5–9 mm; anthers free; pistil included; stigmas 2; lateral veins 6–13 on each side of midrib; bracts linear.
- 5a. Leaf blade abaxially densely woolly on entire surface, 7.5–13 cm, base cuneate; lateral veins 8–13 on each side of midrib; peduncle 8.5–13 cm 1. *O. sinohenryi*
- 5b. Leaf blade abaxially appressed puberulent, woolly only along veins, 2.5–8 cm, base rounded to cordate; lateral veins 6–8 on each side of midrib; peduncle 2–6 cm 2. *O. burttii*
- 2b. Anthers globose-ovoid to reniform with arcuate slits; corolla mouth 5–17 mm in diam.
- 6a. Leaf blade margin nearly entire to indistinctly repand; calyx segment apex caudate-acuminate, tip somewhat obtuse; corolla outside glabrous 6. *O. dinghushanensis*
- 6b. Leaf blade margin denticulate to serrulate to crenate or double crenate; calyx segment apex acute to obtuse; corolla outside sparsely puberulent to strigose at least adaxially.
- 7a. Leaf blade 3–19 cm, base cordate to broadly cuneate; lateral veins 7–9 on each side of midrib; peduncle 4.5–7.5 cm; corolla mouth 1.5–1.7 cm in diam.; stamens adnate to corolla near base, ca. 2 cm; pistil densely glandular puberulent to puberulent 5. *O. dalzielii*
- 7b. Leaf blade to 9.5 cm, base cuneate to broadly so; lateral veins 4–6 on each side of midrib; peduncle 5.5–14 cm; corolla mouth 5–9 mm in diam.; stamens adnate to corolla tube slightly below middle, 5–7.5 mm; pistil glabrous.
- 8a. Petiole 1.3–7.5 cm, with dense, white to brownish shorter appressed hairs and brown longer spreading ones; leaf blade 4–9.5 cm; corolla ca. 3.2 cm, mouth ca. 9 mm in diam.; staminodes 3 7. *O. obtusidentata*
- 8b. Petiole 0.3–1.7 cm, densely grayish strigose; leaf blade 1.5–3.5 cm; corolla 1.5–2 cm, mouth 5–6 mm in diam.; staminodes 2 8. *O. cinerea*

1. *Opithandra sinohenryi* (W. Y. Chun) B. L. Burt, Notes Roy. Bot. Gard. Edinburgh 22: 303. 1958.

毡毛后蕊苣苔 zhan mao hou rui ju tai

Didymocarpus sinohenryi W. Y. Chun, Sunyatsenia 6: 290. 1946.

Petiole 2.5–4.5 cm, brown woolly; leaf blade oblong to narrowly obovate, 7.5–13 × 2.7–7.2 cm, papery, nearly flat, adaxially densely puberulent to velutinous, abaxially brown woolly, base cuneate, margin indistinctly denticulate, apex obtuse to rounded; lateral veins 8–13 on each side of midrib. Peduncle 8.5–13 cm, woolly, glabrescent; bracts linear. Calyx 5-sect from base; segments narrowly lanceolate, 4–5 × ca. 1 mm, apex acute. Corolla pink, ca. 2 cm, outside puberulent, inside sparsely puberulent; tube tubular, not swollen, ca. 1.2 cm × 3.5 mm; adaxial lip ca. 6 mm; abaxial lip ca. 9 mm, all lobes entire. Stamens adnate to corolla tube above middle, ca. 5 mm; filaments glabrous; anthers free, oblong, dehiscing from straight slits; staminode 1, adaxial, ca. 0.4 mm. Pistil included, ca. 1.1 cm,

glabrous. Style ca. 2.5 mm; stigmas 2. Capsule ca. 2.5 cm. Fl. Jul–Aug, fr. Aug.

• Streamside rocks in forests; 500–600 m. S Guangxi (Shiwandashan, Dongxing Xian, Shangsi Xian).

2. *Opithandra burttii* W. T. Wang in A. L. Weitzman et al., Novon 7: 430. 1998.

龙南后蕊苣苔 long nan hou rui ju tai

Petiole 0.5–7.5 cm, brown sericeous-woolly; leaf blade elliptic to oblong, 2.5–8 × 1.7–5.4 cm, papery, nearly flat, adaxially white puberulent, abaxially appressed puberulent, brown sericeous-woolly along veins, base rounded to cordate, margin crenulate, apex obtuse to rounded; lateral veins 6–8 on each side of midrib. Peduncle 2–6 cm, puberulent; bracts linear. Calyx 5-sect from base; segments linear, 3.5–3.8 × ca. 1 mm, apex acute to obtuse. Corolla purple, 1.6–2.2 cm, outside sparsely puberulent, inside glabrous; tube tubular, not swollen, 1–1.4 cm × ca. 3.5 mm; adaxial lip 4–6 mm; abaxial lip 5–7 mm, all lobes entire. Stamens adnate to corolla tube 5–7 mm above base, 5.5–7 mm; filaments glabrous; anthers free, oblong, dehiscing from straight slits; staminodes absent. Pistil included, ca. 6.5

mm, glabrous. Style ca. 1 mm; stigmas 2. Fruit unknown. Fl. Oct.

• Steep, stony slopes in forests. S Jiangxi (Longnan Xian). Burt (Notes Roy. Bot. Gard. Edinburgh 22: 303. 1958) recognized this species as new but did not describe it.

3. *Opithandra acaulis* (Merrill) B. L. Burt, Notes Roy. Bot. Gard. Edinburgh 22: 303. 1958.

小花后蕊苣苔 xiao hua hou rui ju tai

Chirita acaulis Merrill, Lingnan Sci. J. 13: 47. 1934. Petiole 1–3 cm, densely brownish villous; leaf blade ovate to narrowly ovate, 1.7–7 × 1.1–3 cm, papery, nearly flat, adaxially densely brownish puberulent, abaxially sparsely puberulent, base broadly cuneate to rounded, margin denticulate, apex acute to obtuse; lateral veins 4 or 5 on each side of midrib. Peduncle ca. 9 cm, brownish pubescent; bracts subulate. Calyx 5-sect from base; segments narrowly triangular, ca. 2 × 0.9 mm, apex acute to obtuse. Corolla pink, 7–10 mm, outside sparsely puberulent, inside glabrous; tube nearly tubular, not swollen, 6–8 × ca. 3 mm; adaxial lip ca. 1 mm; abaxial lip ca. 2.8 mm, all lobes entire. Stamens adnate to corolla ca. 2 mm above base, ca. 3.7 mm; filaments sparsely puberulent; anthers coherent at apex, oblong ovoid, dehiscing from straight slits; staminodes 3, adaxial 1 ca. 2 mm, abaxial 2 ca. 3.2 mm. Pistil exserted, ca. 1.4 cm; ovary puberulent. Style ca. 7 mm, glabrous; stigma 1. Fruit unknown. Fl. Apr.

• Shaded areas in montane regions. Guangdong (Zengcheng Xian).

4. *Opithandra fargesii* (Franchet) B. L. Burt, Notes Roy. Bot. Gard. Edinburgh 22: 303. 1958.

皱叶后蕊苣苔 zhou ye hou rui ju tai

Roettlera fargesii Franchet, Bull. Mus. Hist. Nat. (Paris) 5: 251. 1899.

Petiole to 2.5 cm, densely brown pubescent; leaf blade oblong to obovate-oblong, 2–6.5 × 1.2–2.5 cm, thick leathery, strongly bullate, adaxially sparsely villous, abaxially brown villous, base cuneate, margin denticulate, apex obtuse to rounded; lateral veins 5–7 on each side of midrib. Peduncle ca. 4.5 cm, brown pubescent, glandular puberulent apically; bracts linear. Calyx 5-sect from base; segments narrowly triangular, 4–5 × ca. 0.4 mm, apex acute. Corolla purplish, ca. 2.8 cm, outside glabrous, inside sparsely puberulent near mouth; tube cylindric, not swollen, ca. 1.5 cm × 3.5 mm; adaxial lip ca. 1 cm; abaxial lip ca. 1.3 cm, all lobes entire. Stamens adnate to corolla tube near middle, ca. 3 mm; filaments glabrous; anthers free, oblong, dehiscing from straight slits; staminodes absent. Pistil included, ca. 5.5 mm, glabrous. Style ca. 1 mm; stigma 1. Fruit unknown. Fl. Aug.

• E Sichuan.

5. *Opithandra dalzielii* (W. W. Smith) B. L. Burt, Notes Roy. Bot. Gard. Edinburgh 22: 303. 1958.

汕头后蕊苣苔 shan tou hou rui ju tai

Chirita dalzielii W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 171. 1918.

Petiole 0.6–9 cm, densely spreading brown villous; leaf blade elliptic to ovate or obovate, 3–19 × 1.1–9 cm, herbaceous to papery, nearly flat, adaxially white puberulent and sparsely brown villous, abaxially appressed puberulent, base oblique, cordate to broadly cuneate, margin denticulate to serrulate or double crenate, apex acute to rounded; lateral veins 7–9 on each side of midrib. Peduncle 4.5–7.5 cm, spreading brown villous; bracts narrowly triangular to linear. Calyx 5-sect from base; segments narrowly triangular to linear, 4–7(–10) × 0.8–1.1 mm, apex acute. Corolla pink, 3–3.6 cm, outside sparsely puberulent adaxially, inside glabrous; tube funnelform, slightly gibbous abaxially, 2.3–2.6 × 1.5–1.7 cm; adaxial lip 5–7 mm; abaxial lip ca. 9 mm, all lobes entire. Stamens adnate to corolla ca. 2 mm above base, ca. 2 cm; filaments glabrous; anthers coherent at apex, globose-ovoid, dehiscing from arcuate slits; staminodes 3, adaxial 1 ca. 3 mm, abaxial 2 1–1.5 mm. Pistil included, ca. 1.7 cm; ovary densely glandular puberulent. Style ca. 5 mm, sparsely puberulent; stigmas 2. Capsule ca. 4.2 cm. Fl. Sep–Oct.

• Valley forests; 600–700 m. S Fujian (Nanjing Xian), Guangdong (Shantou Xian, Xinfeng Xian).

6. *Opithandra dinghushanensis* W. T. Wang, Bull. Bot. Res., Harbin 7(2): 10. 1987.

鼎湖后蕊苣苔 ding hu hou rui ju tai

Petiole 0.7–2.7 cm, densely grayish strigose; leaf blade narrowly elliptic to elliptic-ovate, 3.5–8 × 2–3.5 cm, herbaceous, nearly flat, short strigose, base slightly oblique, broadly cuneate, margin nearly entire to indistinctly repand, apex acute; lateral veins ca. 6 on each side of midrib. Peduncle ca. 5 cm, short strigose; bracts linear. Calyx 5-sect from base; segments lanceolate, 3.5–4 × ca. 0.8 mm, apex caudate-acuminate, tip somewhat obtuse. Corolla pale purplish, ca. 2.8 cm, glabrous, margin sparsely ciliate; tube funnelform, not swollen, ca. 2 × 1.1 cm; adaxial lip ca. 5 mm; abaxial lip ca. 8.5 mm, all lobes entire. Stamens adnate to corolla tube near middle, ca. 1.2 cm; filaments sparsely puberulent; anthers coherent at apex, globose-ovoid, dehiscing from arcuate slits; staminodes 2, abaxial, ca. 1.5 mm. Pistil included, ca. 1.5 cm; ovary puberulent. Style ca. 4.5 mm, glandular puberulent; stigmas 2. Fruit unknown. Fl. Oct.

• Rocks in valley forests. Guangdong (Dinghushan, Gaoyao Xian).

7. *Opithandra obtusidentata* W. T. Wang, Bull. Bot. Res., Harbin 2(4): 38. 1982.

钝齿后蕊苣苔 dun chi hou rui ju tai

Petiole 1.3–7.5 cm, with dense, white to brownish shorter appressed hairs and brown longer spreading ones; leaf blade narrowly elliptic to rhombic-elliptic, 4–9.5 × 2–5 cm, papery to herbaceous, nearly flat, appressed puberulent, abaxially brown villous along veins, base cuneate to broadly cuneate, margin single or double crenate to crenate-dentate, apex obtuse to acute;

lateral veins 4–6 on each side of midrib. Peduncle 6.5–14 cm, spreading brown pubescent; bracts lanceolate-linear. Calyx 5-sect from base; segments lanceolate, ca. 5 × 1.5 mm, apex acute to obtuse. Corolla red-purple, ca. 3.2 cm, outside sparsely pubescent, inside sparsely glandular below abaxial lip; tube funnellform-tubular, slightly gibbous abaxially, ca. 2.3 × 0.9 cm; adaxial lip ca. 5 mm; abaxial lip ca. 9 mm, all lobes entire.

Stamens adnate to corolla tube ca. 7 mm above base, ca. 7.5 mm; filaments sparsely puberulent; anthers coherent at apex, reniform, dehiscent from arcuate slits; staminodes 3, adaxial 1 ca. 1.2 mm, abaxial 2 ca. 2 mm. Pistil included, ca. 2.1 cm, glabrous. Style ca. 6.5 mm; stigmas 2. Fruit unknown. Fl. May.

• Streamsides in valleys. W Hunan (Qianyang Xian).

8. *Opithandra cinerea* W. T. Wang, Bull. Bot. Res., Harbin 2(4): 39. 1982.

灰叶后蕊苣苔 *hui ye hou rui ju tai*

Petiole 0.3–1.7 cm, densely grayish strigose; leaf blade narrowly elliptic to elliptic, 1.5–3.5 × 0.7–1.8 cm, papery, nearly flat, densely short strigose, base cuneate, margin denticulate, apex acute; lateral veins ca. 4 on each side of midrib. Peduncle 5.5–11 cm, short brown hispid; bracts lanceolate-linear. Calyx ca. 3.5 mm, deeply 5-lobed; lobes triangular, ca. 2.7 × 1 mm, apex acute to obtuse. Corolla 1.5–2 cm, outside strigose, inside glandular puberulent below adaxial lip; tube narrowly funnellform, not swollen, 1.2–1.5 cm × 5–6 mm; adaxial lip 2.8–3.2 mm; abaxial lip ca. 4.5 mm, all lobes entire. Stamens adnate to corolla tube slightly

below middle, 5–7.5 mm; filaments sparsely puberulent; anthers coherent at apex, reniform-ovoid, dehiscent from arcuate slits; staminodes 2, abaxial, 2–2.5 mm. Pistil included, ca. 5 mm, glabrous. Style ca. 1 mm; stigmas 2. Fruit unknown. Fl. May.

• E Guizhou (Jianhe Xian).

9. *Opithandra pumila* (W. T. Wang) W. T. Wang, Guihaia 12: 293. 1992.

裂檐苣苔 *lie yan ju tai*

Schistolobos pumilus W. T. Wang, Bot. Res. Academia Sinica 1: 16. 1983.

Petiole 0.8–2.5 cm, rust-brown villous; leaf blade elliptic-ovate to elliptic, 1.8–4 × 1.1–2.2 cm, papery, nearly flat, pubescent and villous, base slightly oblique, broadly cuneate to rounded, margin single or double denticulate to serrulate, apex acute to rounded; lateral veins 4–6 on each side of midrib. Peduncle ca. 4 cm, rust-brown villous; bracts linear. Calyx 5-sect from base; segments linear to elliptic, 2.5–3.5 × 0.8–1 mm, apex acute to obtuse. Corolla purplish, ca. 1.5 cm, outside sparsely puberulent, inside glabrous; tube tubular, not swollen, ca. 1.2 cm × 3 mm; adaxial lip ca. 2.5 mm, lobes 3-lobed; abaxial lip ca. 3 mm, lobes 7–9-lobed. Stamens adnate to corolla tube ca. 4 mm above base, ca. 4.6 mm; filaments glabrous; anthers coherent face to face, nearly reniform, dehiscent from somewhat arcuate slits; staminodes 2, abaxial, ca. 3 mm. Pistil included, ca. 1 cm, glabrous. Style ca. 4 mm; stigma 1. Fruit unknown. Fl. Apr–May.

• Rocks in valley forests; 700–900 m. SW Guangxi (Daxin Xian).

20. **DAYAOSHANIA** W. T. Wang, Acta Phytotax. Sin. 21: 319. 1983.

瑶山苣苔属 *yao shan ju tai shu*

Herbs, perennial, terrestrial, rhizomatous, stemless. Leaves many, basal; leaf blade puberulent, base broadly cuneate to subcordate. Inflorescences monochasial, lax, axillary, 1- or 2-flowered cymes; bracts 2, opposite. Calyx actinomorphic, 5-lobed to 5-sect from base; segments equal. Corolla purplish to white, zygomorphic, inside sparsely puberulent basally; tube nearly campanulate, not swollen, nearly as long as limb, 5–9 mm in diam.; limb 2-lipped; adaxial lip 2-lobed, nearly equalling abaxial lip; abaxial lip (2 or)3-lobed, lobes equal, apex acute, rarely obtuse. Stamens (1 or)2, adnate to abaxial side of corolla tube near base, slightly exerted; anthers dorsifixed, free, thecae parallel, not confluent at apex, dehiscent longitudinally; connective not projecting; staminodes absent or 2, adnate to adaxial side of corolla tube. Disc ringlike. Ovary linear, 1-loculed; placentas 2, parietal, undivided. Stigmas 2, equal, truncate, undivided. Immature capsule straight in relation to pedicel, linear, much longer than calyx; valves 2, straight, not twisted. Seeds unknown.

• One species: endemic to China.

1. *Dayaoshania cotinifolia* W. T. Wang, Acta Phytotax. Sin. 21: 320. 1983.

瑶山苣苔 *yao shan ju tai*

Petiole 0.8–6 cm; leaf blade ovate to nearly orbicular, 2.5–5.5 × 2.3–4.8 cm, puberulent to densely so, base slightly oblique, broadly cuneate to nearly cordate, margin nearly entire to indistinctly crenulate, apex broadly acute to rounded. Peduncle 5.5–8.5 cm, densely puberulent; bracts linear-lanceolate, 5.5–9 × 1.2–2.2 mm, densely puberulent. Calyx segments narrowly

triangular to lanceolate-linear, 5–8 mm, margin nearly entire or few-denticulate. Corolla 1.3–1.9 cm; tube 7–9 mm; adaxial lip 7–10 mm, lobes broadly ovate, 6–10 mm wide; abaxial lip 7–12 mm, 3-lobed, lobes triangular, 2–6 mm wide. Stamens 0.9–1.4 cm; staminodes ca. 4 mm. Pistil 1–1.6 cm; ovary 4.5–9 mm, densely puberulent. Style sparsely puberulent. Immature capsule ca. 2.5 cm. Fl. Sep.

• Forests of montane regions; 900–1200 m. Guangxi (Dayaoshan, Jinxiu Xian).

21. DIDYMOSTIGMA W. T. Wang, Acta Phytotax. Sin. 22: 188. 1984.

双片苣苔属 shuang pian ju tai shu

Herbs, annual, terrestrial or epipetric, not rhizomatous. Stems simple or branched. Leaves few, along stem, opposite, equal to subequal in a pair; leaf blade glabrous to pubescent, base cuneate to rounded. Inflorescences often racemelike, lax, axillary, 2–10-flowered cymes sometimes near stem apex; bracts 2, opposite. Calyx actinomorphic, 5-sect from base; segments equal. Corolla white to purplish, zygomorphic, inside glabrous; tube slender funnellform, not swollen, longer than limb, 0.7–1.3 cm in diam.; limb 2-lipped; adaxial lip 2-lobed, much shorter than abaxial lip; abaxial lip 3-lobed, lobes subequal, apex rounded. Stamens 2, adnate to abaxial side of corolla tube near mouth, slightly exerted; anthers basifixed, coherent at apex, thecae parallel, not confluent at apex, dehiscing longitudinally; connective not projecting or projecting; staminodes 2 or 3, adnate to adaxial side of corolla tube. Disc ringlike. Ovary linear, 1-loculed; placentas 2, parietal, slightly projecting inward, 2-cleft. Stigmas 2, equal, oblate or semiorbicular, undivided. Capsule straight in relation to pedicel, linear, much longer than calyx, dehiscing loculicidally to base; valves 2, straight, not twisted. Seeds unappendaged.

• Two species: endemic to China.

1a. Stem, leaf blade, and peduncle pubescent; leaf blade ovate; bracts linear, 3–6 × 0.5–1 mm 1. *D. obtusum*

1b. Stem, leaf blade, and peduncle glabrous or nearly so; leaf blade oblong elliptic to elliptic; bracts ovate, ca.

6.5 × 3.5 mm 2. *D. leiophyllum*

1. *Didymostigma obtusum* (C. B. Clarke) W. T. Wang, Acta Phytotax. Sin. 22: 189. 1984.

双片苣苔 shuang pian ju tai

Chirita obtusa C. B. Clarke in A. & C. de Candolle, Monogr. Phan. 5: 114. 1883; *Didymocarpus clarkei* H. Léveillé; *Roettlera obtusa* (C. B. Clarke) Kuntze.

Stems ascending to nearly erect, 12–20 cm, pubescent to densely pubescent. Petiole 0.8–3.5 cm; leaf blade ovate, 2–10.5 × 1.4–5(–7) cm, adaxially pubescent, abaxially sparsely pubescent, abaxial surface often purple tinged, base sometimes slightly oblique, broadly cuneate to rounded, margin crenate, apex acute to obtuse. Cymes 2–10-flowered; peduncle 1.5–4 cm, pubescent; bracts linear, 3–6 × 0.5–1 mm, pubescent. Calyx segments lanceolate-linear, 7.5–10 mm. Corolla white, purple-blue near apex, 3.6–5.2 cm; tube 2.7–4 cm; adaxial lip 5–7 mm; abaxial lip 0.9–1.2 cm. Stamens ca. 1.2 cm; filaments slightly tortuous; anther connective not projecting; staminodes 2, ca. 5 mm. Pistil 2.2–3.8 cm, sparsely pubescent; gynophore absent; ovary ca. 1.6 cm. Capsule 4–8 cm. Fl. Jun–Oct, fr. Oct.

22. PSEUDOCHIRITA W. T. Wang, Bot. Res. Academia Sinica 1: 21. 1983.

异裂苣苔属 yi lie ju tai shu

Herbs, probably perennial, terrestrial. Rhizomatous. Stems simple or branched. Leaves few to many, along stem, opposite, equal to subequal in a pair; leaf blade densely pubescent to velutinous, base cuneate to rounded. Inflorescences sympodial, spikelike, dense, ca. 10-flowered cymes axillary near stem apex; bracts 2, opposite. Calyx nearly actinomorphic, 5-lobed; adaxial central lobe larger. Corolla white, zygomorphic, inside glabrous; tube funnellform, not swollen, longer than limb, ca. 9 mm in diam.; limb 2-lipped; adaxial lip 2-lobed, much shorter than abaxial lip; abaxial lip 3-lobed, lobes unequal, apex rounded. Stamens 2, adnate to abaxial side of corolla tube near middle, included; anthers basifixed, coherent at apex, thecae parallel, not confluent at apex, dehiscing longitudinally; connective not projecting; staminodes 2 or 3, adnate to adaxial side of corolla tube. Disc cupular. Ovary linear, 1-loculed; placentas 2, parietal, slightly projecting inward, 2-cleft. Stigmas 2, unequal, smaller 1 truncate, undivided, larger 1 narrowly obtrapeziform, emarginate. Capsule straight in relation to pedicel, linear, much longer than calyx, dehiscing loculicidally to base; valves 2, straight, not twisted. Seeds unappendaged.

• Forests, shaded stream-sides; 200–800 m. S Fujian, Guangdong, Guangxi, Hainan.

2. *Didymostigma leiophyllum* D. Fang & X. H. Lu in D. Fang, D. H. Qin, & X. H. Lu, Acta Phytotax. Sin. 32: 565. 1994.

光叶双片苣苔 guang ye shuang pian ju tai

Stems ascending basally, 7–12 cm, glabrous or nearly so. Leaves slightly unequal in each pair; petiole 0.4–2.2 cm; leaf blade oblong elliptic to elliptic, 3–15 × 1.5–4 cm, glabrous, base broadly cuneate to cuneate, margin serrate to repand-denticulate, apex acute. Cymes ca. 2-flowered; peduncle 3.6–5 cm, nearly glabrous; bracts ovate, ca. 6.5 × 3.5 mm, glabrous. Calyx segments linear-lanceolate, ca. 6.5 mm. Corolla ca. 4 cm; tube ca. 3 cm; adaxial lip ca. 5 mm; abaxial lip ca. 1 cm. Stamens ca. 1.4 cm; anther connective appendage projecting, ca. 1.5 mm; staminodes 3, 1.5–5 mm. Pistil ca. 1.8 cm, glabrous; gynophore ca. 5 mm; ovary ca. 6 mm. Fruit unknown. Fl. Sep.

• Forests, on rocks. Guangxi (Xilin Xian).

One species: China, Vietnam.

1. *Pseudochirita guangxiensis* (S. Z. Huang) W. T. Wang, Bot. Res. Academia Sinica 1: 22. 1983.

异裂苣苔 *yi lie ju tai*

Chirita guangxiensis S. Z. Huang, Acta Bot. Yunnan. 2: 102. 1980.

Stems 50–100 cm, densely velutinous. Leaves unequal in each pair; petiole 1–7 cm; leaf blade ovate, 11–27(–30) × 6–16(–19) cm, adaxially densely appressed pubescent, abaxially velutinous, base slightly oblique, broadly cuneate to rounded, margin serrulate, apex acute to abruptly acuminate. Peduncle 3–9(–12) cm, velutinous; bracts early deciduous, ovate, to 1.5 cm,

densely puberulent. Calyx 0.9–1.1 cm; adaxial central lobe broadly ovate, ca. 2 × 3 mm, other lobes depressed deltoid, ca. 1 × 2.5 mm. Corolla 3.2–4.3 cm; tube 2.5–3 cm; adaxial lip ca. 4 mm; abaxial lip 0.9–1.2 cm. Stamens ca. 1–1.3 cm; central staminode ca. 0.2 mm, laterals 4.5–5 mm. Pistil 2.4–2.9 cm; gynophore 5–8 mm; ovary ca. 1.2 cm, glandular puberulent. Style glandular puberulent; adaxial stigma narrowly ovoid, ca. 1 mm, abaxial stigma obtrapeziform, ca. 2.5 mm, apex emarginate. Capsule 3–4.5 cm.

Forests on limestone hills. Guangxi [Vietnam].

23. *ALLOSTIGMA* W. T. Wang, Acta Phytotax. Sin. 22: 185. 1984.

异片苣苔属 *yi pian ju tai shu*

Herbs, perennial, terrestrial, rhizomatous. Stems simple. Leaves few, along stem, opposite, equal to subequal in a pair; leaf blade puberulent, base cuneate to cordate. Inflorescences lax, axillary, 3–5-flowered cymes; bracts 2, opposite. Calyx actinomorphic, 5-lobed; segments equal. Corolla zygomorphic, inside glabrous; tube funnellform-tubular, not swollen, longer than limb, 8–10 mm in diam.; limb 2-lipped; adaxial lip 2-lobed, much shorter than abaxial lip; abaxial lip 3-lobed, lobes subequal, apex rounded. Stamens 2, adnate to abaxial side of corolla tube near middle, included; anthers basifixed, coherent at apex, thecae parallel, not confluent at apex, dehiscing longitudinally; connective prominent; staminodes 3, adnate to adaxial side of corolla tube. Disc ringlike. Ovary linear, 2-loculed; placenta 1, axile. Stigmas 2, unequal, smaller 1 triangular, undivided, larger 1 narrowly obtrapeziform, emarginate. Capsule straight in relation to pedicel, linear, much longer than calyx, dehiscing loculicidally to base; valves 2, straight, not twisted. Seeds unappendaged.

• One species: endemic to China.

Allostigma is very similar to *Pseudochirita* except that it has axile placentation while *Pseudochirita* has parietal placentation.

1. *Allostigma guangxiense* W. T. Wang, Acta Phytotax. Sin. 22: 187. 1984.

异片苣苔 *yi pian ju tai*

Stems ca. 42 cm, with dense grayish to brownish hairs of 2 lengths. Leaves unequal in each pair; petiole 1–4.5 cm; leaf blade oblique, ovate to elliptic, 6.5–15 × 5–8 cm, puberulent, yellow glandular, base oblique, auriculate to cordate on broad side, broadly cuneate on narrow side, margin crenulate, apex acute to acuminate. Peduncle 4.5–10 cm, villous; bracts linear, 3–5.5 mm, pubescent. Calyx ca. 1.1 cm; tube ca. 2 mm; lobes

lanceolate-linear, 8–9.5 mm, apex often subulate.

Corolla ca. 3.8 cm; tube ca. 2.7 cm; adaxial lip ca. 4 mm; abaxial lip ca. 1.1 cm. Stamens ca. 1 cm; central staminode ca. 0.5 mm, lateral 2 3.5–4.5 mm. Pistil ca. 2.8 cm; ovary ca. 1.2 cm, puberulent. Style sparsely puberulent basally; adaxial stigma ca. 1 mm, abaxial stigma nearly oblong, ca. 4 mm, apex truncate to emarginate. Capsule ca. 4 cm. Fl. and fr. Sep.

• Limestone hills. SW Guangxi (Daxin Xian).

24. *METABRIGGSIA* W. T. Wang, Guihaia 3: 1. 1983.

单座苣苔属 *dan zuo ju tai shu*

Herbs, perennial, terrestrial, rhizomatous. Stems simple. Leaves few, along stem, opposite, unequal to subequal in a pair; leaf blade puberulent, base cuneate to subcordate. Inflorescences lax or dense, 3–12-flowered cymes axillary near stem apex; bracts 2, forming a globose involucre. Calyx actinomorphic, 5-lobed to 5-sect from base; segments equal. Corolla white to yellow, zygomorphic, inside glabrous; tube funnellform, somewhat gibbous abaxially, longer than limb, 1–1.5 cm in diam.; limb 2-lipped; adaxial lip 2-lobed; inconspicuous, much shorter than abaxial lip; abaxial lip 3-lobed, lobes subequal, apex rounded to truncate or acute. Stamens 2, adnate to abaxial side of corolla tube near middle, included; anthers basifixed, coherent at apex, thecae parallel, not confluent at apex, dehiscing longitudinally; connective not projecting; staminodes 2 or 3, adnate to adaxial side of corolla tube. Disc ringlike. Ovary linear, 1-loculed; placenta 1, parietal, projecting into locule, undivided. Stigma 1, terminal, depressed-globose or capitate, undivided. Capsule straight in relation to pedicel, linear, much longer than calyx, dehiscing loculicidally to base; valves 2, straight, not twisted. Seeds unappendaged.

• Two species: endemic to China.

- 1a. Leaf blade oblique, ovate, base oblique, rounded to subcordate, abaxially greenish; calyx segments 1.5–2 mm wide; staminodes 3, central one ca. 1.5 mm, lateral two 9–10 mm 1. *M. ovalifolia*
 1b. Leaf blade elliptic or oblong, base often slightly oblique, broadly cuneate to rounded, abaxially purple except midrib and lateral veins greenish; calyx segments 2.5–3.5 mm wide; staminodes 2, ca. 4 mm 2. *M. purpureotincta*

1. *Metabriggsia ovalifolia* W. T. Wang, Guihaia 3: 2. 1983.

单座苣苔 dan zuo ju tai

Stems 20–40 cm, brown villous. Petiole 0.3–7 cm; leaf blade green on both surfaces, slightly oblique, ovate, 5–25.5 × 2.5–17 cm, appressed puberulent, base oblique, rounded to subcordate, margin repand-crenulate, apex abruptly acuminate. Cymes 3–12-flowered; peduncle 7.5–12.5 cm, brown glandular pubescent; involucre early deciduous. Calyx segments lanceolate-linear, 9–10 × 1.5–2 mm. Corolla white, suffused yellow-green, ca. 3.6 cm, outside sparsely pubescent near apex; tube ca. 2.7 cm; adaxial lip ca. 2.8 mm; abaxial lip ca. 1 cm. Stamens ca. 1.7 cm; staminodes 3, central 1 ca. 1.5 mm, lateral 2 9–10 mm. Pistil ca. 2.5 cm; ovary ca. 8 mm, sparsely puberulent. Style puberulent basally. Capsule ca. 1.5 cm. Fl. and fr. Oct.

• Forests on limestone hills; ca. 1100 m. SW Guangxi (Napo Xian).

2. *Metabriggsia purpureotincta* W. T. Wang, Guihaia 3: 3. 1983.

紫叶单座苣苔 zi ye dan zuo ju tai

Stems 13–32 cm, brown villous. Petiole 0.5–7 cm; leaf blade adaxially green, abaxially purple except midrib and lateral veins greenish, elliptic to oblong, 8–23.5 × 3.8–11.5 cm, adaxially puberulent to densely so, abaxially sparsely puberulent, base often slightly oblique, broadly cuneate to rounded, margin repand to denticulate apically, apex abruptly acuminate. Cymes ca. 4-flowered; peduncle 9–10 cm, brown villous; involucre deciduous, nearly globose, ca. 1.2 cm in diam., apex short cuspidate. Calyx segments lanceolate-linear, 8–9 × 2.5–3.5 mm. Corolla white, ca. 2.9 cm, outside brown puberulent; tube ca. 2.1 cm; adaxial lip ca. 3.2 mm; abaxial lip ca. 8 mm. Stamens ca. 1.5 cm; staminodes 2, ca. 4 mm. Pistil ca. 1.6 cm, sparsely puberulent; ovary ca. 7 mm. Capsule unknown. Fl. Sep.

• Guangxi (Nandan Xian).

25. HEMIBOEA C. B. Clarke, Hooker's Icon. Pl. 18: sub pl. 1798. 1888.

半蒴苣苔属 ban shuo ju tai shu

Herbs, perennial, terrestrial or epipetric, stoloniferous. Stems simple or branched. Leaves few to many, along stem, opposite, equal to subequal in a pair; leaf blade glabrous to pilose, base attenuate to cuneate, rarely rounded. Inflorescences umbel-like, dense, axillary or pseudoterminal, 1- to many-flowered cymes; bracts 2, opposite, connate, forming a globose to ovoid involucre. Calyx actinomorphic, 5-sect from base, 2-lipped, or 5-lobed from middle or above; segments equal, rarely unequal. Corolla white to pink, purple, or yellow, zygomorphic, inside usually with a ring of hairs; tube funnellform-tubular, not swollen, longer than limb, 0.7–2 cm in diam.; limb 2-lipped; adaxial lip 2-lobed, shorter than to nearly as long as abaxial lip; abaxial lip 3-lobed, lobes equal or subequal, apex rounded. Stamens 2, adnate to abaxial side of corolla tube below middle, included; anthers basifixed, coherent apically or adaxially, thecae parallel, not confluent at apex, dehiscing longitudinally; connective not projecting; staminodes 2 or 3, adnate to adaxial side of corolla tube. Disc ringlike. Ovary linear to linear-lanceolate, 2-loculed, only adaxial locule fertile; placenta 1, axile. Stigma 1, terminal, truncate to obtuse or capitate, undivided. Capsule straight or oblique in relation to pedicel, usually narrowly lanceolate, somewhat curved, much longer than calyx, dehiscing loculicidally to base only adaxially; valves 2, straight, not twisted. Seeds unappendaged.

Twenty-three species: China, S Japan, N Vietnam; all 23 species in China.

Petioles are often described as winged in *Hemiboea*; since a winged petiole is really a decurrent leaf blade, they are described here as the leaf blade base.

1a. Calyx 5-lobed from middle or above, lobes equal.

2a. Calyx 5-lobed from middle; corolla pink outside 20. *H. gamosepala*

2b. Calyx 5-lobed from above middle; corolla white outside.

3a. Leaf blade without sclereids; petiole 1–10.5 cm; peduncle 1–4.5 cm; corolla 1.5–1.8 cm, glabrous

outside; staminodes 1–2.5 mm; pistil ca. 0.9 cm 22. *H. follicularis*

3b. Leaf blade with sclereids; petiole 0.5–4 cm; peduncle 0.6–1.5 cm; corolla 3.7–4.5 cm, sparsely glandular puberulent outside; staminodes ca. 8 mm; pistil ca. 2.6 cm.

4a. Stems much branched, with 7 to many nodes; leaf blade 3–10 × 1–4 cm, apex cuspidate to

acuminate; involucre ca. 1 cm in diam.; calyx lobes 3–4 × 2–3 mm; anthers ca. 2.5 mm 21. *H. wangiiana*

- 4b. Stems unbranched, with 3–5 nodes; leaf blade 8–24 × 4–11 cm, apex acute; involucre 2.5–3 cm in diam.; calyx lobes 7–10 × 8–10 mm; anthers ca. 4 mm 23. *H. magnibracteata*
- 1b. Calyx 5-sect from base, segments equal, or unequal and 2-lipped with adaxial lip 2-lobed from base or below middle.
- 5a. Calyx segments outside and margin puberulent or glandular puberulent.
- 6a. Ovary ± glandular puberulent or white pilose.
- 7a. Stems sparsely spreading glandular pubescent toward apex, with 10–15 nodes; leaf blade abaxially glabrous; lateral veins 8–12 on each side of midrib; peduncle 1–2 cm; corolla pale yellow, with a ring of hairs inside 19. *H. longgangensis*
- 7b. Stems densely puberulent to villous, with 3–7 nodes; leaf blade abaxially pubescent to densely pubescent; lateral veins 3–8 on each side of midrib; peduncle 0.4–5.5(–10) cm; corolla white, glabrous inside.
- 8a. Cymes 2–7(–21)-flowered; involucre 1–2.5 cm in diam.; anthers ca. 3.2 mm; staminodes 2, 6–8 mm 17. *H. flaccida*
- 8b. Cymes 2- or 3-flowered; involucre 0.4–0.5 cm in diam.; anthers ca. 1.5 mm; staminodes 3, 0.4–2.5 mm 18. *H. parvibracteata*
- 6b. Ovary glabrous.
- 9a. Leaf blade apex obtuse; staminodes 3, 0.6–2.8 mm; cymes 3–10- or more flowered; adaxial corolla lip ca. 3.5 mm 16. *H. strigosa*
- 9b. Leaf blade apex acute to acuminate; staminodes 2, 4–7 mm; cymes 1–6-flowered; adaxial corolla lip 5–10 mm.
- 10a. Stems densely spreading villous; peduncle 5–14 cm 15. *H. mollifolia*
- 10b. Stems glabrous to sparsely pilose toward apex; peduncle 0.2–2.1(–4) cm.
- 11a. Calyx segments 5–8 mm; style glabrous; leaf blade sparsely pilose on both surfaces, base cuneate to narrowly so; lateral veins 4–6 on each side of midrib 5. *H. gracilis*
- 11b. Calyx segments 11–14 mm; style sparsely glandular puberulent or sparsely glandular; leaf blade adaxially pubescent, abaxially glabrous to sparsely pubescent, base often unequal, cuneate to rounded; lateral veins 5–11 on each side of midrib.
- 12a. Involucre sparsely pubescent outside; corolla ca. 2.1 cm; capsule ca. 1.9 cm; leaf blade margin entire; calyx segments narrowly lanceolate, ca. 2.5 mm wide 13. *H. glandulosa*
- 12b. Involucre glabrous outside; corolla 3.7–4.4 cm; capsule ca. 3.5 cm; leaf blade margin conspicuously serrate to nearly entire; calyx segments lanceolate, 4–5 mm wide 14. *H. fangii*
- 5b. Calyx segments outside and margin glabrous.
- 13a. Peduncle sparsely pilose to densely pubescent.
- 14a. Peduncle 0.2–1.2 cm; leaf blade sparsely pilose on both surfaces 5. *H. gracilis*
- 14b. Peduncle 1.5–5 cm; leaf blade adaxially puberulent to pubescent, abaxially nearly glabrous to pubescent.
- 15a. Stems glabrous, much branched; leaf blade 5–8 × 2.3–4.2 cm, abaxially nearly glabrous, apex acute to abruptly acuminate 10. *H. pingbianensis*
- 15b. Stems glabrescent to densely pubescent, unbranched; leaf blade 5–20 × (3–)5–10.5 cm, abaxially pubescent to sparsely pubescent, apex acute.
- 16a. Cymes 1–3-flowered; stems 5–22.5 cm with 2–5 nodes; petiole (0.5–)1–3.6 cm; leaf blade 5–12 × (3–)5–8.8 cm, without sclereids; corolla pink with purple spots, 2.1–4.1 cm; staminodes 2, 3.5–6 mm; pistil 2.1–2.5 cm 11. *H. subacaulis*

- 16b. Cymes 6- or more flowered; stems ca. 40 cm with ca. 10 nodes; petiole 3–6 cm; leaf blade 14–20 × 7–10.5 cm, with vermiform sclereids surrounding vascular bundles; corolla white with purple spots, ca. 2.2 cm; staminodes 3, 0.6–3.5 mm; pistil ca. 1.4 cm 12. *H. parviflora*
- 13b. Peduncle glabrous.
- 17a. Calyx 2-lipped, adaxial lip 2-lobed, divided to base, abaxial lip 3-lobed, divided to middle or to apical third; stems much branched 8. *H. latisejala*
- 17b. Calyx divided to base, segments equal; stems branched or unbranched.
- 18a. Calyx segments 15–20 mm.
- 19a. Stems not spotted, nodes many; corolla glabrous outside; anthers ca. 2 mm; style glabrous 2. *H. longisejala*
- 19b. Stems sparsely purple-brown spotted, nodes 3 or 4; corolla sparsely glandular puberulent outside; anthers 3.5–4 mm; style sparsely glandular pubescent 6. *H. omeiensis*
- 18b. Calyx segments 5–12 mm.
- 20a. Corolla glabrous outside.
- 21a. Pistil ca. 3.2 cm; corolla pink with purple spots, tube 2.1–2.3 cm, abaxial lip 11–12 mm; petiole 0.5–2 cm; leaf blade entire, without sclereids; involucre ca. 1.3 cm in diam. 1. *H. integra*
- 21b. Pistil ca. 1.5–2 cm; corolla white with purple spots, tube 3–3.8 cm, abaxial lip ca. 7 mm; petiole 2–6 cm; leaf blade margin weakly serrate to nearly entire, with vermiform sclereids surrounding vascular bundles; involucre 2–2.5 cm in diam. 3. *H. bicornuta*
- 20b. Corolla sparsely glandular puberulent outside.
- 22a. Leaf blade sparsely pilose; cymes 1–3-flowered; corolla pink to purple or bluish with darker or yellow lines and spots 5. *H. gracilis*
- 22b. Leaf blade glabrous to pubescent; cymes (1–)3–12-flowered; corolla pale yellow to white with purple spots.
- 23a. Calyx segments 3–4.5 mm wide; pistil 3–4 cm; abaxial corolla lip 6–9 mm; leaf blade base usually slightly unequal, cuneate to attenuate and decurrent, sometimes touching at node 7. *H. subcapitata*
- 23b. Calyx segments 0.2–2 mm wide; pistil 1.7–2.5 cm; abaxial corolla lip 7–15 mm; leaf blade base slightly oblique, cuneate to slightly attenuate.
- 24a. Leaf blade with vermiform sclereids surrounding vascular bundles; lateral veins 4–14 on each side of midrib; peduncle 0.5–6.5(–10) cm 4. *H. cavaleriei*
- 24b. Leaf blade with astrosclereids scattered in mesophyll; lateral veins 5 or 6 on each side of midrib; peduncle 7–10 cm 9. *H. longzhouensis*

1. *Hemiboea integra* C. Y. Wu ex H. W. Li, Bull. Bot. Res., Harbin 3(2): 27. 1983.

全叶半蒴苣苔 *quan ye ban shuo ju tai*

Stems 30–80 cm, sparsely brown spotted, glabrous, simple, with up to 15 nodes. Petiole 0.5–2 cm; leaf

blade narrowly ovate to ovate or obovate, 4–14 × 1.8–6.5 cm, glabrous, base cuneate to attenuate, margin entire, apex abruptly acuminate, without sclereids; lateral veins 5 or 6 on each side of midrib. Cymes ca. 6-flowered; peduncle 3.5–7 cm, glabrous; involucre ca. 1.3 cm in diam., outside glabrous. Calyx 5-sect from

base; segments equal, lanceolate, 7–8 × ca. 2 mm, outside and margin glabrous. Corolla outside pink, inside purple spotted, 3.2–3.5 cm, outside glabrous, inside with a ring of hairs; tube 2.1–2.3 cm; adaxial lip 5–7 mm; abaxial lip 1.1–1.2 cm. Anthers ca. 3.5 mm; staminodes 3, ca. 5 mm. Pistil ca. 3.2 cm, glabrous. Capsule 2–2.5 cm. Fl. Oct–Dec, fr. Dec–Jan.

• Dense montane valley forests; 100–400 m. SE Yunnan.

2. *Hemiboea longisepala* Z. Y. Li, Acta Phytotax. Sin. 21: 195. 1983.

长萼半蒴苣苔 *chang e ban shuo ju tai*

Stems to 1 m, unspotted, glabrous, simple, nodes many. Petiole 1–5.5 cm; leaf blade ovate-lanceolate to elliptic-lanceolate, 9.5–12.5 × 4.4–5.6 cm, adaxially sparsely pubescent, abaxially glabrous, base broadly cuneate, margin repand-crenate, apex acuminate, vermiform sclereids surrounding vascular bundles; lateral veins 10–12 on each side of midrib. Cymes 6–9-flowered; peduncle 3–3.6 cm, glabrous; involucre ca. 1.7 cm in diam., outside glabrous. Calyx 5-sect from base; segments equal, linear-lanceolate, 1.9–2 cm × ca. 2.5 mm, outside and margin glabrous. Corolla outside white, ca. 3.4 cm, outside glabrous, inside with a ring of hairs; tube ca. 2.6 cm; adaxial lip ca. 6 mm; abaxial lip ca. 8 mm. Anthers ca. 2 mm; staminodes 3, 1.5–5.5 mm. Pistil ca. 2.2 cm, glabrous. Capsule unknown. Fl. Sep–Oct.

• Shady roadsides in montane valleys. SW Guangxi.

3. *Hemiboea bicornuta* (Hayata) Ohwi, J. Jap. Bot. 12: 662. 1936.

台湾半蒴苣苔 *tai wan ban shuo ju tai*

Chirita bicornuta Hayata, Icon. Pl. Formos. 3: 154. 1913; *Didymocarpus bicornutus* (Hayata) S. Y. Hu; *Hemiboea merrillii* Yamamoto.

Stems 20–100 cm or more, sparsely purple-brown spotted, glabrous, simple or branched, with 18 or more nodes. Petiole 2–6 cm; leaf blade sometimes oblique, elliptic to narrowly lanceolate, sometimes falcate, 7–20 × 2.5–5 cm, nearly glabrous to sparsely pubescent, base cuneate to attenuate, margin weakly serrate to nearly entire, apex acuminate, vermiform sclereids surrounding vascular bundles; lateral veins 6–10 on each side of midrib. Cymes 3- or more flowered; peduncle 1.5–4 cm, glabrous; involucre 2–2.5 cm in diam., outside glabrous. Calyx 5-sect from base; segments equal, lanceolate to narrowly elliptic, 8–12 × 3–4 mm, outside and margin glabrous. Corolla outside white, inside purple spotted, 3.7–4.5 cm, outside glabrous, inside with a ring of hairs; tube 3–3.8 cm; adaxial lip ca. 5 mm; abaxial lip ca. 7 mm. Anthers ca. 3 mm; staminodes 3, 3–8 mm. Pistil 1.5–2 cm, glabrous. Capsule 2.2–2.5 cm. Fl. Sep–Oct, fr. Nov–Dec.

Forests, shaded streamsides; 300–2200 m. Taiwan [Japan (including SW Ryukyu Islands, Iriomote Island)].

4. *Hemiboea cavaleriei* H. Léveillé, Repert. Spec. Nov. Regni Veg. 9: 328. 1911.

贵州半蒴苣苔 *gui zhou ban shuo ju tai*

Stems 20–150 cm, sparsely purple spotted, glabrous, branched or simple, with 4–15 nodes. Petiole 0.5–6.5 cm; leaf blade elliptic to ovate or broadly lanceolate, sometimes falcate, 5–20 × 2–8 cm, adaxially glabrous to sparsely pubescent, abaxially glabrous, base usually oblique, cuneate to narrowly cuneate, margin serrate to entire, rarely undulate or crenate, apex acuminate to acute, vermiform sclereids surrounding vascular bundles; lateral veins 4–14 on each side of midrib. Cymes (1–)3–12-flowered; peduncle 0.5–6.5(–10) cm, glabrous; involucre 1–2.5 cm in diam., outside glabrous. Calyx 5-sect from base; segments equal, ovate to elliptic-lanceolate or linear-lanceolate, 5–7 × 0.2–0.4 mm, outside and margin glabrous. Corolla outside pale yellow to white, inside purple spotted, 3–4.8 cm, outside sparsely glandular puberulent, inside with a ring of hairs; tube 2.3–3.3 cm; adaxial lip 6–10 mm; abaxial lip 7–15 mm. Anthers (2.5–)3–3.2 mm; staminodes 2 or 3, 2–7 mm. Pistil 1.7–2.5 cm, glabrous. Capsule 1.5–2.5 cm. Fl. Aug–Oct, fr. Oct–Dec.

Shaded areas in montane valleys, forests on calcareous mountains; 300–1600 m. Fujian, Guangdong, Guangxi, Guizhou, S Hunan, S Jiangxi, S Sichuan, SE Yunnan [N Vietnam].

Weitzman and Skog do not recognize the following varieties and believe that the characters used to separate them are insufficient.

- 1a. Leaf blade herbaceous, ± sparsely pubescent; lateral veins 6–14 on each side of midrib; anthers ellipsoid, coherent apically or near apex; staminodes 3 4a. var. *cavaleriei*
- 1b. Leaf blade papery to thin papery, usually glabrous, rarely sparsely pubescent; lateral veins 4–8(or 9) on each side of midrib; anthers nearly discoid, coherent near apex or adaxially; staminodes 2, rarely 3 4b. var. *paucinervis*

4a. *Hemiboea cavaleriei* var. *cavaleriei*

贵州半蒴苣苔(原变种) *gui zhou ban shuo ju tai (yuan bian zhong)*

Leaf blade herbaceous, adaxially sparsely pubescent; lateral veins 6–14 on each side of midrib. Staminodes 3.

• Shady places in montane valleys; 300–1600 m. Fujian, Guangdong, Guangxi, Guizhou, S Hunan, S Jiangxi, S Sichuan.

4b. *Hemiboea cavaleriei* var. *paucinervis* W. T. Wang & Z. Y. Li ex Z. Y. Li, Acta Phytotax. Sin. 21: 194. 1983.

疏脉半蒴苣苔 *shu mai ban shuo ju tai*

Hemiboea flava C. Y. Wu ex H. W. Li.

Leaf blade papery to thin papery, adaxially usually glabrous, rarely sparsely pubescent; lateral veins 4–8 (or 9) on each side of midrib. Staminodes 2, rarely 3.

Forests on calcareous mountains; 300–1600 m. Guangxi, S Guizhou, SE Yunnan [N Vietnam].

5. *Hemiboea gracilis* Franchet, Bull. Mens. Soc. Linn. Paris, sér. 2, 15: 124. 1899.

纤细半蒴苣苔 xian xi ban shuo ju tai

Stems 4–47 cm, sparsely purple-brown spotted, glabrous to sparsely pilose toward apex, usually simple, with 3–5 nodes. Petiole 2–4 cm; leaf blade sometimes oblique, elliptic to ovate or rarely obovate, 3–15 × 1.2–5 cm, sparsely pilose, base cuneate to narrowly cuneate, margin entire to repand, apex acuminate, vermiform sclereids surrounding vascular bundles; lateral veins 4–6 on each side of midrib. Cymes 1–3-flowered; peduncle 2–12 mm, glabrous to sparsely white pilose; involucre to 1–1.4(–2) cm in diam., outside glabrous to white pilose. Calyx 5-sect from base; segments equal, linear to lanceolate, 5–8 × 2–4 mm, outside and margin glabrous to white pilose. Corolla outside pink to purple or bluish, inside with darker or yellow lines and spots, 3–3.8 cm, outside sparsely glandular puberulent, inside with a ring of hairs; tube 2.2–2.8 cm; adaxial lip 5–8 mm; abaxial lip 8–10 mm. Anthers (1.1–)1.7–2.5 mm; staminodes 2, 4–5 mm. Pistil 2–2.5 cm, glabrous. Capsule 1.7–2.5 cm. Fl. Aug–Oct, fr. Oct–Nov.

• Rocks in montane valley forests, rocky streamsides, forest margins; 300–1300 m. Guizhou, W and SW Hubei, Hunan, W Jiangxi, Sichuan.

1a. Stem, petiole, peduncle, involucre, and calyx outside glabrous 5a. var. *gracilis*

1b. Stems near apex, petiole, peduncle, involucre, and calyx outside white pilose 5b. var. *pilobractea*

5a. *Hemiboea gracilis* var. *gracilis*

纤细半蒴苣苔(原变种) xian xi ban shuo ju tai (yuan bian zhong)

Stems, petioles, peduncles glabrous, involucre outside glabrous, and calyx outside glabrous.

• Rocks in montane valley forests; 300–1300 m. Guizhou, W Hubei, Hunan, W Jiangxi, Sichuan.

5b. *Hemiboea gracilis* var. *pilobractea* Z. Y. Li, Acta Phytotax. Sin. 21: 207. 1983.

毛苞半蒴苣苔 mao bao ban shuo ju tai

Stems near apex, petioles, peduncles, involucre outside, and calyx outside white pilose.

• Rocky streamsides, forest margins; 500–1000 m. Guizhou, SW Hubei, W Hunan.

6. *Hemiboea omeiensis* W. T. Wang in W. T. Wang & K. Y. Pan, Bull. Bot. Res., Harbin 2(2): 127. 1982.

峨眉半蒴苣苔 e mei ban shuo ju tai

Stems 30–45 cm, sparsely purple-brown spotted, glabrous, simple, with 3 or 4 nodes. Petiole 0.3–3.5 cm; leaf blade elliptic to ovate or falcate, 8–19 × 4–8.8 cm, adaxially sparsely pubescent, abaxially glabrous, base oblique, cuneate, or 1 side cuneate and other rounded,

margin nearly entire to shallowly undulate or crenate, apex acuminate, vermiform sclereids surrounding vascular bundles; lateral veins 8–10 on each side of midrib. Cymes 3–6-flowered; peduncle 2–3 cm, glabrous; involucre 1.5–2.5 cm in diam., outside glabrous. Calyx 5-sect from base; segments equal, linear-lanceolate, 1.5–1.8 cm × 2.5–3.5(–4) mm, outside and margin glabrous. Corolla outside white, inside purple spotted, 3–4 cm, outside sparsely glandular puberulent, inside with a ring of hairs; tube 2.3–3.2 cm; adaxial lip 8–10 mm; abaxial lip 1–1.3 cm. Anthers 3.5–4 mm; staminodes 3, 4–7 mm. Pistil 2–2.5 cm; ovary glabrous. Style sparsely glandular puberulent. Capsule 3–3.5 cm. Fl. Aug–Oct, fr. Nov–Dec.

• Streamsides, forest margins; 900–1900 m. W Sichuan.

7. *Hemiboea subcapitata* C. B. Clarke, Hooker's Icon. Pl. 18: sub pl. 1798. 1888.

半蒴苣苔 ban shuo ju tai

Stems 10–40 cm, sparsely purple-brown or purple spotted, glabrous to pubescent, simple, with 4–8 nodes. Petiole 0.5–7 (–9) cm; leaf blade elliptic to ovate or obovate, 3–22 × 1.4–11.5 cm, adaxially nearly glabrous to pubescent, abaxially glabrous to pubescent, base usually slightly unequal, cuneate to attenuate and decurrent, sometimes touching at node, margin entire to weakly serrate, shallowly crenate toward apex, or densely denticulate, apex acute to acuminate, vermiform sclereids dispersed in leaf mesophyll; lateral veins 5–7 on each side of midrib. Cymes (1–)3–10- or more flowered; peduncle 2–7(–13) cm, glabrous; involucre 1–2.5 cm in diam., outside glabrous, seldom pilose. Calyx 5-sect from base; segments equal, linear to lanceolate to narrowly ovate or elliptic to oblong, 6–12 × 3–4.5 mm, outside and margin glabrous. Corolla outside white, inside purple spotted, 3.5–4.2 cm, outside sparsely glandular puberulent, inside with a ring of hairs; tube 2.8–3.5 cm; adaxial lip 5–7 mm; abaxial lip 6–9 mm. Anthers 3–4.5 mm; staminodes 3, 2–8 mm. Pistil 3–4 cm, glabrous. Capsule 1.5–2.5 cm. Fl. Aug–Oct, fr. Oct–Dec.

• Rocks in montane valley forests and shaded wet forests; 100–2100 m. S Anhui, Fujian, S Gansu, Guangdong, Guangxi, Guizhou, S Henan, Hubei, Hunan, S Jiangsu, Jiangxi, S Shaanxi, Sichuan, SE Yunnan, Zhejiang.

1a. Involucre glabrous outside 7a. var. *subcapitata*

1b. Involucre pilose outside .. 7b. var. *guangdongensis*

7a. *Hemiboea subcapitata* var. *subcapitata*

半蒴苣苔(原变种) ban shuo ju tai (yuan bian zhong)

Hemiboea henryi C. B. Clarke; *H. henryi* var. *major* Diels; *Didymocarpus hwaianus* S. Y. Hu; *H. marmorata* H. Léveillé; *H. subcapitata* var. *denticulata* W. T. Wang ex Z. Y. Li; *H. subcapitata* var. *intermedia* R. Pampanini; *H. subcapitata* var. *sordidopuberula* Z. Y. Li.

Involucre outside glabrous.

•Rocks in montane valley forests and shaded wet forests; 100–2100 m. S Anhui, Fujian, S Gansu, Guangdong, Guangxi, Guizhou, S Henan, Hubei, Hunan, S Jiangsu, Jiangxi, S Shaanxi, Sichuan, SE Yunnan, Zhejiang.

7b. *Hemiboea subcapitata* var. *guangdongensis* (Z. Y. Li) Z. Y. Li in A. L. Weitzman et al., *Novon* 7: 429. 1998.

广东半蒴苣苔 *guang dong ban shuo ju tai*

Hemiboea henryi C. B. Clarke var. *guangdongensis* Z. Y. Li, *Acta Phytotax. Sin.* 25: 225. 1987.

Involucre outside pilose.

•Known only from cultivation. Cultivated at the South China Institute of Botany; introduced from NW Guangdong (Lian Xian).

8. *Hemiboea latispala* H. W. Li, *Bull. Bot. Res.*, Harbin 3(2): 28. 1983.

宽萼半蒴苣苔 *kuan e ban shuo ju tai*

Stems to 55 cm, purple-brown spotted, sparsely pubescent, glabrescent, much branched, with up to 12 nodes. Petiole 0.5–2.5 cm; leaf blade narrowly ovate to ovate, 4.5–17 × 1.5–6.5 cm, adaxially pubescent, abaxially glabrous, base cuneate to rounded, margin entire to sparsely dentate, apex acute to acuminate, vermiform sclereids dispersed throughout leaf; lateral veins 7 or 8 on each side of midrib. Cymes 2–6-flowered; peduncle (2.5–)3–4 cm, glabrous; involucre 1.3–2 cm in diam., outside glabrous. Calyx ca. 1.3 cm, 2-lipped, with unequal segments; adaxial lip 2-sect from base, segments oblong lanceolate, 1–1.3 cm × 4–5 mm; abaxial lip 3-lobed, divided from middle to above middle, lobes oblong lanceolate, 4–6 × 5–6 mm, outside and margin glabrous. Corolla outside pale purple, ca. 3.2 cm, outside sparsely glandular puberulent, inside with a ring of hairs; tube ca. 2.6 cm; adaxial lip ca. 5 mm; abaxial lip ca. 6 mm. Anthers ca. 3.5 mm; staminodes 3, 3–6 mm. Pistil ca. 2.7 cm, glabrous. Capsule unknown. Fl. May.

•Shady calcareous rocks in forests; ca. 1600 m. SW Yunnan.

9. *Hemiboea longzhouensis* W. T. Wang ex Z. Y. Li, *Acta Phytotax. Sin.* 21: 198. 1983.

龙州半蒴苣苔 *long zhou ban shuo ju tai*

Stems 20–40 cm or more, purple spotted, glabrous, simple or branched, with 5 to many nodes. Petiole 1–4 cm; leaf blade elliptic to ovate, 7–17 × 3–9.5 cm, adaxially pubescent, abaxially glabrous, base slightly oblique, cuneate to slightly attenuate, margin entire to nearly entire, apex acuminate to acute, astrosclereids scattered in mesophyll; lateral veins 5 or 6 on each side of midrib. Cymes ca. 6-flowered; peduncle 7–10 cm, glabrous; involucre ca. 2 cm in diam., outside glabrous. Calyx 5-sect from base; segments equal, narrowly lanceolate, ca. 7 × 1.5–2 mm, outside and margin glabrous. Corolla outside white, inside purple spotted, 3.7–4.4 cm, outside sparsely glandular puberulent, inside with a ring of hairs; tube 2.9–3 cm; adaxial lip 5–9 mm; abaxial lip 0.8–1.4 cm. Anthers ca. 3 mm;

staminodes 3, 1–9 mm. Pistil ca. 2.2 cm, glabrous.

Capsule 2–2.5 cm. Fl. Nov–Dec, fr. Jan–Feb.

•Rocks in montane valley forests; 300–400 m. W Guangxi.

10. *Hemiboea pingbianensis* Z. Y. Li, *Acta Bot. Yunnan.* 5: 383. 1983.

屏边半蒴苣苔 *ping bian ban shuo ju tai*

Stems ca. 25 cm, sparsely brown spotted, glabrous, much branched, with up to 12 large nodes. Petiole 1–5 cm; leaf blade oblong to ovate-oblong, 5–8 × 2.3–4.2 cm, adaxially puberulent, abaxially nearly glabrous, base usually oblique, cuneate, margin entire, apex acute to abruptly acuminate, vermiform sclereids surrounding vascular bundles; lateral veins 7–11 on each side of midrib. Cymes 1- or 2(or 3)-flowered; peduncle 1.5–2.5 cm, sparsely pilose; involucre ca. 1.5 cm in diam., outside pilose. Calyx 5-sect from base; segments equal, narrowly elliptic, ca. 8 × 2.3–2.5 mm, outside and margin glabrous. Corolla, stamens, and pistil unknown. Capsule ca. 2.2 cm. Fr. Dec.

•Rocks in forests; ca. 1600 m. SE Yunnan.

11. *Hemiboea subacaulis* Handel-Mazzetti, *Kaiserl. Akad. Wiss. Wien, Math.-Naturwiss. Kl., Anz.* 62: 66. 1925.

短茎半蒴苣苔 *duan jing ban shuo ju tai*

Stems 5–22.5 cm, sparsely brown spotted, apically pubescent, simple, with 2–5 nodes. Petiole (0.5–)1–3.6 cm; leaf blade broadly elliptic to broadly ovate or lanceolate, 5–12 × (3–) 5–8.8 cm, pubescent to sparsely pubescent, base rounded to cuneate and decurrent and meeting at node, margin entire to nearly entire, apex acute, without sclereids; lateral veins 4 or 5 on each side of midrib. Cymes 1–3-flowered; peduncle 1.5–5 cm, pubescent; involucre 1–1.5 cm in diam., outside pubescent to pilose. Calyx 8–11 mm, 5-sect from base or 2-lipped and adaxial lip 2-lobed from below middle; segments equal or unequal, ovate, 3–6 × 1.8–3 mm, outside and margin glabrous. Corolla outside pink, inside purple spotted, 2.1–4.1 cm, outside sparsely glandular, puberulent, inside with a ring of hairs; tube 1.5–3.4 cm; adaxial lip 4–6 mm; abaxial lip 5–7 mm. Anthers 3–3.5 mm; staminodes 2, 3.5–6 mm. Pistil 2.1–2.5 cm, glabrous. Capsule ca. 2.5 cm.

•Forests, on rocky cliffs along montane streams; 100–900 m. N Guangxi, E Guizhou, Hunan, SW Jiangxi.

1a. Leaf blade apex rounded to acute; involucre densely pubescent outside; calyx 8–9 mm

..... 11a. var. *subacaulis*

1b. Leaf blade apex abruptly acuminate; involucre sparsely pilose outside; calyx 10–11 mm

..... 11b. var. *jiangxiensis*

11a. *Hemiboea subacaulis* var. *subacaulis*

短茎半蒴苣苔(原变种) *duan jing ban shuo ju tai*
(yuan bian zhong)

Chirita subacaulis (Handel-Mazzetti) B. L. Burtt, Notes Roy. Bot. Gard. Edinburgh 23: 99. 1960.

Leaf blade apex rounded to acute. Involucre outside densely pubescent. Calyx 8–9 mm.

• Forests, on rocky cliffs along montane streams; 100–600 m. N Guangxi, E Guizhou, Hunan.

11b. *Hemiboea subacaulis* var. *jiangxiensis* Z. Y. Li, Acta Phytotax. Sin. 21: 199. 1983.

江西半蒴苣苔 *jiang xi ban shuo ju tai*

Leaf blade apex abruptly acuminate. Involucre outside sparsely pilose. Calyx 1–1.1 cm.

• Forest streamsides, along rocky montane streams; 800–900 m. SW Jiangxi.

12. *Hemiboea parviflora* Z. Y. Li, Acta Phytotax. Sin. 21: 201. 1983.

小花半蒴苣苔 *xiao hua ban shuo ju tai*

Stems ca. 40 cm, sparsely purple-brown spotted, densely pubescent, simple, with ca. 10 nodes. Petiole 3–6 cm; leaf blade elliptic, 14–20 × 7–10.5 cm, pubescent, base decurrent and joined across node, margin entire, apex acute, vermiform sclereids surrounding vascular bundles; lateral veins 5–9 on each side of midrib.

Cymes 6- or more flowered; peduncle 2.5–5 cm, densely pubescent; involucre ca. 1.5 cm in diam., outside densely pubescent. Calyx 5-sect from base; segments equal, ovate-oblong, 9–10 × 3–4 mm, outside and margin glabrous. Corolla outside white, inside purple spotted, ca. 2.2 cm, outside sparsely glandular puberulent, inside with a ring of hairs; tube ca. 1.7 cm; adaxial lip ca. 3.5 mm; abaxial lip ca. 5 mm. Anthers ca. 4 mm; staminodes 3, 0.6–3.5 mm. Pistil ca. 1.4 cm, glabrous. Capsule unknown. Fl. Sep–Oct.

• Dense montane valley forests; 500–600 m. SW Guangxi.

13. *Hemiboea glandulosa* Z. Y. Li, Acta Phytotax. Sin. 21: 199. 1983.

腺萼半蒴苣苔 *xian e ban shuo ju tai*

Stems more than 20 cm, sparsely purple spotted, glabrous, branched or simple, with few to many sometimes swollen nodes. Petiole 1.4–4.5 cm; leaf blade narrowly to broadly ovate, 9.5–12.5 × 4.4–5.1 cm, adaxially pubescent, abaxially glabrous, base sometimes slightly unequal, rounded to cuneate, margin entire, apex acute to slightly acuminate, vermiform sclereids surrounding vascular bundles; lateral veins 8–11 on each side of midrib. Cymes ca. 6-flowered; peduncle 1.5–2.1(–4) cm, glabrous; complete involucre unknown, outside sparsely pubescent. Calyx 5-sect from base; segments equal, narrowly lanceolate, 1.3–14 cm × ca. 2.5 mm, outside and margin glandular puberulent. Corolla outside white, inside purple spotted, ca. 2.1 cm, outside glandular puberulent, inside with a ring of hairs; tube ca. 1.5 cm; adaxial lip ca. 5 mm; abaxial lip ca. 6 mm. Anthers ca. 2.5 mm; staminodes 2, ca. 6 mm. Pistil ca. 2 cm; ovary glabrous. Style sparsely glandular. Capsule ca. 1.9 cm. Fl. Sep–Oct, fr. Oct–Nov.

• Rocks in forests; 1600–2500 m. SE Yunnan.

14. *Hemiboea fangii* W. Y. Chun ex Z. Y. Li, Acta Phytotax. Sin. 21: 197. 1983.

齿叶半蒴苣苔 *chi ye ban shuo ju tai*

Stems 15–38 cm, sparsely purple-brown spotted, glabrous, simple, with 3–5 nodes. Petiole 0.4–3.8 cm; leaf blade usually oblique, elliptic to ovate, 4.5–12 × 2.5–6 cm, adaxially pubescent, abaxially glabrous to sparsely pubescent, base usually unequal, cuneate to rounded, margin conspicuously serrate to nearly entire, apex acute to acuminate, vermiform sclereids surrounding vascular bundles; lateral veins 5–10 on each side of midrib. Cymes 1–5-flowered; peduncle 5–12(–30) mm, glabrous; involucre 0.5–1 cm, outside glabrous. Calyx 5-sect from base; segments equal, lanceolate, 1.1–1.4 cm × 4–5 mm, outside and margin sparsely glandular puberulent. Corolla outside white, inside purple spotted, 3.7–4.4 cm, outside sparsely glandular puberulent, inside with a ring of hairs; tube 2.5–3 cm; adaxial lip 9–10 mm; abaxial lip 1.2–1.4 cm. Anthers ca. 2 mm; staminodes 2, ca. 7 mm. Pistil ca. 2 cm; ovary glabrous. Style sparsely glandular puberulent. Capsule ca. 3.5 cm. Fl. Sep–Oct, fr. Nov–Dec.

• Rocks in dense forests; 900–1700 m. SW Sichuan.

15. *Hemiboea mollifolia* W. T. Wang in W. T. Wang & K. Y. Pan, Bull. Bot. Res., Harbin 2(2): 129. 1982.

柔毛半蒴苣苔 *rou mao ban shuo ju tai*

Stems 16–40 cm, purple-brown spotted, densely spreading villous, simple, with 3–5 nodes. Petiole 0.6–6 cm; leaf blade elliptic-ovate to oblong, 3–15 × 1.1–6.4 cm, villous to pubescent, base unequal, cuneate, margin shallowly repand to repand-crenate toward apex, apex acuminate, vermiform sclereids surrounding vascular bundles; lateral veins 6–11 on each side of midrib. Cymes ca. 3-flowered; peduncle 5–14 cm, sparsely villous; involucre 1–2 cm in diam., outside villous. Calyx 5-sect from base; segments equal, narrowly oblanceolate, 1.4–1.5 cm × 3–4 mm, outside sparsely puberulent, margin glandular puberulent. Corolla outside pink, 3.7–4.2 cm, outside sparsely glandular puberulent, inside with a ring of hairs; tube 3–3.4 cm; adaxial lip 5–6 mm; abaxial lip 6–7 mm. Anthers 2–3 mm; staminodes 2, 4–5.5 mm. Pistil ca. 2.5 cm, glabrous. Capsule 2.2–2.4 cm. Fl. Aug–Oct, fr. Sep–Nov.

• Rocks in shaded montane valleys; 600–900 m. E Guizhou, SW Hubei, W Hunan.

16. *Hemiboea strigosa* W. Y. Chun ex W. T. Wang in W. T. Wang & K. Y. Pan, Bull. Bot. Res., Harbin 2(2): 124. 1982.

腺毛半蒴苣苔 *xian mao ban shuo ju tai*

Stems 12–45 cm, purple spotted, sparsely pubescent, simple or branched, with 4–7 nodes. Petiole to 3.5 cm;

leaf blade ovate to obovate, 6–17 × 3–9 cm, pubescent to sparsely pubescent, base cuneate in basal leaves, attenuate and decurrent and joined across node in distal leaves, margin entire, apex obtuse, vermiform sclereids surrounding vascular bundles; lateral veins 5 or 6 on each side of midrib. Cymes 3–10- or more flowered; peduncle 6–10 cm, glandular pubescent; involucre 1–2.5 cm in diam., outside glandular pubescent. Calyx 5-sect from base; segments equal, lanceolate, 7–9 × 1.2–2.2 mm, outside and margin sparsely glandular puberulent. Corolla outside white, inside purple spotted, ca. 3.2 cm, outside sparsely glandular puberulent, inside with a ring of hairs; tube ca. 2.6 cm; adaxial lip ca. 3.5 mm; abaxial lip ca. 6 mm. Anthers ca. 3.8 mm; staminodes 3, 0.6–2.8 mm. Pistil ca. 2.8 cm; ovary glabrous. Style sparsely glandular puberulent. Capsule 1.6–2.1 cm. Fl. Aug–Sep, fr. Sep–Dec.

•Rocks in montane valley forests; 400–900 m. N Guangdong, S Hunan, S Jiangxi.

17. *Hemiboea flaccida* W. Y. Chun ex Z. Y. Li, Acta Phytotax. Sin. 21: 201. 1983.

毛果半蒴苣苔 mao guo ban shuo ju tai

Stems 12–40 cm, often sparsely brown spotted, densely brown puberulent to villous, simple, with 3–6 nodes. Petiole 2–11 cm; leaf blade elliptic to ovate, 7–21 × 4–14 cm, pubescent to densely so, base slightly unequal, cuneate to attenuate, margin entire to weakly serrate toward apex, apex acute to acuminate, without sclereids; lateral veins 5–8 on each side of midrib. Cymes 2–7(–21)-flowered; peduncle 0.4–5.5(–10) cm, sparsely glandular puberulent to pilose; involucre 1–2.5 cm in diam., outside sparsely glandular puberulent. Calyx 5-sect from base; segments equal, linear, 5–9 × 2.5–3 mm, outside and margin sparsely glandular puberulent. Corolla outside white, inside purple spotted, 3–3.4 cm, outside sparsely glandular puberulent, inside glabrous; tube 2.3–2.5 cm; adaxial lip 4–5 mm; abaxial lip 7–9 mm. Anthers ca. 3.2 mm; staminodes 2, 6–8 mm. Pistil 1.8–2.3 cm, sparsely glandular puberulent. Capsule 1.6–2.2 cm. Fl. Aug–Oct, fr. Sep–Nov.

•Calcareous rocks in forests; 700–1400 m. W Guangxi, S Guizhou.

18. *Hemiboea parvibracteata* W. T. Wang & Z. Y. Li, Keys Vasc. Pl. Wuling Mount. 580. 1995.

小苞半蒴苣苔 xiao bao ban shuo ju tai

Stems 20–23 cm, sparsely purple-brown spotted, densely pubescent, simple, with 5–7 nodes. Petiole 1–7 cm; leaf blade slightly oblique, obovate to narrowly so, 3–15.5 × 1.8–5.5 cm, pubescent, base oblique, cuneate, margin entire, apex acuminate to rounded or emarginate, without sclereids; lateral veins 3–6 on each side of midrib. Cymes 2- or 3-flowered; peduncle 4–5 cm, pubescent; involucre 4–5 mm in diam., outside sparsely

glandular pubescent. Calyx 5-sect from base; segments equal, narrowly lanceolate, 6–7 × 2–2.2 mm, outside and margin sparsely glandular puberulent. Corolla outside white, 3–3.2 cm, outside sparsely glandular puberulent, inside glabrous; tube 2.4–2.5 cm; adaxial lip ca. 5 mm; abaxial lip ca. 8 mm. Anthers ca. 1.5 mm; staminodes 3, 0.4–2.5 mm. Pistil ca. 1.2 cm, white pilose. Capsule unknown. Fl. Sep.

•Rocks in dense forest; ca. 900 m. E Guizhou.

19. *Hemiboea longgangensis* Z. Y. Li, Acta Phytotax. Sin. 21: 202. 1983.

岗半蒴苣苔 long gang ban shuo ju tai

Stems 20–50 cm, sparsely purple spotted, sparsely spreading glandular pubescent toward apex, simple or sparsely branched, with 10–15 nodes. Petiole 1.1–5.5 cm; leaf blade narrowly elliptic-lanceolate, 6–13.5 × 2–4 cm, adaxially sparsely pubescent, abaxially glabrous, base oblique, cuneate, margin entire, apex acuminate, without sclereids; lateral veins 8–12 on each side of midrib. Cymes 2- or 3-flowered; peduncle 1–2 cm, glandular pubescent; involucre ca. 1 cm in diam., outside sparsely glandular pubescent. Calyx 5-sect from base; segments equal, narrowly lanceolate, ca. 10 × 3 mm, outside and margin sparsely glandular puberulent. Corolla outside pale yellow, inside sparsely purple spotted, ca. 3 cm, outside sparsely glandular puberulent, inside with a ring of hairs; tube 2–4 cm; adaxial lip ca. 3.5 mm; abaxial lip ca. 6 mm. Anthers ca. 2.5 mm; staminodes 3, 1.2–7 mm. Pistil ca. 1.8 cm, sparsely glandular puberulent. Capsule 1.7–2 cm. Fl. Sep–Oct, fr. Nov.

•Shaded areas in montane valleys; ca. 100 m. SW Guangxi.

20. *Hemiboea gamosepala* Z. Y. Li, Acta Phytotax. Sin. 21: 202. 1983.

合萼半蒴苣苔 he e ban shuo ju tai

Stems 16–60 cm, densely brown spotted, glabrous, simple or branched, with 7–15 nodes. Petiole 0.4–3.5 cm; leaf blade narrowly ovate to ovate or falcate, 5–12(–14) × 2–4.7 cm, glabrous, base slightly oblique, cuneate, margin nearly entire, apex acute to acuminate, vermiform sclereids surrounding vascular bundles; lateral veins 4–10 on each side of midrib. Cymes 2–7-flowered; peduncle 1–2 cm, glabrous; involucre 1.8–2.3 cm in diam., outside glabrous. Calyx 1.4–1.6 cm, 5-lobed from middle; lobes equal, elliptic to ovate-orbicular, 7–8 × 3–7 mm, outside and margin glabrous. Corolla outside pink, inside dark purple spotted, 3.8–4 cm, outside sparsely glandular puberulent, inside with a ring of hairs; tube 3–3.1 cm; adaxial lip 7–8 mm; abaxial lip ca. 9 mm. Anthers ca. 3 mm; staminodes 2, 4–5 mm. Pistil ca. 1.5 cm, glabrous. Capsule 1.8–2.4 cm. Fl. Sep–Oct, fr. Oct–Nov.

• Shaded areas in montane valleys; 500–800 m. SW Guizhou.

21. *Hemiboea wangiana* Z. Y. Li in A. L. Weitzman et al., *Novon* 7: 429. 1998.

王氏半蒴苣苔 wang shi ban shuo ju tai

Stems to 60 cm, dark purple spotted, glabrous, branched, with 7 to many nodes. Petiole 0.5–4 cm; leaf blade ovate to elliptic, 3–10 × 1–4 cm, glabrous, base oblique, cuneate to rounded, margin repand-serrulate to subentire, apex cuspidate to acuminate, vermiform sclereids surrounding vascular bundles; lateral veins 5–8 on each side of midrib. Cymes (2 or) 3-flowered; peduncle 6–12 mm, glabrous; involucre ca. 1 cm in diam., outside glabrous. Calyx ca. 2.5 cm, 5-lobed from above middle; lobes equal, ovate-triangular, 3–4 × 2–3 mm, outside and margin glabrous. Corolla outside white, inside purple spotted, 3.7–4.1 cm, outside sparsely glandular puberulent, inside with a ring of hairs 5–8 mm above base; tube 2.8–3 cm; adaxial lip 6–7 mm; abaxial lip 0.9–1.1 cm. Anthers ca. 2.5 mm; staminodes 2, ca. 8 mm. Pistil ca. 2.6 cm, glabrous. Capsule unknown. Fl. Dec.

• Rocks in stream valleys; ca. 300 m. Yunnan (Gejiu Shi).

22. *Hemiboea follicularis* C. B. Clarke, *Hooker's Icon. Pl.* 18: sub pl. 1798. 1888.

华南半蒴苣苔 hua nan ban shuo ju tai

Hemiboea esquirolii H. Léveillé.

Stems 7–60 cm, sparsely purple spotted, glabrous, simple, with 4–8 nodes. Petiole 1–10.5 cm; leaf blade elliptic to narrowly ovate or falcate, 3–18 × 1.8–8 cm, glabrous, base sometimes slightly oblique, cuneate to attenuate, margin nearly entire or weakly serrate to weakly dentate, apex acuminate, without sclereids; lateral veins 5–9 on each side of midrib. Cymes 7–20-

or more flowered; peduncle 1–4.5 cm, glabrous; involucre 1.5–2 cm in diam., outside glabrous. Calyx 1–1.5 cm, 5-lobed from above middle; lobes equal, ovate, 3–3.5 × 2.5–3 mm, outside and margin glabrous.

Corolla outside white, 1.5–1.8 cm, outside glabrous, inside with a ring of hairs; tube 1.1–1.2 cm; adaxial lip 4–4.5 mm; abaxial lip 5.5–6 mm. Anthers 1–2 mm; staminodes 2, 1–2.5 mm. Pistil ca. 9 mm, glabrous. Capsule ca. 1(–1.5) cm. Fl. Jun–Aug, fr. Sep–Nov.

• Shade, on calcareous rocks in montane valley forests; 200–1500 m. N Guangdong, Guangxi, S Guizhou.

23. *Hemiboea magnibracteata* Y. G. Wei & H. Q. Wen, *Guihaia* 15: 216. 1995.

大苞半蒴苣苔 da bao ban shuo ju tai

Stems 30–60 cm or more, brown spotted, glabrous, simple, with 3–5 nodes. Petiole 1–3 cm; leaf blade broadly elliptic to obovate, 8–24 × 4–11 cm, glabrous, base sometimes oblique, broadly to narrowly cuneate, margin entire, apex acute, short vermiform sclereids surrounding vascular bundles; lateral veins 4–6 on each side of midrib. Cymes 5–7-flowered; peduncle 1–1.5 cm, glabrous; involucre 2.5–3 cm in diam., outside glabrous. Calyx 2–2.5 cm, 5-lobed from above middle; lobes equal, triangular-ovate, 7–10 × 8–10 mm, outside and margin glabrous. Corolla outside white, inside pale yellow with purple spots, ca. 4.5 cm, outside sparsely glandular puberulent, inside with a ring of hairs; tube ca. 3.5 cm; adaxial lip ca. 8 mm; abaxial lip ca. 1 cm. Anthers ca. 4 mm; staminodes 2, ca. 8 mm. Pistil ca. 2.5 cm, glabrous. Capsule 2–2.5 cm. Fl. Aug, fr. Sep–Oct.

• Shade, on limestone rocks in montane valley forests; 500–700 m. NW Guangxi, S Guizhou.

26. HEMIBOEOPSIS W. T. Wang, *Acta Bot. Yunnan.* 6: 397. 1984.

密序苣苔属 mi xu ju tai shu

Subshrubs, terrestrial, not rhizomatous. Stems simple. Leaves few, along stem, opposite, equal to subequal in a pair; leaf blade glabrous to sparsely pubescent, base attenuate to broadly cuneate. Inflorescences dense, axillary, 3–7-flowered cymes; bracts 2, opposite, adjoining, forming a globose involucre. Calyx actinomorphic, 5-sect from base; segments equal. Corolla purplish to white, zygomorphic, inside glabrous; tube funnelform-tubular, not swollen, much longer than limb, ca. 1.3 cm in diam.; limb 2-lipped; adaxial lip 2-lobed, much shorter than abaxial lip; abaxial lip 3-lobed, lobes equal, apex rounded. Stamens 2, adnate to corolla tube below middle of abaxial side, included; anthers dorsifixed, coherent by adaxial surfaces, thecae divaricate, confluent, dehiscing longitudinally; connectives 1-appendiculate abaxially; staminodes 2, adnate to adaxial side of corolla tube. Disc ringlike. Ovary linear, 2-loculed; placentas 2, axile. Stigmas 2, unequal, smaller 1 semiorbicular, undivided, larger 1 broadly flabellate, emarginate. Immature capsule straight in relation to pedicel, linear, much longer than calyx; valves probably 2, straight, not twisted. Seeds unappendaged.

One species: China, Laos.

1. *Hemiboeopsis longisepala* (H. W. Li) W. T. Wang, *Acta Bot. Yunnan.* 6: 399. 1984.

密序苣苔 mi xu ju tai

Lysionotus longisepalus H. W. Li, *Bull. Bot. Res., Harbin* 3(2): 1. 1983.

Stems 25–80 cm, apically densely brownish appressed pubescent, basally glabrescent. Petiole 1.5–5.5 cm; leaf blade falcate, ovate to oblanceolate, 9–24 × 3–6.5 cm, margin repand-crenulate to nearly entire, apex acuminate. Peduncle 1.5–2 cm, pubescent; bracts nearly orbicular to ovate-orbicular, ca. 2 × 2.5 cm. Calyx segments spatulate-linear, ca. 2 cm × 2.5–3 mm. Corolla 3.5–4.5 cm, glabrous; tube 2.5–3.5 cm; adaxial lip ca. 5 mm; abaxial lip ca. 1 cm. Stamens ca. 1.5 cm;

filaments glabrous to puberulent near apex; anthers 2.8–3.2 mm, abaxially puberulent; staminodes ca. 1 cm. Pistil 2.1–2.6 cm; ovary 0.9–1.1 cm, glabrous. Style sparsely glandular puberulent. Capsule ca. 8 cm. Fl. Apr.

Dense shrub thickets, shady streambanks in valleys; 300–800 m. SE Yunnan (Hekou Xian, Jinping Xian) [Laos].

27. PETROCOSMEA Oliver, Hooker's Icon. Pl. 18: t. 1716. 1887.

石蝴蝶属 shi hu die shu

Vaniotia H. Léveillé.

Herbs, perennial, terrestrial or epipetric, rhizomatous, stemless. Leaves few to many, basal; leaf blade puberulent to pilose, rarely sericeous or velutinous, base cuneate to cordate, rarely peltate. Inflorescences usually lax, rarely subumbel-like, axillary, 1–4(–7)-flowered cymes; bracts usually 2, opposite or alternate. Calyx actinomorphic, rarely zygomorphic, 5-sect from base, rarely 3-lobed to 3-sect from base; segments equal, rarely unequal. Corolla blue to purple or white, zygomorphic, inside glabrous, sometimes puberulent; tube broadly tubular, not swollen, shorter than limb, 2–5 mm in diam.; limb 2-lipped; adaxial lip 2-lobed, equalling or much shorter than abaxial lip; abaxial lip 3-lobed, lobes equal or subequal, apex rounded. Stamens 2, adnate to abaxial side of corolla tube near base, included; anthers basifixed, coherent at apex, thecae parallel, confluent at apex or not, dehiscing longitudinally; connective not projecting; staminodes (absent or 1–)3, adnate to adaxial side of corolla tube. Disc absent. Ovary conical to broadly ovoid, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigma 1, terminal, capitate, often nearly globose, undivided. Capsule straight in relation to pedicel, narrowly ellipsoid to oblong to ovoid, nearly as long as calyx, dehiscing loculicidally to base; valves 2, straight, not twisted. Seeds unappendaged.

Twenty-seven species: China, NE India, Myanmar, Thailand, S Vietnam; 24 species in China.

1a. Anthers constricted near apex, forming a short thick beak.

2a. Calyx zygomorphic, 3-parted or 3-sect 24. *P. kerrii*

2b. Calyx actinomorphic, 5-sect.

3a. Leaf blade 7.5–8.5 cm; bracts subulate to lanceolate, 3–4 mm; corolla black at throat, not purple at

base, sparsely puberulent outside, scaly inside 22. *P. menglianensis*

3b. Leaf blade 8–17.5 cm; bracts ovate to lanceolate, 5–12 mm; corolla not black at throat, dark

purple

adaxially near base, glabrous outside, densely minutely yellow glandular and sparsely pubescent

below

abaxial lip inside 23. *P. grandifolia*

1b. Anthers not constricted near apex.

4a. Adaxial corolla lip 9–12 mm, abaxial lip 13–15 mm 6. *P. grandiflora*

4b. Adaxial corolla lip 0.7–5 mm, abaxial lip 2–12 mm.

5a. Abaxial corolla lip nearly equalling adaxial.

6a. Calyx glabrous or nearly so outside; corolla glabrous outside 2. *P. oblata*

6b. Calyx puberulent outside; corolla puberulent or sparsely so outside.

7a. Leaf blade veins abaxially conspicuous 1. *P. nervosa*

7b. Leaf blade veins abaxially subconspicuous or indistinct.

8a. Petiole 0.5–9 cm; anthers triangular; leaf blade 1–3.5 × 1–4.4 cm 3. *P. flaccida*

8b. Petiole 0.5–3.5(–4.5) cm; anthers oblong or oblong ovoid; leaf blade 0.7–3(–4) × 0.7–

2.8(–3.8) cm.

9a. Corolla glabrous inside; ovary and base of style puberulent; bracts 2.5–4 mm;

anthers ca. 3 mm; pistil 9–11 mm 4. *P. sinensis*

9b. Corolla puberulent on adaxial lip inside; ovary and style spreading villous; bracts

1.6–2 mm; anthers ca. 1.2 mm; pistil ca. 5.2 mm 5. *P. qinlingensis*

5b. Abaxial corolla lip at least 2 × longer than adaxial.

10a. Adaxial corolla lip indistinctly 2-lobed, emarginate, or undivided.

11a. Leaf blade base cordate or rounded; calyx segments narrowly lanceolate; style glabrous.

- 12a. Capsule 7–11 mm; calyx 5–7 mm; corolla tube ca. 6.5 mm; bracts 2.5–4 mm; leaf blade 1.5–3.8(–4.9) × 1–4.5 cm; lateral veins abaxially conspicuous; cymes (1 or)2–4-flowered 18. *P. iodoides*
- 12b. Capsule 3.5–5 mm; calyx 2.5–3 mm; corolla tube to 3 mm; bracts 1–2 mm; leaf blade 0.7–2(–2.6) × 0.5–1.5(–1.9) cm; lateral veins inconspicuous; cymes 1(or 2)-flowered 19. *P. martinii*
- 11b. Leaf blade base cuneate, broadly cuneate, rarely rounded; calyx segments linear or narrowly triangular; style puberulent near base.
- 13a. Peduncle, outer calyx surface, petiole, and leaf blade brownish yellow appressed puberulent; pedicel 0.4–1.2 cm; capsule to 12 mm 20. *P. sericea*
- 13b. Peduncle, outer calyx surface, petiole, and leaf blade adaxially whitish to tan pubescent, abaxially densely puberulent; pedicel 1.4–2.5 cm; capsule 5–8(–10) mm 21. *P. minor*
- 10b. Adaxial corolla lip 2-parted near base or at least in apical 1/3.
- 14a. All leaves peltate 17. *P. coerulea*
- 14b. Most or all leaves not peltate.
- 15a. Filaments puberulent.
- 16a. Adaxial corolla lip 2-parted to near base; anthers 2.5 × or more longer than filaments; petiole 1–8 cm; peduncle 4.5–10 cm 7. *P. duclouxii*
- 16b. Adaxial corolla lip 2-lobed in apical 1/3–1/2; anthers 0.5–2 × filament length; petiole 0.3–5.5 cm; peduncle 2.2–7 cm.
- 17a. Pistil 7–10 mm; capsule ca. 13 mm; petiole 1.2–5.5 cm; leaf blade 0.5–4 × 0.6–3 cm 14. *P. begoniifolia*
- 17b. Pistil 4–6 mm; capsule 4–6 mm; petiole 0.3–3.7 cm; leaf blade 0.4–2.5 × 0.4–2.2 cm.
- 18a. Style glabrous; anthers ca. 1.8 mm; petiole 0.3–2.5 cm; leaf blade 0.4–1.7 cm 15. *P. sichuanensis*
- 18b. Style pilose basally; anthers 0.5–1.2 mm; petiole 0.3–3.7 cm; leaf blade 0.5–2.5 cm.
- 19a. Leaf lateral veins conspicuous; bracts ca. 0.8 mm; anthers 1–1.2 mm; pistil 5.2–6 mm 8. *P. mairei*
- 19b. Leaf lateral veins inconspicuous; bracts ca. 2 mm; anthers 0.5–0.6 mm; pistil ca. 4 mm 13. *P. cavaleriei*
- 15b. Filaments glabrous.
- 20a. Anthers 0.6–1 mm; leaf blade 0.4–1.2 cm; petiole 0.1–2 cm.
- 21a. Corolla white, puberulent inside, tube ca. 2 mm, abaxial lip ca. 2.8 mm, adaxial lip ca. 6.8 mm; leaf blade 6–12 mm; peduncle to 8 cm; pedicel 2–3.5 cm; style pubescent near base 12. *P. longipedicellata*
- 21b. Corolla blue, glabrous inside, tube ca. 4 mm, abaxial lip ca. 0.7–1.5 mm, adaxial lip 2–2.8 mm; leaf blade 4–6 mm; peduncle 1.5–2.4 cm; pedicel 0.2–0.7 cm; style glabrous 16. *P. confluens*
- 20b. Anthers 1–2 mm; leaf blade 0.5–4 cm; petiole 1–6 cm.
- 22a. Pistil ca. 12 mm, ovary ca. 5 mm; capsule 10–12 mm; calyx segments ca. 5 mm; leaf blade 0.5–4 cm 10. *P. rosettifolia*
- 22b. Pistil 5–7 mm, ovary 1–2 mm; capsule 4–6 mm; calyx segments 2–4 mm; leaf blade 0.5–2.8 cm.
- 23a. Cymes 1-flowered; leaf blade base broadly cuneate, margin shallowly crenulate to entire; staminodes 3 9. *P. forrestii*
- 23b. Cymes 1–4-flowered; leaf blade base cordate to broadly cuneate, margin crenulate; staminodes 2 11. *P. barbata*

1. *Petrocosmea nervosa* Craib, Notes Roy. Bot. Gard. Edinburgh 11: 272. 1919.

显脉石蝴蝶 xian mai shi hu die

Petiole 0.3–7 cm, pilose; leaf blade broadly ovate, rhombic-ovate, or broadly obovate to nearly orbicular, 1–5 × 1.2–5.2 cm, adaxially pilose, hairs both short and long, abaxially pilose, base broadly cuneate to nearly truncate or cordate, margin entire to repand-crenulate, apex obtuse to rounded; lateral veins abaxially conspicuous. Cymes 1(–4)-flowered; peduncle 3–11 cm, puberulent; bracts linear, 0.8–4 mm. Pedicel 0.6–3.2 cm. Calyx actinomorphic, 5-sect from base; segments equal, narrowly lanceolate, 2–4.5 × 0.8–2 mm, outside puberulent. Corolla blue-purple, outside appressed puberulent, inside glabrous; tube ca. 3 mm; adaxial lip ca. 5 mm, distinctly 2-lobed; abaxial lip ca. 5 mm. Filaments 0.7–1.2 mm, glabrous; anthers ovoid, 2–2.8 mm, beakless; staminodes 2 or 3. Pistil 7–7.5 mm; ovary 1–1.5 mm, sparsely puberulent. Style sparsely puberulent near base. Capsule 5–6.5 mm. Fl. Apr–May, Sep, fr. Sep, Jan, Apr.

• Rocks in forests; 300–3100 m. SW Sichuan (Huili Xian), NW Yunnan (Eryuan Xian, Yongsheng Xian).

2. *Petrocosmea oblata* Craib, Notes Roy. Bot. Gard. Edinburgh 11: 270. 1919.

扁圆石蝴蝶 bian yuan shi hu die

Petiole 0.7–4 cm, puberulent to glabrescent; leaf blade obovate to orbicular-ovate or nearly orbicular, 0.7–2.8 × 0.9–3.2 cm, sparsely puberulent, base nearly cordate to truncate-cordate or broadly cuneate, margin repand, apex rounded to truncate; lateral veins inconspicuous. Cymes 1-flowered; peduncle 3.5–8.5 cm, puberulent; bracts linear to narrowly triangular, 1.1–1.5 mm. Pedicel 2–3.2 cm. Calyx actinomorphic, 5-sect from base; segments equal, narrowly lanceolate to linear or triangular-ovate, 1–3 × 0.3–1.7 mm, outside glabrous or sparsely puberulent. Corolla blue, glabrous; tube 2.5–3 mm; adaxial lip ca. 6 mm, distinctly 2-lobed; abaxial lip 6–8 mm. Filaments ca. 1.5 mm, glabrous; anthers ovoid, 1.5–2.5 mm, beakless; staminodes 2 or 3. Pistil 7–8.8 mm; ovary ca. 2.5 mm, puberulent. Style puberulent near base. Capsule ca. 4 mm. Fl. and fr. Aug–Sep.

• Montane regions or limestone soils; 2200–3000 m. SW Sichuan, NE Yunnan.

1a. Bracts linear, ca. 1.5 mm; calyx segments narrowly lanceolate to linear, 1–3 × 0.3–1 mm, outside sparsely puberulent, inside glabrous; staminodes 2, ca. 1 mm 2a. var. *oblata*

1b. Bracts narrowly triangular, ca. 1.1 mm; calyx segments triangular-ovate, 2–3 × 1–1.7 mm, glabrous; staminodes 3, ca. 0.1 mm 2b. var. *latisepala*

2a. *Petrocosmea oblata* var. *oblata*

扁圆石蝴蝶(原变种) bian yuan shi hu die (yuan bian zhong)

Bracts linear, ca. 1.5 mm. Calyx segments narrowly lanceolate to linear, 1–3 × 0.3–1 mm, outside sparsely puberulent. Staminodes 2. Fl. and fr. Aug–Sep.

• Montane regions; ca. 3000 m. SW Sichuan (Muli Xian).

2b. *Petrocosmea oblata* var. *latisepala* (W. T. Wang) W. T. Wang, Acta Bot. Yunnan. 7: 55. 1985.

宽萼石蝴蝶 kuan e shi hu die

Petrocosmea latisepala W. T. Wang, Bull. Bot. Res., Harbin 1(4): 37. 1981.

Bracts narrowly triangular, ca. 1.1 mm. Calyx segments triangular-ovate, 2–3 × 1–1.7 mm, glabrous. Staminodes 3. Fl. and fr. Aug–Sep.

• Limestone soils; ca. 2200 m. NE Yunnan (Huize Xian).

3. *Petrocosmea flaccida* Craib, Notes Roy. Bot. Gard. Edinburgh 11: 272. 1919.

萎软石蝴蝶 wei ruan shi hu die

Petiole 0.5–9 cm, spreading pilose; leaf blade obovate to orbicular-ovate or nearly orbicular, 1–3.5 × 1–4.4 cm, adaxially sparsely puberulent, hirsute, or nearly glabrous, abaxially pubescent, pilose along veins, base broadly cuneate to nearly truncate, margin entire to repand, apex rounded; lateral veins abaxially subconspicuous. Cymes 1-flowered; peduncle 3.4–8.5 cm, puberulent; bracts linear, 1–2 mm. Pedicel 1.7–2.8 cm. Calyx actinomorphic, 5-sect from base; segments equal, narrowly triangular to lanceolate, 3.2–4.2 × 0.8–1.5 mm, outside pubescent. Corolla blue-purple, outside sparsely puberulent, inside glabrous; tube ca. 2.5 mm; adaxial lip ca. 6 mm, distinctly 2-lobed; abaxial lip ca. 7 mm. Filaments ca. 1.5 mm, glabrous; anthers triangular, ca. 2 mm, beakless; staminodes 3. Pistil 8.5–10 mm; ovary ca. 3 mm, puberulent. Style puberulent near base. Capsule ca. 5 mm. Fl. Aug–Sep, fr. Sep.

• Rocky alpine cliffs; 2800–3100 m. SW Sichuan (Muli Xian), NW Yunnan (Lijiang Xian).

Petrocosmea flaccida and *P. sinensis* are very closely related and may be difficult to distinguish. The largest plants of *P. sinensis* have leaves which fit well into *P. flaccida*, and the leaf shape and indument also occasionally are similar.

4. *Petrocosmea sinensis* Oliver, Hooker's Icon. Pl. 18: pl. 1716. 1887.

中华石蝴蝶 zhong hua shi hu die

Petiole 0.5–3.5(–4.5) cm, puberulent to spreading pilose; leaf blade broadly rhombic to broadly rhombic-obovate or nearly orbicular, 0.9–2.5 × 0.7–1.8 cm, puberulent to densely pilose, base broadly cuneate or rounded to truncate, margin entire to repand-crenate toward apex, apex rounded to obtuse; lateral veins indistinct. Cymes 1-flowered; peduncle 3–7.5 cm, puberulent; bracts

linear, 2.5–4 mm. Pedicel 1.5–3.3 cm. Calyx actinomorphic, 5-sect from base; segments equal, narrowly triangular, 3.5–6 × 1–1.5 mm, outside puberulent. Corolla purple to blue, outside puberulent to sparsely puberulent, inside glabrous; tube 3–3.5 mm; adaxial lip 6.5–8 mm, distinctly 2-lobed; abaxial lip ca. 6.5 mm. Filaments ca. 1.2 mm, glabrous; anthers oblong, ca. 3 mm, beakless; staminodes 3. Pistil 0.9–1.1 cm; ovary ca. 4 mm, appressed puberulent. Style appressed puberulent to puberulent near base. Capsule 4–6 mm. Fl. Aug–Nov, fr. Aug–Dec.

• Shaded rocks in hilly regions; 400–1700 m. W Hubei, Sichuan, N Yunnan.

5. *Petrocosmea qinlingensis* W. T. Wang, Bull. Bot. Res., Harbin 1(4): 36. 1981.

秦岭石蝴蝶 qin ling shi hu die

Petiole 0.5–2.5 cm, sparsely puberulent; leaf blade broadly ovate to rhombic-ovate or nearly orbicular, 0.7–3 × 0.7–2.8 cm, sparsely appressed puberulent, base broadly cuneate, margin repand to indistinctly crenate, apex rounded to obtuse; lateral veins indistinct. Cymes 1-flowered; peduncle 3–5 cm, sparsely puberulent; bracts linear-lanceolate, 1.6–2 mm. Pedicel 1.5–2 cm. Calyx actinomorphic, 5-sect from base; segments equal, narrowly triangular, ca. 3.8 × ca. 1 mm, outside puberulent. Corolla purplish, outside sparsely appressed puberulent, inside densely white puberulent on adaxial lip; tube ca. 2.8 mm; adaxial lip ca. 4.8 mm, distinctly 2-lobed; abaxial lip ca. 4.8 mm. Filaments ca. 1.2 mm, glabrous; anthers oblong ovoid, ca. 1.2 mm, beakless; staminodes 2. Pistil ca. 5.2 mm; ovary ca. 1 mm, spreading pubescent. Style spreading pubescent. Fruit unknown. Fl. Aug–Sep.

• Rocks in hilly regions; 700–1100 m. S Shaanxi (Mian Xian).

6. *Petrocosmea grandiflora* Hemsley, Bull. Misc. Inform. Kew 1895: 115. 1895.

大花石蝴蝶 da hua shi hu die

Petiole 0.2–8.5 cm, pilose; leaf blade elliptic or lanceolate to broadly ovate, 1.2–6.5 × 0.8–2.4 cm, adaxially sericeous, abaxially sparsely sericeous, hirsute along veins, base sometimes oblique, 1 side cuneate to broadly cuneate, other cordate to rounded or cuneate, sometimes peltate, margin shallowly crenate, apex acute to broadly acute; lateral veins conspicuous. Cymes 1–3-flowered; peduncle 2.5–5 cm, pilose; bracts linear, ca. 5 mm. Pedicel 1–1.4 cm. Calyx actinomorphic, 5-sect from base; segments equal, lanceolate, ca. 6 × 1.1 mm, outside appressed puberulent. Corolla blue, outside puberulent near base, inside glabrous; tube ca. 6 mm; adaxial lip 0.9–1.2 cm, distinctly 2-lobed; abaxial lip 1.3–1.5 cm. Filaments ca. 4 mm, puberulent; anthers oblong, ca. 2 mm, beakless; staminodes 3. Pistil 9–10 mm; ovary ca. 2 mm, pilose.

Style pilose near base, glabrous above. Fruit unknown. Fl. Dec.

• Rocks of limestone hills; ca. 2000 m. SE Yunnan (Mengzi Xian).

7. *Petrocosmea duclouxii* Craib, Notes Roy. Bot. Gard. Edinburgh 11: 274. 1919.

石蝴蝶 shi hu die

Petiole 1–8 cm, puberulent; leaf blade ovate to nearly orbicular, 0.5–2.8 × 0.4–2.2 cm, adaxially densely appressed puberulent, abaxially densely pubescent, sometimes brownish pubescent along veins, base sometimes oblique, cordate to truncate, margin crenate to shallowly crenate, apex rounded to obtuse; lateral veins abaxially sometimes conspicuous. Cymes 1 (or 2)-flowered; peduncle 4.5–10 cm, puberulent; bracts narrowly ovate, ca. 1 mm. Pedicel ca. 1 cm. Calyx actinomorphic, 5-sect from base; segments equal, narrowly lanceolate, 2–4 × 0.5–1 mm, outside sparsely puberulent. Corolla blue-purple, outside sparsely puberulent, inside glabrous; tube 3–5.2 mm; adaxial lip 2.2–3 mm, distinctly 2-lobed; abaxial lip ca. 8 mm. Filaments ca. 0.7 mm, rust-brown puberulent; anthers ovoid, ca. 2.5 mm, beakless; staminodes 3. Pistil 7–9 mm; ovary ca. 2 mm, puberulent. Style appressed puberulent near base. Capsule ca. 5 mm. Fl. May–Jun, fr. Jun.

• Shaded rocks in hilly regions; 2000–2600 m. C Yunnan.

8. *Petrocosmea mairei* H. Lévillé, Bull. Acad. Int. Géogr. Bot. 25: 24. 1915.

东川石蝴蝶 dong chuan shi hu die

Petiole 0.3–3.5 cm, pilose; leaf blade ovate to nearly orbicular or elliptic, 0.5–2.5 × 0.4–1.5 cm, adaxially pilose, abaxially densely puberulent, base slightly oblique, cuneate to nearly cordate, margin entire near base, crenate-dentate toward apex, apex acute to rounded; lateral veins conspicuous. Cymes 1-flowered; peduncle 2.6–5 cm, pilose; bracts linear, ca. 0.8 mm. Pedicel ca. 6 mm. Calyx actinomorphic, 5-sect from base; segments equal, lanceolate-linear, 2.5–3.2 × 0.8–1.5 mm, outside pilose. Corolla blue, outside puberulent, inside glabrous or puberulent; tube 3–4 mm; adaxial lip ca. 3 mm, distinctly 2-lobed; abaxial lip ca. 6 mm. Filaments 0.5–2 mm, rust-brown puberulent; anthers nearly globose, 1–1.2 mm, beakless; staminodes 2 (or 3). Pistil 5.2–6 mm; ovary ca. 3 mm, pilose. Style pilose near base. Capsule 4–6 mm. Fl. May, Aug, fr. Aug.

• Hilly regions; 2000–2600 m. SW Sichuan, NE Yunnan.

- 1a. Corolla inside sparsely puberulent below adaxial lobes; staminodes 2 8a. var. *mairei*
1b. Corolla glabrous inside; staminodes 2 or 3 8b. var. *intraglabra*

8a. *Petrocosmea mairei* var. *mairei*

东川石蝴蝶(原变种) dong chuan shi hu die (yuan bian zhong)

Corolla inside sparsely puberulent below adaxial lobes. Staminodes 2. Fl. and fr. Aug.

• Hilly regions; ca. 2600 m. SW Sichuan (Ebian Xian), NE Yunnan (Dongchuan Xian).

8b. *Petrocosmea mairei* var. *intraglabra* W. T. Wang, Acta Bot. Yunnan. 7: 57. 1985.

会东石蝴蝶 *hui dong shi hu die*

Corolla inside glabrous. Staminoles 2 or 3. Fl. May.

• Near rocks in shaded areas in hilly regions; ca. 2000 m. SW Sichuan (Huidong Xian).

9. *Petrocosmea forrestii* Craib, Notes Roy. Bot. Gard. Edinburgh 11: 273. 1919.

大理石蝴蝶 *da li shi hu die*

Petiole 1–4 cm, puberulent; leaf blade rhombic-elliptic to broadly elliptic or nearly orbicular, 0.5–2.8 × 0.4–2.6 cm, adaxially appressed puberulent to sericeous, abaxially densely pilose, base broadly cuneate, margin shallowly crenulate to entire, apex obtuse to rounded; lateral veins inconspicuous. Cymes 1-flowered; peduncle 4–7 cm, puberulent; bracts linear, ca. 2 mm. Pedicel ca. 1.4 cm. Calyx actinomorphic, 5-sect from base; segments equal, lanceolate, 3–4 × 0.7–1 mm, outside puberulent. Corolla blue-purple, outside sparsely puberulent, inside densely pubescent on adaxial lip; tube 3.5–4 mm; adaxial lip 3.5–5 mm, distinctly 2-lobed; abaxial lip 7–9 mm. Filaments 1.5–2 mm, glabrous; anthers oblong, 1–2 mm, beakless; staminodes 3. Pistil 5–7 mm; ovary 1–2 mm, puberulent toward style. Style puberulent to glabrescent. Capsule 4–5 mm. Fl. and fr. Jul.

• Rocks in shady areas; 1600–2000 m. SW Sichuan, N Yunnan.

10. *Petrocosmea rosettifolia* C. Y. Wu ex H. W. Li, Bull. Bot. Res., Harbin 3(2): 19. 1983.

莲座石蝴蝶 *lian zuo shi hu die*

Petiole to 4 cm, puberulent; leaf blade broadly ovate to orbicular or broadly elliptic, 0.5–4 × 0.4–3 cm, sparsely pubescent, base broadly cuneate to nearly rounded, margin entire to crenulate-serrulate toward apex, apex obtuse to broadly acute; lateral veins inconspicuous. Cymes 1-flowered; peduncle to 6 cm, puberulent; bracts subulate to linear-lanceolate, 1–3 mm. Pedicel ca. 1.5 cm. Calyx actinomorphic, 5-sect from base; segments equal, linear-lanceolate, ca. 5 × 1 mm, outside densely puberulent. Corolla color unknown, outside sparsely pubescent; tube ca. 4.5 mm; adaxial lip ca. 5 mm, distinctly 2-lobed; abaxial lip 7–8 mm. Filaments ca. 1 mm, glabrous; anthers ovoid-oblong, ca. 2 mm, beakless; staminodes 3. Pistil ca. 1.2 cm; ovary ca. 5 mm, puberulent. Style puberulent near base. Capsule 1–1.2 cm. Fl. and fr. Oct.

• Rocks in hilly regions; ca. 1400 m. Yunnan (Jingdong Xian).

11. *Petrocosmea barbata* Craib, Notes Roy. Bot. Gard. Edinburgh 11: 273. 1919.

髯毛石蝴蝶 *ran mao shi hu die*

Petiole 1.4–6 cm, puberulent; leaf blade ovate to orbicular, 0.6–2.8 × 0.5–2.9 cm, adaxially sparsely puberulent, abaxially densely puberulent, base cordate to broadly cuneate, margin crenulate, apex broadly

obtuse to rounded; lateral veins inconspicuous. Cymes 1–4-flowered; peduncle 6–9 cm, sparsely puberulent; bracts linear, ca. 2 mm. Pedicel 0.5–3 cm. Calyx actinomorphic, 5-sect from base; segments equal, lanceolate, 2–3.5 × 0.5–1 mm, outside puberulent. Corolla purplish, outside puberulent, inside adaxial lip and tube near mouth densely puberulent; tube ca. 2.8 mm; adaxial lip ca. 4 mm, distinctly 2-lobed; abaxial lip 8–9 mm. Filaments ca. 1.5 mm, glabrous; anthers globose-ovoid, 1–1.5 mm, beakless; staminodes 2. Pistil ca. 5.5 mm; ovary ca. 1 mm, villous. Style villous near base. Capsule 4–6 mm. Fl. Oct.

• Rocks in shady places of hilly regions; ca. 2100 m. Yunnan (Kunming Xian, Songming Xian).

12. *Petrocosmea longipedicellata* W. T. Wang, Acta Bot. Yunnan. 7: 58. 1985.

长梗石蝴蝶 *chang geng shi hu die*

Petiole to 2 cm, puberulent; leaf blade orbicular-ovate to deltoid-ovate or deltoid, 6–12 × 6–14 mm, appressed puberulent to densely appressed puberulent, base cordate-truncate to truncate, margin repand, apex rounded; lateral veins inconspicuous. Cymes 1–3-flowered; peduncle to 8 cm, puberulent; bracts linear, 1.5–2 mm. Pedicel 2–3.5 cm. Calyx actinomorphic, 5-sect from base; segments equal, triangular-linear, ca. 2.2 × 0.8 mm, outside puberulent. Corolla white, outside sparsely puberulent, inside puberulent; tube ca. 2 mm; adaxial lip ca. 2.8 mm, distinctly 2-lobed; abaxial lip ca. 6.8 mm. Filaments ca. 1 mm, glabrous; anthers ellipsoid, ca. 0.6 mm, beakless; staminodes 2. Pistil ca. 4 mm; ovary ca. 1 mm, spreading pubescent toward style. Style spreading pubescent near base. Capsule ca. 5 mm. Fl. Sep–Oct, fr. Oct.

• Forests of hilly regions; 1100–1200 m. Yunnan (Suijiang Xian).

13. *Petrocosmea cavaleriei* H. Léveillé, Repert. Spec. Nov. Regni Veg. 9: 329. 1911.

贵州石蝴蝶 *gui zhou shi hu die*

Petiole 1–3.7 cm, puberulent; leaf blade orbicular-ovate to broadly ovate, 0.6–2.4 × 0.6–2.2 cm, adaxially pubescent, abaxially sparsely puberulent, base nearly cordate to cordate-truncate, margin crenate to shallowly crenate, apex obtuse to rounded; lateral veins inconspicuous. Cymes 1-flowered; peduncle 3.5–7 cm, sparsely pilose; bracts linear, ca. 2 mm. Pedicel 1.2–1.5 cm. Calyx actinomorphic, 5-sect from base; segments equal, narrowly lanceolate, 1.8–3 × 0.3–0.6 mm, outside pilose. Corolla purplish, outside puberulent near base, inside sparsely pilose on adaxial lip; tube 2–3 mm; adaxial lip 2–4 mm, distinctly 2-lobed; abaxial lip 5–8 mm. Filaments ca. 1 mm, pilose; anthers broadly oblate, 0.5–0.6 mm, beakless; staminode 1. Pistil ca. 4 mm; ovary ca. 1.5 mm, pilose. Style pilose near base. Capsule ca. 5 mm. Fl. and fr. Oct.

•Guizhou (Pingba Xian, Huishui Xian).

14. *Petrocosmea begoniifolia* C. Y. Wu ex H. W. Li, Bull. Bot. Res., Harbin 3(2): 22. 1983.

秋海棠叶石蝴蝶 qiu hai tang ye shi hu die

Petiole 1.2–5.5 cm, puberulent; leaf blade obliquely ovate to nearly orbicular, 0.5–4 × 0.6–3 cm, puberulent, base cordate to truncate, margin crenulate-denticulate to remotely serrate, apex obtuse to acute; lateral veins indistinct. Cymes 1(or 2)-flowered; peduncle 2.5–6.5 cm, puberulent; bracts linear, 1–4 mm. Pedicel ca. 8 mm. Calyx actinomorphic, 5-sect from base; segments equal, linear-lanceolate, 3–5 × ca. 0.8 mm, outside puberulent. Corolla white, outside sparsely puberulent, inside glabrous; tube 7–8 mm; adaxial lip 3.5–5 mm, distinctly 2-lobed; abaxial lip 6.5–8 mm. Filaments ca. 3 mm, densely pubescent; anthers nearly globose, ca. 2.5 mm, beakless; staminodes 2. Pistil 7–10 mm; ovary 3.5–5 mm, sparsely pubescent. Style glabrous. Capsule ca. 1.3 cm. Fl. and fr. Apr–May.

•Steep cliffs or rocks in valleys; 1600–2200 m. Yunnan (Jingdong Xian).

15. *Petrocosmea sichuanensis* W. Y. Chun ex W. T. Wang, Bull. Bot. Res., Harbin 4(1): 10. 1984.

四川石蝴蝶 si chuan shi hu die

Petiole 0.3–2.5 cm, puberulent; leaf blade ovate to broadly ovate, seldom elliptic, 4–17 × 4–12 mm, puberulent to densely puberulent, base cordate to broadly cuneate, sometimes peltate, margin crenulate to subentire, apex broadly acute to obtuse; lateral veins inconspicuous. Cymes 1-flowered; peduncle 2.2–5 cm, puberulent; bracts unknown. Calyx actinomorphic, 5-sect from base; segments equal, lanceolate, 2–2.5 × 0.8–1 mm, outside puberulent. Corolla purple-blue, outside sparsely puberulent, inside glabrous; tube ca. 4 mm; adaxial lip 2–3 mm, distinctly 2-lobed; abaxial lip 5–6 mm. Filaments ca. 1.2 mm, densely brownish puberulent toward apex; anthers nearly oblong, ca. 1.8 mm, beakless; staminodes apparently absent. Pistil ca. 5 mm; ovary ca. 1 mm, puberulent toward style. Style glabrous. Capsule ca. 5 mm. Fl. and fr. Jun.

•Rocks in valleys; 500–2200 m. Sichuan (Yuexi Xian).

16. *Petrocosmea confluens* W. T. Wang, Bull. Bot. Res., Harbin 4(1): 9. 1984.

汇药石蝴蝶 hui yao shi hu die

Petiole 0.1–1.7 cm, spreading puberulent; leaf blade broadly ovate to nearly orbicular, 4–6 × 4–9 mm, densely puberulent, base nearly cordate, margin crenulate, apex rounded to obtuse; lateral veins indistinct. Cymes 1-flowered; peduncle 1.5–2.4 cm, spreading puberulent; bracts linear, ca. 1 mm. Pedicel 2–7 mm. Calyx actinomorphic, 5-sect from base; segments equal, linear-lanceolate, 1.8–2.9 × 0.6–0.9 mm, outside densely puberulent. Corolla blue, outside puberulent, inside glabrous; tube 2.2–3 mm; adaxial lip 0.7–1.5 mm,

distinctly 2-lobed; abaxial lip 2–2.8 mm. Filaments 1–1.2 mm, glabrous; anthers triangular, ca. 1 mm, beakless; staminode 1. Pistil ca. 4.5 mm; ovary ca. 1.3 mm, densely puberulent. Style glabrous. Fruit unknown. Fl. Apr.

•Rocky slopes in valleys; ca. 1300 m. S Guizhou (Wangmo Xian).

17. *Petrocosmea coerulea* C. Y. Wu ex W. T. Wang, Acta Bot. Yunnan. 7: 60. 1985.

蓝石蝴蝶 lan shi hu die

Petiole 1.5–2.7 cm, densely appressed puberulent; leaf blade slightly oblique, oblong to elliptic or elliptic-ovate, 1–6.6 × 0.7–2.2 cm, densely appressed puberulent, base peltate, margin nearly entire to indistinctly few repand-crenate, apex slightly obtuse; lateral veins abaxially slightly impressed. Cymes 1-flowered; peduncle 1.5–2.2 cm, spreading puberulent; bracts linear, 1–1.2 mm. Pedicel 1–1.5 cm. Calyx actinomorphic, 5-sect from base; segments equal, lanceolate-linear, 3–3.2 × ca. 1 mm, outside puberulent. Corolla blue, outside puberulent, inside glabrous; tube ca. 4.5 mm; adaxial lip ca. 3.5 mm, distinctly 2-lobed; abaxial lip ca. 6 mm. Filaments ca. 1.2 mm, puberulent above; anthers cordate-ovoid, ca. 2.2 mm, beakless; staminodes 2. Pistil ca. 8 mm; ovary ca. 2.5 mm, puberulent. Style glabrous. Fruit unknown. Fl. Apr.

•Rocks in valleys; ca. 500 m. SE Yunnan (Jinping Xian).

18. *Petrocosmea iodioides* Hemsley, Hooker's Icon. Pl. 26: pl. 2599. 1899.

蒙自石蝴蝶 meng zi shi hu die

Petiole 2–6(–8) cm, matted hirsute; leaf blade ovate to nearly orbicular, 1.5–3.8(–4.9) × 1–4.5 cm, adaxially hirsute, abaxially velutinous, base cordate, margin denticulate to crenulate or serrate, apex broadly acute; lateral veins abaxially conspicuous. Cymes (1 or)2–4-flowered; peduncle 4–7.5 cm, pubescent; bracts linear, 2.5–4 mm. Pedicel 0.4–1.6 cm. Calyx actinomorphic, 5-sect from base; segments equal, narrowly lanceolate, 5–7 × 1–1.2 mm, outside villous. Corolla blue-purple, outside sparsely puberulent, inside glabrous; tube ca. 6.5 mm; adaxial lip ca. 3 mm, indistinctly 2-lobed; abaxial lip ca. 1.2 cm. Filaments 2.2–2.5 mm, puberulent; anthers ellipsoid, ca. 3 mm, beakless; staminodes 2. Pistil ca. 9 mm; ovary 2–2.5 mm, densely puberulent. Style glabrous. Capsule 7–11 mm. Fl. May, Nov, fr. Nov.

•Forests, on shaded cliffs in hilly regions; 1100–2500 m. SW Guangxi, SE Yunnan (Mengzi Xian).

19. *Petrocosmea martinii* (H. Léveillé) H. Léveillé, Repert. Spec. Nov. Regni Veg. 9: 329. 1911.

滇黔石蝴蝶 dian qian shi hu die

Petiole 0.5–3.5 cm, spreading hirsute; leaf blade ovate to orbicular-ovate, 0.7–2(–2.6) × 0.5–1.5(–1.9) cm,

adaxially pilose, abaxially densely pilose, base cordate to rounded, margin crenulate to denticulate, apex rounded to obtuse; lateral veins inconspicuous. Cymes 1 (or 2)-flowered; peduncle 3–5 cm, pilose; bracts linear, 1–2 mm. Pedicel 3–14(–19) mm. Calyx actinomorphic, 5-sect from base; segments equal, narrowly lanceolate, 2.5–3 × 0.8–1.5 mm, outside puberulent. Corolla blue-purple, outside puberulent, inside glabrous; tube to 3 mm; adaxial lip ca. 3 mm, indistinctly 2-lobed; abaxial lip ca. 8.5 mm. Filaments 2–3 mm, rust-brown puberulent or glabrous; anthers oblong, ca. 2 mm, beakless; staminodes 2. Pistil 6–8 mm; ovary 1.5–2 mm, puberulent. Style glabrous. Capsule 3.5–5(–7) mm. Fl. and fr. May–Jun.

• Rocky, shaded cliffs in hilly regions; ca. 1000 m. Guizhou, SE Yunnan.

1a. Filaments rust-brown puberulent 19a. var. *martinii*
1b. Filaments glabrous 19b. var. *leiandra*

19a. *Petrocosmea martinii* var. *martinii*

滇黔石蝴蝶(原变种) dian qian shi hu die (yuan bian zhong)

Vaniotia martinii H. Léveillé, Bull. Acad. Int. Géogr. Bot. 12: 166. 1903.

Filaments rust-brown puberulent. Fl. and fr. Jun.

• Rocky cliffs in hilly regions; ca. 1000 m. Guizhou (Pingba Xian, Qingzhen Xian), SE Yunnan.

19b. *Petrocosmea martinii* var. *leiandra* W. T. Wang, Bull. Bot. Res., Harbin 4(1): 11. 1984.

光蕊滇黔石蝴蝶 guang rui dian qian shi hu die

Filaments glabrous. Fl. and fr. May.

• Steep, shaded cliffs. Guizhou (Qingzhen Xian).

20. *Petrocosmea sericea* C. Y. Wu ex H. W. Li, Bull. Bot. Res., Harbin 3(2): 21. 1983.

丝毛石蝴蝶 si mao shi hu die

Petiole 1–4 cm, densely brownish yellow appressed puberulent; leaf blade elliptic to ovate, 1.5–6.5 × 0.8–3.5(–4.5) cm, brownish yellow appressed puberulent, base broadly cuneate to cuneate, margin nearly entire to repand-crenate, apex broadly acute; lateral veins abaxially conspicuous. Cymes 1–3-flowered; peduncle 5.5–7 cm, densely brownish yellow appressed puberulent; bracts linear, 3–6 mm. Pedicel 4–12 mm. Calyx actinomorphic, 5-sect from base; segments equal, linear, 5.5–6 × ca. 1 mm, outside densely brownish yellow appressed puberulent. Corolla purple-blue, outside sparsely puberulent, inside glabrous; tube ca. 5 mm; adaxial lip ca. 5 mm, indistinctly 2-lobed; abaxial lip ca. 8 mm. Filaments ca. 3 mm, minutely hispid; anthers ca. 1 mm, beakless; staminodes 2. Pistil ca. 1 cm; ovary ca. 3 mm, appressed puberulent. Style sparsely puberulent near base. Capsule to 1.2 cm. Fl. Oct, fr. Nov–Jan.

• Rocks in valley forests; 1000–1700 m. SE Yunnan (Malipo Xian, Pingbian Xian).

21. *Petrocosmea minor* Hemsley, Hooker's Icon. Pl. 26: pl. 2600. 1899.

小石蝴蝶 xiao shi hu die

Petrocosmea henryi Craib.

Petiole 0.5–5(–7) cm, whitish to tan densely pubescent; leaf blade rhombic to elliptic to ovate or obovate, rarely nearly orbicular, (0.5–)1–2(–5) × 0.5–1.5(–2.4) cm, adaxially densely whitish to tan pubescent, hairs both long and short, abaxially densely puberulent, base broadly cuneate to cuneate, rarely rounded, margin crenate to repand-crenulate or serrate, apex broadly acute to rounded; lateral veins abaxially conspicuous. Cymes 1- or 2-flowered; peduncle 3.5–7.5 cm, whitish to tan pubescent; bracts linear, 2–4 mm. Pedicel 1.4–2.5 cm. Calyx actinomorphic, 5-sect from base; segments equal, narrowly triangular, 3–6 × 0.6–1.2 mm, outside whitish to tan pubescent. Corolla purple with whitish base, outside pubescent, inside glabrous; tube 2.5–5 mm; adaxial lip 2–4 mm, indistinctly 2-lobed; abaxial lip 0.8–1.2 cm. Filaments ca. 2.2 mm, densely brown puberulent near apex; anthers narrowly ovoid, ca. 3 mm, beakless; staminodes 2. Pistil 8–11 mm; ovary 2–3 mm, appressed puberulent. Style appressed puberulent near base. Capsule 5–8(–10) mm. Fl. and fr. Aug–Nov.

• Limestone rocks in forests, forest margin; 1000–2200 m. SE Yunnan.

22. *Petrocosmea menglianensis* H. W. Li, Bull. Bot. Res., Harbin 3(2): 23. 1983.

孟连石蝴蝶 meng lian shi hu die

Petiole 1.4–10 cm, rust-brown villous; leaf blade oblique, elliptic to elliptic-ovate, 7.5–8.5 × 5–6 cm, adaxially rust-brown pubescent, abaxially rust-brown pubescent along midrib and lateral veins, base sometimes oblique, rounded to cuneate on 1 side, rounded on other, margin irregularly dentate, apex broadly acute to obtuse; lateral veins abaxially conspicuous. Cymes ca. 3-flowered; peduncle ca. 8 cm, rust-brown pubescent; bracts subulate to lanceolate, 3–4 mm. Pedicel 1.1–1.4 cm. Calyx actinomorphic, 5-sect from base; segments equal, linear-lanceolate, 5–6 × ca. 1.5 mm, outside rust-brown pubescent. Corolla white, inside blackish near mouth, outside sparsely white puberulent, inside with small scales; tube ca. 3 mm; adaxial lip ca. 3.5 mm, distinctly 2-lobed; abaxial lip ca. 4 mm. Filaments ca. 1 mm, puberulent; anthers broadly ellipsoid, ca. 3 mm, beaked ca. 0.5 mm; staminodes 3. Pistil ca. 5.5 mm; ovary ca. 2.5 mm, minutely villous. Style glabrous. Fruit unknown. Fl. Aug.

• Damp rocks in forests on limestone hills. SW Yunnan (Menglian Xian).

23. *Petrocosmea grandifolia* W. T. Wang, Acta Bot. Yunnan. 7: 63. 1985.

大叶石蝴蝶 da ye shi hu die

Petiole 5–15 cm, densely brownish pubescent; leaf blade oblique, ovate to broadly ovate, 8–17.5 × 5.2–13.5 cm, adaxially pubescent, abaxially puberulent, base very oblique, broadly cuneate on 1 side, nearly cordate to auriculate-peltate on other, margin irregularly denticulate, apex acute; lateral veins abaxially conspicuous. Cymes 3–7-flowered; peduncle 6–10 cm, pubescent; bracts ovate to lanceolate, unequal, 5–12 mm. Pedicel 0.5–2.2 cm. Calyx actinomorphic, 5-sect from base; segments equal, lanceolate-linear to narrowly triangular, 6.5–8 × 1.5–2.5 mm, outside puberulent. Corolla white, purplish adaxially near base, outside glabrous, inside densely minute yellow glandular and sparsely pubescent below abaxial lip; tube ca. 4 mm; adaxial lip ca. 7 mm, distinctly 2-lobed; abaxial lip ca. 6 mm. Filaments 0.8–1 mm, puberulent; anthers narrowly ovoid, 2.8–3 mm, beaked ca. 0.3 mm; staminodes 3. Pistil ca. 1 cm; ovary ca. 3.5 mm, puberulent. Style glabrous. Capsule ca. 6 mm. Fl. Aug–Sep, fr. Sep.

• Rocky crevices in forests; ca. 1000 m. SW Yunnan (Zhenkang Xian).

24. *Petrocosmea kerrii* Craib, Bull. Misc. Inform. Kew 1918: 365. 1918.

滇泰石蝴蝶 dian tai shi hu die

Petiole 0.5–9.5 cm, pubescent to densely hirsute; leaf blade oblique, elliptic to rhombic-elliptic or ovate, 1.8–13.5 × 1.2–8.5 cm, densely hirsute to densely puberulent, base usually oblique, rounded on 1 side, broadly cuneate to rounded on other, margin dentate, apex broadly acute to obtuse, rarely rounded; lateral veins abaxially conspicuous. Cymes subumbel-like, 1–7-flowered; peduncle 2–6 cm, densely hirsute to appressed puberulent; bracts lanceolate, ca. 2 × 0.5 mm. Pedicel 1–1.5 cm. Calyx zygomorphic, 3-sect from base, outside puberulent to woolly; adaxial lobe larger, 3-lobed from near to above middle, 3–5 × ca. 4 mm;

28. **METAPETROCOSMEA** W. T. Wang, Bull. Bot. Res., Harbin 1(4): 38. 1981.

盾叶苣苔属 dun ye ju tai shu

Herbs, perennial, epipetric, rhizomatous, stemless. Leaves few to many, basal; leaf blade sparsely puberulent, base rounded, peltate. Inflorescences lax, axillary, 1- or 2(–7)-flowered cymes; bracts 2, opposite. Calyx actinomorphic, 5-sect from base; segments equal. Corolla white, zygomorphic, inside glabrous; tube tubular, not swollen, longer than limb, ca. 3 mm in diam.; limb 2-lipped; adaxial lip 2-lobed, shorter than abaxial lip; abaxial lip 3-lobed, lobes subequal, apex rounded. Stamens 2, adnate to abaxial side of corolla tube near base, included; anthers nearly dorsifixed, free, thecae divaricate, not confluent, dehiscing longitudinally; connective not projecting; staminodes 2, adnate to adaxial side of corolla tube. Disc absent. Ovary broadly ovoid, 1-loculed; placentas 2, parietal, slightly projecting inward and divaricate. Stigma 1, terminal, capitate, undivided. Capsule straight in relation to pedicel, nearly globose, slightly surpassing calyx, dehiscing loculicidally to near middle; valves 2, straight, not twisted. Seeds unappendaged.

• One species: endemic to China.

1. *Metapetrocosmea peltata* (Merrill & W. Y. Chun) W. T. Wang, Bull. Bot. Res., Harbin 1(4): 39. 1981.

盾叶苣苔 dun ye ju tai

abaxial 2 lobes smaller, entire, triangular to ovate-rhombic, 2.5–5 × 1.5–2 mm. Corolla white, outside puberulent, inside glabrous or somewhat puberulent; tube ca. 4 mm; adaxial lip ca. 6 mm, distinctly 2-lobed; abaxial lip ca. 8 mm. Filaments ca. 1.2 mm, puberulent; anthers ellipsoid, ca. 3 mm, beaked ca. 0.5 mm; staminodes 3. Pistil ca. 8.5 mm; ovary 2–2.5 mm, sparsely puberulent. Style sparsely puberulent near base. Capsule 5–6.5 mm. Fl. Jun–Sep.

Rocks in forests; 1500–3100 m. S and SW Yunnan [N Myanmar, N Thailand].

- 1a. Calyx puberulent outside, margin denticulate to subentire with very small, narrowly triangular teeth, abaxial 2 lobes narrowly triangular 24a. var. *kerrii*
- 1b. Calyx woolly outside, margin denticulate with small, deltoid teeth, abaxial 2 lobes triangular to ovate-rhombic 24b. var. *crinita*

24a. *Petrocosmea kerrii* var. *kerrii*

滇泰石蝴蝶(原变种) dian tai shi hu die (yuan bian zhong)

Damrongia kerrii (Craib) Pellegrin; *Petrocosmea wardii* W. W. Smith.

Calyx with abaxial 2 lobes narrowly triangular, outside puberulent, margin denticulate to subentire with very small, narrowly triangular teeth. Fl. Jun, Sep.

Rocks in forests; 1900–3100 m. SW Yunnan [N Myanmar, N Thailand].

24b. *Petrocosmea kerrii* var. *crinita* W. T. Wang, Acta Bot. Yunnan. 7: 66. 1985.

棉毛石蝴蝶 mian mao shi hu die

Calyx with abaxial 2 lobes triangular to ovate-rhombic, outside woolly, margin denticulate with small, deltoid teeth. Fl. Jul.

• Forests; ca. 1500 m. S Yunnan (Mengzi Xian).

Petrocosmea peltata Merrill & W. Y. Chun, Sunyatsenia 2: 320. 1935.

Petiole 0.6–2(–5) cm, puberulent; leaf blade ovate to broadly ovate, 1.2–2(–4.5) × 0.5–1.5(–2.5) cm, margin repand to entire, apex obtuse to rounded. Peduncle 2.5–4(–8) cm, puberulent; bracts narrowly triangular to linear, 0.7–1 mm. Calyx segments lanceolate to narrowly ovate, 1.5–2.5 × 0.7–1 mm, outside pubescent. Corolla ca. 8 mm; tube ca. 4.5 mm; adaxial lip ca. 2.2

mm; abaxial lip ca. 3.5 mm. Filaments ca. 1.8 mm, glabrous; anthers ca. 1 mm, white villous; staminodes ca. 0.25 mm. Ovary ca. 1 mm, densely appressed puberulent. Style 4–6 mm, glabrous. Capsule ca. 3 mm in diam. Fl. Dec–Feb.

• Streamside rocks in forests in hilly regions; 300–700 m. Hainan.

29. DEINOCHEILOS W. T. Wang, Guihaia 6: 1. 1986.

全唇苣苔属 *quan chun ju tai shu*

Herbs, perennial, terrestrial or epipetric, rhizomatous, stemless. Leaves many, basal; leaf blade puberulent to pubescent, rarely woolly, base broadly cuneate to subrounded. Inflorescences lax, axillary, 2–8-flowered cymes; bracts 2, opposite. Calyx actinomorphic, 5-sect from base; segments equal. Corolla white to purplish, zygomorphic, inside glabrous; tube tubular to funnelform-tubular, not swollen, longer than limb, ca. 4 mm in diam.; limb 2-lipped; adaxial lip undivided, 1.5–4 × shorter than abaxial lip; abaxial lip 3-lobed, lobes subequal or central lobe longer, apex rounded. Stamens 2, adnate to abaxial side of corolla tube above middle, exerted; anthers basifixed, free or coherent at apex, thecae parallel, not confluent, dehiscing longitudinally; connective not projecting; staminodes 3 or absent, adnate to adaxial side of corolla tube. Disc ringlike. Ovary linear, 1-loculed; placentas 2, parietal, not projecting inward, 2-cleft. Stigma 1, terminal, truncate to depressed capitate, undivided. Capsule straight in relation to pedicel, linear, much surpassing calyx, dehiscing loculicidally to base; valves 2, straight, not twisted. Seeds unappendaged.

• Two species: endemic to China.

1a. Leaf blade leathery, 2.2–4 cm, abaxially sparsely rust-brown pubescent, margin crenate; lateral veins ca.

4 on

each side of midrib, indistinct; calyx segments 1.9–2.4 mm, margin entire; adaxial corolla lip shallowly erose

apically; anthers coherent at apex; staminodes 3 1. *D. sichuanense*

1b. Leaf blade herbaceous, 2.5–8 cm, abaxially sparsely white puberulent, midrib and lateral veins brown woolly,

margin double dentate to crenate; lateral veins 6–8 on each side of midrib, slightly prominent abaxially; calyx segments 2.5–3.5 mm, margin sparsely denticulate; adaxial corolla lip entire; anthers free;

staminodes absent 2. *D. jiangxiense*

1. *Deinocheilos sichuanense* W. T. Wang, Guihaia 6: 2. 1986.

全唇苣苔 *quan chun ju tai*

Petiole 0.2–6 cm; leaf blade ovate to oblong ovate, 2.2–4 × 1.4–2 cm, leathery, adaxially sparsely pubescent, abaxially sparsely rust-brown pubescent, base broadly cuneate to nearly rounded, margin crenate, apex narrowly obtuse; lateral veins ca. 4 on each side of midrib, indistinct. Cymes 5–8-flowered; peduncle 5–6.2 cm, sparsely yellow villous and glandular puberulent. Pedicel 0.9–5 cm. Calyx segments linear to narrowly triangular, 1.9–2.4 mm, outside sparsely pubescent, margin entire. Corolla 1.3–1.5 cm, outside puberulent; tube ca. 1.1 cm; adaxial lip ca. 1.8 × 3 mm, shallowly erose at apex; abaxial lip 3.2–3.8 × ca. 7.5 mm.

Stamens 1–1.1 cm; anthers coherent at apex; staminodes 3, 2.5–3.8 mm. Pistil ca. 1.1 cm, glabrous. Style ca. 2.5 mm. Capsule ca. 3.8 cm. Fl. Aug.

• Rocky cliffs in hilly regions. E Sichuan (Wuxi Xian).

Petiole 0.5–7 cm; leaf blade oblique, elliptic to obovate, 2.5–8 × 1.3–4.8 cm, herbaceous, adaxially white appressed puberulent, abaxially sparsely white puberulent, midrib and lateral veins brown woolly, base slightly oblique, broadly cuneate to nearly rounded, margin double dentate to crenate, apex obtuse to rounded; lateral veins 6–8 on each side of midrib, abaxially slightly prominent. Cymes 2–8-flowered; peduncle 6–12 cm, spreading puberulent and glandular puberulent. Pedicel 0.8–2 cm. Calyx segments linear to spatulate-linear, 2.5–3.5 mm, outside puberulent, margin sparsely denticulate. Corolla light purple, ca. 1.5 cm, outside glandular puberulent adaxially, more so apically; tube ca. 1.1 cm; adaxial lip ca. 1 × 4 mm, entire; abaxial lip ca. 4 × 5.5 mm. Stamens ca. 1.4 cm; anthers free; staminodes absent. Pistil ca. 9.5 mm, glabrous. Style ca. 3.3 mm. Capsule unknown. Fl. Jul, Oct.

• Montane regions; ca. 1200 m. SE Jiangxi (Xunwu Xian).

2. *Deinocheilos jiangxiense* W. T. Wang, Guihaia 6: 4. 1986.

江西全唇苣苔 *jiang xi quan chun ju tai*

30. LAGARSOLEN W. T. Wang, Acta Bot. Yunnan. 6: 11. 1984.

细筒苣苔属 xi tong ju tai shu

Herbs, perennial, terrestrial or epipetric, rhizomatous, stemless. Leaves few to many, basal; leaf blade pubescent to hispid, base rounded to cordate. Inflorescences lax, axillary, few- to many-flowered cymes; bracts 2, opposite. Calyx actinomorphic, 5-sect from base; segments equal. Corolla purple, zygomorphic, inside strigose or puberulent; tube cylindric, not swollen, much longer than limb, 3–4 mm in diam.; limb 2-lipped; adaxial lip 2-lobed, ca. 2 × shorter than abaxial lip; abaxial lip 3-lobed, lobes subequal, apex acute. Stamens 2, adnate to above middle of abaxial side of corolla tube, included; anthers dorsifixed, coherent adaxially, thecae divaricate, confluent at apex, dehiscing longitudinally; connective not projecting; staminodes 3, adnate to adaxial side of corolla tube. Disc cupular or ringlike. Ovary linear, 1-loculed; placentas 2, parietal, projecting slightly inward, 2-cleft. Stigmas 2, equal, oblate, undivided. Capsule straight in relation to pedicel, linear, much surpassing calyx, dehiscing loculicidally to base; valves 4, straight, not twisted. Seeds unknown.

• Two species: endemic to China.

- 1a. Leaves and peduncle spreading or appressed hispid; leaf blade margin shallowly crenulate; bracts 1.4–2.5 cm; corolla tube ca. 2.2 cm, upper lip 4–5 mm; filaments glabrous; petiole to 14.2 cm 1. *L. hispidus*
- 1b. Leaves and peduncle spreading or appressed pubescent; leaf blade margin entire, seldom undulate; bracts 0.3–0.8 cm; corolla tube 1.5–1.6 cm, upper lip ca. 9 mm; filaments puberulent and glandular puberulent; petiole to 8.5 cm 2. *L. integrifolius*

1. *Lagarosolen hispidus* W. T. Wang, Acta Bot. Yunnan. 6: 12. 1984.

2. *Lagarosolen integrifolius* D. Fang & L. Zeng, Acta Phytotax. Sin. 31: 463. 1993.

细筒苣苔 xi tong ju tai

全缘叶细筒苣苔 quan yuan ye xi tong ju tai

Petiole 2–14.2 cm, spreading hispid; leaf blade slightly oblique, broadly ovate to orbicular, 4.5–11 × 4–13 cm, white appressed hispid, margin shallowly crenulate, apex rounded. Peduncle 3.5–5 cm, hispid; bracts elliptic to oblong, 1.4–2.5 cm, sparsely hispid. Calyx segments narrowly triangular, 7–8 × 0.8–1.2 mm, outside sparsely hispid. Corolla 2.5–3 cm; tube ca. 2.2 cm; adaxial lip 4–5 mm; abaxial lip 7–9 mm, lobes triangular. Stamens ca. 3.7 mm, glabrous; staminodes 0.4–1.5 mm. Pistil 1.2–1.8 cm, puberulent and glandular puberulent. Style ca. 1.3 cm. Fruit unknown. Fl. Aug.

Petiole 2–8.5 cm, spreading pubescent; leaf blade ovate to orbicular, 3–13 × 2–10.5 cm, appressed pubescent, margin entire, seldom undulate, apex obtuse to rounded. Peduncle 3–6 cm, densely spreading pubescent; bracts oblong to lanceolate, 3–8 mm, puberulent. Calyx segments narrowly triangular, 7–11 × 1–1.5 mm, outside pubescent. Corolla inside with 3 dark purple lines, 2.5–2.7 cm; tube 1.5–1.6 cm; adaxial lip ca. 9 mm; abaxial lip ca. 1.2 cm, lobes triangular. Stamens ca. 5 mm, puberulent and glandular puberulent; anthers glabrous; staminodes 0.5–1.5 mm. Pistil ca. 1.6 cm; ovary spreading glandular puberulent. Style ca. 1.1 cm, glandular puberulent. Capsule (possibly immature) 0.9–1.5 cm. Fl. Jun.

• Evergreen broad-leaved forests on slopes; ca. 1500 m. SE Yunnan (Xichou Xian).

• Limestone hills; ca. 500 m. SW Guangxi (Longzhou Xian).

31. PRIMULINA Hance, J. Bot. 21: 169. 1883.

报春苣苔属 bao chun ju tai shu

Herbs, perennial, terrestrial or epipetric, rhizomatous, stemless. Leaves few, basal; leaf blade puberulent, base cordate. Inflorescences umbel-like, dense, axillary, 3–9-flowered cymes; bracts 2, opposite. Calyx actinomorphic, deeply 5-lobed; segments equal. Corolla pale purple, lobes with purple central stripe and apical band, zygomorphic, inside puberulent, nearly salverform; tube cylindric, not swollen, longer than limb, ca. 3 mm in diam.; limb indistinctly 2-lipped; adaxial lip 2-lobed, slightly shorter than abaxial lip; abaxial lip 3-lobed, lobes subequal, apex rounded, erose. Stamens 2, adnate to abaxial side of corolla tube near base, included; anthers dorsifixed, coherent, thecae divaricate, confluent at apex, dehiscing longitudinally; connective not projecting; staminodes 3, adnate to adaxial side of corolla tube. Disc of 2 glands, ringlike. Ovary narrowly ovoid, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigma 1, abaxial, narrowly obtrapeziform, 2-lobed. Capsule straight in relation to pedicel, ellipsoid, shorter than calyx, dehiscing loculicidally to base; valves 2, straight, not twisted. Seeds unappended.

• One species: endemic to China.

1. *Primulina tabacum* Hance, J. Bot. 21: 169. 1883.
报春苣苔 bao chun ju tai

Primulina sinensis J. D. Hooker.

Petiole with wide, undulate marginal wings, 2.5–14 × 0.4–1.2 cm, sparsely puberulent; leaf blade broadly ovate, 5–12 × 4–12.5 cm, adaxially appressed puberulent, abaxially sparsely puberulent, margin deeply lobed, sometimes undulate, lobes occasionally toothed, apex broadly acute to obtuse, subpalmately veined; lateral veins 2 or 3 on each side of midrib.

Peduncle 7–11 cm, puberulent; bracts narrowly lanceolate, 4–10(–15) × ca. 1 mm. Calyx 4–6.5 mm; tube to 1 mm; lobes narrowly triangular, 3–5.5 × 0.8–1.5 mm, puberulent. Corolla tube ca. 9 × 3 mm; limb

spreading, ca. 1.6 cm in diam.; adaxial lip ca. 7 mm; abaxial lip ca. 9 mm, all lobes ovate, 7–9 mm. Stamens glabrous; filaments 0.8–1.4 mm; anthers ca. 1.5 mm; staminodes 0.2–0.3 mm. Pistil 2.6–5.8 mm, puberulent. Style 1–2 mm. Capsule 3.2–6 mm. Fl. Aug–Oct.

• Stony, riverside cliffs; 100–300 m. N Guangdong (Lian Xian, Yangshan Xian).

The leaves of *Primulina* have the odor of tobacco.

32. *CHIRITA* Buchanan-Hamilton ex D. Don, Edinburgh Philos. J. 7: 83. 1822.

唇柱苣苔属 *chun zhu ju tai shu*

Babactes A. P. de Candolle ex Meisner; *Ceratocyphus* W. Y. Chun; *Deltocheilos* W. T. Wang.

Herbs, perennial or rarely annual, terrestrial or epipetric, often rhizomatous, stemless or with simple or branched stems. Leaves few to many, basal or along stem and opposite, seldom in whorls of 3 or alternate, unequal to equal in a pair; leaf blade puberulent to villous or velutinous, rarely glabrous, base cuneate to cordate, rarely attenuate.

Inflorescences umbel-like, lax or dense, axillary, 1- to many-flowered cymes; bracts 2, opposite, rarely to 7 and whorled, 1, or absent. Calyx actinomorphic or slightly zygomorphic, 5-sect from base or (3–)5-lobed; segments equal to subequal. Corolla purple to blue or white to yellow, pink or purple-red, rarely flesh colored, zygomorphic, inside puberulent, glandular puberulent, or glabrous; tube funnellform-tubular to campanulate or cylindric, not swollen or gibbous abaxially, longer than limb, 0.2–2 cm in diam.; limb 2-lipped; adaxial lip 2-lobed, slightly to 2–3.5 × shorter than abaxial lip; abaxial lip 3-lobed, lobes equal or central lobe longer, apex rounded, rarely to obtuse. Stamens 2, adnate to abaxial side of corolla tube near or above middle, included; anthers dorsifixed, coherent, thecae divaricate, confluent at apex, dehiscing longitudinally; connective not projecting; staminodes (absent or 1–)3, adnate to adaxial or adaxial and abaxial sides of corolla tube. Disc ringlike. Ovary linear, 1-loculed; placentas 2, parietal, projecting inward, seldom 2-loculed, abaxial locule sterile, or placenta 1, axile, projecting inward, 2-cleft. Stigma 1, abaxial, obtriangular to oblong, flabellate, obtrapeziform, or lamelliform, 2-lobed to undivided. Capsule straight, rarely oblique in relation to pedicel, linear to very narrowly ovoid, much surpassing calyx, dehiscing loculicidally to base, rarely only adaxial locule dehiscing; valves 2 or 4, straight, not twisted. Seeds unappendaged.

About 140 species: Bhutan, Borneo, China, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Thailand, Vietnam; 99 species in China.

Chirita is divided into three sections: *Chirita* sect. *Gibbosaccus* C. B. Clarke (approximately 91 species in China and Vietnam; spp. 1–81 in China), *Chirita* sect. *Chirita* (about 39 species in Bhutan, China, India, Laos, Myanmar, Nepal, Thailand, Vietnam; spp. 82–98 in China), and *Chirita* sect. *Microchirita* C. B. Clarke (about 18 species in Borneo, China, Indonesia, Malaysia, Thailand, Vietnam; sp. 99 in China). The last section consists of annuals (rarely perennials) with peduncles ± fused to the petiole and anthers fused only by projections on their connectives. The first two sections are usually perennials (rarely annuals) with peduncles free from petioles and anthers fused by their entire adaxial surfaces. Section *Gibbosaccus* has calyces 5-sect from base or rarely 5-lobed and stigmas 0.5–3 mm wide, while sect. *Chirita* has 5-lobed calyces and stigmas 2.4–5.8 mm wide.

Chirita umbrophila C. Y. Wu ex H. W. Li (Bull. Bot. Res., Harbin 3(2): 38. 1983), which is known only from a fruiting specimen without persistent stigma, is impossible to determine whether it belongs in *Chirita*.

Observations of several cultivated species of *Chirita* show that the basal leaves may be ternate as well as opposite, and this may be true of others. The margin of calyx lobes, which is of diagnostic significance in several species, varies from entire to denticulate on a single cultivated plant of *C. fimbrisepala*. Therefore, variation in these characters needs further study to determine their taxonomic value.

1a. Peduncle often fused with petiole; anthers fused by projections on connectives; plants annual 99. *C. hamosa*

1b. Peduncle never fused with petiole; anthers fused along entire adaxial surface (anthers unknown in some species); plants perennial, rarely annual.

2a. Calyx with a tube, 5-lobed, rarely 5-sect from near base.

3a. Plants stemless, or stems prostrate and rooting at nodes.

4a. Calyx ca. 1.5 mm; corolla 0.9–1.5 cm 64. *C. hedyotideia*

4b. Calyx 7–35 mm; corolla 1.7–7 cm.

5a. Petiole to 1.5 cm wide; apical internodes of rhizome to 2.2 cm 36. *C. heterotricha*

5b. Petiole to 0.4 cm wide; apical internodes of rhizome inconspicuous, or plants not rhizomatous.

6a. Leaf blade lateral veins 4 or 5 on each side of midrib.

7a. Calyx tube 5–10 mm; ovary sparsely glandular puberulent; leaf blade adaxially with hairs to 1.2 mm 83. *C. monantha*

- 7b. Calyx tube 1–3 mm; ovary glabrous; leaf blade adaxially with hairs 1–6.5 mm.
- 8a. Peduncle ca. 4 cm; calyx ca. 2.3 cm, 5-lobed, lobes equal; leaf blade adaxially with hairs 1–3 mm, apex acute to obtuse; style sparsely glandular puberulent; flowers always solitary 82. *C. briggsioides*
- 8b. Peduncle 3–8(–11) cm; calyx 1–1.7 cm, 2-lipped, adaxial lip 4-lobed, abaxial lip entire; leaf blade adaxially with hairs 3–6.5 mm, apex obtuse to rounded; style glabrous; flowers solitary or sometimes paired 84. *C. dielsii*
- 6b. Leaf blade lateral veins 6–12 on each side of midrib.
- 9a. Calyx segments hollow and hornlike apically; petiole 4–5 cm; leaf blade base cuneate on 1 side, broadly cuneate to rounded on other; lateral veins 7–12 on each side of midrib; peduncle 3–5 cm 86. *C. corniculata*
- 9b. Calyx segments not hollow and hornlike apically; petiole 1.8–40 cm; leaf blade base rounded to cordate or oblique, cuneate to cordate on 1 side, rounded to cordate on other; lateral veins 6–9 on each side of midrib; peduncle 3.5–25 cm.
- 10a. Calyx 0.9–1.5 cm, tube 1–7 mm; corolla 1.7–4.5 cm; bract 1 87. *C. lachenensis*
- 10b. Calyx 1.1–3 cm, tube 5–11 mm; corolla 4.4–7 cm; bracts 2 or rarely 1.
- 11a. Flowers always solitary; bract margins entire; calyx lobes slightly unequal 85. *C. fruticola*
- 11b. Cymes 1–6-flowered; bract margins entire to dentate or serrulate; calyx lobes unequal.
- 12a. Petiole 1.8–17(–24) cm; peduncle rust-colored pubescent and villous; bracts narrowly ovate or oblong, 1–4 mm wide, rust-colored villous; corolla sparsely puberulent to sparsely pilose outside, tube narrowly funnelform; anthers densely puberulent; staminode 1 89. *C. speciosa*
- 12b. Petiole 13–40 cm; peduncle sparsely pubescent; bracts ovate or elliptic to suborbicular, 1–10 mm wide, sparsely pubescent; corolla glabrous outside, tube tubular; anthers glabrous; staminodes 3 90. *C. macrophylla*
- 3b. Plants stemmed, stems ± erect.
- 13a. Petiole to 1.5 cm wide; apical internodes of rhizome to 2.2 cm 36. *C. heterotricha*
- 13b. Petiole to 0.4 cm wide; rhizome usually without conspicuous internodes, or plants not rhizomatous (rarely rhizomes unknown).
- 14a. At least upper 2 pairs of stem leaves crowded at stem apex.
- 15a. Stem leaves alternate, abaxially often purplish, especially along veins; stems rust-colored pilose 89. *C. speciosa*
- 15b. Stem leaves opposite, abaxially green; stems white villous or glabrescent to glabrous.
- 16a. Flowers 1–10 in umbel-like fascicles in leaf axils, peduncle absent; bracts ca. 7, 6–15 mm; pedicel to 2.5 cm; calyx 1–1.4 cm, tube ca. 3 mm; anthers ca. 2 mm; ovary puberulent; stigma undivided 95. *C. fasciculiflora*
- 16b. Flowers 1 or 2 per inflorescence, peduncle 1–6 cm; bracts 2, 0.5–1.7 mm; pedicel 3–5(–8.5) cm; calyx 2.4–3 cm, tube 13–19 mm; anthers ca. 4.5 mm; ovary glabrous; stigma 2-lobed 96. *C. shuii*
- 14b. Stem leaves ± widely spaced.
- 17a. Bracts connate, forming a funnelform involucre 94. *C. infundibuliformis*
- 17b. Bracts free.
- 18a. Stem leaves alternate 97. *C. pycnantha*
- 18b. Stem leaves opposite.
- 19a. Bracts ovate-orbicular to subreniform, at least slightly wider than long; calyx 2-lipped, adaxial lip 4-lobed, abaxial lip entire 98. *C. puerensis*
- 19b. Bracts lanceolate to ovate or obovate or elliptic to suborbicular, longer than wide; calyx 5-lobed, lobes equal or unequal, but not 2-lipped.
- 20a. Petiole 13–40 cm; leaves basal and on stem 90. *C. macrophylla*
- 20b. Petiole 0.2–7 cm; leaves all on stem.

- 21a. Leaf blade abaxially densely yellow glandular; lateral veins 8–13 on each side of midrib; anthers ca. 1.5 mm 88. *C. oblongifolia*
- 21b. Leaf blade eglandular; lateral veins 5–10 on each side of midrib; anthers 2–4 mm.
- 22a. Plants perennial; calyx 2.5–3.5 cm, tube 1–1.5 cm, lobes 1–2 cm; capsule often at under 90° to peduncle 91. *C. urticifolia*
- 22b. Plants annual; calyx 0.6–1.8 cm, tube 0.3–1.2 cm, lobes 0.4–1 cm; capsule always erect.
- 23a. Leaf blade not purple spotted; calyx lobes not hornlike, not spreading outward at apex; petiole 0.2–4(–7) cm 92. *C. anachoreta*
- 23b. Leaf blade purple spotted abaxially; calyx lobes hornlike at apex, spreading; petiole 0.4–1.2(–2.8) cm 93. *C. pumila*
- 2b. Calyx without a tube, 5-sect from near base.
- 24a. Leaf blade margin shallowly to deeply pinnately lobed.
- 25a. Leaf blade margin deeply dentate or pinnately compound, lateral lobe margin deeply crenate or serrate to entire; lateral veins 3–10 on each side of midrib; pedicel spreading and appressed villous; calyx margin denticulate; stigma emarginate 58. *C. pinnata*
- 25b. Leaf blade margin simple, irregularly pinnately lobed or dentate to pinnately lobed basally or crenate; lateral veins 3–5 on each side of midrib; pedicel pubescent to pilose, sometimes glandular puberulent; calyx margin entire or 1- or 2(or 3)-denticulate; stigma 2-lobed.
- 26a. Leaf blade margin irregularly pinnately lobed; cymes 1–4-flowered; bracts oblong or ovate to obovate, 1.5–8(–10) mm wide; calyx segments 3–7 mm, margin 1- or 2(or 3)-denticulate; ovary ca. 1.4 cm; capsule at ca. 90° to peduncle, ca. 3–4 cm 57. *C. pinnatifida*
- 26b. Leaf blade margin dentate to lobed basally or crenate; cymes 2–12-flowered; bracts lanceolate-linear, 0.6–1.2 mm wide; calyx segments 4–13 mm, margin entire; ovary 4–8 mm; capsule erect, 0.9–1.3 cm 41. *C. juliae*
- 24b. Leaf blade margin not lobed.
- 27a. Leaf blade glabrous, margin finely spiny denticulate, lanceolate-linear, seldom falcate.
- 28a. Cyme 2- or 3-flowered; bracts 3.0–3.5 cm; calyx 10–12 mm, segment apex attenuate; corolla 4.5–5 cm; staminodes 3 65. *C. wentsaii*
- 28b. Cyme 5–9-flowered; bracts 0.2–1.2 cm; calyx 1.5–5 mm, segment apex acute; corolla 1.3–2 cm; staminodes 2.
- 29a. Bracts linear to lanceolate-linear, 9–12 mm; peduncle ca. 6 cm; pedicel 2–2.5 cm; calyx segments lanceolate-linear, 4–5 mm; corolla ca. 2 cm 66. *C. ophiopogoides*
- 29b. Bracts narrowly triangular, 2–2.5 mm; peduncle ca. 20 cm; pedicel 0.15–0.6 cm; calyx segments triangular, ca. 1.5 mm; corolla ca. 1.3 cm 67. *C. spinulosa*
- 27b. Leaf blade sparsely puberulent or strigose to densely pubescent, pilose, or villous, sometimes only along veins, margin entire to crenate, dentate, repand, serrate, undulate, denticulate, or rarely lobed, but not spiny denticulate; ovate, elliptic, reniform, narrowly elliptic, obovate, or oblong, seldom linear.
- 30a. Plants with a stem.
- 31a. Leaves alternate; anthers densely puberulent or woolly.
- 32a. Capsule erect, 3–3.6 cm; cymes 1- or 2-flowered; corolla glabrous inside, adaxial lip exceeding abaxial lip; ovary ca. 18 mm; stigma emarginate; leaf blade 1.5–8.5 cm, base oblique, cuneate to cordate, not peltate 70. *C. minutihamata*
- 32b. Capsule at ca. 90° to peduncle, 1.5–2 cm; cymes 2–11-flowered; corolla glandular puberulent basally inside adaxial lip, abaxial lip exceeding adaxial lip; ovary 7–9 mm; stigma 2-lobed; leaf blade 3–15 cm, base oblique, rounded to cordate on 1 side, cuneate on other, often slightly peltate 71. *C. cyrtocarpa*
- 31b. Leaves opposite; anthers glabrous.
- 33a. Corolla glandular, puberulent, or glandular puberulent on yellow spot or on adaxial lip inside; petiole 0.5–11 cm; leaf blade 3–26 × 1.5–14 cm; cymes 2–28-flowered; peduncle 4.4–35 cm; bracts 0.9–25 mm; pedicel (0.3–)1.2–6 cm.
- 34a. Ovary 2–2.3 cm; rhizome internodes inconspicuous; peduncle 20–35 cm 10. *C. flavimaculata*

- 34b. Ovary ca. 1.2 cm; rhizome internodes to 2.2 cm toward apex; peduncle 4.4–21 cm 36. *C. heterotricha*
- 33b. Corolla glabrous inside; petiole 0.2–3 cm; leaf blade 1–15 × 0.7–8.5 cm; cymes 1–5-flowered; peduncle 2.4–7 cm; bracts 2.6–7 mm; pedicel 0.7–1.8 cm.
- 35a. Corolla white; leaf blade 1–6.6 × 0.9–3.5 cm, margin entire to repand or shallowly crenate; filaments glandular puberulent near apex; staminodes 2 68. *C. tibetica*
- 35b. Corolla purple to blue with yellow throat; leaf blade 1–15 × 0.7–8.5 cm, margin dentate; filaments glabrous; staminode 1 69. *C. forrestii*
- 30b. Plants stemless.
- 36a. Calyx segment margin denticulate or serrate, at least once near apex.
- 37a. Leaves leathery.
- 38a. Cymes 7–11-flowered; peduncle ca. 12 cm; bracts 1.3–2 cm; corolla ca. 2.7 cm; leaf blade to 10 cm 46. *C. liboensis*
- 38b. Cymes 1–3-flowered; peduncle 5.5–8 cm; bracts 0.4–0.6 cm; corolla ca. 4.5 cm; leaf blade to 7 cm 48. *C. subrhomboidea*
- 37b. Leaves herbaceous or papery.
- 39a. Corolla tube cylindric, 2–5 mm in diam. at mouth; filaments 1.6–5.5 mm.
- 40a. Bract 1; calyx ca. 2 mm; corolla ca. 1.2 cm; staminode 1; stigma not divided; petiole to 1 cm; leaf blade 1–2.2 × 0.5–0.9 cm, margin entire 63. *C. speluncae*
- 40b. Bracts 2; calyx 4–6 mm; corolla 2.2–3.4 cm; staminodes 3; stigma 2-lobed or 2-parted; petiole to 3.4 cm; leaf blade 1.4–5.4 × 0.6–3 cm, margin repand to indistinctly denticulate.
- 41a. Flowers always solitary; peduncle ca. 1.2 cm; corolla 2.5–3.4 cm, inside glabrous; filaments ca. 5.5 mm 60. *C. vestita*
- 41b. Flowers 1–6 per cyme; peduncle 2.4–4.5 cm; corolla ca. 2.2 cm, inside puberulent on limb; filaments ca. 3 mm 61. *C. secundiflora*
- 39b. Corolla tube thin funnellform to nearly tubular, 6–14 mm in diam. at mouth; filaments 8–14 mm.
- 42a. Leaf blade 1.5–3.3 cm wide; cymes 1–3-flowered; corolla 2.3–2.7 cm; adaxial lip 3–3.5 mm.
- 43a. Corolla purplish blue, inside with longitudinal lines of very short hairs on adaxial lip; petiole 0.7–1.1 cm; leaf blade 3–4.8 cm; calyx segments ca. 5 mm; filaments glandular puberulent; anthers purple strigose at apex 23. *C. jiuwanshanica*
- 43b. Corolla flesh colored, inside pilose basally; petiole 2.5–3 cm; leaf blade 3–9 cm; calyx segments 7–7.5 mm; filaments glabrous; anthers glabrous 74. *C. skogiana*
- 42b. Leaf blade 1.9–16.5 cm wide; cymes (1–)4–15-flowered; corolla 2.5–6.4 cm; adaxial lip 6–12 mm.
- 44a. Corolla 2.5–3.4 cm; pistil ca. 2.1 cm; petiole 5–25 cm 77. *C. macrodonta*
- 44b. Corolla 3.5–6.4 cm; pistil 2.7–3.2 cm; petiole 0.8–10 cm.
- 45a. Calyx 4–7 mm; corolla ca. 3.5 cm, inside sparsely pubescent basally; leaf blade 1.9–7 cm wide; cymes with up to 12 flowers 22. *C. obtusidentata*
- 45b. Calyx 7–17 mm; corolla (3.5–)4–6.4 cm, inside puberulent just below adaxial lip on lines or spots; leaf blade 3.5–11 cm wide; cymes with up to 5 flowers.
- 46a. Peduncle to 28 cm; bract margin entire; pedicel 0.5–3.8 cm; calyx segments 0.7–1.1(–1.5) cm, apex acute to acuminate 29. *C. fimbrisepala*
- 46b. Peduncle to 10 cm; bract margin crenulate; pedicel 0.1–0.5(–2) cm; calyx segments 1.2–1.7 cm, apex attenuate 30. *C. verecunda*
- 36b. Calyx segment margin entire.
- 47a. Bracts 3.
- 48a. Corolla 4.5–6 cm, abaxial lip 2–3 cm; peduncle 8–31.5 cm 78. *C. macrorrhiza*
- 48b. Corolla 3–4 cm, abaxial lip 0.9–1.5 cm; peduncle 4–13.5 cm.
- 49a. Leaf blade lateral veins 2 or 3 on each side of midrib; cymes (3–)10–14-flowered; calyx 4–5 mm; corolla white, ca. 3 cm, abaxial lip ca. 0.9 cm 28. *C. xinningensis*
- 49b. Leaf blade lateral veins 4 or 5 on each side of midrib; cymes up to 7-flowered; calyx 5–10 mm; corolla blue or purple, 3.5–4 cm, abaxial lip 1.4–1.5 cm.

- 50a. Petiole 2–4.5 cm; leaf blade elliptic to broadly obovate; cymes ca. 7-flowered; peduncle 8.5–9.8 cm; bracts 3–7.5 mm wide; calyx 7–10 mm; filaments ca. 13 mm, glandular puberulent near apex; staminodes 3 27. *C. tribracteata*
- 50b. Petiole to 1 cm; leaf blade ovate to orbicular-ovate; cymes ca. 2-flowered; peduncle 4–6 cm; bracts 1–2 mm wide; calyx 5–7 mm; filaments ca. 8 mm, glabrous; staminode 1 42. *C. cruciformis*
- 47b. Bracts 1 or 2.
- 51a. Bract 1.
- 52a. Leaf blade margin entire; peduncle 1.1–2.2 cm, densely spreading villous; calyx ca. 2 mm; corolla ca. 1.2 cm, tube cylindric, mouth ca. 2 mm in diam.; filaments ca. 1.6 mm; staminode 1 63. *C. speluncae*
- 52b. Leaf blade margin repand-crenate, remotely denticulate or undulate-crenate; peduncle 5–7 cm, densely or spreading puberulent; calyx 4.8–5 mm; corolla 2.8–3 cm, tube narrowly funnellform or nearly campanulate, mouth 9–15 mm in diam.; filaments 9–10 mm; staminodes 2.
- 53a. Leaf blade membranous; petiole 0.3–2 cm; bract subulate, ca. 1.2 mm, apex acute; corolla tube narrowly funnellform; stigma undivided 7. *C. tenuifolia*
- 53b. Leaf blade papery; petiole 1–9 cm; bract narrowly spathe-like, navicular-ovate, 15–20 mm, apex long acuminate; corolla tube nearly campanulate; stigma 2-lobed 35. *C. spadiciformis*
- 51b. Bracts 2.
- 54a. Leaf blade leathery.
- 55a. Leaf blade margin crenate or repand, rarely subentire.
- 56a. Leaf blade to 3.2 cm; cymes 2–4-flowered 51. *C. yungfuensis*
- 56b. Leaf blade 4–10 cm; cymes 5–11-flowered.
- 57a. Corolla 3.7–4.6 cm; peduncle villous; bracts linear-lanceolate, ca. 1 mm wide, apex acute to acuminate; calyx segments apex acuminate 44. *C. sclerophylla*
- 57b. Corolla ca. 2.7 cm; peduncle puberulent; bracts narrowly ovate, 3.5–5 mm wide, apex obtuse; calyx segments apex obtuse 46. *C. liboensis*
- 55b. Leaf blade margin entire.
- 58a. Leaf blade to 4 cm, apex obtuse to rounded; cymes 1- or 2-flowered.
- 59a. Leaf base rounded; peduncle 5.3–5.6 cm; bracts 8–11 × ca. 4 mm; corolla ca. 2.7 cm, glabrous inside; anthers glabrous; stigma 2-lobed 50. *C. parvifolia*
- 59b. Leaf base broadly cuneate; peduncle 9–12.5 cm; bracts 4–5 × 1.6–2 mm; corolla 3.4–4 cm, puberulent at least basally inside; anthers pubescent or villous; stigma undivided.
- 60a. Petiole 1–5 mm; calyx segments narrowly lanceolate-linear, 6.5–7 × 1–1.2(–1.5) mm; stigma ovate, ca. 0.8 mm 3. *C. brachystigma*
- 60b. Petiole 6–14 mm; calyx segments lanceolate, ca. 5 × 1.5–2 mm; stigma ligulate-linear, ca. 6 mm 5. *C. atropurpurea*
- 58b. Leaf blade 2.5–16 cm, apex acute to acuminate or attenuate, rarely rounded; cymes (1 or)2–15-flowered.
- 61a. Petiole absent to 1 cm; leaf blade base attenuate; stigma obtrapeziform.
- 62a. Leaf blade 1–2.9 cm wide; bracts 4–20 mm; pedicel 0.7–4 cm; calyx 5–8 mm; corolla 3.4–4 cm 54. *C. longgangensis*
- 62b. Leaf blade 0.4–0.8 cm wide; bracts 4–10 mm; pedicel 0.5–1.2 cm; calyx 3.2–4 mm; corolla ca. 2.4 cm 55. *C. linearifolia*
- 61b. Petiole 1–5 cm; leaf blade base cuneate, rarely broadly cuneate; stigma cuneate or oblong (unknown in *C. minutimaculata*).
- 63a. Cymes 7–11-flowered; bract and calyx segment apex obtuse; leaf blade apex acute to rounded 46. *C. liboensis*

- 63b. Cymes ca. 5-flowered; bract apex acute, calyx segment apex attenuate; leaf blade apex acute.
- 64a. Leaf blade not spotted; bracts 5–7 mm wide; calyx segments ca. 11 mm 20. *C. pseudoeburnea*
- 64b. Leaf blade adaxially densely and minutely purple spotted; bracts 8–12 mm wide; calyx segments ca. 5.5 mm 21. *C. minutimaculata*
- 54b. Leaf blade herbaceous or papery.
- 65a. Bracts 3 mm or more wide.
- 66a. Leaf blade with 3–6 palmate basal veins and 1–3 pinnate veins on each side of midrib distally.
- 67a. Leaf blade adaxially with dense, long and short hairs, abaxially puberulent, base cuneate; petiole to 9 cm; bracts 2–2.5 mm; corolla ca. 4.4 cm 31. *C. langshanica*
- 67b. Leaf blade villous on both surfaces, base cordate; petiole to 25 cm; bracts 4–10 mm; corolla 2.5–3.4 cm 77. *C. macrodonta*
- 66b. Leaf blade with 3–7 pinnate lateral veins on each side of midrib.
- 68a. Leaf blade 0.8–3.2 cm 17. *C. lienxienensis*
- 68b. Leaf blade (2–)3–26 cm.
- 69a. Calyx at least 10 mm.
- 70a. Adaxial corolla lip 10–15 mm; leaf blade 2.2–9.5 × 1.4–6.5 cm; cymes 1–6-flowered.
- 71a. Petiole 0.2–2.8 cm; leaf surfaces appressed puberulent; peduncle 3–9 cm; corolla ca. 4 cm, abaxial lip ca. 1.3 cm; anthers glabrous; staminodes 2; stigma undivided 2. *C. subulatisepala*
- 71b. Petiole 2.5–7.5 cm; leaf surfaces sparsely strigose; peduncle 8–31.5 cm; corolla 4.5–6 cm, abaxial lip 2–3 cm; anthers densely bearded abaxially; staminodes 3; stigma 2-lobed 78. *C. macrorhiza*
- 70b. Adaxial corolla lip 3–7 mm; leaf blade (3–)6–26 × (1.5–)4–16 cm; cymes 2–28-flowered.
- 72a. Anthers villous abaxially; leaf blade 3–12 cm; lateral veins 3 or 4 on each side of midrib; peduncle 4–12 cm; staminodes 2 24. *C. polycephala*
- 72b. Anthers glabrous; leaf blade 3–26 cm; lateral veins 4–7 on each side of midrib; peduncle 4.4–35 cm; staminodes (2 or)3.
- 73a. Pistil 2.9–3.2 cm, ovary 2–2.3 cm; leaf blade abaxially pubescent with veins pilose, base cuneate to broadly so 10. *C. flavimaculata*
- 73b. Pistil 2–2.6 cm, ovary 1.2–1.6 cm; leaf blade abaxially sparsely pubescent or puberulent, base cuneate or broadly cuneate to attenuate and decurrent into petiole wings, seldom truncate-cordate.
- 74a. Leaf blade lateral veins inconspicuous; peduncle 4.4–21 cm; bracts 0.9–25 mm; pedicel puberulent to spreading pilose 36. *C. heterotricha*
- 74b. Leaf blade lateral veins conspicuous; peduncle 15–30 cm; bracts 10–13 mm; pedicel glandular puberulent 40. *C. pteropoda*
- 69b. Calyx less than 10 mm.
- 75a. Petiole (0.2–)7–18 mm wide.
- 76a. Corolla tube ca. 3 cm; bracts (8–)12–28 mm wide.
- 77a. Leaf blade margin entire; bract margin entire; pedicel to 2.3 cm; staminodes 2 16. *C. eburnea*
- 77b. Leaf blade margin dentate or denticulate to serrate; bract margin denticulate; pedicel to 1.1 cm; staminodes 3 19. *C. lungzhouensis*
- 76b. Corolla tube 1.3–2.8 cm; bracts less than 10 mm wide.

- 78a. Apical internodes of rhizome to 2.2 cm; calyx 7–17 mm; leaf blade 3–23 cm, margin entire to indistinctly denticulate; pedicel to 6 cm 36. *C. heterotricha*
- 78b. Apical internodes of rhizome inconspicuous; calyx 4–7 mm; leaf blade 2–15 cm, margin undulate-dentate, crenulate, crenate, dentate, or repand; pedicel to 2.5 cm.
- 79a. Peduncle ca. 18 cm; bracts ca. 22 mm; corolla ca. 2.1 cm; anthers glabrous; pistil ca. 1 cm; stigma obovoid 13. *C. latinervis*
- 79b. Peduncle 7–13 cm; bracts 4–13(–18) mm; corolla 3.2–4 cm; anthers sparsely puberulent or bearded; pistil 2.6–2.8 cm; stigma cuneate.
- 80a. Leaf blade surfaces sparsely strigose; peduncle 9–13 cm; calyx segments 0.8–1 mm wide, apex acute 39. *C. roseoalba*
- 80b. Leaf blade surfaces sparsely puberulent; peduncle 7–9 cm; calyx segments 1.5–2.5 mm wide, apex obtuse 45. *C. brachytricha*
- 75b. Petiole to 6 mm wide.
- 81a. Leaves sessile or petiole to 1.4 cm.
- 82a. Rhizome internodes conspicuous, 0.4–2 cm; leaf blade base attenuate; anthers bearded; cymes 2–15-flowered 54. *C. longgangensis*
- 82b. Rhizome internodes inconspicuous; leaf blade base cuneate; anthers glabrous; cymes 4- or 5-flowered.
- 83a. Leaf blade margin shallowly crenate, apex obtuse to rounded; filaments glabrous; staminodes 3; stigma 2-lobed 26. *C. depressa*
- 83b. Leaf blade margin subentire to repand, apex acute; filaments glandular puberulent above middle; staminodes 2; stigma emarginate . 80. *C. atroglandulosa*
- 81b. Petiole (0.2–)1–9(–19) cm.
- 84a. Bracts to 3 mm wide.
- 85a. Corolla 4.5–6 cm, adaxial lip 10–15 mm, abaxial lip 20–30 mm; peduncle 8–31.5 cm; calyx 6–11 mm; petiole 2.5–7.5 cm; leaf blade sparsely strigose 78. *C. macrorrhiza*
- 85b. Corolla 2.2–3.5 cm, adaxial lip 3–3.5 mm, abaxial lip 5–11 mm; peduncle 7–8 cm; calyx 3–6 mm; petiole 1–3.5 cm; leaf blade sparsely to densely puberulent.
- 86a. Bracts ca. 5 mm, margin remotely crenulate, apex obtuse; calyx 3–3.5 mm; corolla glabrous outside, abaxial lip ca. 5 mm; anthers glabrous; staminodes 2 14. *C. orthandra*
- 86b. Bracts 8–9 mm, margin entire, apex acute; calyx ca. 6 mm; corolla puberulent outside, abaxial lip ca. 11 mm; anthers bearded; staminodes 3 25. *C. leiophylla*
- 84b. Bracts (4–)5–28 mm wide.
- 87a. Adaxial corolla lip ca. 11 mm; stigma ligulate, undivided; leaf blade 2.2–6.5 cm; bracts strigose 2. *C. subulatisepala*
- 87b. Adaxial corolla lip 4–7 mm; stigma cuneate or obtuse to oblong, 2-lobed; leaf blade 2.6–20 cm; bracts puberulent to villous.
- 88a. Staminodes 3; calyx densely puberulent and glandular puberulent inside 19. *C. lungzhouensis*
- 88b. Staminodes 2; calyx glabrous inside.
- 89a. Leaf blade adaxially puberulent only near margin, abaxial surface sparsely appressed puberulent, margin repand to entire; bracts 0.9–1.8 × 0.4–0.9 cm 47. *C. glabrescens*

- 89b. Leaf blade both surfaces puberulent, pubescent, and/or pilose, margin repand to crenate or denticulate, rarely dentate or serrate; bracts 0.6–4 × 0.4–2.7 cm.
- 90a. Leaf blade adaxially puberulent; staminodes ca. 0.8 mm; cymes 1–4-flowered; peduncle 4–8 cm; bracts 0.9–2.1 cm 15. *C. sichuanensis*
- 90b. Leaf blade adaxially appressed pubescent and pilose; staminodes 3–7 mm; cymes 1–12-flowered; peduncle 5–32 cm; bracts 0.6–4 cm.
- 91a. Leaf blade 2.6–10(–12) cm, abaxially appressed pilose; corolla tube narrowly funnellform; peduncle 5–20 cm; bracts elliptic to broadly ovate, 0.4–2.7 cm wide; pedicel 0.6–1 cm 18. *C. lunglinensis*
- 91b. Leaf blade 4–20 cm, abaxially appressed pubescent and pilose; corolla tube tubular to broadly funnellform, often gibbous abaxially; peduncle 12–32 cm; bracts ovate to lanceolate, 0.4–1.6 cm wide; pedicel 0.8–2.5 cm 56. *C. sinensis*
- 65b. Bracts less than 3 mm wide.
- 92a. Leaf blade base cordate, rarely truncate-cordate on both sides.
- 93a. Filaments sparsely puberulent; anthers glabrous; rhizome apical internodes to 2.2 cm; leaf blade sometimes oblique, narrowly elliptic to oblong, obovate or ovate, apex acute to obtuse; adaxial corolla lip 3–5 mm 36. *C. heterotricha*
- 93b. Filaments glabrous or sparsely glandular near apex; anthers glandular, villous, or densely bearded abaxially; rhizome internodes inconspicuous; leaf blade ovate to orbicular, oblate, or reniform, apex acute to rounded; adaxial corolla lip 5–7 mm.
- 94a. Leaf blade basally with 3–6 palmate veins, apically with 2 or 3 pinnate veins on each side of midrib, blade 4.5–15 × 5–16.5 cm; peduncle 8–23 cm; bract margin 3–5-glandular denticulate 77. *C. macrodonta*
- 94b. Leaf blade veins all pinnate, 3–5 on each side of midrib, blade 1.6–6.8 × 1.6–6.8 cm; peduncle 3.5–13 cm; bract margin entire.
- 95a. Cymes 2–7-flowered; peduncle 4.5–13 cm; pedicel 1.7–7 cm; calyx 4–5 mm; corolla 2.3–2.7 cm; leaf blade adaxially appressed pilose (hairs to 5 mm); petiole 1–4.5 cm 49. *C. rotundifolia*
- 95b. Flowers solitary; peduncle ca. 3.5 cm; pedicel ca. 1 cm; calyx ca. 13 mm; corolla 4–4.5 cm; leaf blade adaxially puberulent; petiole 3–17.5 cm .. 52. *C. cordifolia*
- 92b. Leaf blade base decurrent, attenuate, cuneate to broadly cuneate to rounded, rarely truncate, if cordate on 1 side then other side merely cuneate or rounded.
- 96a. Calyx to 4 mm.
- 97a. Cymes 2–11-flowered; peduncle 3.5–20 cm; leaf blade 3.5–20 cm.
- 98a. Leaf blade 2–3.5 cm wide, abaxially velutinous, base cuneate; petiole 0.5–2.5 cm 12. *C. medica*
- 98b. Leaf blade 2.5–10 cm wide, abaxially appressed puberulent or densely puberulent and appressed pilose, base cuneate to rounded or cordate; petiole 0.5–11 cm.
- 99a. Pedicel 2.5–4 cm; stigma undivided; pistil ca. 1.1 cm; bracts ca. 3.5 mm 8. *C. liguliformis*
- 99b. Pedicel 0.3–1.6 cm; stigma 2-lobed; pistil 1.2–3.7 cm; bracts 3–9 mm 37. *C. fordii*
- 97b. Cymes 1–3-flowered; peduncle 2.5–7 cm; leaf blade 1.5–4.2(–4.7) cm.
- 100a. Calyx pilose inside; corolla ca. 1.4 cm, mouth ca. 4 mm in diam., adaxial lip ca. 2 mm, abaxial lip ca. 5.5 mm; anthers glabrous 75. *C. napoensis*

- 100b. Calyx glabrous inside; corolla 3–3.5 cm, mouth ca. 1 cm in diam., adaxial lip 5–6 mm, abaxial lip ca. 1 cm; anthers puberulent or villous.
- 101a. Leaves ca. 8; bracts 1.2–2.2 mm; staminodes 3 33. *C. villosissima*
- 101b. Leaves to 24; bracts 3–4 mm; staminodes 2 72. *C. wangiana*
- 96b. Calyx at least 4 mm.
- 102a. Leaf blade (2–)6–24 cm.
- 103a. Leaf blade to 3 cm wide, margin entire.
- 104a. Petiole 1.5–4 cm; leaf blade apex acute to obtuse; staminodes absent; rhizome internodes inconspicuous 53. *C. bicolor*
- 104b. Leaves sessile or petiole to 1 cm; leaf blade apex acute to acuminate; staminodes 3; rhizome internodes conspicuous, 0.4–2 cm 54. *C. longgangensis*
- 103b. Leaf blade (1.5–)3.5–17 cm wide, margin crenate, crenulate, dentate, denticulate, or serrate, often repand, seldom subentire to entire.
- 105a. Bracts over 9 mm.
- 106a. Petiole to 3 cm; bract and calyx segment apex obtuse 45. *C. brachytricha*
- 106b. Petiole (0.5–)2–17 cm; bract apex acute to acuminate (unknown in *C. depressa*, sometimes obtuse in *C. macrorhiza*), calyx segment apex acute to acuminate or attenuate.
- 107a. Pistil ca. 1.4 cm; stigma ligulate, undivided; corolla tube ca. 1.7 cm 6. *C. brassicoides*
- 107b. Pistil 2–3.3 cm; stigma cuneate, oblong, trapezoid, obtrapeziform, or obovoid, 2-lobed or rarely undivided; corolla tube 2.2–3.3 cm.
- 108a. Leaf blade adaxially sparsely to densely strigose; anthers sparsely puberulent to densely bearded.
- 109a. Bract strigose; peduncle 9–13 cm, puberulent; leaf blade base broadly cuneate, margin crenulate or remotely dentate 39. *C. roseoalba*
- 109b. Bract puberulent or pubescent; peduncle 8–31.5 cm, villous or pubescent; leaf blade base cuneate to rounded, margin crenate to subentire or repand.
- 110a. Corolla tube mouth 0.9–1.3 cm in diam., abaxial lip 1.2–2 cm; staminodes 2; stigma ca. 1.2 mm; cymes 5–10-flowered 44. *C. sclerophylla*
- 110b. Corolla tube mouth 1.5–2 cm in diam., abaxial lip 2–3 cm; staminodes 3; stigma ca. 3.5 mm; cymes 1–6-flowered 78. *C. macrorhiza*
- 108b. Leaf blade adaxially sparsely to densely puberulent, sometimes also pilose; anthers glabrous.
- 111a. Leaf blade 3–24 cm; lateral veins 4 or 7 on each side of midrib; peduncle 4.4–30 cm.
- 112a. Peduncle 4.4–21 cm; apical rhizome internodes to 2.2 cm; petiole to 1.5 cm wide; bracts 0.9–25 mm 36. *C. heterotricha*
- 112b. Peduncle 15–30 cm; rhizome internodes inconspicuous; petiole to 3 cm wide; bracts 10–13 mm 40. *C. pteropoda*
- 111b. Leaf blade 6–15 cm; lateral veins 4 or 5 on each side of midrib; peduncle 4–11 cm.
- 113a. Petiole ca. 8 mm; leaf blade abaxially velutinous; corolla ca. 3 cm; staminodes 3 26. *C. depressa*
- 113b. Petiole 3–17 cm; leaf blade abaxially appressed puberulent; corolla 3.5–4.5 cm; staminodes 2 41. *C. juliae*

- 105b. Bracts to 9 mm.
- 114a. Petiole to 3 cm.
- 115a. Leaf blade narrowly elliptic to oblong, densely appressed puberulent 38. *C. carnosifolia*
- 115b. Leaf blade broadly ovate to ovate, sparsely puberulent 45. *C. brachytricha*
- 114b. Petiole (0.5–)2–17 cm.
- 116a. Leaf blade sparsely strigose to strigose on both surfaces; abaxial corolla lip 1–3 cm.
- 117a. Corolla 2.4–4.2 cm, abaxial lip 1–2.2 cm; staminodes 2; pistil 1.5–1.7 cm; stigma undivided; bracts 2–6 mm 1. *C. swinglei*
- 117b. Corolla 4.5–6 cm, abaxial lip 2–3 cm; staminodes 3; pistil ca. 3.3 cm; stigma 2-lobed; bracts 5–16 mm 78. *C. macrorhiza*
- 116b. Leaf blade adaxially sparsely to densely puberulent and sometimes pilose, abaxially sparsely to densely puberulent and sometimes pilose, pubescent, or velutinous; abaxial corolla lip 0.6–1.5 cm.
- 118a. Staminode 1; anthers pilose; cymes ca. 2-flowered 42. *C. cruciformis*
- 118b. Staminodes 2 or 3; anthers glabrous or seldom puberulent; cymes 2–15-flowered.
- 119a. Petiole (0.5–)4–17 cm; bracts to 25 mm; calyx segments to 17 mm; corolla tube mouth 0.8–1.5 cm in diam.
- 120a. Adaxial corolla lip 3–5 mm; anthers 2.2–3 mm; pistil 2–2.6 cm; petiole to 11 cm; leaf blade to 23 cm; bracts to 25 mm; pedicel (0.3–)1.5–6 cm; calyx 7–17 mm 36. *C. heterotricha*
- 120b. Adaxial corolla lip 7–8 mm; anthers 3.2–3.5 mm; pistil 3–3.2 cm; petiole to 17 cm; leaf blade to 15 cm; bracts to 13 mm; pedicel 0.1–1.5 cm; calyx 4–13 mm 41. *C. juliae*
- 119b. Petiole to 5.2 cm; bracts and calyx segments to 9 mm (bracts unknown in *C. depressa*); corolla tube mouth 0.4–0.8 cm in diam.
- 121a. Staminodes 3; petiole ca. 0.8 cm; leaf blade abaxially velutinous 26. *C. depressa*
- 121b. Staminodes 2; petiole (0.5–)2–5.2 cm; leaf blade abaxially densely puberulent and sometimes appressed pilose.
- 122a. Stigma 2-lobed; corolla tube 1.5–2.6 cm; leaf blade lateral veins ca. 4 on each side of midrib; calyx 3.5–9 mm; peduncle spreading pubescent to pilose 37. *C. fordii*
- 122b. Stigma undivided; corolla tube ca. 1.2 cm; leaf blade lateral veins 5–7 on each side of midrib; calyx 4.5–4.8 mm; peduncle puberulent or glandular puberulent.
- 123a. Bracts 3–4 mm; pistil ca. 9.5 mm; calyx segment apex obtuse; cymes 3–7-flowered; leaf blade 6–9.6 cm 9. *C. laxiflora*
- 123b. Bracts 6–8 mm; pistil ca. 12.5 mm; calyx segment apex acute; cymes 8–15-flowered; leaf blade 8.5–14 cm 11. *C. floribunda*
- 102b. Leaf blade 0.8–8(–11) cm.
- 124a. Leaf blade margin shallowly crenate to crenate to serrate, dentate, denticulate, or undulate, indistinctly undulate-denticulate.
- 125a. Stigma undivided; pistil ca. 1 cm; corolla ca. 1.7 cm, glabrous inside .. 9. *C. laxiflora*
- 125b. Stigma 2-lobed, 2-parted, or emarginate; pistil (1.2–)1.5–3.7 cm; corolla 2.1–6 cm, puberulent inside basally, on adaxial lip, below stamens, near mouth, or on lobes.
- 126a. Leaf blade apex acute or acuminate, seldom obtuse.
- 127a. Stigma emarginate; filaments glabrous; leaf blade 2.8–4 × 1.6–2.4 cm; cymes 1- or 2-flowered; bract 2–5 mm 59. *C. fangii*

- 127b. Stigma 2-lobed; filaments sparsely puberulent or glandular puberulent at base and apex; leaf blade 2.5–11 × 1.5–7 cm; cymes 1–8-flowered; bract 3–16 mm.
- 128a. Corolla 2.1–3.9 cm, mouth 0.6–0.8 cm in diam., abaxial lip 7–9 mm; leaf blade puberulent and villous or pilose; peduncle 3.5–13 cm; staminodes 2 37. *C. fordii*
- 128b. Corolla 4.5–6 cm, mouth 1.5–2 cm in diam., abaxial lip 20–30 mm; leaf blade sparsely strigose; peduncle 8–31.5 cm; staminodes 3 ... 78. *C. macrorhiza*
- 126b. Leaf blade apex obtuse to rounded.
- 129a. Leaf blade abaxially velutinous; petiole ca. 0.8 cm 26. *C. depressa*
- 129b. Leaf blade abaxially puberulent, pubescent, pilose, or villous; petiole (0.5–)1–5(–6) cm.
- 130a. Staminodes 3; stigma 2-parted; abaxial corolla lip ca. 1.6 cm; petiole to 2.5 cm.
- 131a. Bracts lanceolate-linear, ca. 7 × 1–1.2 mm, apex attenuate; staminodes ca. 5 mm 32. *C. linglingensis*
- 131b. Bracts ovate-triangular, ca. 4 × 1.6–1.8 mm, apex obtuse; staminodes 7–14 mm 43. *C. crassituba*
- 130b. Staminodes 2; stigma 2-lobed; abaxial corolla lip 0.7–1.5 cm; petiole (0.5–)1–5(–6) cm.
- 132a. Leaf blade 0.8–3.2 × 0.8–2.8 cm; corolla ca. 2.7 cm 17. *C. lienxienensis*
- 132b. Leaf blade 2–11 × 1–7 cm; corolla (2.1–)3–6 cm.
- 133a. Filaments glabrous; corolla 4–6 cm, mouth 1.2–2 cm in diam., adaxial lip 9–12 mm; bracts 2–14 mm; peduncle 1.5–6 cm 34. *C. guelinensis*
- 133b. Filaments sparsely puberulent at least near apex; corolla 2.1–3.9 cm, mouth 0.6–1 cm in diam., adaxial lip 3–7 mm; bracts 3–9 mm; peduncle 3–14 cm.
- 134a. Peduncle spreading pubescent to pilose; bracts and calyx pubescent to pilose outside; corolla tube nearly tubular, mouth 6–8 mm in diam., abaxial lip 7–9 mm; cymes 2–8-flowered 37. *C. fordii*
- 134b. Peduncle villous and glandular pubescent; bracts and calyx villous outside; corolla tube funnelform, mouth ca. 1 cm in diam., abaxial lip ca. 12 mm; cymes 2- or 3-flowered 79. *C. liujiangensis*
- 124b. Leaf blade margin entire, subentire, repand, repand-crenate, or repand-denticulate.
- 135a. Peduncle 0.6–1.4 cm.
- 136a. Calyx 10–12 mm; bracts 4–6 mm; pedicel 7–11 mm; corolla ca. 4.5 cm, mouth ca. 1.4 cm in diam.; filaments ca. 11 mm; anthers woolly; pistil ca. 3.4 cm; stigma 2-lobed, adaxial lobe 2-lobed 73. *C. shouchengensis*
- 136b. Calyx 4–6 mm; bracts 0.8–3 mm; pedicel 2–5.5 mm; corolla 2–3.4 cm, mouth 2–5 mm in diam.; filaments 4.5–5.5 mm; anthers glabrous; pistil 1.9–2.2 cm; stigma merely 2-lobed or 2-parted.
- 137a. Corolla 2.5–3.4 cm, abaxial lip ca. 13 mm; staminodes 3; stigma 2-lobed; flowers solitary; petiole 2–30 mm; leaf blade to 5.4 cm 60. *C. vestita*
- 137b. Corolla 2–2.5 cm, abaxial lip 5–7.5 mm; staminodes 2; stigma 2-parted; cymes 1–3-flowered; petiole 3–9 mm; leaf blade to 3.2 cm 62. *C. tenuituba*
- 135b. Peduncle 3–31.5 cm.

- 138a. Leaf blade sparsely strigose; corolla 4.5–6 cm, mouth 1.5–2 cm in diam., adaxial lip 10–15 mm, abaxial lip 20–30 mm; petiole to 7.5 cm; peduncle to 31.5 cm 78. *C. macrorrhiza*
- 138b. Leaf blade puberulent, pubescent, pilose, villous, and/or velutinous; corolla 2–4 cm, mouth 0.5–1 cm in diam., adaxial lip 3–8 mm, abaxial lip 4–15 mm; petiole to 5 cm; peduncle to 14 cm.
- 139a. Bracts 1.2–2.2 mm; staminodes absent or 3.
- 140a. Pedicel ca. 5 mm; bract apex obtuse; corolla mouth ca. 5 mm in diam.; filaments pilose basally, pubescent above; staminodes absent; stigma undivided 4. *C. demissa*
- 140b. Pedicel 9–14 mm; bract apex acute; corolla mouth ca. 1 cm in diam.; filaments glabrous; staminodes 3; stigma 2-lobed 33. *C. villosissima*
- 139b. Bracts 3–13 mm; staminodes (1 or) 2.
- 141a. Staminode 1; anthers pilose; corolla abaxial lip ca. 15 mm; peduncle 4–6 cm 42. *C. cruciformis*
- 141b. Staminodes 2; anthers glabrous to puberulent or villous; corolla abaxial lip 4–12 mm; peduncle 3–14 cm.
- 142a. Filaments 5–6 mm, glandular pilose; anthers villous; abaxial corolla lip 4–7 mm; leaf blade 2–5.5 cm 76. *C. hochiensis*
- 142b. Filaments 7–13 mm, glabrous, sparsely puberulent at least near apex, or glandular puberulent above middle; anthers glabrous or puberulent; abaxial corolla lip 7–12 mm; leaf blade 2–11 cm.
- 143a. Leaf blade ovate, elliptic, or obovate, 1–7 cm wide.
- 144a. Corolla tube nearly tubular, mouth 6–8 mm in diam., adaxial lip 3–5.5 mm, abaxial lip ca. 7–9 mm; peduncle spreading pubescent to pilose; bracts and calyx pubescent to pilose outside 37. *C. fordii*
- 144b. Corolla tube funnelliform, mouth ca. 1 cm in diam., adaxial lip ca. 7 mm, abaxial lip ca. 12 mm; peduncle villous and glandular pubescent; bracts and calyx villous outside 79. *C. liujiangensis*
- 143b. Leaf blade narrowly elliptic to narrowly ovate, 0.8–2.8 cm wide.
- 145a. Peduncle 12–13 cm; leaf blade base cuneate, margin subentire to repand; bracts ovate to narrowly ovate, 6.5–7 × 2.5–3 mm; pedicel 0.3–1.8 cm; calyx segments appressed puberulent inside; stigma emarginate 80. *C. atroglandulosa*
- 145b. Peduncle 5–7.8 cm; leaf blade base attenuate, margin entire; bracts triangular-linear, 5–13 × ca. 1.5 mm; pedicel 2.7–5 cm; calyx segments glabrous inside; stigma 2-lobed 81. *C. pungentisepala*

1. *Chirita swinglei* (Merrill) W. T. Wang, Bull. Bot. Res., Harbin 1(4): 62. 1981.

钟冠唇柱苣苔 zhong guan chun zhu ju tai

Didymocarpus swinglei Merrill, Philipp. J. Sci. 13: 156. 1918; *Chirita pellegriniana* B. L. Burtt; *Didymocarpus balansae* Pellegrin (1926), not *C. balansae* Drake (1890).

Perennial, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 0.8–7.5 cm × 2–11 mm; leaf blade elliptic to ovate, obovate, or orbicular, 6–19 × 4–17 cm, herbaceous, strigose, eglandular, base often oblique, broadly cuneate to rounded or truncate, margin denticulate or dentate to crenate, apex acute to rounded;

lateral veins 3–7 on each side of midrib, slightly conspicuous. Cymes (1–)3–8-flowered; peduncle 2.8–19 cm, pubescent; bracts 2, free, linear to linear-lanceolate, 2–6 × 0.8–1 mm, puberulent, margin entire, apex acute. Pedicel 2–4(–8) cm, spreading puberulent. Calyx 5-sect from base; segments equal, lanceolate-linear, 6–10 × 1–1.5 mm, outside densely puberulent, inside apically sparsely puberulent, margin entire, apex acute. Corolla bluish to purple, 2.4–4.2 cm, outside sparsely puberulent, inside glabrous or glandular puberulent on adaxial lip; tube campanulate to funnelliform, 1.2–2.2 × 0.7–1.2 cm; adaxial lip 7–11 mm; abaxial lip 1–2.2 cm. Filaments ca. 9 mm, sparsely puberulent; anthers fused by entire adaxial surfaces, 2.5–3 mm,

glabrous; staminodes 2, 1.2–2 mm. Pistil 1.5–1.7 cm, puberulent; ovary ca. 9 mm. Stigma spatulate to narrowly ovoid, 1–2 mm, undivided. Capsule erect, 2–3.5 cm. Fl. May–Sep, fr. Jul–Oct.

Forests, cliffs in valleys; 600–900 m. Guangdong (Luofushan, Zengcheng Xian), S Guangxi [N Vietnam].

2. *Chirita subulatisepala* W. T. Wang, Bull. Bot. Res., Harbin 4(1): 18. 1984.

钻萼唇柱苣苔 *zuan e chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 0.2–2.8 cm × 2–3 mm; leaf blade narrowly ovate to ovate, 2.2–6.5 × 1.4–5 cm, papery, appressed puberulent, eglandular, base oblique, broadly cuneate to truncate, margin obtusely dentate to crenate, apex acute to rounded; lateral veins ca. 3 on each side of midrib, inconspicuous. Cymes (1–)4–6-flowered; peduncle 3–9 cm, sparsely puberulent; bracts 2, free, elliptic to elliptic-ovate, leaflike, 1.7–2.3 × 0.8–1.1 cm, strigose, margin remotely denticulate, apex acute. Pedicel 0.5–1.5 cm, puberulent and glandular puberulent. Calyx 5-sect from base; segments equal, narrowly lanceolate-linear, 9–15 × 1.1–1.8 mm, outside densely puberulent, inside apically puberulent, margin entire, apex subulate-acuminate. Corolla purple, ca. 4 cm, outside puberulent, inside puberulent basally; tube funnelform-tubular, ca. 2.7 × 1 cm; adaxial lip ca. 1.1 cm; abaxial lip ca. 1.3 cm. Filaments ca. 1.2 cm, apically sparsely glandular puberulent; anthers fused by entire adaxial surfaces, ca. 3.5 mm, glabrous; staminodes 2, ca. 5 mm. Pistil ca. 3 cm, puberulent; ovary ca. 1 cm. Stigma ligulate, ca. 2 mm, undivided. Fruit and seeds unknown. Fl. Jun.

• Shaded rocky cliffs; ca. 800 m. SW Hubei (Xianfeng Xian), SE Sichuan (Qianjiang Xian).

3. *Chirita brachystigma* W. T. Wang, Bull. Bot. Res., Harbin 4(1): 22. 1984.

短头唇柱苣苔 *duan tou chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 1–5 × 2.5–4 mm; leaf blade oblique, orbicular-ovate to ovate, 1.2–3 × 0.9–1.8 cm, leathery, appressed puberulent, eglandular, base broadly cuneate, margin entire, apex obtuse; lateral veins 3 or 4 on each side of midrib, inconspicuous. Cymes 1- or 2-flowered; peduncle 9–11.5 cm, spreading purple puberulent; bracts 2, free, lanceolate, ca. 5 × 1.6 mm, puberulent, margin entire, apex obtuse. Pedicel ca. 1.2 cm, puberulent. Calyx 5-sect from base; segments equal, narrowly lanceolate-linear, 6.5–7 × 1–1.2(–1.5) mm, outside purple puberulent, inside glabrous, margin entire, apex obtuse. Corolla ca. 3.4 cm, outside sparsely puberulent, inside densely puberulent; tube narrowly funnelform, ca. 2.2 × 0.8 cm; adaxial lip ca. 6 mm; abaxial lip ca. 1.2 cm.

Filaments ca. 8 mm, sparsely glandular puberulent near apex; anthers fused by entire adaxial surfaces, ca. 3 mm, pubescent; staminodes 2, ca. 4.5 mm. Pistil ca. 2.2 mm, puberulent; ovary ca. 1.4 cm. Stigma ovate, ca. 0.8 mm, undivided. Immature capsule erect, ca. 6 cm. Fl. Apr–May, fr. May.

• Shaded areas in valleys. Guangxi (Hechi Xian).

4. *Chirita demissa* (Hance) W. T. Wang in A. L. Weitzman et al., Novon 7: 424. 1998.

巨柱唇柱苣苔 *ju zhu chun zhu ju tai*

Didymocarpus demissus Hance, J. Bot. 21: 166. 1883;
Roettlera demissa (Hance) Kuntze.

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 0.5–3 cm × 1–3 mm; leaf blade elliptic to narrowly ovate or narrowly obovate, 2.5–5(–7) × 1–2 cm, papery, adaxially densely puberulent and villous, eglandular, abaxially grayish velutinous to densely pubescent, base cuneate to broadly cuneate, margin entire, apex acute to rounded; lateral veins ca. 3 on each side of midrib, inconspicuous. Cymes 1–3-flowered; peduncle ca. 6 cm, densely pubescent to villous; bracts 2, free, triangular-linear, ca. 2 × 0.3 mm, pilose, margin entire, apex obtuse. Pedicel ca. 5 mm, densely spreading pilose. Calyx 5-sect from base; segments equal, lanceolate-linear, 4–5 × 0.8–1 mm, outside densely pilose, inside above sparsely pubescent, margin entire, apex acute. Corolla white, ca. 2.3 cm, outside sparsely puberulent, inside glandular puberulent near mouth; tube narrowly funnelform, 1.5–1.8 × ca. 0.5 cm; adaxial lip ca. 4 mm; abaxial lip 8–9 mm. Filaments ca. 6.5 mm, pilose basally, pubescent above; anthers fused by entire adaxial surfaces, ca. 3.2 mm, abaxially pilose; staminodes absent. Pistil ca. 1.5 cm, puberulent; ovary ca. 5.5 mm. Stigma narrowly oblong, ca. 1 mm, undivided. Capsule erect, ca. 5 cm. Fl. Oct.

• Rocks in shaded hilly regions. N Guangdong (Lian Xian).

This species was previously placed in *Didymocarpus*. It is currently included in *Chirita* because its stigma is abaxial and oblong. In *Didymocarpus*, the stigma is terminal and capitate or discoid in shape, probably formed by fusion of the adaxial and abaxial stigmas.

5. *Chirita atropurpurea* W. T. Wang, Bull. Bot. Res., Harbin 1(4): 60. 1981.

紫萼唇柱苣苔 *zi e chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 6–14 × ca. 4 mm; leaf blade narrowly ovate to ovate, 2.2–4 × 1.3–2 cm, leathery, adaxially sparsely appressed puberulent, eglandular, abaxially densely appressed puberulent, base broadly cuneate, margin entire, apex obtuse to rounded; lateral veins invisible. Cymes ca. 2–

flowered; peduncle 9.5–12.5 cm, dark purple pubescent; bracts 2, free, narrowly ovate, 4–5 × ca. 2 mm, densely purple villous, margin entire, apex obtuse. Pedicel 0.7–1.5 cm, puberulent. Calyx 5-sect from base; segments equal, lanceolate, ca. 5 × 1.5–2 mm, outside densely purple puberulent, inside glabrous, margin entire, apex obtuse. Corolla purple, ca. 4 cm, outside puberulent, inside puberulent basally; tube nearly tubular, ca. 3 × 1.2 cm; adaxial lip ca. 6 mm; abaxial lip ca. 1 cm. Filaments ca. 1.4 cm, glabrous; anthers fused by entire adaxial surfaces, ca. 4.5 mm, villous; staminodes 3, central 1 ca. 0.5 mm, laterals ca. 1 mm. Pistil ca. 3.2 cm, puberulent; ovary ca. 1.6 cm. Stigma ligulate-linear, ca. 6 mm, undivided. Fruit and seeds unknown. Fl. Feb.

• Limestone hills. Guangxi (Guilin Xian).

6. *Chirita brassicoides* W. T. Wang, Bull. Bot. Res., Harbin 1(4): 63. 1981.

芥状唇柱苣苔 jie zhuang chun zhu ju tai

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 1.5–6 cm × 3–5 mm; leaf blade broadly elliptic to elliptic-ovate, 7–15.5 × 5–14 cm, herbaceous, densely appressed puberulent, eglandular, base oblique, cordate to broadly cuneate on 1 side and cordate on other, margin irregularly crenate-dentate, apex acute to obtuse; lateral veins 6 or 7 on each side of midrib, conspicuous. Cymes ca. 6-flowered; peduncle ca. 17 cm, puberulent; bracts 2, free, linear to lanceolate-linear, 1–1.5 cm × ca. 2 mm, puberulent, margin entire, apex acute. Pedicel to 3 cm, densely spreading puberulent. Calyx 5-sect from base; segments equal, linear-lanceolate, ca. 10 × 1.2 mm, puberulent, margin entire, apex acute. Corolla purplish, ca. 2.8 cm, outside puberulent, inside sparsely puberulent below stamens; tube nearly tubular, ca. 1.7 × 0.8 cm; adaxial lip ca. 5 mm; abaxial lip ca. 1 cm. Filaments ca. 9 mm, glabrous; anthers fused by entire adaxial surfaces, ca. 2.8 mm, glabrous; staminodes 2, ca. 2.6 mm. Pistil ca. 1.4 cm, puberulent; ovary ca. 7 mm. Stigma ligulate, ca. 1.5 mm, undivided. Fruit and seeds unknown. Fl. Jun.

• Rocks on limestone hills. SW Guangxi (Longzhou Xian).

7. *Chirita tenuifolia* W. T. Wang, Bull. Bot. Res., Harbin 1(4): 61. 1981.

薄叶唇柱苣苔 bo ye chun zhu ju tai

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 3–20 × 0.6–1 mm; leaf blade elliptic, 2.2–5 × 1.1–3 cm, membranous, sparsely appressed puberulent, eglandular, base oblique, broadly cuneate, margin remotely denticulate to undulate-crenate, apex obtuse to rounded; lateral veins ca. 4 on each side of midrib, inconspicuous.

Cymes 1-flowered; peduncle ca. 5 cm, densely puberulent; bract 1, subulate, ca. 1.2 × 0.3 mm, puberulent, margin entire, apex acute. Pedicel ca. 3.3 cm, puberulent. Calyx 5-sect from base; segments equal, linear-lanceolate, ca. 4.8 × 0.8 mm, outside densely puberulent, inside apically sparsely puberulent, margin entire, apex acute. Corolla purplish, ca. 2.8 cm, outside sparsely puberulent, inside glabrous; tube narrowly funnelform, ca. 1.5 × 0.9 cm; adaxial lip ca. 6 mm; abaxial lip ca. 8 mm. Filaments ca. 9 mm, sparsely puberulent; anthers fused by entire adaxial surfaces, ca. 2.2 mm, glabrous; staminodes 2, ca. 1.2 mm. Pistil ca. 1.8 cm, puberulent; ovary ca. 1 cm. Stigma ligulate, ca. 1.8 mm, undivided. Fruit and seeds unknown. Fl. Aug.

• Limestone hills. Guangxi (Donglan Xian).

8. *Chirita liguliformis* W. T. Wang, Bull. Bot. Res., Harbin 4(1): 20. 1984.

舌柱唇柱苣苔 she zhu chun zhu ju tai

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 1.5–11 cm × 4–9 mm; leaf blade elliptic to broadly ovate, 4–20 × 2.5–10 cm, papery, adaxially appressed pilose, eglandular, abaxially appressed puberulent, base sometimes oblique, broadly cuneate to cordate on 1 side and cuneate to rounded on other, margin undulate-crenate to dentate, apex obtuse to acute; lateral veins 4 or 5 on each side of midrib, inconspicuous. Cymes 7–11-flowered; peduncle 6–20 cm, spreading puberulent; bracts 2, free, narrowly triangular, ca. 3.5 × 1.1 mm, puberulent, margin entire, apex acute. Pedicel 2.5–4 cm, puberulent. Calyx 5-sect from base; segments equal, lanceolate-linear, 3–3.5 × ca. 1 mm, outside puberulent, inside glabrous, margin entire, apex acute. Corolla purplish, ca. 2.2 cm, outside sparsely puberulent, inside below adaxial lip puberulent; tube funnelform-tubular, ca. 1.5 cm × 6 mm; adaxial lip ca. 3 mm; abaxial lip ca. 7 mm. Filaments ca. 1 cm, sparsely puberulent basally, black glandular near apex; anthers fused by entire adaxial surfaces, ca. 3 mm, glabrous; staminodes 2, ca. 2 mm. Pistil ca. 1.1 cm, puberulent; ovary ca. 7 mm. Stigma ligulate, ca. 2 mm, undivided. Capsule erect, 2–3 cm. Fl. Jun–Jul, fr. Jul.

• Wet valley forests; ca. 800 m. SW Guizhou (Anlong Xian, Ceheng Xian).

9. *Chirita laxiflora* W. T. Wang, Bull. Bot. Res., Harbin 4(1): 21. 1984.

疏花唇柱苣苔 shu hua chun zhu ju tai

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 2–5 cm × 3–8 mm; leaf blade ovate to elliptic, 6–9.6 × 4–6.5 cm, herbaceous, densely puberulent, eglandular, base sometimes oblique, cuneate to nearly rounded on 1 side and cuneate on other, margin crenate to serrate or dentate, apex acute to rounded; lateral veins 5–7 on

each side of midrib, conspicuous. Cymes 3–7-flowered; peduncle 8.5–15 cm, puberulent; bracts 2, free, linear, 3–4 × 0.6–0.8 mm, puberulent, margin entire, apex obtuse. Pedicel 0.3–3 cm, puberulent. Calyx 5-sect from base; segments equal, lanceolate-linear, ca. 4.5 × 1 mm, outside puberulent, inside apically sparsely puberulent, margin entire, apex obtuse. Corolla purple, ca. 1.7 cm, outside puberulent, inside glabrous; tube nearly tubular, ca. 1.2 × 0.6 cm; adaxial lip ca. 3 mm; abaxial lip ca. 6 mm. Filaments ca. 8.5 mm, sparsely puberulent; anthers fused by entire adaxial surfaces, ca. 3 mm, glabrous; staminodes 2, ca. 1.5 mm. Pistil ca. 1 cm, puberulent; ovary ca. 5.5 mm. Stigma ligulate-oblong, ca. 1.5 mm, undivided. Capsule erect, ca. 2.8 cm. Fl. Jun.

• Rocks in limestone hills. NW Guangxi (Lingyun Xian).

10. *Chirita flavimaculata* W. T. Wang, Bull. Bot. Res., Harbin 5(3): 40. 1985.

黄斑唇柱苣苔 huang ban chun zhu ju tai

Perennial, stemless or pilose stemmed. Rhizome internodes inconspicuous. Leaves basal or along stem, opposite; petiole 2–9 × 0.4–1 cm; leaf blade oblong ovate to ovate, obovate, or narrowly elliptic, 8–26 × 4.5–14 cm, papery, adaxially pilose, eglandular, abaxially pubescent, pilose along veins, base cuneate to broadly cuneate, margin nearly entire to shallowly crenate, apex acute; lateral veins 4–6 on each side of midrib, conspicuous to inconspicuous. Cymes 7–28-flowered; peduncle 20–35 cm, puberulent; bracts 2, free, narrowly triangular to navicular-triangular, 1–1.6 cm × 3–4 mm, puberulent to pilose, margin entire, apex attenuate. Pedicel 1.2–3 cm, glandular puberulent. Calyx 5-sect from base; segments equal, narrowly triangular to lanceolate-linear, 1–1.5 cm × ca. 2 mm, puberulent, margin entire, apex attenuate. Corolla blue-purple, with 1 yellow spot below adaxial lip, 3.2–4.5 cm, outside sparsely glandular puberulent, inside glandular puberulent on yellow spot; tube nearly tubular, 2.4–3.5 × ca. 1 cm; adaxial lip 3.5–4 mm; abaxial lip 8–10 mm. Filaments ca. 1 cm, puberulent near apex; anthers fused by entire adaxial surfaces, ca. 2.2 mm, glabrous; staminodes 3, central 1 ca. 0.8 mm, laterals 5–6 mm. Pistil 2.9–3.2 cm, densely glandular puberulent; ovary 2–2.3 cm. Stigma narrowly elliptic, 2.2–3 mm, undivided. Immature capsule ca. 3 cm. Fl. Nov.

• Known only from cultivation. First cultivated at the South China Institute of Botany in Guangzhou, Guangdong; possibly introduced from Guangxi.

11. *Chirita floribunda* W. T. Wang, Bull. Bot. Res., Harbin 4(1): 23. 1984.

多花唇柱苣苔 duo hua chun zhu ju tai

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 1.2–5.2 × 0.5–1 cm; leaf blade narrowly elliptic to narrowly

ovate, 8.5–14 × 3.8–7 cm, papery, densely appressed puberulent, eglandular, base cuneate, margin crenate, apex acute to obtuse; lateral veins 6 or 7 on each side of midrib, slightly conspicuous. Cymes 8–15-flowered; peduncle 10–12 cm, densely spreading glandular puberulent; bracts 2, free, lanceolate-linear, 6–8 × ca. 1 mm, puberulent, margin entire, apex acute. Pedicel 1.5–20 mm, densely glandular puberulent. Calyx 5-sect from base; segments equal, narrowly triangular to narrowly lanceolate-linear, ca. 4.8 × 0.6–0.9 mm, outside puberulent, inside apically sparsely puberulent, margin entire, apex acute. Corolla purple, ca. 2.1 cm, outside sparsely puberulent, inside adaxial lip puberulent basally; tube funnel-form-tubular, ca. 1.2 cm × 4–6 mm; adaxial lip ca. 2.5 mm; abaxial lip ca. 8.5 mm. Filaments ca. 7 mm, sparsely glandular; anthers fused by entire adaxial surfaces, ca. 2 mm, glabrous; staminodes 2, ca. 3 mm. Pistil ca. 1.2 cm, densely puberulent and glandular puberulent; ovary ca. 7.5 mm. Stigma obtrapezoid, ca. 1.5 mm, undivided. Fruit and seeds unknown. Fl. Jun.

• Known only from cultivation. Cultivated in the Medicinal Botanic Garden of Nanning, Guangxi; possibly introduced from Jinxiu Xian, Guangxi.

12. *Chirita medica* D. Fang ex W. T. Wang, Bull. Bot. Res., Harbin 1(4): 64. 1981.

药用唇柱苣苔 yao yong chun zhu ju tai

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 5–25 × 5–8 mm; leaf blade narrowly ovate to elliptic, 3.5–7 × 2–3.5 cm, papery to herbaceous, adaxially with dense, short and long hairs, eglandular, abaxially velutinous, base oblique, cuneate, margin entire to repand, apex acute; lateral veins ca. 5 on each side of midrib, inconspicuous. Cymes 3–7-flowered; peduncle 8.5–11 cm, villous and glandular puberulent; bracts 2, free, lanceolate-linear, 4–7 × 1–1.2 mm, villous, margin entire, apex acute. Pedicel 3–15 mm, villous and glandular puberulent. Calyx 5-sect from base; segments equal, lanceolate-linear, 3.5–4 × 0.8–1 mm, outside puberulent, inside glabrous, margin entire, apex acute. Corolla white, tinged pink, 1.7–2.1 cm, outside sparsely puberulent, inside basally sparsely puberulent; tube nearly tubular, 1.3–1.5 cm × 5–6 mm; adaxial lip ca. 3 mm; abaxial lip ca. 6 mm. Filaments ca. 9 mm, glabrous; anthers fused by entire adaxial surfaces, ca. 2.2 mm, pubescent; staminodes 2, 1.5–2.5 mm. Pistil 1.3–1.8 cm, densely puberulent; ovary ca. 7 mm. Stigma obdeltoid, ca. 1 mm, 2-lobed. Capsule erect, ca. 1.5 mm. Fl. Apr.

• Rocky crevices of limestone hills. Guangxi (Pingle Xian).

13. *Chirita latinervis* W. T. Wang, Bull. Bot. Res., Harbin 9(4): 21. 1989.

宽脉唇柱苣苔 kuan mai chun zhu ju tai

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 0.8–3.5

× 0.5–1.8 cm; leaf blade broadly ovate to orbicular-ovate, 6–12 × 5–12 cm, papery, sparsely appressed puberulent, eglandular, base nearly truncate to truncate on 1 side and broadly cuneate on other, margin undulate-dentate to repand, apex acute to rounded; lateral veins 3 or 4 on each side of midrib, inconspicuous. Cymes ca. 10-flowered; peduncle ca. 18 cm, spreading pubescent; bracts 2, free, lanceolate, ca. 2.2 cm × 5–7 mm, appressed puberulent, margin entire, apex obtuse. Pedicel to 1.6 cm, puberulent. Calyx 5-sect from base; segments equal, narrowly triangular to lanceolate-linear, ca. 6 × 1.1 mm, outside puberulent, inside apically puberulent with very short hairs, margin entire, apex acute. Corolla blue-purple, ca. 2.1 cm, sparsely puberulent; tube nearly tubular, ca. 1.3 cm × 7 mm; adaxial lip ca. 5 mm; abaxial lip ca. 8 mm. Filaments ca. 8 mm, sparsely glandular puberulent near apex; anthers fused by entire adaxial surfaces, ca. 4 mm, glabrous; staminodes 2, ca. 2.2 mm. Pistil ca. 1 cm, puberulent; ovary ca. 6 mm. Stigma obovoid, ca. 1.2 mm, 2-lobed. Fruit and seeds unknown. Fl. Aug.

• Damp rocks at cave entrances; ca. 300 m. S Hunan (Xinning Xian).

14. *Chirita orthandra* W. T. Wang, Bull. Bot. Res., Harbin 5(3): 42. 1985.

直蕊唇柱苣苔 zhi rui chun zhu ju tai

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 1–3.5 cm × 3–6 mm; leaf blade narrowly ovate to narrowly elliptic, 7–11 × 3–4.2 cm, herbaceous, densely puberulent, eglandular, base oblique, cuneate, margin densely crenulate to dentate or serrulate, apex acute to rounded; lateral veins 5 or 6 on each side of midrib, slightly conspicuous. Cymes 2–8-flowered; peduncle 7–8 cm, spreading puberulent; bracts 2, free, ovate, ca. 5 × 3 mm, puberulent, margin remotely crenulate, apex obtuse. Pedicel 4–13 mm, puberulent and glandular puberulent. Calyx 5-sect from base; segments equal, narrowly triangular, 3–3.5 × ca. 1.2 mm, outside puberulent, inside glabrous, margin entire, apex acute. Corolla purple-blue, 2.2–2.7 cm, glabrous; tube nearly tubular, ca. 1.7 × 0.7 cm; adaxial lip ca. 3.5 mm; abaxial lip ca. 5 mm. Filaments ca. 9 mm, sparsely puberulent and glandular above; anthers fused by entire adaxial surfaces, ca. 2.5 mm, glabrous; staminodes 2, ca. 1.5 mm. Pistil ca. 2.1 cm, puberulent; ovary ca. 1 cm. Stigma oblong, ca. 2 mm, 2-lobed. Capsule erect, 2.5–3 cm. Fl. May.

• Rocks in hilly regions. N Guangdong (Liannan Xian).

15. *Chirita sichuanensis* W. T. Wang, Bull. Bot. Res., Harbin 4(1): 16. 1984.

四川唇柱苣苔 si chuan chun zhu ju tai

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 0.5–5 cm × 2–4 mm; leaf blade ovate to elliptic, 2.9–11.5 × 1.5–6.5 cm, papery, puberulent, eglandular, base often oblique, cuneate on 1 side and broadly cuneate on other,

margin repand-crenate to denticulate, apex acute to obtuse; lateral veins 3 or 4 on each side of midrib, inconspicuous. Cymes 1–4-flowered; peduncle 4–8 cm, spreading puberulent; bracts 2, free, ovate to nearly elliptic, 0.9–2.1 × 0.5–1.2 cm, puberulent, margin crenulate to entire, apex acute to obtuse. Pedicel 6–12 mm, puberulent. Calyx 5-sect from base; segments equal, lanceolate-linear, 7–10 × 1.5–2 mm, outside puberulent, inside glabrous, margin entire, apex acute. Corolla purple, ca. 4 cm, outside puberulent, inside puberulent below adaxial lip; tube funnellform-tubular, ca. 2.8 × 0.9 cm; adaxial lip ca. 6.5 mm; abaxial lip ca. 1.1 cm. Filaments ca. 9 mm, glandular puberulent above; anthers fused by entire adaxial surfaces, ca. 3 mm, apically with a few short hairs; staminodes 2, ca. 0.8 mm. Pistil ca. 2.6 cm, puberulent; ovary ca. 1.1 cm. Stigma cuneate, ca. 3 mm, 2-lobed. Capsule erect, ca. 4 cm. Fl. May–Jun.

• Shaded damp areas of montane forests; 700–1200 m. SE Sichuan (Pengshui Xian, Xiushan Xian).

16. *Chirita eburnea* Hance, J. Bot. 21: 168. 1883.

牛耳朵 niu er duo

Chirita fauriei Franchet; *Didymocarpus eburneus* (Hance) H. Léveillé; *D. fauriei* (Franchet) H. Léveillé; *Roettlera eburnea* (Hance) Kuntze.

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 1–8 × 0.5–1 cm; leaf blade ovate to elliptic or obovate, 3.5–17 × 2–9.5 cm, papery, appressed puberulent to pilose, eglandular, base attenuate to broadly cuneate, margin entire, apex acute; lateral veins 4 or 5 on each side of midrib, inconspicuous. Cymes (1 or)2–13(–17)-flowered; peduncle 4–30 cm, puberulent; bracts 2, free, ovate to orbicular-ovate, 1–4.5 × 0.8–2.8 cm, densely puberulent, margin entire, apex acute to obtuse. Pedicel to 2.3 cm, puberulent and glandular puberulent. Calyx 5-sect from base; segments equal, narrowly lanceolate, (3–)7–10 × (1–)2–2.5 mm, outside puberulent and glandular puberulent, inside sparsely puberulent, margin entire, apex acute. Corolla purple to white or yellow, 3–4.5 cm, sparsely puberulent; tube nearly tubular, ca. 3 × 1–1.4 cm; adaxial lip 5–9 mm; abaxial lip 1.2–1.8 cm. Filaments 9–10 mm, sparsely puberulent basally; anthers fused by entire adaxial surfaces, 3–5 mm, nearly glabrous; staminodes 2, 4–6 mm. Pistil 2.2–3 cm, densely puberulent; ovary ca. 2 cm. Stigma cuneate, ca. 3 mm, 2-lobed. Capsule erect, 4–8 cm. Fl. Apr–Sep, fr. May–Oct.

• Rocks in forests or along streamsides in forests on limestone hills; near sea level to 1900 m. N Guangdong, N Guangxi, Guizhou, W Hubei, SE and W Hunan, E and S Sichuan.

17. *Chirita lienxienensis* W. T. Wang, Bull. Bot. Res., Harbin 2(4): 48. 1982.

连县唇柱苣苔 lian xian chun zhu ju tai

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 1.5–3.5(–6) cm × 1.5–3 mm; leaf blade broadly ovate to ovate, seldom nearly orbicular, 0.8–3.2 × 0.8–2.8 cm, papery, puberulent to pilose, eglandular, base sometimes oblique, cuneate to nearly truncate, margin indistinctly undulate-denticulate, apex obtuse to rounded; lateral veins ca. 3 on each side of midrib, inconspicuous. Cymes 1- or 2-flowered; peduncle 1.5–6 cm, spreading puberulent; bracts 2, free, ovate to lanceolate or oblanceolate-linear, 5–12 × 2.2–5 mm, puberulent, margin entire, apex acute. Pedicel 4–13 mm, spreading puberulent. Calyx 5-sect from base; segments equal, narrowly lanceolate-linear, 3–7 × 0.8–1 mm, puberulent, margin entire, apex acute. Corolla purple, ca. 2.7 cm, outside sparsely puberulent, inside puberulent on and below adaxial lip; tube nearly tubular, ca. 1.8 × 0.9 cm; adaxial lip ca. 4 mm; abaxial lip ca. 8 mm. Filaments ca. 1 cm, sparsely glandular; anthers fused by entire adaxial surfaces, ca. 3.2 mm, sparsely puberulent; staminodes 2, ca. 4.5 mm. Pistil ca. 2.1 cm, puberulent; ovary ca. 9 mm. Stigma cuneate, ca. 3 mm, 2-lobed. Capsule erect, 2.2–3.2 cm. Fl. Sept–Oct, fr. Oct.

• Rocks in montane thickets. N Guangdong (Lian Xian).

18. *Chirita lunglinensis* W. T. Wang, Bull. Bot. Res., Harbin 1(4): 53. 1981.

隆林唇柱苣苔 long lin chun zhu ju tai

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 0.6–8 cm × 1–5 mm; leaf blade elliptic to ovate, seldom broadly ovate, 2.6–10(–12) × 1.6–5.7 (–11.5) cm, papery, adaxially appressed pubescent and pilose, eglandular, abaxially appressed pilose, base oblique, broadly cuneate to cuneate on 1 side, cuneate to nearly cordate on other, margin crenate to denticulate, apex acute to obtuse; lateral veins 3 or 4 on each side of midrib, inconspicuous. Cymes 2–8-flowered; peduncle 5–20 cm, spreading pilose; bracts 2, free, elliptic to broadly ovate, 0.6–3.8 × 0.4–2.7 cm, puberulent, margin entire or denticulate, apex acute to obtuse. Pedicel 6–10 mm, glandular puberulent. Calyx 5-sect from base; segments equal, narrowly lanceolate to narrowly triangular, 3–9 × 1.1–1.9 mm, outside puberulent, inside glabrous, margin entire, apex attenuate to acute. Corolla white to purple-blue, 3–3.8 cm, outside puberulent, inside puberulent below abaxial lip and stamens; tube narrowly funnelliform, ca. 2.8 × 1–1.2 cm; adaxial lip ca. 6 mm; abaxial lip ca. 1.1 cm. Filaments ca. 1.3 cm, sparsely glandular puberulent; anthers fused by entire adaxial surfaces, ca. 4.5 mm, bearded; staminodes 2, 6–7 mm. Pistil ca. 2.7 cm, puberulent; ovary ca. 1.7 cm. Stigma cuneate, ca. 3 mm, 2-lobed. Fruit and seeds unknown. Fl. Jun.

• Streamside cliffs in valleys or on rocks on forest margin in limestone hills; 300–800 m. Guangxi, S Guizhou.

1a. Bracts 1–3.8 × 0.9–2.7 cm, margin denticulate; calyx segments 1–1.5 mm, apex attenuate

..... 18a. var. *lunglinensis*

1b. Bracts 0.6–0.9 × 0.4–0.45 cm, margin entire; calyx segments 2–3 mm, apex acute 18b. var. *amblyosepala*

18a. *Chirita lunglinensis* var. *lunglinensis*

隆林唇柱苣苔(原变种) long lin chun zhu ju tai (yuan bian zhong)

Bracts 1–3.8 × 0.9–2.7 cm, margin denticulate. Calyx segments 1–1.5 mm, apex attenuate.

• Valleys, on rocks of forest margin on limestone hills; 300–500 m. NW Guangxi (Longlin Xian), S Guizhou (Luodian Xian).

18b. *Chirita lunglinensis* var. *amblyosepala* W. T. Wang, Bull. Bot. Res., Harbin 2(4): 48. 1982.

钝萼唇柱苣苔 dun e chun zhu ju tai

Bracts 6–9 × 4–4.5 mm, margin entire. Calyx segments 2–3 mm, apex acute. Fl. Jun.

• Streamside cliffs in valleys; 700–800 m. Guangxi (Luocheng Xian).

19. *Chirita lungzhouensis* W. T. Wang, Bull. Bot. Res., Harbin 1(4): 56. 1981.

龙州唇柱苣苔 long zhou chun zhu ju tai

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 4–6 cm × 5–8 mm; leaf blade elliptic to ovate, 8–18 × 4.5–10 cm, herbaceous, sparsely appressed puberulent, more densely so on margin and veins, eglandular, base oblique, broadly cuneate to rounded, margin dentate or denticulate to serrate, apex acute; lateral veins 4 or 5 on each side of midrib, inconspicuous. Cymes 5–7-flowered; peduncle 14–19 cm, puberulent; bracts 2, free, ovate, 2.5–3.8 × 2.2–2.8 cm, puberulent, margin denticulate, apex acute. Pedicel 6–11 mm, densely glandular puberulent. Calyx 5-sect from base; segments equal, lanceolate, 7–8.5 × 1.2–2 mm, outside puberulent apically, inside densely puberulent and glandular puberulent, margin entire, apex acute. Corolla ca. 4.8 cm [color unknown, probably purple], outside sparsely puberulent and glandular puberulent, inside puberulent below adaxial lip and stamens; tube funnelliform, ca. 3 × 1.4 cm; adaxial lip ca. 7 mm; abaxial lip ca. 1.6 cm. Filaments ca. 1.1 cm, sparsely glandular puberulent; anthers fused by entire adaxial surfaces, ca. 4.5 mm, puberulent; staminodes 3, central ca. 1 mm, laterals 4–9 mm. Pistil ca. 3 cm, densely puberulent; ovary ca. 1.4 cm. Stigma cuneate, ca. 3.5 mm, 2-lobed. Immature capsule, ca. 3 cm. Fl. Apr–May.

•Rocks in forested valleys among limestone hills. SW Guangxi (Longzhou Xian).

20. *Chirita pseudoeburnea* D. Fang & W. T. Wang in W. T. Wang, Bull. Bot. Res., Harbin 1(4): 54. 1981.

紫纹唇柱苣苔 *zi wen chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 1.5–4.5 cm × 3–7 mm; leaf blade narrowly ovate to elliptic, 2.5–11 × 1.2–4.4 cm, leathery, appressed puberulent, eglandular, base cuneate, margin entire, apex acute; lateral veins ca. 3 on each side of midrib, inconspicuous. Cymes ca. 5-flowered; peduncle 10–19 cm, densely appressed puberulent; bracts 2, free, lanceolate, 1.5–1.8 cm × 5–7 mm, pubescent, margin entire, apex acute. Pedicel 1–5 cm, densely glandular puberulent. Calyx 5-sect from base; segments equal, lanceolate, ca. 11 × 1.2 mm, outside densely glandular puberulent, inside densely puberulent, margin entire, apex attenuate. Corolla purple, ca. 3 cm, outside sparsely puberulent, inside with short, yellow hairs below stamens and in 4 longitudinal lines; tube narrowly funnellform, ca. 2 × 0.8 cm; adaxial lip ca. 6 mm; abaxial lip ca. 1 cm. Filaments ca. 6 mm, puberulent; anthers fused by entire adaxial surfaces, ca. 1.5 mm, glabrous; staminodes 2, ca. 3 mm. Pistil ca. 9 mm, glandular puberulent; ovary ca. 1.5 cm. Stigma cuneate, ca. 2.5 mm, 2-lobed. Fruit and seeds unknown. Fl. May–Jun.

•Limestone hills. W Guangxi (Tiandong Xian).

21. *Chirita minutimaculata* D. Fang & W. T. Wang in W. T. Wang, Bull. Bot. Res., Harbin 1(4): 55. 1981.

微斑唇柱苣苔 *wei ban chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 1.5–5 cm × 3–6 mm; leaf blade narrowly elliptic to oblanceolate, 6–13 × 2–5.4 cm, leathery, sparsely appressed puberulent, adaxially densely minutely purple spotted, base cuneate, margin entire, apex acute; lateral veins ca. 4 on each side of midrib, inconspicuous. Cymes 5-flowered; fruiting peduncle 15–28 cm, strigose; bracts 2, free, ovate, 1.5–2.5 × 0.8–1.2 cm, strigose, margin entire, apex acute. Pedicel ca. 2.2 cm, spreading glandular puberulent. Persistent calyx 5-sect from base; segments equal, linear-lanceolate, ca. 5.5 × 0.8 mm, outside densely glandular puberulent, inside glabrous, margin entire, apex attenuate. Corolla, stamens, and pistil unknown. Capsule erect, 4–6 cm. Fr. Jun.

•Rocks in forests on limestone hills. SW Guangxi (Longzhou Xian, Tiandong Xian).

22. *Chirita obtusidentata* W. T. Wang, Bull. Bot. Res., Harbin 1(4): 57. 1981.

钝齿唇柱苣苔 *dun chi chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 0.8–8 cm × 2–6 mm; leaf blade elliptic to broadly ovate or obovate, 2.7–13 × 1.9–7 cm, papery, puberulent,

eglandular, base broadly cuneate to truncate, margin obtusely dentate to crenate or denticulate, apex acute to rounded; lateral veins 3–5 on each side of midrib, inconspicuous. Cymes 1–12-flowered; peduncle 0.1–13 cm, pubescent to densely pilose; bracts 2, free, ovate to oblong or nearly orbicular, 4–11 × 2.7–7 mm, sparsely puberulent, margin denticulate to entire, apex acute to obtuse. Pedicel 3–11 mm, densely glandular puberulent. Calyx 5-sect from base; segments equal, linear to lanceolate, 4–7 × 1.2–2 mm, outside densely glandular puberulent, inside sparsely puberulent apically, margin 1- or 2-denticulate apically, apex acute. Corolla purple, ca. 3.5 cm, outside puberulent, inside sparsely pubescent basally; tube nearly tubular, 2.5–2.7 cm × 8–9 mm; adaxial lip 6–7 mm; abaxial lip 1.1–1.2 cm. Filaments 1.1–1.4 cm, sparsely glandular puberulent; anthers fused by entire adaxial surfaces, 2.5–4 mm, abaxially bearded; staminodes 2, 4–7 mm. Pistil ca. 2.9 cm, puberulent; ovary 1.1–1.5 cm. Stigma linear, 2–3 mm, 2-lobed. Fruit and seeds unknown. Fl. Jun–Jul.

•Rocks in evergreen broad-leaved forests in valleys; 200–1200 m. NE Guizhou (Fanjingshan, Jiangkou Xian, Yinjiang Xian), SW Hubei (Laifeng Xian), Hunan.

1a. Peduncle 4–13 cm, pubescent 22a. var. *obtusidentata*

1b. Peduncle 0.1–0.4 cm, densely villous 22b. var. *mollipes*

22a. *Chirita obtusidentata* var. *obtusidentata*

钝齿唇柱苣苔(原变种) *dun chi chun zhu ju tai* (yuan bian zhong)

Chirita laifengensis W. T. Wang.

Peduncle 4–13 cm, pubescent. Fl. Jun–Jul.

•Rocks in evergreen broad-leaved forests in valleys; 900–1200 m. NE Guizhou (Fanjingshan, Jiangkou Xian, Yinjiang Xian), SW Hubei (Laifeng Xian), NW Hunan (Sangzhi Xian).

22b. *Chirita obtusidentata* var. *mollipes* W. T. Wang in W. T. Wang & Z. Y. Li, Keys Vasc. Pl. Wuling Mts. 581. 1995.

毛序唇柱苣苔 *mao xu chun zhu ju tai*

Peduncle 0.1–0.4 cm, densely villous. Fl. Jun.

•Rocks; 200–300 m. Hunan (Yongshun Xian).

23. *Chirita jiuwanshanica* W. T. Wang, Guihaia 12: 294. 1992.

九万山唇柱苣苔 *jiu wan shan chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 7–11 × 2.2–2.6 mm; leaf blade elliptic to ovate, 3–4.8 × 1.5–3 cm, papery, adaxially with short and long hairs, whitish along midrib and lateral veins, eglandular, abaxially puberulent, base oblique, cuneate to rounded, margin crenate to dentate, apex rounded to acute; lateral veins 4 or 5 on each side of midrib, conspicuous. Cymes 2- or 3-flowered; peduncle ca. 6 cm, densely puberulent; bracts 2, free, ovate to narrowly elliptic, ca. 9 × 4.5 mm,

puberulent, margin 1-denticulate to subentire, apex acute to obtuse. Pedicel to 1.2 cm, puberulent. Calyx 5-sect from base; segments equal, lanceolate-linear to narrowly triangular, ca. 5×0.9 –1.2 mm, outside densely puberulent, inside puberulent apically, margin 1- or 2-denticulate, apex attenuate. Corolla purple-blue, ca. 2.7 cm, outside puberulent, inside in longitudinal lines with very short hairs on adaxial lip; tube funnelform-tubular, ca. 2×0.9 cm; adaxial lip ca. 3.5 mm; abaxial lip ca. 7 mm. Filaments ca. 9 mm, glandular puberulent; anthers fused by entire adaxial surfaces, 2.8–3 mm, purple strigose at apex; staminodes 2, ca. 3 mm. Pistil ca. 2.8 cm, puberulent; ovary ca. 1 cm. Stigma ligulate-linear, ca. 2 mm, apex nearly truncate and emarginate. Capsule erect, ca. 2.5 cm. Fl. Jun, fr. Aug.

•Rocks under shrubs in valleys; ca. 700 m. N Guangxi (Rongshui Xian).

24. *Chirita polycephala* (W. Y. Chun) W. T. Wang, Bull. Bot. Res., Harbin 1(4): 58. 1981.

多葶唇柱苣苔 duo ting chun zhu ju tai

Didymocarpus polycephalus W. Y. Chun, Sunyatsenia 6: 299. 1946.

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 0.7–10 cm \times 3–7 mm; leaf blade ovate to nearly orbicular, seldom elliptic, 3–12 \times 2.8–11 cm, thin papery, sparsely appressed pilose and appressed pubescent, eglandular, base broadly cuneate, truncate, to nearly cordate, margin entire or repand to irregularly shallowly crenate, apex obtuse to rounded; lateral veins 3 or 4 on each side of midrib, inconspicuous. Cymes 2–7(–15)-flowered; peduncle 4–12 cm, villous; bracts 2, free, ovate to lanceolate or elliptic, 2–3.2 \times (0.3–)1–1.8 cm, pubescent, margin entire, apex acute to attenuate. Pedicel 0.5–2 cm, puberulent and glandular villous. Calyx 5-sect from base; segments equal, linear-lanceolate, 1–1.5 cm \times 1–2 mm, outside puberulent and glandular villous, inside puberulent, margin entire, apex attenuate. Corolla purplish, 3–4.5 cm, outside sparsely puberulent, inside puberulent in longitudinal lines near base of tube; tube nearly tubular, 2–2.5 \times to 1.2 cm; adaxial lip ca. 7 mm; abaxial lip ca. 1.1 cm. Filaments 8–10 mm, sparsely puberulent and glandular puberulent; anthers fused by entire adaxial surfaces, 3–3.5 mm, abaxially villous; staminodes 2, 3.5–6 mm. Pistil ca. 3 cm, densely puberulent; ovary ca. 1.1 cm. Stigma cuneate, 2–4 mm, 2-lobed. Capsule erect, 4–5 cm. Fl. Jun, fr. Oct.

•Rocks in forested valleys; 600–800 m. N Guangdong (Ruyuan Xian, Yangshan Xian).

25. *Chirita leiophylla* W. T. Wang, Guihaia 6: 159. 1986.

光叶唇柱苣苔 guang ye chun zhu ju tai

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 1–2.5 cm

\times ca. 6 mm; leaf blade elliptic to oblong, ca. 12 \times 4.7–7.2 cm, thin papery, sparsely puberulent, eglandular, base oblique, cuneate to broadly cuneate on 1 side, broadly cuneate to rounded on other, margin indistinctly denticulate to crenulate or entire on 1 side, apex acute to obtuse; lateral veins ca. 6 on each side of midrib, inconspicuous. Cymes 2–4-flowered; peduncle ca. 7.2 cm, puberulent; bracts 2, free, elliptic, 8–9 \times ca. 3 mm, puberulent, margin entire, apex acute. Pedicel 5–12 mm, puberulent. Calyx 5-sect from base; segments equal, lanceolate-linear, ca. 6 \times 1–1.2 mm, outside purplish puberulent, inside glabrous, margin entire, apex acute. Corolla purple-white, ca. 3.5 cm, outside puberulent, inside sparsely puberulent on adaxial lip; tube funnelform-tubular, ca. 2.4 \times 1.3 cm; adaxial lip ca. 3 mm; abaxial lip ca. 1.1 cm. Filaments ca. 8.5 mm, glandular puberulent above; anthers fused by entire adaxial surfaces, ca. 2.1 mm, bearded; staminodes 3, central ca. 0.8 mm, laterals ca. 6 mm. Pistil ca. 2.5 cm, puberulent and purplish glandular puberulent; ovary ca. 1.7 cm. Stigma trapezoid, ca. 2 mm, 2-lobed. Fruit and seeds unknown. Fl. Jun.

•Mixed forests on limestone hills. SW Guangxi (Longzhou Xian).

26. *Chirita depressa* J. D. Hooker, Bot. Mag. 118: pl. 7213. 1892.

短序唇柱苣苔 duan xu chun zhu ju tai

Didymocarpus depressus (J. D. Hooker) W. Y. Chun, Sunyatsenia 6: 298. 1946.

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole ca. 8 \times 6 mm; leaf blade broadly ovate or elliptic to obovate, ca. 10 \times 6 cm, papery, adaxially densely puberulent, eglandular, abaxially velutinous, base cuneate, margin shallowly crenate, apex obtuse to rounded; lateral veins ca. 4 on each side of midrib, conspicuous. Cymes ca. 4-flowered; peduncle shorter than leaves; bracts 2. Calyx 5-sect from base; segments slightly unequal, narrowly linear, ca. 7 \times 1 mm, outside puberulent and glandular puberulent, margin entire, apex attenuate. Corolla purple, ca. 3 cm, outside sparsely pubescent, inside glandular puberulent below stamens; tube funnelform-tubular, ca. 2.3 \times 0.8 cm; adaxial lip ca. 6 mm; abaxial lip ca. 7 mm. Filaments ca. 1.3 cm, glabrous; anthers fused by entire adaxial surfaces, ca. 2.5 mm, glabrous; staminodes 3, central ca. 2 mm, laterals ca. 6 mm. Pistil nearly as long as corolla tube; ovary puberulent and sparsely glandular puberulent. Stigma obovoid, 2-lobed. Fruit and seeds unknown.

•N Guangdong.

This species is known only from the type specimen, which has only two detached leaves and a corolla (without stamens). The plate in the protologue is excellent, but does not show inflorescence characters.

27. *Chirita tribracteata* W. T. Wang, Bull. Bot. Res., Harbin 1(4): 58. 1981.

三苞唇柱苣苔 san bao chun zhu ju tai

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 2–4.5 cm × 3–5 mm; leaf blade elliptic to broadly obovate, (1.8–)8–10 × (1.4–)5–7.4 cm, papery, adaxially puberulent near margin, eglandular, abaxially sparsely puberulent, base oblique, broadly cuneate, margin crenate to repand, apex obtuse to rounded; lateral veins 4 or 5 on each side of midrib, inconspicuous. Cymes ca. 7-flowered; peduncle 8.5–9.8 cm, villous and glandular puberulent; bracts 3, free, lanceolate to narrowly elliptic, 0.9–1.3 cm × 3–7.5 mm, ciliate, margin entire, apex acute. Pedicel 0.8–1.6 cm, glandular puberulent. Calyx 5-sect from base; segments equal, linear-lanceolate, 7–10 × 1–1.5 mm, outside puberulent, inside glabrous, margin entire, apex attenuate. Corolla blue, 3.6–4 cm, outside sparsely puberulent, inside puberulent on adaxial lip; tube narrowly funnellform, ca. 2.5 × 0.9–1.1 cm; adaxial lip ca. 7 mm; abaxial lip ca. 1.4 cm. Filaments ca. 1.3 cm, glandular puberulent near apex; anthers fused by entire adaxial surfaces, ca. 3.2 mm, glabrous; staminodes 3, central ca. 0.5 mm, laterals ca. 3.2 mm. Pistil ca. 2.5 cm, densely puberulent; ovary ca. 1.5 cm. Stigma cuneate, ca. 2 mm, 2-lobed. Fruit and seeds unknown. Fl. Jun.

• Near caves in limestone hills. NW Guangxi (Fengshan Xian).

28. *Chirita xinningensis* W. T. Wang, Bull. Bot. Res., Harbin 9(4): 22. 1989.

新宁唇柱苣苔 *xin ning chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 0.3–2 × 0.4–1.4 cm; leaf blade orbicular to broadly ovate, 3–8 × 2.5–8 cm, papery, adaxially puberulent, eglandular, abaxially puberulent, base broadly cuneate to subcordate, margin irregularly dentate or undulate and obtusely dentate, apex rounded to obtuse; lateral veins 2 or 3 on each side of midrib, inconspicuous. Cymes (3–)10–14-flowered; peduncle 4.5–13.5 cm, spreading puberulent; bracts 3, free, unequal, linear-lanceolate, 6–13 × 1–3 mm, densely puberulent, margin entire, apex acute. Pedicel 4–12 mm, puberulent and glandular puberulent. Calyx 5-sect from base; segments equal, lanceolate-linear, 4–5 × 0.8–1 mm, outside puberulent, inside glabrous, margin entire, apex acute. Corolla white, ca. 3 cm, outside sparsely glandular puberulent, inside puberulent only below adaxial lip; tube nearly tubular, ca. 2.1 × 1 cm; adaxial lip ca. 7 mm; abaxial lip ca. 9 mm. Filaments ca. 8 mm, sparsely glandular puberulent near apex; anthers fused by entire adaxial surfaces, ca. 3 mm, glabrous; staminodes 3, central ca. 3 mm, laterals ca. 1 cm. Pistil ca. 2.5 cm, puberulent; ovary ca. 1.2 cm. Stigma obtrapezoid, ca. 1 mm, 2-lobed. Fruit and seeds unknown. Fl. Jul.

• Limestone hills; ca. 400 m. S Hunan (Xinning Xian).

29. *Chirita fimbrispala* Handel-Mazzetti, Kaiserl. Akad. Wiss. Wien, Math.-Naturwiss. Kl., Anz. 62: 65. 1925.

蚂蝗七 *ma huang qi*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 2–8.5 cm × 3–7 mm; leaf blade oblique, ovate to orbicular, rarely oblanceolate, lanceolate, or oblanceolate, 4–10 × 3.5–11 cm, herbaceous, adaxially puberulent and appressed pilose, eglandular, abaxially sparsely puberulent to velutinous, base oblique, broadly cuneate to cordate, margin denticulate to dentate, crenate, or serrate, apex acute to rounded; lateral veins 3–5 on each side of midrib, inconspicuous. Cymes (1 or)2–5-flowered; peduncle 6–28 cm, pubescent to appressed pilose; bracts 2, free, narrowly elliptic to lanceolate, ovate, or narrowly triangular, 5–11 × 1–3(–7) mm, pubescent, margin entire, apex acute. Pedicel 0.5–3.8 cm, pubescent. Calyx 5-sect from base; segments equal, lanceolate-linear to narrowly ovate, 7–11(–15) × 1.5–3 mm, puberulent, margin often denticulate to serrate apically, apex acute to acuminate. Corolla blue, purple, to pinkish green, (3.5–)4.2–6.4 cm, outside basally sparsely puberulent, inside puberulent below adaxial lip on 2 purple lines; tube narrowly funnellform, 2.5–3.8 × 0.8–1.4 cm; adaxial lip 0.7–1.2 cm; abaxial lip 1.5–2.4 cm. Filaments ca. 1.3 cm, apex sparsely puberulent to glabrous; anthers fused by entire adaxial surfaces, ca. 4 mm, sparsely bearded; staminodes 2 or 3, ca. 4 mm. Pistil ca. 2.7–3.2 cm, densely puberulent; ovary 2–2.6 cm. Stigma obtrapezoid, 2–3 mm, 2-lobed. Capsule erect, 4–8 cm. Fl. Mar–Apr, fr. Apr–Jun.

• Rocks or cliffs in forests or montane streamsides; 400–1000 m. Fujian, N Guangdong, N and S Guangxi, S Guizhou, Hunan, Jiangxi.

- 1a. Leaf blade abaxially sparsely puberulent to pubescent 29a. var. *fimbrispala*
 1b. Leaf blade abaxially densely puberulent to velutinous 29b. var. *mollis*

29a. *Chirita fimbrispala* var. *fimbrispala*

蚂蝗七(原变种) *ma huang qi* (*yuan bian zhong*)

Didymocarpus fimbrispalus (Handel-Mazzetti) Handel-Mazzetti.

Leaf blade abaxially sparsely puberulent to pubescent.

• Rocks or cliffs in forests or montane streamsides; 400–1000 m. Fujian, N Guangdong, N Guangxi, S Guizhou, Hunan, Jiangxi.

The rhizome of *Chirita fimbrispala* var. *fimbrispala* is used medicinally by local people for injuries from fractures and contusions.

29b. *Chirita fimbrispala* var. *mollis* W. T. Wang, Bull. Bot. Res., Harbin 2(4): 50. 1982.

密毛蚂蝗七 *mi mao ma huang qi*

Leaf blade abaxially densely puberulent to velutinous.

• Rocks in forested valleys; 800–1000 m. S Guangxi (Fangcheng Xian, Shangsi Xian).

30. *Chirita verecunda* (W. Y. Chun) W. T. Wang, Bull. Bot. Res., Harbin 1(4): 50. 1981.

齿萼唇柱苣苔 *chi e chun zhu ju tai*

Didymocarpus verecundus W. Y. Chun, Sunyatsenia 6: 297. 1946.

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 1–10 cm × 4–10 mm; leaf blade oblique, rhombic-elliptic, 8–15 × 5–11 cm, papery, sparsely puberulent, eglandular, base oblique, cuneate to rounded on 1 side and rounded to cordate on other, margin irregularly dentate to denticulate, apex acute to rounded; lateral veins 4 or 5 on each side of midrib, inconspicuous. Cymes ca. 5-flowered; peduncle to 10 cm, villous; bracts 2, free, narrowly ovate to oblong, 1–1.2 cm × 3–6 mm, puberulent, margin crenulate, apex acute. Pedicel 1–5(–20) mm, puberulent. Calyx 5-sect from base; segments equal, linear-lanceolate, 1.2–1.7 cm × 2–4 mm, outside puberulent, inside appressed puberulent, margin denticulate, apex attenuate. Corolla blue, 4–4.5 cm, outside sparsely puberulent, inside puberulent on purple spots below adaxial lip; tube nearly tubular, ca. 3 × 0.9 cm; adaxial lip ca. 8 mm; abaxial lip ca. 1.8 cm. Filaments ca. 1.2 cm, apex puberulent; anthers fused by entire adaxial surfaces, ca. 6 mm, abaxially puberulent; staminodes 2, ca. 3 mm. Pistil ca. 3 cm, puberulent; ovary ca. 2 cm. Stigma cuneate, ca. 5 mm, 2-lobed. Capsule erect, 4–5 cm. Fl. Dec.

• Forests, rocky streamsides in valleys; 1000–1100 m. NE Guangxi (Mengshan Xian, Lipu Xian).

31. *Chirita langshanica* W. T. Wang, Guihaia 12: 293. 1992.

葭山唇柱苣苔 *lang shan chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole (1–)8–9 cm × 7–9 mm; leaf blade rhombic-ovate to nearly rhombic, 4.8–10 × 3.8–7 cm, papery, adaxially with dense, short and long hairs, eglandular, abaxially puberulent, base cuneate, margin coarsely dentate, apex rounded to acute, basal veins 5; lateral veins 1 or 2 on each side of midrib, conspicuous. Cymes 10–16-flowered; peduncle 16.5–17.5 cm, puberulent; bracts 2, free, lanceolate-linear, 2–2.5 cm × 3–3.5 mm, puberulent, margin entire, apex attenuate. Pedicel 1.6–5 cm, glandular puberulent. Calyx 5-sect from base; segments equal, narrowly lanceolate-linear, 1.2–1.4 cm × 1–2 mm, appressed puberulent, margin entire, apex subulate-acuminate. Corolla purplish, ca. 4.4 cm, outside sparsely puberulent, inside sparsely puberulent on spots below adaxial lip; tube funnellform-tubular, ca. 3 × 1 cm; adaxial lip ca. 9 mm; abaxial lip ca. 1.4 cm. Filaments ca. 1 cm, glandular puberulent apically; anthers fused by entire adaxial surfaces, ca. 3 mm, puberulent; staminodes 2, ca. 5 mm. Pistil ca. 2.9 cm,

puberulent; ovary ca. 1.7 cm. Stigma linear, ca. 3 mm, 2-lobed. Fruit and seeds unknown. Fl. Sep.

• Shaded rocky cliffs; ca. 500 m. S Hunan (Xinning Xian).

32. *Chirita linglingensis* W. T. Wang, Bull. Bot. Res., Harbin 1(4): 42. 1981.

零陵唇柱苣苔 *ling ling chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 0.5–2 × 0.4–1.2 cm; leaf blade oblique, ovate to nearly orbicular, 2.5–6 × 2.5–6.4 cm, papery, puberulent, eglandular, base oblique, broadly cuneate to rounded, margin dentate to obtusely dentate, apex rounded to obtuse; lateral veins ca. 4 on each side of midrib, inconspicuous. Cymes 1–4-flowered; peduncle 3–7 cm, villous; bracts 2, free, lanceolate-linear, ca. 7 × 1–1.2 mm, villous, margin entire, apex attenuate. Pedicel 1.2–2.2 cm, pubescent and glandular puberulent. Calyx 5-sect from base; segments equal, linear-lanceolate, 7–9 × 1.2–2 mm, outside puberulent, inside glabrous, margin entire, apex attenuate. Corolla purple-red, 3.5–5 cm, outside sparsely puberulent, inside puberulent toward mouth; tube broadly funnellform to tubular-funnelform, 2.3–3 × 1.4–1.8 cm; adaxial lip ca. 8 mm; abaxial lip ca. 1.6 cm. Filaments ca. 1.1 cm, sparsely puberulent apically; anthers fused by entire adaxial surfaces, ca. 3.2 mm, abaxially puberulent; staminodes 3, ca. 5 mm. Pistil ca. 3 cm, densely puberulent; ovary ca. 1.4 cm. Stigma suboblong, ca. 3 mm, 2-parted. Capsule erect, 3–4 cm. Fl. Mar–Apr.

• Shaded rocks in valleys; ca. 300 m. S Hunan (Lingling Xian).

33. *Chirita villosissima* W. T. Wang, Guihaia 6: 161. 1986.

长毛唇柱苣苔 *chang mao chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 0.4–2.2 cm × ca. 3 mm; leaf blade narrowly to broadly elliptic or ovate, 1.5–3.6(–4.7) × 1–1.9(–2.4) cm, papery, adaxially densely villous (hairs to 8.2 mm) and puberulent, eglandular, abaxially densely pubescent, base cuneate to broadly cuneate, margin repand to entire, apex acute to rounded; lateral veins ca. 3 on each side of midrib, inconspicuous. Cymes 1- or 2-flowered; peduncle ca. 7 cm, spreading pubescent; bracts 2, free, triangular to narrowly triangular, 1.2–2.2 × 0.6–1.2 mm, pubescent, margin entire, apex acute. Pedicel 0.9–1.4 cm, spreading pubescent. Calyx 5-sect from base; segments equal, linear-triangular, ca. 4 × 1.5–1.8 mm, outside puberulent, inside glabrous, margin entire, apex attenuate. Corolla pale purple, ca. 3 cm, outside puberulent, inside puberulent basally; tube tubular-funnelform, ca. 2 × 1 cm; adaxial lip ca. 6 mm; abaxial lip ca. 1 cm. Filaments ca. 1 cm, glabrous; anthers fused by entire adaxial surfaces, ca. 3.5 mm, villous; staminodes 3, central ca. 2 mm, laterals ca. 5 mm. Pistil ca. 1.8 cm, puberulent; ovary ca. 1.1 cm. Stigma sub-

oblong, ca. 2 mm, 2-lobed. Fruit and seeds unknown. Fl. May.

• Forests on limestone hills; ca. 100 m. S Guangdong (Zhaoqing Xian).

34. *Chirita gueilinensis* W. T. Wang, Bull. Bot. Res., Harbin 1(4): 43. 1981.

桂林唇柱苣苔 *gui lin chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 0.5–4 cm × 4–8 mm; leaf blade narrowly elliptic to rhombic-elliptic or ovate, 2.5–7.5 × 1.4–4 cm, papery, densely puberulent, eglandular, base oblique, cuneate, margin shallowly crenate, apex obtuse to rounded; lateral veins 4–6 on each side of midrib, inconspicuous. Cymes 1–5-flowered; peduncle 1.5–6 cm, densely spreading puberulent; bracts 2, free, linear to narrowly elliptic or narrowly triangular, 2–14 × 0.3–1.5 mm, puberulent, margin entire, apex acute. Pedicel 2.5–10 mm, densely spreading puberulent. Calyx 5-sect from base; segments equal, narrowly lanceolate, 5–7 × 1.2–2 mm, outside puberulent, inside glabrous, margin entire, apex acute. Corolla purple, 4–6 cm, outside puberulent, inside puberulent only on adaxial lip; tube tubular to narrowly funnellform, 2.5–3.8 × 1.2–2 cm; adaxial lip 0.9–1.2 cm; abaxial lip 1.1–1.5 cm. Filaments 1.1–1.2 cm, glabrous; anthers fused by entire adaxial surfaces, 4.5–5 mm, pubescent; staminodes 2, 5.5–7 mm. Pistil 2–3 cm, puberulent; ovary (0.4–)1.5–2.6 cm. Stigma obtrapezoid, 2.5–4 mm, 2-lobed. Capsule erect, 2.5–3.6 cm. Fl. Mar–Apr.

• Shaded forest areas in limestone hills; to 800 m. W Guangdong (Yunfu Xian), E and NE Guangxi.

35. *Chirita spadiciformis* W. T. Wang, Bull. Bot. Res., Harbin 5(3): 49. 1985.

焰苞唇柱苣苔 *yan bao chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite or ternate; petiole 1–9 cm × 1.5–3.5 mm; leaf blade slightly oblique, elliptic, 1.5–8.2 × 1–4.4 cm, papery, densely puberulent, eglandular, base oblique, cuneate to cuneate on 1 side and rounded on other, margin repand-crenate, apex obtuse; lateral veins ca. 4 on each side of midrib, inconspicuous. Cymes ca. 2-flowered; peduncle 6–7 cm, densely spreading puberulent; bract 1, spathe-like, navicular-ovate, 1.5–2 cm × 4–6 mm, densely puberulent, margin entire, apex long acuminate. Pedicel 1–16 mm, puberulent. Calyx 5-sect from base; segments equal, linear-lanceolate, ca. 5 × 1–1.2 mm, outside puberulent, inside glabrous, margin entire, apex attenuate. Corolla bluish to pale purple with 1 yellow spot below adaxial lip, ca. 3 cm, outside puberulent, inside glandular puberulent only on yellow spot; tube nearly campanulate, ca. 2.1 × 1.5 cm; adaxial lip ca. 6 mm; abaxial lip ca. 9 mm. Filaments ca. 1 cm, sparsely puberulent near apex; anthers fused by entire adaxial

surfaces, ca. 2.5 mm, glabrous; staminodes 2, ca. 4 mm. Pistil ca. 2.2 cm, puberulent; ovary ca. 1.1 cm. Stigma obtrapezoid, ca. 1.5 mm, 2-lobed. Capsule erect, ca. 3 cm. Fl. and fr. Aug.

• Known only from cultivation. Cultivated in the Medicinal Botanic Garden in Nanning, Guangxi; possibly introduced from Mt. Damingshan, Wuming Xian, Guangxi.

36. *Chirita heterotricha* Merrill, Lingnan Sci. J. 13: 71. 1934.

烟叶唇柱苣苔 *yan ye chun zhu ju tai*

Perennials. Rhizome apical internodes to 2.2 cm. Stem absent, or decumbent, to 25 × 3 cm, puberulent. Leaves basal or crowded at apex of stem, opposite; petiole 0.5–11 × 0.2–1.5 cm; leaf blade sometimes oblique, narrowly elliptic to oblong, obovate, or ovate, 3–23 × 1.5–13 cm, herbaceous to papery, adaxially sparsely puberulent and sparsely pilose, eglandular, abaxially sparsely pubescent, base sometimes oblique, cuneate to attenuate and decurrent, seldom truncate-cordate, margin entire to indistinctly denticulate, apex acute to obtuse; lateral veins 4–7 on each side of midrib, inconspicuous. Cymes 2–15-flowered; peduncle 4.4–21 cm, puberulent to spreading pilose and glandular puberulent; bracts 2, free, elliptic to ovate or narrowly triangular, 0.9–25 × 0.2–9 mm, pubescent, margin entire, apex acute to acuminate. Pedicel (0.3–)1.5–6 cm, puberulent to spreading pilose. Calyx 5-sect from or near base; segments equal, linear-lanceolate to narrowly triangular, 0.7–1.7 cm × 0.5–1.2 mm, outside sparsely to densely puberulent and glandular puberulent, inside puberulent, margin entire, apex acute to attenuate. Corolla purplish to white with a purple spot below adaxial lip, 3–4 cm, outside sparsely puberulent to puberulent, inside glandular or puberulent on adaxial lip; tube nearly tubular, 2.4–2.8 × 0.8–1.2 cm; adaxial lip 3–5 mm; abaxial lip 7–12 mm. Filaments ca. 1 cm, sparsely puberulent; anthers fused by entire adaxial surfaces, 2.2–3 mm, glabrous; staminodes 2 or 3, 3–4 mm. Pistil 2–2.6 cm, puberulent and glandular puberulent; ovary ca. 1.2 cm. Stigma cuneate to narrowly oblong, 2–4 mm, 2-lobed or undivided. Capsule erect, 4.5–9 cm. Fl. Apr–Oct, fr. May–Oct.

• Rocky streamsides in forested valleys; 400–600 m. Hainan.

37. *Chirita fordii* (Hemsley) D. Wood, Notes Roy. Bot. Gard. Edinburgh 31: 371. 1972.

桂粤唇柱苣苔 *gui yue chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 0.5–5 cm × 2–5 mm; leaf blade ovate to elliptic or obovate, 5.5–11 × 2.5–7 cm, herbaceous, adaxially appressed puberulent (hairs 0.2–0.9 mm) and sparsely villous (hairs 2–5 mm), eglandular, abaxially densely puberulent and appressed pilose, base slightly oblique, cuneate to nearly rounded,

margin entire to shallowly crenate or denticulate, apex obtuse to abruptly acuminate; lateral veins ca. 4 on each side of midrib, inconspicuous. Cymes 2–8-flowered; peduncle 3.5–13 cm, spreading pubescent to pilose; bracts 2, free, linear-lanceolate to narrowly triangular, 3–9 × 0.5–2 mm, pubescent to pilose, margin entire, apex obtuse to acute. Pedicel 3–16 mm, pubescent to spreading pilose. Calyx 5-sect from base; segments equal, lanceolate-linear to narrowly triangular, 3.5–9 × 0.8–1.5 mm, outside pubescent to pilose, inside glabrous to puberulent, margin entire, apex obtuse to acute. Corolla pink to purple with a purple spot on adaxial lip, 2.1–3.9 cm, outside sparsely puberulent, inside sparsely pubescent on purple spot and lines; tube nearly tubular, 1.5–2.6 cm × 6–8 mm; adaxial lip 3–5.5 mm; abaxial lip 7–9 mm. Filaments 7–11 mm, sparsely puberulent; anthers fused by entire adaxial surfaces, 2.5–3.5 mm, glabrous to sparsely puberulent; staminal nodes 2, ca. 5 mm. Pistil 1.2–3.7 cm, puberulent; ovary 0.6–1.7 cm. Stigma cuneate to linear, 1–3.5 mm, 2-lobed. Capsule erect, 1.4–3 cm. Fl. Apr, Jul, Aug, fr. Aug–Oct.

• Rocky streamsides in forested valleys; 400–1100 m. N and S Guangdong, E Guangxi, Guizhou, NW Hunan, E and SE Sichuan.

- 1a. Leaf blade adaxially with shorter (0.3–0.9 mm) and longer (2–4 mm) hairs; calyx segments 0.8–1 mm wide; anthers glabrous ... 37a. var. *fordii*
1b. Leaf blade adaxially with shorter (0.8–1.5 mm) and longer (4–5 mm) hairs; calyx segments 1–1.5 mm wide; anthers sparsely puberulent 37b. var. *dolichotricha*

37a. *Chirita fordii* var. *fordii*

桂粤唇柱苣苔(原变种) *gui yue chun zhu ju tai* (yuan bian zhong)

Didymocarpus fordii Hemsley in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 229. 1890; *Chirita longistyla* W. T. Wang.

Leaf blade adaxially with shorter (0.3–0.9 mm) and longer (2–4 mm) hairs. Calyx segments 0.8–1 mm wide. Anthers glabrous.

• Rocky streamsides in valleys; ca. 400 m. N Guangdong, E Guangxi (Cangwu Xian), Guizhou, NW Hunan, E and SE Sichuan.

37b. *Chirita fordii* var. *dolichotricha* (W. T. Wang) W. T. Wang, Guihaia 12: 296. 1992.

鼎湖唇柱苣苔 *ding hu chun zhu ju tai*

Chirita guelinensis W. T. Wang var. *dolichotricha* W. T. Wang, Bull. Bot. Res., Harbin 2(4): 50. 1982.

Leaf blade adaxially with shorter (0.8–1.5 mm) and longer (4–5 mm) hairs. Calyx segments 1–1.5 mm wide. Anthers sparsely puberulent.

• Rocks along streamsides in forested valleys. S Guangdong (Zhaqing Xian).

38. *Chirita carnosifolia* C. Y. Wu ex H. W. Li, Bull. Bot. Res., Harbin 3(2): 36. 1983.

肉叶唇柱苣苔 *rou ye chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 1–3 cm × 4–5 mm; leaf blade narrowly elliptic to oblong, 9–12 × 3–6 cm, papery, densely appressed puberulent, eglandular, base attenuate, margin entire to repand, apex obtuse; lateral veins 4–7 on each side of midrib, inconspicuous. Cymes ca. 10-flowered; peduncle 4.5–11 cm, spreading pubescent; bracts 2, free, linear-lanceolate, 4–9 × ca. 1.5 mm, pubescent, margin entire, apex obtuse. Pedicel to 1 cm in fruit, spreading pubescent. Persistent calyx 5-sect from base; segments equal, linear, 5–8 × ca. 1 mm, outside densely puberulent, inside pubescent only near apex, margin entire, apex acute. Corolla, stamens, and pistil unknown. Capsule erect, 2.5–3.5 cm; persistent stigma 2-lobed. Fr. Jun.

• Rocks in rainforest valleys; 300–1100 m. SE Yunnan (Malipo Xian).

39. *Chirita roseoalba* W. T. Wang, Bull. Bot. Res., Harbin 1(4): 44. 1981.

粉花唇柱苣苔 *fen hua chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 2.5–5 × 0.7–1.5 cm; leaf blade slightly oblique, ovate, 6.8–12.5 × 4–8 cm, herbaceous, sparsely strigose, eglandular, base oblique, broadly cuneate, margin crenulate to remotely dentate, apex obtuse; lateral veins 3 or 4 on each side of midrib, inconspicuous. Cymes 3–6-flowered; peduncle 9–13 cm, puberulent; bracts 2, free, linear-lanceolate, 1.1–1.3 cm × 2.2–3 mm, strigose, margin entire, apex acute. Pedicel 1–2.5 cm, puberulent and glandular puberulent. Calyx 5-sect from base; segments equal, linear-lanceolate, 4–6 × 0.8–1 mm, outside puberulent and glandular puberulent, inside glabrous, margin entire, apex acute. Corolla white to pinkish, ca. 4 cm, outside sparsely puberulent, inside puberulent on adaxial lip; tube funnellform-tubular, ca. 2.4 × 1.2 cm; adaxial lip ca. 7 mm; abaxial lip ca. 1.5 cm. Filaments ca. 1.1 cm, base sparsely pubescent, apex sparsely glandular puberulent; anthers fused by entire adaxial surfaces, ca. 3 mm, sparsely puberulent; staminal nodes 2, ca. 6 mm. Pistil ca. 2.8 cm; ovary ca. 1.5 cm, puberulent. Style glandular puberulent; stigma cuneate, ca. 2 mm, 2-lobed. Fruit and seeds unknown. Fl. Jul.

• Streamside thickets in valleys. NW Hunan (Dayong Xian).

40. *Chirita pteropoda* W. T. Wang, Bull. Bot. Res., Harbin 5(3): 51. 1985.

翅柄唇柱苣苔 *chi bing chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 1.4–8 × 0.8–3 cm; leaf blade elliptic-ovate to elliptic, 6–24 × 4.4–16 cm, papery, sparsely puberulent, eglandular,

base broadly cuneate and decurrent into broad wings of petiole, margin repand-denticulate to shallowly crenate, apex acute to rounded; lateral veins ca. 6 on each side of midrib, conspicuous. Cymes 5–19-flowered; peduncle 15–30 cm, glandular puberulent and sparsely puberulent; bracts 2, free, lanceolate to narrowly triangular, 1–1.3 cm × 2.5–4 mm, pubescent, margin entire, apex acute. Pedicel 1–3.8 cm, glandular puberulent. Calyx 5-sect from base; segments equal, lanceolate-linear, 1–1.2 cm × ca. 2 mm, outside puberulent and glandular puberulent, inside puberulent, margin entire, apex acute. Corolla white to purplish with 1 purple spot below adaxial lip, 3.6–4 cm, outside glandular puberulent, inside puberulent only on purple spot; tube nearly tubular, 2.5–2.8 × ca. 1 cm; adaxial lip 4.5–6 mm; abaxial lip 1.1–1.2 cm. Filaments ca. 1.2 cm, glandular puberulent only near apex; anthers fused by entire adaxial surfaces, ca. 2 mm, glabrous; staminodes 3, central ca. 0.5 mm, laterals 4.5–5 mm. Pistil 2.2–2.5 cm, densely glandular puberulent; ovary 1.3–1.6 cm. Stigma oblong, ca. 2 mm, 2-lobed. Fruit and seeds unknown. Fl. Nov.

• Known only from cultivation. Cultivated at the South China Institute of Botany in Guangzhou, Guangdong; possibly introduced from Guangxi.

41. *Chirita juliae* Hance, J. Bot. 21: 168. 1883.

大齿唇柱苣苔 *da chi chun zhu ju tai*

Chirita gueilinensis W. T. Wang var. *brachycarpa* W.

T. Wang; *C. mangshanensis* W. T. Wang; *C.*

mangshanensis var. *lasiandra* W. T. Wang;

Didymocarpus juliae (Hance) H. Léveillé; *Roettlera*

juliae (Hance) Kuntze.

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 3–17 × 0.4–1.3 cm; leaf blade ovate to elliptic, 6–15 × 4.4–9 cm, herbaceous, appressed puberulent, eglandular, base narrowly cuneate to subtruncate, margin dentate to pinnately lobed basally or crenate, apex acute to rounded; lateral veins 4 or 5 on each side of midrib, inconspicuous. Cymes 2–12-flowered; peduncle 4–11 cm, spreading puberulent; bracts 2, free, lanceolate-linear, 5–13 × 0.6–1.2 mm, puberulent, margin entire, apex acute. Pedicel 1–15 mm, pubescent. Calyx 5-sect from base; segments equal, subulate to lanceolate, 4–13 × 0.6–1.5 mm, puberulent, margin entire, apex acute. Corolla blue to purple, 3.5–4.5 cm, outside sparsely puberulent, inside nearly glabrous; tube nearly tubular to funnellform-tubular, 2.2–3.3 × 0.8–1.5 cm; adaxial lip 7–8 mm; abaxial lip 1–1.2 cm. Filaments 1–1.3 cm, glabrous to glandular puberulent near apex; anthers fused by entire adaxial surfaces, 3.2–3.5 mm, glabrous; staminodes 2, 4–5.5 mm. Pistil 3–3.2 cm, puberulent; ovary 4–8 mm. Stigma narrowly oblong, ca. 5 mm, 2-lobed. Capsule erect, 0.9–1.3 cm. Fl. Jul–Oct, fr. Oct.

• Shaded streamside rocks in hilly regions; 300–600 m. W Fujian (Ninghua Xian), N Guangdong, SE Hunan, NE Jiangxi (Guangfeng Xian).

42. *Chirita cruciformis* (W. Y. Chun) W. T. Wang, Bull. Bot. Res., Harbin 1(4): 45. 1981.

十字唇柱苣苔 *shi zi chun zhu ju tai*

Didymocarpus cruciformis W. Y. Chun, Sunyatsenia 6: 296. 1946.

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 5–10 × 4–10 mm; leaf blade ovate to orbicular-ovate, 5–8 × 4–7 cm, papery, densely appressed puberulent and appressed pilose (hairs to 1 mm and to 3 mm), eglandular, base broadly cuneate, margin subentire to repand-crenate, apex acute to rounded; lateral veins ca. 4 on each side of midrib, inconspicuous. Cymes ca. 2-flowered; peduncle 4–6 cm, spreading pilose; bracts 2, seldom 3, free, linear-lanceolate to narrowly triangular, 4–9 × 1–2 mm, densely puberulent and pilose, margin entire, apex acute. Pedicel 1–2.3 cm, densely glandular puberulent and pilose. Calyx 5-sect from base; segments equal, linear-lanceolate, 5–7 × 0.8–1 mm, outside puberulent, inside glabrous, margin entire, apex subulate-acuminate. Corolla purple, 3.5–4 cm, outside sparsely pubescent, inside puberulent on 2 longitudinal lines; tube narrowly funnellform, ca. 2.2 × 1 cm; adaxial lip ca. 8 mm; abaxial lip ca. 1.5 cm. Filaments ca. 8 mm, glabrous; anthers fused by entire adaxial surfaces, 3–4 mm, pilose; staminode 1, ca. 4 mm. Pistil ca. 2.5 cm, puberulent; ovary ca. 2 cm. Stigma cuneate, ca. 2 mm, 2-lobed. Fruit and seeds unknown.

• Hunan (Hengyang Xian).

Only known from the type specimen.

43. *Chirita crassituba* W. T. Wang, Bull. Bot. Res., Harbin 9(4): 24. 1989.

粗筒唇柱苣苔 *cu tong chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole to 2.5 cm × 7 mm; leaf blade orbicular-ovate to nearly orbicular, to 4.8 × 5.8 cm, thin papery, puberulent, eglandular, base broadly cuneate, margin obtusely dentate to undulate, apex rounded to obtuse; lateral veins ca. 3 on each side of midrib, inconspicuous. Cymes 1–3-flowered; peduncle ca. 4.5 cm, puberulent; bracts 2, free, ovate-triangular, ca. 4 × 1.6–1.8 mm, puberulent, margin entire, apex obtuse. Pedicel ca. 2 cm, villous. Calyx 5-sect from base; segments equal, lanceolate-linear, ca. 7 × 1.3 mm, outside puberulent, inside glabrous, margin entire, apex acute to obtuse. Corolla red, ca. 4.5 cm, outside sparsely puberulent, inside puberulent below adaxial lip; tube broadly tubular, ca. 3 × 1.8 cm; adaxial lip ca. 1 cm; abaxial lip ca. 1.6 cm. Filaments ca. 8.5 mm, glandular puberulent above; anthers fused by entire adaxial surfaces, ca. 4 mm, puberulent; staminodes 3, central ca. 7 mm, laterals ca.

1.4 cm. Pistil ca. 2.7 cm, puberulent; ovary ca. 1.4 cm. Stigma obtriangular, ca. 3 mm, 2-parted. Capsule erect, ca. 6 cm. Fl. Apr, fr. Jun.

• Dense slope forests; ca. 900 m. S Hunan (Shuangpai Xian).

44. *Chirita sclerophylla* W. T. Wang, Bull. Bot. Res., Harbin 1(4): 46. 1981.

硬叶唇柱苣苔 *ying ye chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 1.2–5.5 cm × 5–8 mm; leaf blade slightly oblique, elliptic to ovate, 7.5–10 × 4.2–5.2 cm, leathery to papery, adaxially densely strigose (hairs mixed 0.15–1.2 mm), eglandular, abaxially appressed puberulent, base cuneate to rounded, margin crenate to subentire, apex acute to obtuse; lateral veins 4 or 5 on each side of midrib, inconspicuous. Cymes 5–10-flowered; peduncle 8–26 cm, villous; bracts 2, free, linear-lanceolate, ca. 1.4 cm × 1 mm, puberulent, margin entire, apex acute to acuminate. Pedicel 0.7–2 cm, puberulent and glandular puberulent. Calyx 5-sect from base; segments equal, lanceolate to narrowly triangular, 4–8 × 1–2 mm, outside puberulent to pilose, inside glabrous, margin entire, apex acuminate. Corolla pink to purplish with a purple spot, 3.7–4.6 cm, outside sparsely glandular puberulent, inside sparsely pubescent basally and on purple spot; tube nearly tubular, 2.2–2.5 × 0.9–1.3 cm; adaxial lip 0.8–1 cm; abaxial lip 1.2–2 cm. Filaments ca. 1.3 cm, glandular puberulent; anthers fused by entire adaxial surfaces, ca. 3.8 mm, pubescent; staminodes 2, ca. 4 mm. Pistil ca. 2.5 cm, puberulent and glandular puberulent; ovary ca. 1.8 cm. Stigma trapezoid, ca. 1.2 mm, 2-lobed. Fruit and seeds unknown. Fl. Apr–May.

• Shaded, stony cliffs of limestone hills; ca. 200 m. Guangxi (Du'an Xian, Yishan Xian).

45. *Chirita brachytricha* W. T. Wang & D. Y. Chen in W. T. Wang, Bull. Bot. Res., Harbin 5(3): 54. 1985.

短毛唇柱苣苔 *duan mao chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 0.4–3 × 0.9–1.3 cm; leaf blade slightly oblique, broadly ovate to ovate, 2–15 × 2–12 cm, papery, sparsely puberulent (hairs 0.15–0.25 and 0.8–1 mm), eglandular, base oblique, truncate-rounded to broadly cuneate, margin crenate to dentate to repand, apex rounded to acute; lateral veins 4–6 on each side of midrib, inconspicuous. Cymes 3–6-flowered; peduncle 7–9 cm, densely purple puberulent; bracts 2, free, linear to ovate, 4–8(–18) × 2.8–3.5(–6) mm, pubescent to ciliate, margin entire, apex obtuse. Pedicel 3.5–12 mm, purple puberulent and glandular puberulent. Calyx 5-sect from base; segments equal, triangular-linear, ca. 7 × 1.5–2.5 mm, outside puberulent, inside glabrous, margin entire, apex obtuse. Corolla purple, ca. 3.2 cm, outside puberulent, inside puberulent in lines; tube funnellform-tubular, ca. 2 × 1

cm; adaxial lip ca. 7 mm; abaxial lip ca. 1.1 cm. Filaments ca. 1.2 cm, glandular puberulent above; anthers fused by entire adaxial surfaces, ca. 3.5 mm, bearded; staminodes 2, ca. 6 mm. Pistil ca. 2.6 cm, pubescent; ovary ca. 1.6 cm. Stigma cuneate, ca. 3 mm, 2-lobed. Fruit and seeds unknown. Fl. Apr–May.

• Damp rocky crevices in forests of hilly regions, rocks in forested valleys; 400–1000 m. SE Guizhou (Libo Xian).

1a. Leaf blade 2–8.5 × 2–6.6 cm, apex rounded; bracts 4–8 × 2.8–3.5 mm; calyx segments purple puberulent outside 45a. var. *brachytricha*

1b. Leaf blade to 15 × 12 cm, apex obtuse; bracts to 18 × 6 mm; calyx segments white puberulent outside 45b. var. *magnibracteata*

45a. *Chirita brachytricha* var. *brachytricha*

短毛唇柱苣苔(原变种) *duan mao chun zhu ju tai*
(yuan bian zhong)

Leaf blade 2–8.5 × 2–6.6 cm, apex rounded. Bracts 4–8 × 2.8–3.5 mm. Calyx segments outside purple puberulent.

• Damp rocky crevices in forests of hilly regions; 400–1000 m. SE Guizhou (Libo Xian).

45b. *Chirita brachytricha* var. *magnibracteata* W. T. Wang & D. Y. Chen ex W. T. Wang, Bull. Bot. Res., Harbin 5(3): 55. 1985.

大苞短毛唇柱苣苔 *da bao duan mao chun zhu ju tai*
Leaf blade to 15 × 12 cm, apex obtuse. Bracts to 18 × 6 mm. Calyx segments outside white puberulent.

• Rocks in forested valleys; ca. 700 m. SE Guizhou (Libo Xian).

46. *Chirita liboensis* W. T. Wang & D. Y. Chen in W. T. Wang, Bull. Bot. Res., Harbin 5(3): 56. 1985.

荔波唇柱苣苔 *li bo chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 1–4.5 cm × 1.5–5 mm; leaf blade oblique, elliptic to ovate, 4–10 × 2–4.5 cm, leathery, sparsely puberulent, eglandular, base oblique, cuneate to broadly cuneate, margin entire to repand, apex acute to rounded; lateral veins 3 or 4 on each side of midrib, inconspicuous. Cymes 7–11-flowered; peduncle ca. 12 cm, purple puberulent; bracts 2, free, narrowly ovate, 1.3–2 cm × 3.5–5 mm, sparsely puberulent, margin entire, apex obtuse. Pedicel 1.5–15 mm, purple puberulent. Calyx 5-sect from base; segments equal, lanceolate-linear, ca. 7 × 1.2–1.5 mm, purplish puberulent, margin indistinctly denticulate, apex obtuse. Corolla blue-purple, ca. 2.7 cm, outside puberulent, inside puberulent on limb; tube funnellform-tubular, ca. 1.7 × 0.8 cm; adaxial lip ca. 4 mm; abaxial lip ca. 1 cm. Filaments ca. 1 cm, glandular puberulent apically; anthers fused by entire adaxial surfaces, ca. 3.8 mm, bearded; staminodes 2, ca. 3 mm. Pistil ca. 1.9 cm, puberulent; ovary ca. 1.3 cm. Stigma oblong, ca. 1.5 mm, 2-lobed. Fruit and seeds unknown. Fl. May.

•Rocks in forests of hilly regions; ca. 400 m. SE Guizhou (Libo Xian).

47. *Chirita glabrescens* W. T. Wang & D. Y. Chen in W. T. Wang, Bull. Bot. Res., Harbin 5(3): 57. 1985.

少毛唇柱苣苔 shao mao chun zhu ju tai

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 0.5–5 cm × 3.5–4.5 mm; leaf blade oblique, oblong to narrowly oblong, 4–12 × 1.9–3.5 cm, papery, adaxially puberulent near margin, eglandular, abaxially sparsely appressed puberulent, base oblique, cuneate, margin repand to entire, apex acute to rounded; lateral veins 3–5 on each side of midrib, inconspicuous. Cymes 3–11-flowered; peduncle 9–13 cm, sparsely purple puberulent; bracts 2, free, ovate, 0.9–18 cm × 4–9 mm, sparsely puberulent, margin entire, apex obtuse. Pedicel 0.15–12 mm, spreading purple puberulent. Calyx 5-sect from base; segments equal, lanceolate-linear, ca. 6 × 0.8 mm, outside puberulent, inside glabrous, margin entire, apex acute to acuminate. Corolla purple, ca. 2.8 cm, sparsely puberulent; tube funnelform-tubular, ca. 1.9 × 0.7 cm; adaxial lip ca. 4 mm; abaxial lip ca. 8 mm. Filaments ca. 1.1 cm, margin sparsely puberulent; anthers fused by entire adaxial surfaces, ca. 2.8 mm, bearded; staminodes 2, ca. 6 mm. Pistil ca. 2.3 cm, puberulent; ovary ca. 1.5 cm. Stigma cuneate, ca. 3 mm, 2-lobed. Fruit and seeds unknown. Fl. May.

•Rocks in forested valleys; ca. 900 m. SE Guizhou (Libo Xian).

48. *Chirita subrhomboidea* W. T. Wang, Bull. Bot. Res., Harbin 1(4): 47. 1981.

菱叶唇柱苣苔 ling ye chun zhu ju tai

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 0.4–2.5 cm × 2–4.5 mm; leaf blade rhomboid-ovate to elliptic, broadly ovate, or spatulate, 3–7 × 1.5–3.7 cm, leathery, adaxially sparsely strigose, eglandular, abaxially sparsely pubescent, base cuneate to broadly cuneate, margin repand to subentire, apex rounded to acute; lateral veins ca. 3 on each side of midrib, inconspicuous. Cymes 1–3-flowered; peduncle 5.5–8 cm, densely purple puberulent and pilose; bracts 2, free, narrowly ovate to triangular, 4–6 × 2–3 mm, puberulent and pilose, margin entire, apex acute to obtuse. Pedicel 0.8–1.4 cm, densely pubescent and pilose. Calyx 5-sect from base; segments equal, narrowly lanceolate, 6–7 × 1–1.2 mm, outside puberulent and pilose, inside nearly glabrous, margin 1- or 2-denticulate apically, apex acute to obtuse. Corolla purple, ca. 4.5 cm, outside puberulent, inside puberulent below adaxial lip; tube broadly funnelform, ca. 3 × 1.4 cm; adaxial lip ca. 9 mm; abaxial lip ca. 1.5 cm. Filaments ca. 1.2 cm, apically sparsely puberulent; anthers fused by entire adaxial surfaces, ca. 3.5 mm, villous; staminodes 2, ca. 7 mm. Pistil ca. 3.3 cm, densely puberulent; ovary ca. 1.5 cm. Stigma obtrapeziform, ca. 4 mm, 2-parted. Fruit and seeds unknown.

•N Guangxi (Guilin Xian).

49. *Chirita rotundifolia* (Hemsley) D. Wood, Notes Roy. Bot. Gard. Edinburgh 31: 371. 1972.

卵圆唇柱苣苔 luan yuan chun zhu ju tai

Didymocarpus rotundifolius Hemsley in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 230. 1890.

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 1–4.5 cm × ca. 2 mm; leaf blade orbicular-ovate to orbicular-reniform, 1.6–4.9 × 1.6–5.3 cm, herbaceous, adaxially appressed pilose (hairs to 5 mm), eglandular, base cordate, margin entire to shallowly crenate, apex rounded; lateral veins 3 or 4 on each side of midrib, inconspicuous. Cymes 2–7-flowered; peduncle 4.5–13 cm, pilose; bracts 2, free, narrowly triangular, 4–6 × 0.8–1 mm, puberulent, margin entire, apex acute. Pedicel 1.7–7 cm, glandular puberulent, puberulent, and spreading pilose. Calyx 5-sect from base; segments equal, narrowly triangular to lanceolate-linear, 4–5 × ca. 1 mm, outside pilose, inside pubescent, margin entire, apex attenuate. Corolla purple, 2.3–2.7 cm, outside sparsely puberulent, inside apically pubescent; tube nearly tubular, 1.2–1.7 cm × ca. 8 mm; adaxial lip ca. 5 mm; abaxial lip 7–10 mm. Filaments ca. 7 mm, glandular apically; anthers fused by entire adaxial surfaces, ca. 2 mm, glandular; staminodes 2, ca. 3 mm. Pistil 1.2–1.6 cm, densely glandular puberulent; ovary ca. 7 mm. Stigma obtrapeziform, ca. 1 mm, 2-lobed. Capsule erect, 3–3.5 cm. Fl. and fr. Nov.

•N Guangdong.

50. *Chirita parvifolia* W. T. Wang, Bull. Bot. Res., Harbin 1(4): 50. 1981.

小叶唇柱苣苔 xiao ye chun zhu ju tai

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 1–1.4 cm × ca. 1.2 mm; leaf blade broadly elliptic to ovate, 1.7–3 × 1.3–1.9 cm, leathery, densely brownish appressed puberulent, eglandular, base rounded, margin entire, apex rounded; lateral veins invisible. Cymes 1-flowered; peduncle 5.3–5.6 cm, densely appressed puberulent; bracts 2, free, obovate to elliptic, 8–11 × ca. 4 mm, appressed puberulent, margin entire, apex obtuse. Pedicel ca. 8 mm, densely spreading glandular puberulent. Calyx 5-sect from base; segments equal, linear-lanceolate to lanceolate, 5–6 × 0.8–2.2 mm, outside puberulent, inside glabrous, margin entire, apex acute. Corolla purple-red, ca. 2.7 cm, outside sparsely puberulent basally, inside glabrous; tube narrowly funnelform, ca. 1.7 × 1.1 cm; adaxial lip ca. 6 mm; abaxial lip ca. 9 mm. Filaments ca. 1.1 cm, puberulent; anthers fused by entire adaxial surfaces, ca. 2 mm, glabrous; staminodes 2, ca. 5 mm. Pistil ca. 2.4 cm, puberulent; ovary ca. 1.5 cm. Stigma obdeltooid, ca. 1.5 mm, 2-lobed. Fruit and seeds unknown. Fl. Oct.

• Limestone hills. Guangxi (Gui Xian).

51. *Chirita yungfuensis* W. T. Wang, *Guihaia* 7: 125. 1987.

永福唇柱苣苔 *yong fu chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole (0.5–)1–3 cm × ca. 3 mm; leaf blade elliptic to ovate, (1.4–)2.3–3.2 × (1.1–)1.7–2.4 cm, leathery, purple puberulent to pilose (hairs 0.3–4 mm adaxially, 0.5–2 mm abaxially), eglandular, base broadly cuneate, margin crenate to repand, apex acute to rounded; lateral veins ca. 3 on each side of midrib, inconspicuous.

Cymes 2–4-flowered; peduncle 4.5–9 cm, purple villous; bracts 2, free, narrowly ovate to elliptic, 7–12 × 5–7 mm, purple pubescent, margin entire, apex obtuse. Pedicel 1–1.8 cm, densely puberulent. Calyx 5-sect from base; segments equal, lanceolate-linear to narrowly triangular, 5.5–7 × 1.2–2.2 mm, puberulent, margin entire, apex acute. Corolla purplish, 3.8–4.6 cm, outside puberulent, inside basally puberulent with very short hairs; tube tubular, 2.5–3 × 1–1.3 cm; adaxial lip ca. 7 mm; abaxial lip 1.2–1.7 cm. Filaments ca. 1.1 cm, glabrous; anthers fused by entire adaxial surfaces, 4–5 mm, bearded; staminodes 2, ca. 7.5 mm. Pistil ca. 3.2 cm, densely puberulent; ovary ca. 1.4 cm. Stigma linear, ca. 3 mm, 2-lobed. Fruit and seeds unknown. Fl. May.

• Shaded areas on limestone hills. Guangxi (Yongfu Xian).

52. *Chirita cordifolia* W. T. Wang, *Bull. Bot. Res.*, Harbin 1(4): 51. 1981.

心叶唇柱苣苔 *xin ye chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 3–17.5 cm × ca. 2 mm; leaf blade ovate to obovate or reniform, 2–6.8 × 2–6.8 cm, herbaceous, puberulent, eglandular, base cordate, margin irregularly repand-crenate to dentate to serrate, apex acute to rounded; lateral veins 3–5 on each side of midrib, slightly conspicuous. Cymes 1-flowered; peduncle ca. 3.5 cm, white villous; bracts 2, free, linear-lanceolate, 6–9 × 1–1.2 mm, puberulent and glandular puberulent, margin entire, apex acute. Pedicel ca. 1 cm, densely puberulent. Calyx 5-sect from base; segments equal, linear-lanceolate, ca. 1.3 cm × 1.2–1.5 mm, outside puberulent and glandular, inside strigose, margin entire, apex attenuate. Corolla pink, 4–4.5 cm, outside puberulent, inside puberulent basally and on limb; tube narrowly funnelform, ca. 2.8 × 1.1 cm; adaxial lip ca. 7 mm; abaxial lip ca. 1.4 cm. Filaments ca. 1.4 cm, glabrous; anthers fused by entire adaxial surfaces, ca. 5 mm, villous; staminodes 2, ca. 8.5 mm. Pistil ca. 2.7 cm, puberulent; ovary ca. 2 cm. Stigma cuneate, ca. 2 mm, 2-lobed. Fruit and seeds unknown. Fl. Jul.

• Among shaded rocks on limestone hills; ca. 200 m. Guangxi (Yangshuo Xian).

53. *Chirita bicolor* W. T. Wang, *Bull. Bot. Res.*, Harbin 5(3): 59. 1985.

二色唇柱苣苔 *er se chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 1.5–4 cm × 3–5 mm; leaf blade oblique, narrowly oblong to narrowly elliptic, often falcate, 4–13 × 1.3–3 cm, papery, adaxially densely appressed puberulent, eglandular, abaxially white velutinous, base attenuate, margin entire, apex acute to obtuse; lateral veins 5 or 6 on each side of midrib, inconspicuous. Cymes 2-flowered; peduncle 8–13 cm, puberulent to velutinous; bracts 2, free, linear to triangular or ovate, 5–12 × 1.5–2.5 mm, densely puberulent to velutinous, margin entire, apex acute. Pedicel 6–12(–18) mm, pilose and sparsely glandular puberulent. Calyx 5-sect from base; segments equal, lanceolate-linear to narrowly triangular, 4–7 × 1.2–2 mm, outside densely pubescent to pilose, inside puberulent near apex, margin entire, apex acute. Corolla purplish, ca. 3.6 cm, outside sparsely pilose, inside puberulent below stamens; tube narrowly funnelform, ca. 2.2 × 1 cm; adaxial lip ca. 6 mm; abaxial lip ca. 1.3 cm. Filaments ca. 1 cm, glabrous; anthers fused by entire adaxial surfaces, 3–5 mm, bearded; staminodes absent. Pistil ca. 2.5 cm, puberulent; ovary ca. 1.5 cm. Stigma cuneate, ca. 3 mm, 2-lobed. Capsule erect, 5–6 cm. Fl. Apr, fr. May.

• Rocks in hilly regions. Guangdong (Yunfu Xian).

54. *Chirita longgangensis* W. T. Wang in W. T. Wang & S. Z. Huang, *Guihaia* 2: 171. 1982.

岗唇柱苣苔 *long gang chun zhu ju tai*

Perennial, stemless. Rhizome with conspicuous internodes, 0.4–2 cm. Leaves basal, opposite or ternate, sessile or petiole to 10 × 5 mm; leaf blade narrowly elliptic or narrowly oblanceolate to oblong linear, 5–16 × 1–2.9 cm, papery to leathery, densely appressed puberulent and pilose, eglandular, base attenuate, margin entire, revolute, apex acute to acuminate; lateral veins 3–6 on each side of midrib, abaxially prominent. Cymes 2–15-flowered; peduncle 3–15 cm, glandular pilose to puberulent; bracts 2, free, linear to lanceolate or obovate, 4–20 × 0.5–6 mm, abaxially pilose to puberulent, margin entire, involute, apex acute. Pedicel 0.7–4 cm, glandular puberulent and pilose. Calyx 5-sect from base; segments equal, lanceolate-linear, 5–8 × 0.9–1.5 mm, outside minutely appressed puberulent and glandular puberulent, inside puberulent near apex, margin entire, apex attenuate. Corolla white to red-purple, 3.4–4 cm, outside glabrous to puberulent, inside puberulent or glabrous below stamens; tube narrowly funnelform, ca. 2 × 1 cm; adaxial lip ca. 8 mm; abaxial lip ca. 1.2 cm. Filaments ca. 1.4 cm, basally puberulent; anthers fused by entire adaxial surfaces, 3–4 mm, bearded; staminodes 3, central ca. 0.5 mm, laterals 5–7 mm. Pistil ca. 2.8 cm, densely pubescent to glandular

puberulent; ovary ca. 1.7 cm. Stigma obtrapeziform, ca. 2 mm, 2-lobed. Capsule erect, 1.6–2.5 cm. Fl. Sep–Dec.

• Rocks of forest margin on limestone hills; 200–300 m. SW Guangxi.

1a. Bracts lanceolate to ovate, 7–20 × 3–6 mm;

corolla white, outside glabrous, inside

puberulent below stamens 54a. var. *longgangensis*

1b. Bracts linear, 4–15 × 0.5–1.5 mm; corolla

purple-red, puberulent outside, glabrous

inside 54b. var. *hongyao*

54a. *Chirita longgangensis* var. *longgangensis*

岗唇柱苣苔(原变种) long gang chun zhu ju tai
(yuan bian zhong)

Bracts lanceolate to obovate, 7–20 × 3–6 mm.

Corolla white, outside glabrous, inside

puberulent below stamens.

• Rocks on forest margin on limestone hills; 200–300 m. SW Guangxi (Longzhou Xian).

54b. *Chirita longgangensis* var. *hongyao* S. Z. Huang in W.

T. Wang & S. Z. Huang, *Guihaia* 2: 173. 1982.

红药唇柱苣苔 hong yao chun zhu ju tai

Bracts linear, 4–15 × 0.5–1.5 mm. Corolla purple-red, outside puberulent, inside glabrous.

• Shaded rocky crevices on limestone hills. SW Guangxi (Tiandeng Xian).

The entire plant is used medicinally as a hematic tonic and is one of the raw materials of the medicine “guihuagao” made in Tiandeng Xian, Guangxi. The name “hong yao” means “red medicine.”

55. *Chirita linearifolia* W. T. Wang in W. T. Wang & K. Y. Pan, *Bull. Bot. Res.*, Harbin 2(2): 136. 1982.

线叶唇柱苣苔 xian ye chun zhu ju tai

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite, sessile; leaf blade linear to narrowly elliptic or narrowly oblanceolate, 3–8.3 cm × 4–8 mm, leathery, appressed pubescent, eglandular, base attenuate, margin entire, apex attenuate to acute; lateral veins 4 or 5 on each side of midrib, inconspicuous. Cymes 1–7-flowered; peduncle 5.5–15 cm, densely glandular puberulent and villous; bracts 2, free, lanceolate to ovate, 4–10 × 1.6–5 mm, puberulent to glabrous, margin entire, apex acute. Pedicel 5–12 mm, glandular puberulent. Calyx 5-sect from base; segments equal, linear-lanceolate, 3.2–4 × 0.6–1.1 mm, outside puberulent, inside glabrous, margin entire, apex attenuate. Corolla white to pale bluish, ca. 2.4 cm, outside puberulent, inside basally sparsely puberulent; tube narrowly funnelform, ca. 1.4 cm × 6–7 mm; adaxial lip ca. 4 mm; abaxial lip ca. 9 mm. Filaments ca. 1 cm, puberulent basally; anthers fused by entire adaxial surfaces, ca. 2.5 mm, bearded; staminodes 2, 7–8 mm. Pistil ca. 1.6 cm, glandular puberulent; ovary ca. 1 cm. Stigma obtrapeziform, ca. 0.5 mm, 2-parted. Capsule erect, 2.2–3.6 cm. Fl. Apr, fr. Jun.

• Rocks on limestone hills; 100–300 m. S Guangxi (Long'an Xian).

56. *Chirita sinensis* Lindley, *Edward's Bot. Reg.* 30: pl. 59. 1844.

唇柱苣苔 chun zhu ju tai

Chirita dryas Dunn; *C. sinensis* var. *angustifolia* Dunn;

C. sinensis var. *bodinieri* H. Léveillé; *Didymocarpus*

sinensis (Lindley) H. Léveillé; *Roettlera sinensis*

(Lindley) Kuntze.

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite or ternate; petiole 2–8(–19) cm × 2–5 mm; leaf blade ovate to elliptic, lanceolate, oblong, or suborbicular, sometimes falcate, 4–20 × 3.5–6.5(–9) cm, papery, appressed pubescent and pilose, eglandular, base attenuate to cordate, margin repand to crenate, rarely dentate to serrate, apex acuminate to rounded; lateral veins 3–5 on each side of midrib, inconspicuous. Cymes 1–12-flowered; peduncle 12–32 cm, spreading villous to pilose; bracts 2, free, ovate to lanceolate, 1–4 × 0.4–1.6 cm, pubescent to villous, margin entire or crenulate to serrulate, apex acute. Pedicel 0.8–2.5 cm, pubescent to pilose and glandular puberulent. Calyx 5-sect from base; segments equal, lanceolate to narrowly ovate, 3–6 × 1–2.5 mm, outside puberulent to pilose, inside glabrous, margin entire, apex acute to rounded. Corolla purple to white, inside tinged purple with 2 yellow longitudinal lines adaxially of tube, (2–)2.7–4.6 cm, outside sparsely pubescent to pilose, inside puberulent only on purple spot of adaxial lip; tube tubular to broadly funnelform, often gibbous abaxially, (1.5–)2–3.5 × 1.1–1.5 cm; adaxial lip 4–6 mm; abaxial lip 0.7–1.5 cm. Filaments 0.7–1.4 mm, puberulent; anthers fused by entire adaxial surfaces, ca. 3 mm, glabrous to pubescent; staminodes 2, 3–6 mm. Pistil 1.8–2.5 cm, puberulent to pilose and glandular pubescent; ovary 1–1.8 cm. Stigma obtrapeziform to oblong, 2–3 mm, 2-lobed. Capsule at ca. 90° to peduncle, 4–7.5 cm. Fl. May–Feb, fr. Aug–Feb.

• Wet shady places by streams or on rocks in valleys; 100–500 m. W Guangdong.

57. *Chirita pinnatifida* (Handel-Mazzetti) B. L. Burtt, *Notes Roy. Bot. Gard. Edinburgh* 23: 99. 1960.

羽叶唇柱苣苔 yu ye chun zhu ju tai

Didymocarpus pinnatifidus Handel-Mazzetti,

Sinensia 5: 8. 1934; *Chirita quercifolia* D.

Wood.

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 1.5–10 cm × 1–3 mm; leaf blade oblong to lanceolate or narrowly ovate, 3–20 × 1.5–7.8 cm, herbaceous, appressed puberulent to pilose, eglandular, base cuneate to broadly cuneate, margin irregularly pinnately lobed, apex acute to rounded; lateral veins 3–5 on each side of midrib, inconspicuous. Cymes 1–4-flowered; peduncle 4.5–20 cm, spreading villous to pilose; bracts 2, free, oblong to ovate or obovate, 5–14(–25) × 1.5–8(–10)

mm, pubescent to appressed pilose, margin denticulate to entire, apex acute. Pedicel 0.5–2 cm, pubescent to pilose and glandular puberulent. Calyx 5-sect from base; segments equal, linear-lanceolate to narrowly ovate or oblong, 3–7 × 1–3 mm, puberulent, margin 1- or 2(or 3)-denticulate, apex acute to rounded.

Corolla purple to white, tinged purple, 3.2–4.5 cm, outside sparsely puberulent, inside puberulent below adaxial lip; tube tubular-funnelform, sometimes gibbous abaxially, 1.8–2.8 × 0.9–1.3 cm; adaxial lip 6–10 mm; abaxial lip 1–1.5 cm. Filaments 1–1.1 cm, sparsely glandular puberulent; anthers fused by entire adaxial surfaces, 1.5–3.8 mm, glabrous to sparsely pubescent; staminodes 2, 2–4 mm. Pistil 2.4–3 cm, densely puberulent to nearly glabrous; ovary ca. 1.4 cm. Stigma oblong to obtrapeziform, 1–4 mm, 2-lobed. Capsule at ca. 90° to peduncle, 3–4 cm. Fl. May–Sep, fr. Aug–Nov.

•Rocks, streamsides in forested valleys; 600–2100 m. W Fujian, N Guangdong, Guangxi, S Hunan, Jiangxi, S and W Zhejiang.

58. *Chirita pinnata* W. T. Wang, Bull. Bot. Res., Harbin 4(1): 25. 1984.

复叶唇柱苣苔 *fu ye chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 1.5–5 cm × 1–2 mm; leaf blade deeply pinnately lobed, nearly compound, elliptic to narrowly ovate or oblanceolate, 3–15 × 2–6 cm, papery, sparsely appressed puberulent to pilose, eglandular, base cuneate, margin deeply dentate to pinnately lobed, lateral lobes 3–7 on each side of midrib, 0.4–4 cm, margin deeply crenate or serrate to entire, apex acuminate to rounded; lateral veins 3–10 on each side of midrib, inconspicuous. Cymes 1–3-flowered; peduncle 4–11 cm, spreading and appressed villous; bracts 2, free, oblong to elliptic or oblanceolate, 5–14 × 1.8–5 mm, sparsely pubescent, margin denticulate to entire, apex acute. Pedicel 4–10(–15) mm, spreading and appressed villous. Calyx 5-sect from base; segments equal, linear to narrowly oblong, 5–9 × 2–2.5 mm, outside puberulent to pilose, inside puberulent near apex, margin denticulate, apex acute to obtuse. Corolla purple, 4–4.5 cm, outside puberulent to sparsely pilose, inside basally puberulent; tube narrowly to broadly funnelform, often gibbous abaxially, ca. 2.7 × 1.2–1.5 cm; adaxial lip ca. 7 mm; abaxial lip ca. 1.5 cm. Filaments ca. 1 cm, sparsely glandular; anthers fused by entire adaxial surfaces, 3.8–4 mm, glabrous; staminodes 2, ca. 2 mm. Pistil ca. 3 cm, glandular puberulent to pilose; ovary ca. 9 mm. Stigma oblong, ca. 3 mm, emarginate. Capsule forming at angle of ca. 90° to peduncle, ca. 3–3.5 cm. Fl. and fr. May–Sep.

•Shaded rocks in montane regions; 700–1300 m. N Guangxi (Rongshui Xian).

59. *Chirita fangii* W. T. Wang, Bull. Bot. Res., Harbin 2(4): 51. 1982.

方氏唇柱苣苔 *fang shi chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 1.2–3.8 cm × 1–1.5 mm; leaf blade elliptic to ovate, 2.8–4 × 1.6–2.4 cm, thin papery, puberulent, eglandular, base cuneate to rounded, margin denticulate, apex acute; lateral veins ca. 3 on each side of midrib, inconspicuous. Cymes 1- or 2-flowered; peduncle 3–5 cm, puberulent; bracts 2, free, linear to lanceolate, 2–5 × 0.5–1 mm, puberulent, margin entire, apex acute. Pedicel 4–9 mm, puberulent. Calyx 5-sect from base; segments equal, lanceolate-linear, 6–7 × ca. 1.4 mm, outside puberulent, inside sparsely puberulent near apex, margin entire, apex attenuate. Corolla purple, ca. 2.8 cm, outside puberulent, inside puberulent on limb and below stamens; tube cylindric, ca. 2.3 cm × 7 mm; adaxial lip ca. 3.5 mm; abaxial lip ca. 7 mm. Filaments ca. 1.3 cm, glabrous; anthers fused by entire adaxial surfaces, ca. 3 mm, puberulent; staminodes 3, central ca. 0.2 mm, laterals 0.3–0.4 mm. Pistil ca. 2 cm, puberulent; ovary ca. 7 mm. Stigma narrowly oblong, ca. 2.5 mm, emarginate. Fruit and seeds unknown. Fl. Jun.

•Rocks in montane regions. E Sichuan (Kai Xian).

60. *Chirita vestita* D. Wood, Notes Roy. Bot. Gard. Edinburgh 31: 369. 1972.

细筒唇柱苣苔 *xi tong chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 0.2–3 cm × ca. 1.2 mm; leaf blade narrowly elliptic to narrowly obovate, 1.4–5.4 × 0.6–2.4 cm, thin papery, densely pubescent to appressed pilose, eglandular, base cuneate, margin repand-denticulate, apex acute; lateral veins ca. 3 on each side of midrib, inconspicuous. Cymes 1-flowered; peduncle ca. 1.2 cm, puberulent; bracts 2, free, linear, (1–)2.5–3 × ca. 0.3 mm, puberulent, margin entire, apex acute. Pedicel 3–5 mm, puberulent. Calyx 5-sect from base; segments equal, lanceolate-linear, 4–6 × 0.5–1 mm, outside puberulent to pilose, inside glabrous to pubescent, margin 2–4-denticulate to entire, apex acute to attenuate. Corolla purple, 2.5–3.4 cm, outside puberulent to sparsely puberulent, inside glabrous; tube cylindric, ca. 2.1 cm × 3–5 mm; adaxial lip ca. 6 mm; abaxial lip ca. 1.3 cm. Filaments ca. 5.5 mm, sparsely glandular puberulent; anthers fused by entire adaxial surfaces, ca. 3 mm, glabrous; staminodes 3, central ca. 0.4 mm, laterals 0.6–1 mm. Pistil ca. 2.2 cm, puberulent to pilose; ovary ca. 3.5 mm. Stigma cuneate, ca. 2.5 mm, 2-lobed. Fruit and seeds unknown. Fl. Jun.

•Rocks in shaded areas. Guizhou (Qingzhen Xian).

61. *Chirita secundiflora* (W. Y. Chun) W. T. Wang, Bull. Bot. Res., Harbin 2(4): 52. 1982.

清镇唇柱苣苔 *qing zhen chun zhu ju tai*

Didymocarpus secundiflorus W. Y. Chun, Sunyatsenia 6: 293. 1946.

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 1.2–3.4 cm × 1.5–2.5 mm; leaf blade broadly ovate to narrowly elliptic, 2.2–4 × 1.1–3 cm, papery, adaxially densely appressed villous and puberulent, eglandular, abaxially puberulent, base cuneate to nearly truncate, margin repand to indistinctly denticulate, apex acute to obtuse; lateral veins ca. 3 on each side of midrib, inconspicuous. Cymes 1–6-flowered; peduncle 2.4–4.5 cm, spreading pubescent; bracts 2, free, linear, 2.5–6.5 × ca. 1 mm, pubescent, margin entire, apex acute. Pedicel 3–7 mm, densely puberulent. Calyx 5-sect from base; segments equal, narrowly triangular to linear-lanceolate, ca. 4 × 0.8–1 mm, outside densely villous, inside puberulent, margin 1- or 2-denticulate, apex acute. Corolla purplish, ca. 2.2 cm, outside puberulent, inside puberulent on the limb; tube cylindrical, ca. 9 × 3.5 mm; adaxial lip ca. 3 mm; abaxial lip ca. 7 mm. Filaments ca. 3 mm, glabrous; anthers fused by entire adaxial surfaces, ca. 1.6 mm, glabrous; staminodes 3, central ca. 0.3 mm, laterals 0.6–0.8 mm. Pistil ca. 1 cm, puberulent; ovary ca. 3 mm. Stigma obdeltoid, ca. 2 mm, 2-parted. Capsule erect, 7–9 mm. Fl. May.

•Rocks in shaded areas. Guizhou (Qingzhen Xian).

62. *Chirita tenuituba* (W. T. Wang) W. T. Wang, Fl. Reipubl. Popularis Sin. 69: 388. 1990.

神农架唇柱苣苔 shen nong jia chun zhu ju tai

Deltocheilos tenuitubum W. T. Wang, Bull. Bot. Res., Harbin 1(3): 40. 1981; *Chirita shennungjiaensis* W. T. Wang.

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 3–9 × 1–1.2 mm; leaf blade ovate to suborbicular, 1–3.2 × 0.8–2.5 cm, papery, appressed pubescent to appressed pilose, eglandular, base broadly cuneate to nearly truncate, margin entire to repand-crenate, apex acute to rounded; lateral veins ca. 3 on each side of midrib, inconspicuous. Cymes 1–3-flowered; peduncle 0.6–1.4 cm, densely spreading pilose; bracts 2, free, narrowly triangular to lanceolate, 0.8–3 × 0.3–1 mm, puberulent to pilose, margin entire, apex acute. Pedicel 2–5.5 mm, densely spreading puberulent to pilose. Calyx 5-sect from base; segments equal, linear to narrowly triangular, 4.5–5.5 × 0.8–1.2 mm, outside puberulent to pilose, inside glabrous, margin entire, apex acute to obtuse. Corolla purple, 2–2.5 cm, outside sparsely puberulent, inside puberulent below abaxial lip; tube cylindrical, 1.3–1.8 cm × 2–5 mm; adaxial lip ca. 4 mm; abaxial lip 5–7.5 mm. Filaments 4.5–5.5 mm, glabrous; anthers fused by entire adaxial surfaces, 1.5–2 mm, glabrous; staminodes 2, 0.5–0.8 mm. Pistil 1.9–2.2 cm, puberulent; ovary 3.2–6 mm. Stigma obdeltoid, 1.5–3.5 mm, 2-parted. Capsule erect, 2–2.8 mm. Fl. Mar–May.

•Rocky crevices, cliffs in forests; 300–1000 m. Guizhou, W Hubei, W Hunan, SE Sichuan.

63. *Chirita speluncae* (Handel-Mazzetti) D. Wood, Notes Roy. Bot. Gard. Edinburgh 31: 370. 1972.

小唇柱苣苔 xiao chun zhu ju tai

Didymocarpus speluncae Handel-Mazzetti, Symb. Sin. 7: 1377. 1936; *D. minutus* Handel-Mazzetti (1936), not Kraenzlin (1927).

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 2–10 × 1–2 mm; leaf blade narrowly elliptic to elliptic, 1–2.2 cm × 5–9 mm, papery, densely pubescent, eglandular, base cuneate, margin entire, apex acute to rounded; lateral veins 2 or 3 on each side of midrib, inconspicuous. Cymes 1-flowered; peduncle 1.1–2.2 cm, densely spreading villous; bract 1, narrowly linear, ca. 1 × 0.3 mm, pubescent, margin entire, apex acute. Pedicel ca. 4 mm, puberulent. Calyx 5-sect from base; segments equal, lanceolate-linear, ca. 2 × 0.5 mm, outside densely villous, inside puberulent near apex, margin often 1-denticulate apically, apex acute. Corolla purple, ca. 1.2 cm, outside sparsely pubescent, inside nearly glabrous; tube cylindrical, ca. 6 × 2 mm; adaxial lip ca. 4 mm; abaxial lip ca. 6 mm. Filaments ca. 1.6 mm, glabrous; anthers fused by entire adaxial surfaces, ca. 1.2 mm, glabrous; staminode 1, ca. 0.3 mm. Pistil ca. 3.8 mm, puberulent; ovary ca. 1.7 mm. Stigma oblate, ca. 0.4 mm, undivided. Capsule erect, ca. 7 mm. Fl. Apr.

•Hilly regions; ca. 800 m. NE Yunnan.

64. *Chirita hedyotide* (W. Y. Chun) W. T. Wang, Bull. Bot. Res., Harbin 1(4): 65. 1981.

肥牛草 fei niu cao

Didymocarpus hedyotideus W. Y. Chun, Sunyatsenia 6: 291. 1946.

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole nearly absent to 2 cm × 1.5–3 mm; leaf blade elliptic to lanceolate, often falcate, 6.5–12 × 0.9–2.4 cm, leathery, appressed pilose, eglandular, base attenuate, margin entire, revolute, apex attenuate; lateral veins 3 or 4 on each side of midrib, conspicuous abaxially. Cymes 12–20-flowered; peduncle 5.5–21 cm, densely puberulent; bracts 2, free, narrowly elliptic to lanceolate, 3–5 × 1.5–2 mm, puberulent, margin entire, apex acute. Pedicel 2–5 mm, puberulent. Calyx ca. 1.5 mm, 5-lobed from middle; tube ca. 0.5 mm; lobes equal, broadly triangular, ca. 1 × 1 mm, outside puberulent, inside glabrous, margin entire, apex acute. Corolla purple, 0.9–1.5 cm, outside puberulent, inside glabrous; tube cylindrical, 7–10 × ca. 3 mm; adaxial lip ca. 2.5 mm; abaxial lip ca. 6 mm. Filaments ca. 6 mm, sparsely puberulent; anthers fused by entire adaxial surfaces, ca. 2 mm, glabrous; staminodes 2, ca. 4 mm. Pistil ca. 1 cm, puberulent;

ovary ca. 6 mm. Stigma obtrapeziform, ca. 1 mm, 2-lobed. Capsule erect, 2–3 cm. Fl. Aug–Oct, fr. Sep–Oct.

• Shaded rocks or cliffs in limestone hills; ca. 200 m. SW Guangxi (Longzhou Xian, Ningming Xian).

65. *Chirita wentsaii* D. Fang & L. Zeng, Acta Phytotax. Sin. 31: 466. 1993.

文采唇柱苣苔 wen cai chun zhu ju tai

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, crowded, sessile; leaf blade lanceolate-linear, seldom falcate, 4.5–9 × 0.4–1.5 cm, leathery, glabrous, eglandular, base cuneate, margin finely spiny denticulate, apex acute to obtuse; lateral veins invisible. Cymes 2- or 3-flowered; peduncle 6–10 cm, spreading pubescent and glandular pubescent; bracts 2, free, narrowly linear, 3–3.5 cm × 2–2.4 mm, pubescent and glandular pubescent, margin entire, apex attenuate. Pedicel 1–2 cm, spreading pubescent and glandular pubescent. Calyx 5-sect from base; segments equal, linear-lanceolate, 1–1.2 cm × ca. 2 mm, outside pubescent and glandular pubescent, inside nearly glabrous, margin entire, apex attenuate. Corolla blue-purple, 4.5–5 cm, outside sparsely glandular puberulent and puberulent, inside glabrous; tube nearly tubular, 3–3.5 × ca. 1.2 cm; adaxial lip ca. 1 cm; abaxial lip ca. 1.5 cm. Filaments ca. 1.5 cm, glandular puberulent; anthers fused by entire adaxial surfaces, ca. 3.5 mm, glandular puberulent; staminodes 3, central ca. 0.8 mm, laterals ca. 1.2 cm. Pistil ca. 2.6 cm, densely glandular pubescent; ovary ca. 1.8 cm. Stigma obtrapeziform, ca. 2 mm, 2-lobed. Fruit and seeds unknown. Fl. May.

• Limestone hills; ca. 400 m. SW Guangxi (Longzhou Xian).

66. *Chirita ophiopogoides* D. Fang & W. T. Wang in W. T. Wang, Bull. Bot. Res., Harbin 1(4): 68. 1981.

条叶唇柱苣苔 tiao ye chun zhu ju tai

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, crowded, sessile; leaf blade lanceolate-linear, 4.5–11 cm × 4–8 mm, leathery, glabrous, eglandular, base cuneate, margin finely spiny denticulate, apex acute to obtuse; lateral veins invisible. Cymes 5–7-flowered; peduncle ca. 6 cm, puberulent and glandular puberulent; bracts 2, free, narrowly linear to lanceolate-linear, 0.9–1.2 cm × 0.6–1.5 mm, puberulent, margin entire, apex acute. Pedicel 2–2.5 cm, densely glandular puberulent. Calyx 5-sect from base; segments equal, lanceolate-linear, 4–5 × ca. 0.8 mm, outside glandular puberulent, inside glabrous, margin entire, apex acute. Corolla purplish, ca. 2 cm, outside puberulent, inside glabrous; tube narrowly funnelform, ca. 10 × 6 mm; adaxial lip ca. 5.5 mm; abaxial lip ca. 1 cm. Filaments ca. 9 mm, glandular puberulent; anthers fused by entire adaxial surfaces, ca. 2.5 mm, glandular puberulent; staminodes 2, ca. 3 mm. Pistil ca. 1 cm, glandular puberulent; ovary ca. 8 mm. Stigma obtrapeziform, ca. 1 mm, 2-lobed. Capsule erect, ca. 3 cm. Fl. Mar–Apr, fr. Apr.

• Cliffs in forests among limestone hills; 200–600 m. SW Guangxi (Fusui Xian, Longzhou Xian).

67. *Chirita spinulosa* D. Fang & W. T. Wang in W. T. Wang, Bull. Bot. Res., Harbin 1(4): 67. 1981.

刺齿唇柱苣苔 ci chi chun zhu ju tai

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite, sessile; leaf blade lanceolate-linear, 6–11 × 0.8–1.2 cm, leathery, glabrous, eglandular, base cuneate, margin finely spiny denticulate, apex acute to obtuse; lateral veins invisible. Cymes ca. 9-flowered; peduncle ca. 20 cm, mostly sparsely puberulent; bracts 2, free, narrowly triangular, 2–2.5 × ca. 1 mm, sparsely dark purple puberulent, margin entire, apex acute. Pedicel 1.5–6 mm, sparsely puberulent. Calyx 5-sect from base; segments equal, triangular, ca. 1.5 × 0.8–1 mm, outside sparsely puberulent, inside glabrous, margin entire, apex acute. Corolla blue-purple, ca. 1.3 cm, outside apically puberulent, inside glabrous; tube nearly tubular, ca. 10 × 2 mm; adaxial lip ca. 2.5 mm; abaxial lip ca. 3.5 mm. Filaments ca. 6.5 mm, glabrous; anthers fused by entire adaxial surfaces, ca. 2 mm, basally sparsely puberulent; staminodes 2, ca. 1.5 mm. Pistil ca. 1.4 cm; ovary ca. 7 mm, glabrous. Style sparsely puberulent; stigma obtrapeziform, ca. 0.8 mm, 2-lobed. Fruit and seeds unknown. Fl. Nov.

• Shaded areas on limestone hills; ca. 100 m. SW Guangxi (Fusui Xian).

68. *Chirita tibetica* (Franchet) B. L. Burtt, Notes Roy. Bot. Gard. Edinburgh 23: 99. 1960.

康定唇柱苣苔 kang ding chun zhu ju tai

Roettlera tibetica Franchet, Bull. Mus. Hist. Nat. (Paris) 5: 251. 1899; *Didymocarpus tibeticus* (Franchet) Handel-Mazzetti.

Perennials. Rhizome tuberlike, internodes conspicuous. Stems erect, 3.5–14(–25) cm, sparsely puberulent to pilose. Stem leaves 4–10, opposite, ± spaced along stem or crowded near apex; petiole 2–10(–30) × ca. 1 mm; leaf blade elliptic to ovate or obovate, 1–6.6 × 0.9–3.5 cm, thin papery, sparsely puberulent to pilose, eglandular, base cuneate to rounded, margin entire to repand or shallowly crenate, apex acute to rounded; lateral veins 5–7 on each side of midrib, inconspicuous. Cymes 1–4-flowered; peduncle 2.4–5.5 cm, sparsely puberulent to pilose; bracts 2, free, narrowly elliptic to lanceolate, 3–7 × 1–2 mm, pilose, margin entire, apex acute. Pedicel 0.7–1.5 cm, glandular puberulent to pilose. Calyx 5-sect from base; segments equal, linear-triangular, 6–9 × 1–1.5 mm, outside puberulent to pilose, inside glabrous, margin entire, apex acute. Corolla white, 3.2–3.6 cm, outside sparsely puberulent to pilose, inside glabrous; tube nearly tubular, ca. 2.5 × 1 cm; adaxial lip ca. 5 mm; abaxial lip ca. 1 cm. Filaments ca. 9 mm, glandular puberulent above; anthers fused by entire

adaxial surfaces, ca. 2 mm, glabrous; staminodes 2, ca. 4 mm. Pistil ca. 2 cm, puberulent; ovary ca. 1 cm. Stigma obtrapeziform, ca. 2 mm, 2-lobed. Fruit and seeds unknown. Fl. Jul–Sep.

• Forests, cliffs, on rocks; 1400–3200 m. SW Sichuan, NE Yunnan.

69. *Chirita forrestii* J. Anthony, Notes Roy. Bot. Gard. Edinburgh 18: 192. 1934.

滇川唇柱苣苔 dian chuan chun zhu ju tai

Chirita forrestii var. *acutidentata* W. T. Wang;

Didymocarpus forrestii (Anthony) Handel-Mazzetti.

Probably perennial. Rhizome internodes inconspicuous.

Stems erect, 1.2–12(–19) cm, sparsely pilose to pubescent. Stem leaves 4 or 6, opposite, 4 crowded near apex; petiole 0.3–3 cm × 0.5–2 mm; leaf blade elliptic to ovate or obovate, 1–15 × 0.7–8.5 cm, membranous, sparsely pubescent to appressed pilose, eglandular, base broadly cuneate to subcordate, margin dentate to serrate, apex acute to rounded; lateral veins 4–6 on each side of midrib, slightly conspicuous. Cymes 1–5-flowered; peduncle 1.7–7 cm, pilose to glandular puberulent; bracts 2, free, lanceolate-linear, 2.6–7 × 0.8–1 mm, pubescent to pilose, margin entire, apex attenuate. Pedicel 0.7–1.8 cm, pilose to glandular pubescent. Calyx 5-sect from base; segments equal, narrowly lanceolate, 7–11 × 1–1.5 mm, outside pubescent to pilose, inside nearly glabrous, margin entire, apex acuminate. Corolla purple to blue with yellow throat, 3.2–4 cm, outside basally sparsely puberulent to pilose, inside glabrous; tube funnellform, ca. 2.5 × 1.2 cm; adaxial lip ca. 1.1 cm; abaxial lip ca. 1.6 cm. Filaments ca. 1.1 cm, glabrous; anthers fused by entire adaxial surfaces, ca. 1.5 mm, glabrous; staminode 1, ca. 2 mm. Pistil ca. 2 cm, densely pubescent to puberulent; ovary ca. 1.4 cm. Stigma obtrapeziform, ca. 2.5 mm, 2-lobed. Capsule erect, 7–10 cm. Fl. Jul–Sep, fr. Jul–Oct.

• Streamside rocks in forested valleys; 2000–3100 m. SW Sichuan, NW Yunnan (Zhongdian Xian).

70. *Chirita minutihamata* D. Wood, Notes Roy. Bot. Gard. Edinburgh 31: 370. 1972.

多痕唇柱苣苔 duo hen chun zhu ju tai

Chirita cicatricosa W. T. Wang.

Perennials. Rhizome internodes conspicuous. Stems decumbent, 4–20 cm, densely brownish glandular pubescent and villous. Stem leaves 4–10, alternate; petiole 0.5–5.5 cm × ca. 2 mm; leaf blade ovate to elliptic, 1.5–8.5 × 1.4–4.2 cm, herbaceous, sparsely puberulent to pilose, eglandular, base oblique, cuneate to cordate, margin denticulate to crenate or serrate, apex acute; lateral veins 5 or 6 on each side of midrib, slightly conspicuous. Cymes 1- or 2-flowered; peduncle 1.5–8 cm, pubescent to pilose; bracts 2, free, broadly lanceolate, 5–11 × 2.4–3.5 mm, pubescent to pilose, margin entire, apex acuminate. Pedicel 0.6–1.4 cm, pubescent to glandular pilose. Calyx 5-sect from base; segments equal, lanceolate, 8–10 × 1.8–2.5 mm, outside pilose, inside sparsely puberulent, margin entire, apex

acuminate. Corolla blue-purple, ca. 4.5 cm, outside sparsely puberulent, inside glabrous; tube narrowly funnellform, ca. 2.8 cm × 8 mm; adaxial lip ca. 1.2 cm; abaxial lip ca. 7 mm. Filaments ca. 1 cm, puberulent near apex; anthers fused by entire adaxial surfaces, ca. 3 mm, densely puberulent; staminodes 2, 2–7 mm. Pistil ca. 3 cm, puberulent; ovary ca. 1.8 cm. Stigma obtrapeziform, ca. 2.5 mm, emarginate. Capsule erect, 3–4.5 cm. Fl. Oct, fr. Nov.

Montane forests. S Guangxi (Dongxing Xian, Fangcheng Xian) [Vietnam].

71. *Chirita cyrtocarpa* D. Fang & L. Zeng, Acta Phytotax. Sin. 31: 468. 1993.

弯果唇柱苣苔 wan guo chun zhu ju tai

Perennials. Rhizome internodes conspicuous. Stems decumbent, 32–61 cm, spreading glandular villous and puberulent. Stem leaves 6–17, alternate; petiole 1–11 cm × ca. 1 mm; leaf blade oblique, narrowly to broadly ovate or elliptic, 3–15 × 1.5–6.5 cm, herbaceous, villous and puberulent, eglandular, base oblique rounded to cordate on 1 side, cuneate on other, often slightly peltate, margin serrate, apex acute to acuminate; lateral veins (4 or) 5–7 on each side of midrib, inconspicuous. Cymes 2–11-flowered; peduncle 5.5–11 cm, spreading glandular villous and puberulent; bracts 2, free, ovate to lanceolate or narrowly elliptic, 6–14 × 1–4 mm, adaxially nearly glabrous, margin entire, apex acute. Pedicel 1.5–8 mm, spreading glandular villous and puberulent. Calyx 5-sect from base; segments equal, oblong lanceolate, 5–8 × 1–2 mm, outside spreading glandular villous and puberulent, inside nearly glabrous, margin entire, apex acute. Corolla dark purple, 3.3–5.5 cm, outside glandular pubescent and sparsely pubescent, inside glandular puberulent on base of adaxial lip; tube funnellform, ca. 3 × 0.9 cm; adaxial lip 4–6 mm; abaxial lip 1–1.5 cm. Filaments ca. 1 cm, glandular puberulent, densely bearded apically; anthers fused by entire adaxial surfaces, ca. 3.5 mm, woolly; staminodes 2, 7–10 mm. Pistil 3–4 cm, glandular puberulent; ovary 7–9 mm. Stigma obtrapeziform, ca. 4.5 mm, 2-lobed. Capsule at ca. 90° to peduncle, 1.5–2 cm. Fl. Jun, fr. Jul–Aug.

• Hilly regions; 100–200 m. NE Guangxi (He Xian).

72. *Chirita wangiana* Z. Y. Li in A. L. Weitzman et al., Novon 7: 428. 1998.

王氏唇柱苣苔 wang shi chun zhu ju tai

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 4–12 × 3–4 mm; leaf blade ovate to orbicular, 2–4 × 1.4–3.5 cm, thick papery, adaxially sparsely appressed puberulent, eglandular, abaxially sparsely appressed puberulent, base broadly cuneate to rounded, margin remotely repand-crenate, apex obtuse to rounded; lateral veins 3 or 4 on each side of midrib, inconspicuous. Cymes 1–3-flowered; peduncle 4–4.5

cm, densely purple puberulent and glandular puberulent; bracts 2, free, linear, 3–4 × ca. 0.4 mm, puberulent, margin entire, purple ciliate, apex obtuse to rounded. Pedicel ca. 3 mm, purple puberulent and glandular puberulent. Calyx 5-sect from base; segments equal, lanceolate-linear, ca. 3 × 0.8 mm, outside puberulent, inside glabrous, margin entire, apex subulate-acuminate. Corolla white, inside limb purplish, ca. 3.5 cm, outside sparsely puberulent and glandular puberulent, inside glabrous; tube funnellform-tubular, ca. 2.5 × 1 cm; adaxial lip ca. 5 mm; abaxial lip ca. 1 cm. Filaments ca. 1.4 cm, glabrous; anthers fused by entire adaxial surfaces, ca. 3 mm, glabrous; staminodes 2, ca. 4 mm. Pistil ca. 2.7 cm, densely puberulent and glandular puberulent; ovary ca. 1.7 cm. Stigma obtrapeziform, ca. 3 mm, 2-lobed. Fruit and seeds unknown. Fl. Jul.

• Known only from cultivation. Cultivated in the conservatory of Longtan Park; introduced from Guangxi (Rong'an Xian).

73. *Chirita shouchengensis* Z. Y. Li in A. L. Weitzman et al., *Novon* 7: 426. 1998.

寿城唇柱苣苔 *shou cheng chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves crowded at rhizome apex, opposite; petiole ca. 10 × 1–2 mm; leaf blade oblanceolate, 2–3 × 0.5–1 cm, papery, adaxially greenish white puberulent, eglandular, abaxially appressed white velutinous, base decurrent, margin entire, apex acute; lateral veins 2 or 3 on each side of midrib, inconspicuous. Cymes 1-flowered; peduncle nodding, 0.9–1.1 cm, densely puberulent; bracts 2, free, oblong linear, 4–6 × ca. 1 mm, densely puberulent, margin entire, apex obtuse to rounded. Pedicel 7–11 mm, densely puberulent. Calyx 5-sect from base; segments equal, lanceolate-linear, 1–1.2 cm × 1.6–1.8 mm, outside puberulent, inside glabrous, margin entire, apex acuminate. Corolla purplish, ca. 4.5 cm, outside sparsely puberulent, inside glabrous; tube funnellform, ca. 3.3 × 1.4 cm; adaxial lip ca. 8 mm; abaxial lip ca. 1.2 cm. Filaments ca. 1.1 cm, glabrous; anthers fused by entire adaxial surfaces, ca. 4 mm, woolly; staminodes 2, 3–4 mm. Pistil ca. 3.4 cm, densely puberulent; ovary ca. 1.2 cm. Stigma obtrapeziform, ca. 4.2 mm, 2-lobed. Fruit and seeds unknown. Fl. Apr–Jun.

• Limestone hills, also cultivated; ca. 300 m. Cultivated in Longtan Park; introduced from Guangxi (Yongfu Xian).

74. *Chirita skogiana* Z. Y. Li in A. L. Weitzman et al., *Novon* 7: 427. 1998.

斯氏唇柱苣苔 *si shi chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal; petiole 2.5–3 cm; leaf blade strongly oblique, ovate to ovate-elliptic, 3–9 × 2–3.3 cm, herbaceous, appressed pilose and puberulent, eglandular, base broadly rounded to narrowly cuneate, margin repand-denticulate, apex minutely acute; lateral veins 3 or 4 on each side of midrib, conspicuous. Cymes 1- or 2-flowered; peduncle ca. 4.5 cm, pubescent; bracts 2, free, oblong-lanceolate, 8–9 × ca. 2

mm, appressed puberulent, margin few-denticulate, apex minutely acute. Pedicel 7–10 mm, pilose. Calyx 5-sect from base; segments slightly unequal, elliptic-lanceolate, 7–7.5 × 1.8–2.1 mm, outside brown pilose, inside glabrous, margin 4–6-denticulate, apex acute to obtuse. Corolla flesh colored, ca. 2.3 cm, outside glandular puberulent, inside pilose basally; tube subtubular, ca. 12 × 6 mm; adaxial lip ca. 3 mm; abaxial lip ca. 1.1 cm. Filaments ca. 8 mm, glabrous; anthers fused by entire adaxial surfaces, ca. 3.5 mm, glabrous; staminodes 2, ca. 1.5 mm. Pistil ca. 1.1 cm; ovary ca. 6 mm, puberulent and glandular puberulent. Style base puberulent and glandular puberulent; stigma linear, ca. 1.8 × 1 mm, 2-lobed. Immature capsule erect, ca. 1.1 cm. Fl. Apr.

• Rocks in valleys; ca. 900 m. Gansu (Wen Xian).

75. *Chirita napoensis* Z. Y. Li in A. L. Weitzman et al., *Novon* 7: 424. 1998.

那坡唇柱苣苔 *na po chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal; petiole 1–1.7 cm × 1–3.5 mm; leaf blade broadly elliptic to oblong, 2.5–4.2 × ca. 1.3 cm, papery, densely appressed white pilose, eglandular, base oblique, cuneate, decurrent, margin crenate to repand-crenate, apex minutely obtuse; lateral veins 3 or 4 on each side of midrib, inconspicuous. Cymes 1- or 2-flowered; peduncle 2.5–6.5 cm, densely puberulent; bracts 2, free, narrowly oblong, 1.5–3.5 × ca. 0.3 mm, puberulent, margin entire, apex obtuse. Calyx 5-sect from base; segments equal, lanceolate-linear, 2.5–3 × 0.7–0.9 mm, outside puberulent, inside pilose, margin entire, apex obtuse. Corolla blue-purple, ca. 1.4 cm, outside puberulent and glandular puberulent, inside glabrous; tube subcampanulate, ca. 8.5 × 4 mm; adaxial lip ca. 2 mm; abaxial lip ca. 5.5 mm. Filaments ca. 4 mm, glabrous; anthers fused by entire adaxial surfaces, ca. 3 mm, glabrous; staminodes 2, ca. 0.7 mm. Pistil ca. 1.3 cm, puberulent; ovary ca. 3 mm. Stigma narrowly oblong, ca. 1.2 mm, undivided. Immature capsule erect, ca. 1.5 cm. Fl. May.

• Rocks in valleys; ca. 600 m. Guangxi (Napo Xian).

76. *Chirita hochiensis* C. C. Huang & X. X. Chen, *Bot. J. South China* 1: 14. 1992.

河池唇柱苣苔 *he chi chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal; petiole 1–3.5 cm × ca. 3 mm; leaf blade ovate to ovate-elliptic, 2–5.5 × 1.3–3.5 cm, papery, densely appressed puberulent, eglandular, base cuneate to rounded, margin nearly entire, apex rounded to obtuse; lateral veins 3 or 4 on each side of midrib, conspicuous. Cymes 1–4-flowered; peduncle 4–7 cm, glandular puberulent; bracts 2, free, linear-lanceolate, 3–4 × ca. 1.2 mm, glandular puberulent, margin entire, apex acute. Pedicel 0.7–2.3 cm, glandular puberulent. Calyx 5-sect from base; segments

equal, lanceolate-linear to subulate, 4–7 × 0.5–0.8 mm, outside densely pubescent, margin entire, apex acute. Corolla purple, 2–3 cm, outside glandular puberulent, inside glabrous; tube funnellform, 1.3–1.8 cm × ca. 6 mm; adaxial lip 3–5 mm; abaxial lip 4–7 mm.

Filaments 5–6 mm, glandular pilose; anthers fused by entire adaxial surfaces, ca. 3 mm, abaxially villous; staminodes 2, ca. 1.5 mm. Pistil 1.5–2 cm; ovary 5–9 mm, densely puberulent and glandular puberulent or glandular pilose. Stigma ligulate, ca. 1 mm, emarginate at apex. Capsule erect, 1.5–2 cm. Fl. and fr. Oct.

• Limestone hills; ca. 600 m. Guangxi (Hechi Xian).

77. *Chirita macrodonta* D. Fang & D. H. Qin in D. Fang, D. H. Qin, & X. H. Lu, *Acta Phytotax. Sin.* 32: 566. 1994.

粗齿唇柱苣苔 *cu chi chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal; petiole 5–25 cm × 2–4 mm; leaf blade orbicular to ovate, 4.5–15 × 5–16.5 cm, papery, villous, eglandular, base cordate, margin double dentate, occasionally lobed, apex acute to rounded, basal veins 3–6; lateral veins 2 or 3 on each side of midrib, adaxially inconspicuous, abaxially slightly conspicuous. Cymes 4–15-flowered; peduncle 8–23 cm, densely spreading villous and glandular pubescent; bracts 2, free, lanceolate to oblong, 4–10 × 1–2.5 mm, densely villous and glandular pubescent, margin 3–5-glandular denticulate, apex acute. Pedicel 2–5 cm.

Calyx 5-sect from base; segments equal, lanceolate, 0.8–1.2 cm × ca. 1.5 mm, densely villous and glandular pubescent, margin entire or 1- or 2-denticulate, apex acute. Corolla white to purplish, 2.5–3.4 cm, outside glandular pubescent, inside pubescent at lobe base; tube subtubular, 1.7–2.5 × ca. 1 cm; adaxial lip ca. 6 mm; abaxial lip 1–1.2 cm. Filaments ca. 1 cm, glabrous; anthers fused by entire adaxial surfaces, ca. 4 mm, abaxially densely bearded; staminodes 2, ca. 5.5 mm. Pistil ca. 2.1 cm; ovary ca. 6 mm, densely glandular villous or densely glandular pubescent. Stigma obtrapeziform, ca. 2 mm, 2-lobed. Fruit and seeds unknown. Fl. Jul.

• Forests on limestone hills; ca. 200 m. Guangxi (Lingchuan Xian).

78. *Chirita macrorhiza* D. Fang & D. H. Qin in D. Fang, D. H. Qin, & X. H. Lu, *Acta Phytotax. Sin.* 32: 568. 1994.

大根唇柱苣苔 *da gen chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal; petiole 2.5–7.5 cm × 1–3 mm; leaf blade ovate, seldom elliptic to broadly ovate, 2.5–9.5 × 1.5–6.5 cm, papery, sparsely strigose, eglandular, base broadly cuneate to rounded, margin crenate, seldom repand, apex acute; lateral veins 3–5 on each side of midrib, inconspicuous. Cymes 1–6-flowered; peduncle 8–31.5 cm, pubescent; bracts 2 (or 3), free, nearly oblong to lanceolate-triangular, 0.5–1.6 cm × 1–2 mm, pubescent, margin entire, apex acute to obtuse. Pedicel 0.7–2.6 cm, puberulent. Calyx 5-sect from base; segments equal, lanceolate, 6–11 × ca. 1.5

mm, pubescent, margin entire, apex acute. Corolla white, limb purplish, inside with 2 purple spots on adaxial lip and 2 yellow spots on abaxial lip, 4.5–6 cm, outside sparsely pubescent, inside sparsely pubescent, densely glandular pubescent on spots of adaxial lip, glandular puberulent on spots of abaxial lip; tube funnellform, 2.5–3 × 1.5–2 cm; adaxial lip 1–1.5 cm; abaxial lip 2–3 cm. Filaments ca. 1.5 cm, glandular puberulent at base and apex; anthers fused by entire adaxial surfaces, ca. 4 mm, abaxially densely bearded; staminodes 3, 1–12 mm. Pistil ca. 3.3 cm; ovary ca. 2.2 cm, densely glandular puberulent. Stigma obtrapeziform, ca. 3.5 mm, 2-lobed. Fruit and seeds unknown. Fl. Apr.

• Forests on limestone hills; ca. 200 m. S Guangxi (Wuming Xian).

79. *Chirita lijiangensis* D. Fang & D. H. Qin in D. Fang, D. H. Qin, & X. H. Lu, *Acta Phytotax. Sin.* 32: 569. 1994.

柳江唇柱苣苔 *liu jiang chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal; petiole 0.5–4 cm × 2–4 mm; leaf blade ovate, seldom elliptic, 2–8 × 1–6 cm, papery, pubescent (hairs 1–7 mm), eglandular, base cuneate or oblique and broadly cuneate, margin crenate to slightly repand, apex obtuse; lateral veins 3–5 on each side of midrib, inconspicuous. Cymes 2- or 3-flowered; peduncle 3–14 cm, villous and glandular pubescent; bracts 2, free, linear, 3–6 × 0.5–1.5 mm, villous, margin entire, apex obtuse. Pedicel 3–15 mm, villous and glandular puberulent. Calyx 5-sect from base; segments equal, narrowly lanceolate, 4–6 × ca. 1 mm, outside villous, inside sparsely puberulent, margin entire, apex acute. Corolla purple red, 3–3.8 cm, outside sparsely pubescent and glandular pubescent, inside glandular puberulent on lobes; tube funnellform, ca. 2.4 × 1 cm; adaxial lip ca. 7 mm; abaxial lip ca. 1.2 cm. Filaments ca. 1 cm, sparsely puberulent near apex; anthers fused by entire adaxial surfaces, ca. 3 mm, abaxially puberulent; staminodes 2, ca. 4 mm. Pistil ca. 2.4 cm; ovary ca. 1.8 cm, densely puberulent and glandular puberulent. Stigma obtrapeziform, ca. 1 mm, 2-lobed. Fruit and seeds unknown. Fl. Jun.

• Forests on limestone hills. Guangxi (Liujiang Xian).

80. *Chirita atroglandulosa* W. T. Wang in A. L. Weitzman et al., *Novon* 7: 423. 1998.

黑腺唇柱苣苔 *hei xian chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 2–14 × 2–4 mm; leaf blade narrowly elliptic to narrowly ovate, 2–7.5 × 0.8–2.8 cm, papery, densely appressed puberulent, adaxially with hairs 0.8–1.1 and 0.15–0.5 mm, eglandular, base cuneate, margin subentire to repand, apex acute; lateral veins ca. 3 on each side of midrib, inconspicuous. Cymes ca. 5-flowered; peduncle 12–13 cm, spreading puberulent; bracts 2, free, ovate to narrowly ovate, 6.5–7 × 2.5–3 mm, densely appressed puberulent, margin entire, apex acute. Pedicel 0.3–1.8

cm, densely puberulent and glandular puberulent. Calyx 5-sect from base; segments nearly equal, narrowly triangular-lanceolate, 4–5 × 1–1.1 mm, appressed puberulent, margin entire, apex acute. Corolla ca. 3 cm, outside sparsely puberulent, inside puberulent near base of adaxial lip and below filaments; tube funnellform-tubular, ca. 2 × 1 cm; adaxial lip ca. 4 mm; abaxial lip ca. 1 cm. Filaments ca. 9 mm, glandular puberulent above middle; anthers fused by entire adaxial surfaces, ca. 3 mm, glabrous; staminodes 2, ca. 3 mm. Pistil ca. 1.5 cm; ovary ca. 9 mm, densely appressed puberulent. Style glabrous; stigma narrowly oblong, ca. 2 mm, emarginate. Fruit and seeds unknown.

• Cliffs, Guangxi (Longzhou Xian).

81. *Chirita pungitisepala* W. T. Wang in A. L. Weitzman et al., *Novon* 7: 425. 1998.

尖萼唇柱苣苔 *jian e chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 0.8–2.8 cm × 3–5 mm; leaf blade narrowly elliptic, 3.5–8.5 × 1–2.5 cm, papery, adaxially densely appressed pilose with hairs 1–1.8 and 0.3–0.5 mm, eglandular, abaxially densely puberulent, base attenuate, margin entire, apex acute; lateral veins ca. 5 on each side of midrib, inconspicuous. Cymes 2–4-flowered; peduncle 5–7.8 cm, spreading puberulent and glandular puberulent; bracts 2, free, triangular-linear, 5–13 × ca. 1.5 mm, pubescent, margin entire, apex acute. Pedicel 2.7–5 cm, glandular puberulent and pilose. Calyx 5-sect from base; segments equal, narrowly triangular-linear, ca. 6 × 1.2 mm, outside pubescent, inside glabrous, margin entire, apex subulate-acuminate. Corolla ca. 3.5 cm, outside sparsely appressed puberulent, inside pilose below filaments; tube funnellform-tubular, ca. 2.5 × 1 cm; adaxial lip ca. 5 mm; abaxial lip ca. 1 cm. Filaments ca. 1.3 cm, glabrous; anthers fused by entire adaxial surfaces, ca. 3 mm, glabrous; staminodes 2, 7–8 mm. Pistil ca. 2.2 cm; ovary ca. 1.4 cm, densely glandular puberulent. Style sparsely glandular puberulent; stigma suboblong, ca. 1.5 mm, 2-lobed. Fruit and seeds unknown.

• Guangxi (Longzhou Xian).

82. *Chirita briggsioides* W. T. Wang in W. T. Wang & K. Y. Pan, *Bull. Bot. Res.*, Harbin 2(2): 138. 1982.

鹤峰唇柱苣苔 *he feng chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 1.5–4.5 cm × ca. 1.5 mm; leaf blade broadly ovate to ovate, 2.8–8 × 2.2–7.4 cm, herbaceous, puberulent, hairs 1–3 mm, eglandular, abaxially brownish villous along veins, base cordate, margin crenulate, apex acute to obtuse; lateral veins 4 or 5 on each side of midrib, slightly conspicuous. Cymes 1-flowered; peduncle ca. 4 cm, sparsely pubescent; bracts 2, free, linear, ca. 9 × 2.2 mm, puberulent, margin entire, apex acute. Pedicel ca. 2 cm, sparsely pubescent. Calyx ca. 2.3 cm, shallowly 5-lobed; tube 1.3–1.8 mm; lobes equal, triangular, 5–10

mm, outside puberulent, inside glabrous, margin entire, apex acute. Corolla pink, ca. 4.7 cm, outside glabrous, inside glandular puberulent above middle of tube; tube funnellform, ca. 3.6 × 1.4 cm; adaxial lip ca. 7 mm; abaxial lip ca. 9 mm. Filaments ca. 1.2 cm, glandular puberulent near apex; anthers fused by entire adaxial surfaces, ca. 4.5 mm, puberulent; staminodes 2, 6–8 mm. Pistil ca. 3.5 cm; ovary ca. 1.7 cm, glabrous. Style sparsely glandular puberulent; stigma nearly flabellate, ca. 3 mm, 2-lobed. Fruit and seeds unknown. Fl. May.

• Shaded rocky cliffs in montane regions. SW Hubei (Hefeng Xian).

83. *Chirita monantha* W. T. Wang, *Bull. Bot. Res.*, Harbin 2(4): 53. 1982.

单花唇柱苣苔 *dan hua chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 2–7.5 cm × 0.6–2 mm; leaf blade elliptic to elliptic-ovate or elliptic-obovate, 4.5–13 × 2.3–6.5 cm, herbaceous, sparsely puberulent (hairs to 1.2 mm), eglandular, base oblique, rounded to subcordate, margin dentate to serrate, apex obtuse; lateral veins ca. 5 on each side of midrib, conspicuous. Cymes 1-flowered; peduncle 2–4 cm, sparsely pubescent; bracts absent or 2, free, narrowly linear, 2.5–3 × 0.3–0.5 mm, puberulent, margin entire, apex acute. Pedicel 1.3–3 cm, pubescent. Calyx 1.7–1.9 cm, 5-lobed; tube 5–10 mm; lobes equal, triangular-lanceolate, ca. 7 mm, outside sparsely puberulent, inside glabrous, margin entire, apex subulate-acuminate. Corolla purplish, 4.5–5.6 cm, glabrous; tube narrowly funnellform, 3–4 × 1–1.5 cm; adaxial lip ca. 1 cm; abaxial lip ca. 1.6 cm. Filaments ca. 9 mm, glandular puberulent near apex; anthers fused by entire adaxial surfaces, ca. 3 mm, glabrous; staminodes 2, ca. 6 mm. Pistil ca. 3.1 cm, sparsely glandular puberulent; ovary ca. 1.5 cm. Stigma flabellate, ca. 3 mm, 2-lobed. Fruit and seeds unknown. Fl. Jun–Jul.

• Forests, valley streamsides; 400–1600 m. NW Hunan (Sangzhi Xian, Yongshun Xian).

84. *Chirita dielsii* (Borza) B. L. Burtt, *Notes Roy. Bot. Gard. Edinburgh* 23: 97. 1960.

圆叶唇柱苣苔 *yuan ye chun zhu ju tai*

Didymocarpus dielsii Borza, *Repert. Spec. Nov. Regni Veg.* 13: 390. 1914; *Chirita orbicularis* W. W. Smith; *Didymocarpus uniflorus* (Franchet) Borza; *Roettlera uniflora* Franchet (1899), not *C. uniflora* Ridley (1912).

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 1–5(–8) cm × 1.5–3 mm; leaf blade broadly ovate to broadly obovate or orbicular to reniform, 2–11 × 2–8 cm, herbaceous, adaxially between lateral veins with long white hairs 3–6.5 mm, eglandular, abaxially puberulent, white to brownish pubescent to pilose along veins, base rounded to cordate, margin dentate to crenate or serrate, apex obtuse to rounded; lateral veins 4 or 5 on each side

of midrib, conspicuous. Cymes 1(or 2)-flowered; peduncle 3–8(–11) cm, pubescent to sparsely pilose; bracts 2 or absent, free, lanceolate to oblanceolate, 0.8–1.2 cm × 1–2.5 mm, pubescent, margin entire to sparsely denticulate, apex acute. Pedicel 3–4 cm, pubescent to sparsely pilose. Calyx 1–1.7 cm, 2-lipped; adaxial lip 4-lobed from above middle; tube 1–3 mm; lobes triangular, 4–5 × 2–2.5 mm; abaxial lip entire, linear to lanceolate, 1–1.5 cm × 3–4 mm, outside sparsely pubescent to pilose or glabrous, inside glabrous, margin entire, apex acuminate. Corolla purple to purple-blue, 4–7 cm, glabrous; tube funnell-form-tubular, 2.8–5 × 1.2–2 cm; adaxial lip 1–1.2 cm; abaxial lip 1.2–2 cm. Filaments ca. 1 cm, glabrous; anthers fused by entire adaxial surfaces, ca. 3 mm, glabrous; staminodes 2, ca. 5.5 mm. Pistil ca. 3 cm, glabrous; ovary ca. 1.8 cm. Stigma flabellate, ca. 5 mm, 2-lobed. Capsule erect, 6–12 cm. Fl. Jun–Sep, fr. Aug–Sep.

• Shaded rocks in montane regions; 1900–3400 m. Yunnan (Fengqing Xian, Lufeng Xian, Yongsheng Xian).

85. *Chirita fruticola* H. W. Li, Bull. Bot. Res., Harbin 3(2): 37. 1983.

灌丛唇柱苣苔 *guan cong chun zhu ju tai*

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 12.5–21 cm × ca. 3 mm; leaf blade broadly ovate, ca. 8.3 × 8.3 cm, papery, adaxially brownish pubescent, eglandular, abaxially yellowish pubescent along veins, base cordate, margin denticulate to serrate, apex acute; lateral veins ca. 9 on each side of midrib, inconspicuous. Cymes 1-flowered; peduncle to 10 cm, appressed pubescent; bracts 2, free, ovate-triangular, ca. 5 × 3 mm, pubescent, margin entire, apex acute. Pedicel to 2.3 cm, pubescent. Calyx ca. 3 cm, 5-lobed from near middle; tube ca. 1.5 cm; lobes slightly unequal, narrowly linear-triangular, ca. 1.5 cm, outside sparsely pubescent, inside glabrous, margin entire, apex subulate-acuminate. Corolla purple to purple-blue, ca. 7 cm, outside puberulent, inside with 2 longitudinal lines of puberulent hairs below adaxial lip; tube funnell-form-tubular, 5.5–6.5 × ca. 2 cm; adaxial lip ca. 1.5 cm; abaxial lip ca. 2 cm. Filaments ca. 1.1 cm, glandular puberulent apically, glandular below; anthers fused by entire adaxial surfaces, ca. 4 mm, glabrous; staminodes 3, central ca. 0.8 mm, laterals ca. 3 mm. Pistil ca. 3 cm, glandular puberulent; ovary ca. 1 cm. Stigma obovate, ca. 3 × 5 mm, 2-lobed. Fruit and seeds unknown. Fl. May. Montane thickets; ca. 1300 m. SE Yunnan (Jinping Xian) [Vietnam]. Mature flowers are known only from Vietnam.

86. *Chirita corniculata* Pellegrin, Bull. Soc. Bot. France 73: 420. 1926.

角萼唇柱苣苔 *jiao e chun zhu ju tai*

Ceratoscyphus caeruleus W. Y. Chun (1946), not *Chirita caerulea* R. Brown (1840); *Chirita ceratoscyphus* B. L. Burtt.

Perennials, stemless. Rhizome internodes inconspicuous. Leaves basal, opposite; petiole 4–5 cm × ca. 2 mm; leaf blade narrowly to broadly elliptic, 3–18 × 1.5–5.5 cm, herbaceous to papery, adaxially densely puberulent, eglandular, abaxially puberulent and densely so along veins, base oblique, cuneate on 1 side, broadly cuneate to rounded on other, margin serrate, apex acute; lateral veins 7–12 on each side of midrib, conspicuous. Cymes 1–3-flowered; peduncle 3–5 cm, puberulent; bracts 2, free, narrowly ovate to oblong, 0.8–3.5 × 0.3–1.6 cm, puberulent, margin dentate to serrulate, apex acute. Pedicel 1.2–2 cm, puberulent. Calyx 1.1–2 cm, 5-lobed from middle to above middle; tube 4–10 mm; lobes equal, lanceolate-linear with protruberance near middle, 5–10 mm, outside puberulent, inside glabrous, margin entire, apex attenuate, hollow, hornlike. Corolla purple to blue, ca. 4.5 cm, outside sparsely puberulent, inside glabrous; tube funnell-form, ca. 3.2 × 1.4 cm; adaxial lip ca. 8 mm; abaxial lip ca. 1.2 cm. Filaments ca. 1.1 cm, glandular puberulent apically; anthers fused by entire adaxial surfaces, 2–4 mm, puberulent; staminodes 3, central ca. 1.5 mm, laterals ca. 6 mm. Pistil ca. 2.8 cm, puberulent; ovary ca. 1.5 cm. Stigma flabellate, ca. 6 mm, 2-lobed. Old capsule erect, ca. 5.5 cm. Fl. Apr–Jun.

Shaded valleys along streamsides; ca. 600 m. S Guangxi (Ningming Xian, Shangsi Xian) [Vietnam].

Based on observation of the types of *Chirita ceratoscyphus* and *C. corniculata*, Burtt (pers. comm.) concluded that they are the same.

87. *Chirita lachenensis* C. B. Clarke in A. & C. de Candolle, Monogr. Phan. 5: 118. 1883.

卧茎唇柱苣苔 *wo jing chun zhu ju tai*

Chirita clarkei J. D. Hooker.

Perennials. Rhizome internodes inconspicuous. Stems absent or prostrate and rooting at nodes, puberulent. Leaves 2–8, basal, sometimes on stem and alternate or opposite, ± widely spaced; petiole 2–18 cm × 1–2 mm; leaf blade ovate to narrowly ovate or rarely oblong, 5–14 × 3.4–9 cm, herbaceous, adaxially puberulent, eglandular, abaxially pubescent only along veins, base oblique, cuneate to cordate on 1 side, rounded to cordate on other, margin dentate to serrate, apex acute to obtuse or abruptly acuminate; lateral veins 6–8 on each side of midrib, conspicuous. Cymes 1–4-flowered; peduncle 4.5–17(–21) cm, puberulent to villous; bract 1, narrowly ovate or oblong to spatulate, 1.8–7 × 1–3 mm, sparsely puberulent to villous, margin sparsely denticulate to subentire, apex acute. Pedicel 2–4 cm, sparsely puberulent to villous. Calyx 0.9–1.2 cm, 5-sect from near base to 5-lobed from near middle; tube 1.6–7 mm; lobes equal, lanceolate-linear to ovate, 3–10 mm, outside puberulent to sparsely villous, inside glabrous,

margin entire, apex subulate-acuminate to acute. Corolla white or tinged pink to blue, 3–4.5 cm, outside puberulent and sometimes villous, inside apically sparsely puberulent; tube funnellform-tubular, 2–3 × 0.8–1.2 cm; adaxial lip 6–10 mm; abaxial lip 1.2–1.5 cm. Filaments ca. 8 mm, puberulent; anthers fused by entire adaxial surfaces, ca. 3 mm, glabrous; staminodes 2, ca. 2 mm. Pistil 1.6–2.5 cm, puberulent; ovary 1–1.8 cm. Stigma suboblate, ca. 3 mm, undivided or 2-lobed. Capsule often at 90° to peduncle, 6–12 cm. Fl. Jun–Aug, fr. Oct–Dec.

Montane broad-leaved forests; 2300–3100 m. SE Xizang (Medog Xian), W Yunnan (Tengchong Xian) [Bhutan, NE India, N Myanmar, Sikkim].

88. *Chirita oblongifolia* (Roxburgh) Sinclair, Bull. Bot. Soc. Bengal 9: 102. 1957.

长圆叶唇柱苣苔 *chang yuan ye chun zhu ju tai*
Incarvillea oblongifolia Roxburgh, Fl. Ind., ed. 2, 3: 113. 1832; *Aeschynanthus oblongifolius* (Roxburgh) G. Don; *Babactes oblongifolia* (Roxburgh) A.P. de Candolle ex Meisner; *Chirita acuminata* R. Brown; *Roettlera oblongifolia* (Roxburgh) Kuntze.

Perennials. Rhizomes unknown. Stems erect, 45–90 cm, rust-brown puberulent apically. Leaves to 8 or more, along stem, opposite, ± widely spaced; petiole 1.6–4.5 cm × 1.5–2 mm; leaf blade oblique, ovate to elliptic or oblong, 8–18 × 5–10 cm, papery, densely puberulent, densely yellow glandular, base oblique, cuneate to cordate, margin denticulate, apex acuminate; lateral veins 8–13 on each side of midrib, conspicuous. Cymes 5–7-flowered; peduncle 1.8–3.8 cm, densely rust-brown puberulent; bracts 2, free, narrowly ovate, ca. 6 × 2–3 mm, densely puberulent, margin denticulate, apex acute. Pedicel 0.5–1.5 cm, densely rust-brown puberulent. Calyx 1.1–1.4 cm, 5-lobed from above middle; tube 7–9 mm; lobes equal, triangular, 3–5 mm, outside densely puberulent and glandular, inside glabrous with very short hairs near apex, margin entire, apex acute to acuminate. Corolla white with yellow at throat, 4–4.3 cm, outside sparsely puberulent, inside glabrous; tube funnellform, 2.7–3 × ca. 1.2 cm; adaxial lip ca. 7 mm; abaxial lip ca. 1.2 cm. Filaments ca. 1.3 cm, glabrous; anthers fused by entire adaxial surfaces, ca. 1.5 mm, glabrous; staminodes 3, central ca. 0.6 mm, laterals ca. 6 mm. Pistil ca. 2.5 cm, puberulent; ovary ca. 2 cm. Stigma obtrapeziform to obdeltoid, ca. 2–5 mm, emarginate or 2-lobed. Capsule erect, 5–7 cm. Fl. Aug–Sep, fr. Sep–Oct.

Montane evergreen broad-leaved forests; 800–1200 m. SE Xizang (Medog Xian), NW Yunnan (Gongshan Xian) [NE India, N Myanmar].

89. *Chirita speciosa* Kurz, J. Bot. 11: 195. 1873.

美丽唇柱苣苔 *mei li chun zhu ju tai*

Chirita brevipes C. B. Clarke; *C. trailliana* Forrest & W. W. Smith; *Didymocarpus brevipes* (C. B. Clarke)

Handel-Mazzetti; *D. speciosus* (Kurz) Handel-Mazzetti; *D. traillianus* (Forrest & W. W. Smith) Handel-Mazzetti; *Roettlera brevipes* (C. B. Clarke) Kuntze; *R. speciosa* (Kurz) Kuntze.

Perennials. Rhizome internodes inconspicuous. Stems absent or to 5 cm, rust-brown pilose. Leaves 4–6, basal or along stem, crowded at apex, alternate; petiole 1.8–17(–24) cm × 1–3 mm; leaf blade oblique, ovate to suborbicular, 5–19 × 3.7–13 cm, herbaceous, adaxially sparsely white pubescent, eglandular, abaxially leaves often purplish, especially along veins, rust-colored pilose, especially along veins, base oblique, cordate to rounded, margin dentate to serrate or crenate, apex acuminate to rounded; lateral veins 6–9 on each side of midrib, conspicuous. Cymes 1–6-flowered; peduncle 3.5–16.5 cm, rust-brown pubescent and villous; bracts 1 or 2, free, narrowly ovate to oblong, 6–14 × 1–4 mm, rust-brown villous, margin entire to serrulate, apex acute. Pedicel 0.8–2 cm, rust-brown pubescent. Calyx 1.1–2.5 cm, 5-lobed from above to near middle; tube 5–10 mm; lobes unequal, narrowly triangular, 0.7–1.5 cm × 3–4 mm, outside rust-brown pubescent to villous, inside glabrous, margin entire, apex subulate-acuminate. Corolla blue-purple with yellow in tube, 4.8–6.5 cm, outside sparsely puberulent to sparsely pilose, inside puberulent below stamens and near mouth of tube; tube narrowly funnellform, 3.5–4.6 × 1.3–1.8 cm; adaxial lip 1–1.2 cm; abaxial lip 1.6–1.8 cm. Filaments ca. 1.1 cm, glabrous to sparsely pubescent; anthers fused by entire adaxial surfaces, 4–6.5 mm, densely puberulent; staminode 1, ca. 3 mm. Pistil ca. 3.4 cm, puberulent; ovary ca. 2.2 cm. Stigma flabellate, ca. 4 mm, 2-lobed. Capsule at 90° to peduncle, 7–9 cm. Fl. Mar–Sep, fr. May–Jul.

Rocks in wet valleys; 700–3100 m. S and W Yunnan [NE India, Myanmar, Thailand, N Vietnam].

90. *Chirita macrophylla* Wallich, Pl. Asiat. Rar. 1: 56. 1830.
大叶唇柱苣苔 *da ye chun zhu ju tai*

Didymocarpus grandifolius (A. Dietrich) F. G. Dietrich; *Henckelia grandifolia* A. Dietrich (1831), not *H. macrophylla* (Wallich ex D. Don) Sprengel (1817).

Perennials. Rhizome internodes inconspicuous. Stems absent or erect to prostrate, to 15(–37) cm, sparsely appressed puberulent. Basal leaves ca. 2, stem leaves 1–3 pairs, opposite, ± widely spaced, strongly unequal in each pair, larger ones similar to basal leaves, but smaller; petiole 1.3–4 cm × 1–4 mm; leaf blade ovate to elliptic, 9.5–19 × 6–14 cm, herbaceous, adaxially appressed puberulent, eglandular, abaxially sparsely pubescent, base oblique, cordate to rounded, margin dentate to serrate, apex abruptly acuminate to rounded; lateral veins 6–9 on each side of midrib, conspicuous. Cymes (1 or) 2–6-flowered; peduncle 6.5–15(–25) cm, sparsely pubescent; bracts 2, free, ovate or elliptic to suborbicular, 0.4–2 cm × 1–10 mm, sparsely pubescent, margin entire to dentate, apex acute to rounded. Pedicel

0.7–2.3 cm, pubescent to glabrous. Calyx 1.5–2.2 cm, 5-lobed from above to near middle; tube 7–11 mm; lobes unequal, narrowly triangular, 5–8 × 3–4 mm, glabrous or outside sparsely puberulent, margin entire, apex acute to attenuate. Corolla white to yellow, sometimes purplish to bluish, 4.4–5.5 cm, glabrous; tube tubular, 3–4 × ca. 1 cm; adaxial lip ca. 9 mm; abaxial lip ca. 1.1 cm. Filaments ca. 1 cm, glabrous; anthers fused by entire adaxial surfaces, 3–4 mm, glabrous; staminodes 3, central ca. 2 mm, laterals 3.5–5.5 mm. Pistil ca. 2.3 cm, puberulent; ovary ca. 1.5 cm. Stigma flabellate, ca. 3 mm, 2-lobed. Capsule often at to 90° to peduncle, 8–13 cm. Fl. May–Sep, fr. Aug–Dec. Rocks in forests; 1300–3100 m. SW Guizhou (Zhenfeng Xian), S Yunnan [Bhutan, NE India, N Myanmar, Nepal, Thailand].

91. *Chirita urticifolia* Buchanan-Hamilton ex D. Don, Prodr. Fl. Nepal. 90. 1825.

麻叶唇柱苣苔 *ma ye chun zhu ju tai*

Chirita grandiflora Wallich; *Didymocarpus urticifolius* (Buchanan-Hamilton ex D. Don) Wonisch; *Gonatostemon boucheanum* Regel; *Henckelia urticifolia* (Buchanan-Hamilton ex D. Don) A. Dietrich; *H. wallichiana* A. Dietrich; *Roettlera urticifolia* (Buchanan-Hamilton ex D. Don) Kuntze.

Perennials. Rhizome unknown. Stems erect, 30–80 cm, sparsely puberulent. Stem leaves to 8 or more, ± widely spaced, unequal in a pair; petiole 0.7–6.5 cm × 1–2 mm; leaf blade elliptic to broadly elliptic, rarely ovate or obovate, 4–11(–17) × 2.2–6(–10) cm, papery, puberulent, eglandular, abaxially mostly along veins, base oblique, broadly cuneate to rounded, margin dentate to serrate, apex acute to abruptly acuminate; lateral veins 5–10 on each side of midrib, conspicuous. Cymes 1- or 2-flowered; peduncle 1.5–5.5 cm, puberulent to sparsely puberulent; bracts 2, free, lanceolate to ovate, 6–16 × 3–9 mm, nearly glabrous to pubescent, margin subentire to denticulate, apex acute. Pedicel 0.8–2.2 cm, puberulent or pilose to glabrous. Calyx 2.5–3.5 cm, 5-lobed; tube 1–1.5 cm; lobes slightly unequal, narrowly triangular to lanceolate, 1–2 cm, outside sparsely puberulent to villous near base, inside glabrous, margin entire, apex attenuate. Corolla purple to pink, 5.5–6 cm, outside sparsely puberulent to sparsely pilose, inside glabrous; tube narrowly funnellform, 3.5–4 × 1.5–2 cm; adaxial lip ca. 1.5 cm; abaxial lip ca. 2.2 cm. Filaments ca. 1.5 cm, glabrous; anthers fused by entire adaxial surfaces, ca. 3 mm, glabrous; staminodes 2, 6–7 mm. Pistil 3.2–3.6 cm, puberulent to sparsely pubescent; ovary ca. 2 cm. Stigma narrowly obtrapeziform, ca. 7 mm, deeply 2-lobed. Capsule often at under 90° to peduncle, 8–15 cm. Fl. Jul–Sep, fr. Sep–Oct.

Forests, valley streamsides; 1300–1700 m. SE Yunnan (Luchun Xian, Pingbian Xian) [Bhutan, NE India, N Myanmar, Nepal, Sikkim].

92. *Chirita anachoreta* Hance, Ann. Sci. Nat. Bot., sér. 5, 5: 231. 1866.

光萼唇柱苣苔 *guang e chun zhu ju tai*

Chirita dimidiata R. Brown ex C. B. Clarke; *C. minutiserrulata* Hayata; *Didymocarpus anachoretus* (Hance) H. Léveillé; *D. minutiserrulatus* (Hayata) Yamamoto; *Roettlera anachoreta* (Hance) Kuntze; *R. dimidiata* (Wallich ex C. B. Clarke) Kuntze.

Annuals, not rhizomatous. Stems erect, 6–35(–55) cm, glabrous to sparsely pubescent or pilose apically. Stem leaves 4–10, opposite, ± widely spaced; petiole 0.2–4(–7) cm × 1–2.5 mm; leaf blade oblique, lanceolate to ovate or elliptic, 3–14 × 1.5–7.5 cm, thin herbaceous, sparsely puberulent to sparsely pilose or nearly glabrous, eglandular, base oblique, broadly cuneate to cordate, margin denticulate to serrulate or crenulate, apex acute to acuminate; lateral veins 6–10 on each side of midrib, conspicuous. Cymes 1–3(–9)-flowered; peduncle 2.5–5(–8.5) cm, glabrous to sparsely pubescent; bracts 2, free, lanceolate to ovate, 5–8(–15) × 2–4(–7) mm, ciliate to puberulent, margin entire to remotely denticulate, apex acute. Pedicel 0.5–1.8 cm, glabrous to sparsely pubescent or glandular puberulent. Calyx (0.6–)1.1–1.7 cm, 5-lobed from near middle; tube 3–12 mm; lobes slightly unequal, narrowly triangular to triangular, 5–7.5 × 3–4 mm, outside sparsely puberulent to pilose or glabrous, sometimes glandular, inside glabrous, margin entire, apex acuminate. Corolla white to yellow with yellow or purple markings or blue-purple, (2.3–)3.4–5.8 cm, outside glabrous to sparsely puberulent, inside glabrous; tube nearly tubular, 2.5–4 × 1–1.6 cm; adaxial lip 7–10 mm; abaxial lip 1.2–1.5 cm. Filaments 1–1.2 cm, glabrous to sparsely puberulent; anthers fused by entire adaxial surfaces, 2–3 mm, glabrous (rarely pubescent); staminodes 2 or 3, (0.2–)3–5 mm. Pistil 2.4–3 cm, glabrous or with a few hairs (rarely pubescent); ovary 1.5–2.5 cm. Stigma obtrapeziform, 3.5–4.5 mm, 2-lobed to deeply 2-lobed. Capsule erect, 7.5–12 cm. Fl. Jul–Sep, fr. Aug–Nov.

Rocks in forests, valley streamsides; 200–2300 m. Guangdong, Guangxi, S Hunan, Taiwan, SE Xizang (Medog Xian), S Yunnan [Laos, N Myanmar, Sikkim, N Thailand, N Vietnam].

93. *Chirita pumila* D. Don, Prodr. Fl. Nepal. 90. 1825.

斑叶唇柱苣苔 *ban ye chun zhu ju tai*

Bonnaya pumila (D. Don) Sprengel; *Chirita flava* R. Brown; *C. sphagnicola* H. Léveillé & Vaniot; *Didymocarpus anthonyanus* Handel-Mazzetti; *Henckelia pumila* (D. Don) A. Dietrich; *Roettlera pumila* (D. Don) Kuntze.

Annuals, not rhizomatous. Stems erect, 6–46 cm, pubescent to sparsely pilose. Stem leaves 4–8, opposite, ± widely spaced; petiole 4–12(–28) × 1–2 mm; leaf blade oblique, lanceolate to ovate or elliptic, 2–17 × 1.2–5.5(–8) cm, herbaceous, puberulent to pilose, eglandular, abaxially purple spotted, base oblique,

cuneate to cordate, margin denticulate to serrulate, apex acute to acuminate; lateral veins 6–9 on each side of midrib, conspicuous. Cymes (1 or) 2–7-flowered; peduncle 2.8–10 cm, puberulent to sparsely pilose or glabrescent; bracts 2, free, ovate to lanceolate or obovate, 5–18 × 1–4 cm, pubescent, margin entire to shallowly denticulate, apex acute. Pedicel 3–20 mm, glabrous to puberulent or pilose. Calyx 0.9–1.8 cm, 5-lobed from below to above middle; tube 4–10 mm; lobes slightly unequal, narrowly triangular to ovate, 4–10 × ca. 2 mm, outside pubescent to sparsely pilose, inside glabrous, margin entire, apex subulate-acuminate, hornlike, spreading. Corolla white to purple with yellow or purple markings, 3.2–5.7 cm, outside puberulent to pilose, inside glabrous to sparsely pubescent adaxially; tube narrowly funnelliform, 2.5–4.5 × 0.8–1.5 cm; adaxial lip 4–10 mm; abaxial lip 0.6–1.5 cm. Filaments 0.8–1.3 cm, sparsely puberulent to glabrous; anthers fused by entire adaxial surfaces, 3–4 mm, glabrous; staminodes 2, 2.5–4(–10) mm. Pistil 2.5–3.8 cm, glabrous to puberulent; ovary 1.4–2.8 cm. Stigma flabellate, ca. 3 mm, 2-lobed. Capsule erect, 6–12 cm. Fl. Jul–Sep, fr. Jul–Oct.

Forests, streamsides, rocks, cliffs, or among grassy clumps; 800–2800 m. NW Guangxi, SW Guizhou, SE Xizang, NW and S Yunnan [Bhutan, N and NE India, Myanmar, Nepal, Sikkim, Thailand, N Vietnam].

94. *Chirita infundibuliformis* W. T. Wang, Acta Phytotax. Sin. 17: 111. 1979.

合苞唇柱苣苔 he bao chun zhu ju tai

Perennials. Rhizome internodes inconspicuous. Stems erect, 12–40 cm, densely brown pubescent. Stem leaves 4–8, opposite, ± widely spaced; petiole 1–5.5 cm × 1–2 mm; leaf blade oblique, elliptic to ovate, 3.5–12.5 × 2–8 cm, papery, adaxially densely puberulent, eglandular, abaxially pubescent along veins, base oblique, broadly cuneate on 1 side, cordate on other, margin irregularly denticulate, apex acuminate; lateral veins ca. 7 on each side of midrib, slightly conspicuous. Cymes 1- or 2-flowered; peduncle 3.4–6 cm, densely brown pubescent; bracts 2, connate into an involucre, broadly funnelliform, ca. 1.5 cm, ca. 2.3 cm in diam., puberulent, margin denticulate, apex acute. Pedicel 2–4 mm, sparsely puberulent. Calyx ca. 2.5 cm, 5-lobed from middle; tube ca. 1 cm; lobes equal, triangular, 1.1–1.5 cm, outside puberulent, inside glabrous, margin entire, apex acute. Corolla purple-red, ca. 4.8 cm, outside sparsely puberulent, inside glabrous; tube nearly tubular, ca. 4 × 1 cm; adaxial lip ca. 6 mm; abaxial lip ca. 8 mm. Filaments ca. 1.1 cm, glanduliferous apically; anthers fused by entire adaxial surfaces, ca. 6 mm, glabrous; staminodes 2, ca. 6 mm. Pistil ca. 6.8 cm; ovary ca. 1.1 cm, glabrous. Style puberulent; stigma obtrapeziform, ca. 6 mm, 2-lobed. Fruit and seeds unknown. Fl. Aug.

• Broad-leaved forest margins, montane streamsides; 900–1700 m. SE Xizang (Medog Xian).

95. *Chirita fasciculiflora* W. T. Wang in W. T. Wang & K. Y. Pan, Bull. Bot. Res., Harbin 2(2): 139. 1982.

簇花唇柱苣苔 cu hua chun zhu ju tai

Perennials. Rhizome internodes inconspicuous. Stems erect, 5.5–20 cm, white villous. Stem leaves 2–6, opposite, crowded at stem apex; petiole 1–12 × 1–2 mm; leaf blade elliptic to obovate or ovate, 2.5–17.5 × 2–9.5 cm, herbaceous, puberulent to pilose, eglandular, base oblique, cuneate to truncate, margin denticulate to serrulate, apex acute to rounded; lateral veins 5 or 6 on each side of midrib, slightly conspicuous. Cymes 1–10-flowered; peduncle absent; bracts ca. 7, free, spatulate to linear, 0.6–1.5 cm × 0.3–2 mm, pubescent, margin entire, apex attenuate. Pedicel to 2.5 cm, puberulent. Calyx 1–1.4 cm, deeply 5-lobed; tube ca. 3 mm; lobes slightly unequal, triangular, 3–10 mm, outside with 5 longitudinal bands of pilose hairs between lobes, inside glabrous, margin entire, apex acute. Corolla blue, 5–6.5 cm, outside puberulent, inside glabrous; tube narrowly funnelliform, 4–5.5 × ca. 1.3 cm; adaxial lip ca. 7 mm; abaxial lip ca. 1.2 cm. Filaments ca. 1.2 cm, glabrous; anthers fused by entire adaxial surfaces, ca. 2 mm, glabrous; staminodes 2, ca. 9 mm. Pistil 4–5.2 cm, puberulent; ovary ca. 3 cm. Stigma ligulate-spatulate, ca. 5 mm, undivided. Fruit and seeds unknown. Fl. Jun.

• Valley forests; ca. 1500 m. S Yunnan (Menghai Xian).

96. *Chirita shuii* Z. Y. Li in A. L. Weitzman et al., Novon 7: 427. 1998.

税氏唇柱苣苔 shui shi chun zhu ju tai

Perennials. Rhizome internodes conspicuous. Stems erect, 18–34 cm, glabrous or glabrescent. Stem leaves 2–4 pairs, opposite, all or at least upper 2 pairs crowded near stem apex; petiole 1.2–9.5 cm × 2–2.5 mm; leaf blade elliptic to broadly ovate or suborbicular, 2.5–21.4 × 2.5–11.2 cm, herbaceous, adaxially appressed white puberulent, eglandular, abaxially glabrous to puberulent near veins, base oblique, 1 side cuneate to auriculate, other narrowly cuneate to cuneate, rarely rounded, margin dentate to repand-crenate, apex acute to rounded; lateral veins 4–9 on each side of midrib, conspicuous. Cymes 1- or 2-flowered; peduncle 1–6 cm, glabrous; bracts 2, free, ovate to lanceolate, 0.5–1.7 × 2–8 mm, ciliate, margin denticulate, apex acuminate. Pedicel 3–5(–8.5) cm, glabrous. Calyx 2.4–3 cm, 5-lobed from middle; tube 1.3–1.9 cm; lobes unequal, ovate to ovate-lanceolate, adaxial lobes 1.1–1.2 cm × 4–6 mm, abaxial lobes ca. 8 × 2–5 mm, outside pilose, inside glabrous, margin entire, apex cuspidate. Corolla pale yellow with pale brown stripes in the throat, 5.9–6.1 cm, outside sparsely puberulent, inside glabrous; tube funnelliform, 4.2–4.5 × ca. 1.1 cm; adaxial lip ca. 1.1 cm; abaxial lip 1.6–1.7 cm. Filaments ca. 8 mm, glabrous; anthers fused by entire adaxial surfaces, ca. 4.5 mm, glabrous; staminodes 2, ca. 2.5 mm. Pistil ca. 3.8 cm, glabrous;

ovary ca. 2.4 cm. Stigma deltoid, ca. 3.5 mm, 2-lobed. Capsule erect, 14–18.5 cm. Fl. Jul–Sep, fr. Sep–Oct.

• Under dense forests near mountain streams; 2600–2900 m. Yunnan (Wenshan Xian).

97. *Chirita pycnantha* W. T. Wang in A. L. Weitzman et al., *Novon* 7: 425. 1998.

密花唇柱苣苔 mi hua chun zhu ju tai

Perennials (probably). Rhizomes unknown. Stems 2.2–9 cm, glabrous. Stem leaves 1–3, alternate, ± widely spaced; petiole 1.8–9 cm × 1–2 mm; leaf blade oblique, ovate, 4–9 × 2.1–5.4 cm, papery, adaxially sparsely puberulent, eglandular, abaxially sparsely puberulent along veins, base often oblique, cuneate to truncate-rounded, margin crenate, apex acute; lateral veins 7 or 8 on each side of midrib, conspicuous. Cymes 2–6-flowered; peduncle 0.5–6 cm, glabrous; bracts free, depressed semiorbicular, 5–7 mm × 1–2 cm, glabrous, margin subentire, apex truncate-rounded. Pedicel ca. 1.8 mm, glabrous. Calyx ca. 1.3 cm, 5-lobed from above middle; tube ca. 9 mm; lobes equal, deltoid, ca. 4 × 4.8 mm, glabrous, margin entire, apex acute. Corolla ca. 3.2 cm, glabrous; tube funnellform, ca. 3 × 1.8 cm; adaxial lip ca. 2 mm; abaxial lip ca. 4 mm. Filaments ca. 9 mm, minutely glandular; anthers fused by entire adaxial surfaces, ca. 3 mm, glabrous; staminodes 2, 4–5.5 mm. Pistil ca. 2.9 cm, sparsely appressed puberulent; ovary ca. 1.7 cm. Stigma flabellate, ca. 3 mm, deeply 2-lobed. Fruit and seeds unknown. Fl. Oct.

• Yunnan (Simao Xian).

98. *Chirita puerensis* Y. Y. Qian, *Acta Phytotax. Sin.* 34: 216. 1996.

普洱唇柱苣苔 pu er chun zhu ju tai

Annuals, not rhizomatous. Stems 10–30 cm, glabrous to sparsely puberulent. Basal leaves 1–2, stem leaves usually 2 pairs, opposite; petiole 1.5–9.5 cm × 2–2.5 mm; leaf blade ovate to elliptic, 1.7–14.5 × 1.2–7.5 cm, herbaceous, adaxially densely to sparsely puberulent, sparsely puberulent along veins, eglandular, abaxially puberulent to glabrescent, densely to sparsely puberulent along veins, base oblique, broadly cuneate to subcordate, margin serrate to double serrate, apex obtuse, rarely acute to shortly acuminate; lateral veins 4–8 on each side of midrib, conspicuous. Cymes (2 or) 3–7-flowered; peduncle 3–8 cm, glabrous to sparsely puberulent; bracts 2, free, ovate-orbicular to subreniform, 1–1.8 × 1.2–2.7 cm, sparsely ciliate, margin entire, apex

rounded. Pedicel 4–10 mm, glabrous to sparsely puberulent. Calyx 1.5–2 cm, 2-lipped; tube 1.1–1.5 mm; adaxial lip shallowly 4-lobed, lobes triangular, 4–7 mm; abaxial lip entire, oblanceolate, 1.4–1.9 cm × 5–6 mm, outside sparsely pilose near apex, inside glabrous, margin entire, apex apiculate. Corolla white, 3.5–5 cm, glabrous; tube funnellform, 2–3.3 × 1–1.3 cm; adaxial lip 5–9 mm; abaxial lip 1–1.4 cm. Filaments 1–1.2 cm, sparsely glandular puberulent near apex; anthers fused by entire adaxial surfaces, 2.9–3.2 mm, glabrous; staminodes 3, central ca. 1 mm, laterals 3.5–4.5 mm. Pistil 2.5–3.5 cm; ovary 1.5–2 cm, puberulent near apex. Style puberulent and glandular puberulent; stigma obdeltoid, 3.5–3.7 mm, deeply 2-lobed. Capsule erect, 8–12 cm. Fl. and fr. Aug.

• Rocks in shrubby area; 1200–1400 m. Yunnan (Puer Xian).

99. *Chirita hamosa* R. Brown, *On Cyrtandreae* 117. 1839.

钩序唇柱苣苔 gou xu chun zhu ju tai

Roettlera hamosa (R. Brown) Kuntze.

Annuals, not rhizomatous. Stems erect, 5–25(–36) cm, sparsely puberulent to glabrous. Stem leaves 1–3(–7), lowest solitary, leaves toward apex opposite; petiole 2–4(–10) × 1–3 mm; leaf blade narrowly to broadly ovate, 1.5–13 × 1–11 cm, herbaceous, adaxially puberulent, eglandular, abaxially sparsely puberulent to glabrescent, base rounded to cordate, margin entire, apex acute to obtuse; lateral veins 6–16 on each side of midrib, slightly conspicuous. Cymes scorpioid, 1–5(–10)-flowered; peduncle adnate to petiole, puberulent; bracts absent. Pedicel 3–14 mm, spreading pubescent. Calyx 5–11 mm, 5-lobed to 5-sect from near base; tube 0.5–4 mm; segments unequal, linear to narrowly triangular, 4.5–7 × 1–1.5 mm, outside puberulent, inside glabrous, margin entire, apex attenuate. Corolla white, yellow at throat, often flushed lavender, 1–1.9 cm, outside sparsely puberulent adaxially, inside glabrous; tube nearly tubular, 7–15 × 3–5 mm; adaxial lip 1.2–2 mm; abaxial lip ca. 2.3 mm. Filaments 2–4 mm, glabrous; anthers fused by projections on connectives, 1–1.8 mm, bearded; staminodes 2, 0.8–1.5 mm. Pistil 1.1–1.4 cm, puberulent; ovary 3–6 mm. Stigma narrowly obtrapeziform, ca. 1 mm, deeply 2-lobed. Capsule erect, 1.4–4 cm. Fl. Jul–Oct, fr. Jul–Nov.

Shaded rocks in forests, cliffs, or streamside valleys; 300–1500 m. S and W Guangxi, S and SE Yunnan [India, Laos, Malaysia, Myanmar, Thailand, N Vietnam].

33. CHIRITOPSIS W. T. Wang, *Bull. Bot. Res.*, Harbin 1(3): 21. 1981.

小花苣苔属 xiao hua ju tai shu

Herbs, perennial, epipetric or terrestrial, rhizomatous, stemless. Leaves few to many, basal; leaf blade puberulent to pilose, base cuneate to cordate. Inflorescences lax or rarely dense, axillary, few- to many-flowered cymes; bracts 2, opposite. Calyx actinomorphic, 5-sect from base; segments equal. Corolla white, yellowish, or purplish,

zygomorphic, inside puberulent to glabrous; tube nearly tubular, not swollen, much longer than limb, 3–5 mm in diam.; limb indistinctly to distinctly 2-lipped; adaxial lip 2-lobed, slightly to 2–3 × shorter than abaxial lip; abaxial lip 3(or 4)-lobed, lobes equal or central lobe longer, apex rounded. Stamens 2, adnate to abaxial side of corolla tube near base or above middle, included; anthers dorsifixed, connate by adaxial surfaces, thecae divaricate, confluent at apex, dehiscing longitudinally; connective not projecting; staminodes (absent or) 1 or 3, adnate to adaxial or adaxial and abaxial sides of corolla tube. Disc ringlike or 2-lobed. Ovary ovoid, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigma 1, abaxial, obtrapeziform, rarely linear, undivided to 2-lobed. Capsule straight in relation to pedicel, ovoid to narrowly ellipsoid, equalling to shorter than calyx, dehiscing loculicidally to base; valves 2, straight, not twisted. Seeds unappendaged.

• Nine species: endemic to China.

- 1a. Leaf blade margin pinnately to palmately lobed; staminodes 1 or 3, less often 2 or absent.
 2a. Leaf blade ovate to rhombic, base broadly cuneate, margin pinnatifid 7. *C. bipinnatifida*
 2b. Leaf blade ovate to orbicular or reniform, base cordate, margin palmately or nearly palmately lobed.
 3a. Corolla ca. 7.8 mm; petiole, peduncle, pedicel, and calyx white puberulent to pilose; calyx segments 3–4 × 0.4–0.7 mm; stamens glabrous; disc 2-lobed, eglandular; staminode 1 8. *C. lobulata*
 3b. Corolla 11–13 mm; petiole, peduncle, pedicel, and calyx glandular puberulent or pubescent and purple glandular; calyx segments 3–8 × 1.3–2 mm; stamens sparsely pubescent; disc ringlike, glandular; staminodes 2 or 3, seldom absent 9. *C. glandulosa*
- 1b. Leaf blade margin denticulate, dentate, crenate, or nearly entire; staminodes 2 or absent.
 4a. Leaf blade orbicular-ovate to nearly orbicular; corolla purplish; stigma linear, 1–1.5 mm, undivided 1. *C. mollifolia*
 4b. Leaf blade elliptic or rhombic to ovate or reniform, rarely nearly orbicular; corolla white or yellowish; stigma obtrapeziform, 0.3–0.9 mm, 2-lobed.
 5a. Leaf blade base rounded to cordate; peduncle 5–9 cm; corolla 10–14 mm, inside puberulent in 2 longitudinal lines on or below abaxial lip; stamens puberulent or sparsely so.
 6a. Leaf blade 4–8.5 × 3–9 cm, puberulent, margin repand-crenate to obtusely dentate; petiole 5.5–16.5 cm; bracts 2–3 × ca. 0.3 mm; pedicel 4–18 mm; corolla ca. 1.4 cm; stamens adnate to corolla ca. 3 mm above base, staminodes 2 5. *C. cordifolia*
 6b. Leaf blade 3–4 × 2.2–3.6 cm, pubescent and pilose, margin remotely denticulate to entire; petiole 3–7 cm; bracts 5.5–7 × 1.8–2 mm; pedicel 1.5–3.5 mm; corolla ca. 1 cm; stamens adnate to corolla 1–1.5 mm above base, staminodes absent 6. *C. subulata*
 5b. Leaf blade base cuneate to broadly cuneate, seldom to nearly cordate; peduncle 8–9 cm; corolla 7.2–12 mm, inside glabrous or sparsely puberulent below abaxial lip; stamens glabrous.
 7a. Cymes dense; pedicels 0.2–2 mm; corolla distinctly 2-lipped, adaxial lip ca. 0.8 mm, abaxial lip ca. 2.2 mm, inside sparsely puberulent below abaxial lip; disc ringlike, ca. 0.5 mm; style ca. 2.8 mm, puberulent 4. *C. confertiflora*
 7b. Cymes lax; pedicels 3–25 mm; corolla indistinctly 2-lipped, adaxial lip 2–3 mm, abaxial lip ca. 2 mm, inside glabrous; disc 2-lobed, 1–1.5 mm; style 5–7 mm, glabrous or nearly so.
 8a. Leaf blade puberulent to villous, base cuneate to broadly cuneate; lateral veins conspicuous; pedicel 3–8 mm; corolla white, ca. 8 mm 2. *C. repanda*
 8b. Leaf blade sparsely puberulent, base broadly cuneate to nearly cordate; lateral veins inconspicuous; pedicel 8–25 mm; corolla yellowish, ca. 12 mm 3. *C. xiuningensis*

1. *Chiritopsis mollifolia* D. Fang & W. T. Wang in W. T. Wang, *Guihaia* 6: 6. 1986.

密毛小花苣苔 *mi mao xiao hua ju tai*

Petiole 2.6–13.5 cm, densely spreading puberulent; leaf blade orbicular-ovate to nearly orbicular, 2–4.8 × 2–4.5 cm, very densely puberulent, base rounded to cordate, margin crenulate to obtusely

dentate, apex obtuse to rounded; lateral veins inconspicuous. Cymes lax, 7–20-flowered; peduncle 4–8 cm, densely spreading puberulent; bracts linear, 3–5 × 0.5–1 mm, margin entire. Pedicel 1.5–8 mm, spreading densely puberulent. Calyx segments narrowly lanceolate-linear, ca. 3.5 × 0.7 mm, outside puberulent, inside sparsely puberulent near apex. Corolla purplish,

7.5–9 mm, inside glabrous; tube 5–6 mm; limb 2-lipped; adaxial lip ca. 2.2 mm; abaxial lip ca. 3 mm. Stamens adnate to corolla 0.4–0.6 mm above base, glabrous; filaments linear, 2–2.3 mm; staminodes 2, 0.5–1 mm. Disc ringlike, ca. 0.3 mm, glabrous. Pistil 7–8.5 mm, puberulent. Style 5.5–7 mm; stigma linear, 1–1.5 mm, apex undivided, truncate. Capsule narrowly ellipsoid, ca. 4 × 1.6 mm. Fl. Apr–Jun, fr. Jun.

• Shady cliffs in limestone hills; ca. 300 m. N Guangxi (Yishan Xian).
2. *Chiritopsis repanda* W. T. Wang, Bull. Bot. Res., Harbin 1(3): 23. 1981.

小花苣苔 *xiao hua ju tai*

Petiole 3.5–11.6 cm, puberulent to villous; leaf blade elliptic to ovate, 3.5–9.5 × 2.5–4.2 cm, puberulent to villous, base cuneate to broadly suneate, margin sparsely repand-crenate to dentate, apex acute to rounded; lateral veins conspicuous. Cymes lax, 8–15-flowered; peduncle 3–14 cm, sparsely to densely pubescent or pilose; bracts lanceolate-linear to subulate, 4–10 × ca. 1 mm, margin entire. Pedicel 3–8 mm, sparsely to densely puberulent or pilose. Calyx segments narrowly triangular, 3–4 × ca. 1 mm, outside puberulent to pilose, inside glabrous. Corolla white, ca. 8 mm, inside glabrous; tube ca. 6 mm; limb indistinctly 2-lipped, both lips ca. 2 mm. Stamens adnate to corolla ca. 2 mm above base, glabrous; filaments subulate, ca. 3 mm; staminodes 2, ca. 1 mm. Disc 2-lobed, ca. 1 mm, glabrous. Pistil ca. 7.5 mm; ovary densely puberulent. Style ca. 5 mm, glabrous; stigma obtrapeziform, ca. 0.5 mm, 2-lobed. Capsule narrowly ovoid, ca. 4.5 × 1.5 mm. Fl. Jul–Sep, fr. Aug–Sep.

• Guangxi.

1a. Leaf blade base decurrent, cuneate 2a. var. *repanda*

1b. Leaf blade base oblique, broadly cuneate

..... 2b. var. *guilinensis*

2a. *Chiritopsis repanda* var. *repanda*

小花苣苔(原变种) *xiao hua ju tai* (yuan bian zhong)

Leaf blade base decurrent, cuneate. Fl. Jul–Sep, fr. Sep.

• NW Guangxi (Tian'e Xian).

2b. *Chiritopsis repanda* var. *guilinensis* W. T. Wang, Guihaia 12: 299. 1992.

桂林小花苣苔 *gui lin xiao hua ju tai*

Leaf blade base oblique, broadly cuneate. Fl. Aug, fr. Aug–Sep.

• Guangxi (Guilin Xian, Shanglin Xian).

3. *Chiritopsis xiuningensis* X. L. Liu & X. H. Guo, Bull. Bot. Res., Harbin 9(3): 51. 1989.

休宁小花苣苔 *xiu ning xiao hua ju tai*

Petiole 1–8 cm, densely spreading puberulent; leaf blade ovate to broadly ovate or elliptic to nearly orbicular, 2–9 × 1–6 cm, sparsely puberulent, base broadly cuneate to nearly cordate, margin repand-denticulate to nearly entire, apex obtuse to rounded; lateral veins inconspicuous. Cymes lax, 2–10-flowered;

peduncle 3–14 cm, spreading puberulent; bracts linear, 3–7 × 0.5–1 mm, margin entire. Pedicel 0.8–2.5 cm, spreading puberulent. Calyx segments linear to narrowly linear-lanceolate, 3–5 × 0.7–1 mm, outside puberulent, inside glabrous. Corolla yellowish, ca. 1.2 cm, inside glabrous; tube ca. 9 × 4 mm; limb indistinctly 2-lipped; adaxial lip ca. 3 mm; abaxial lip ca. 2 mm. Stamens adnate to corolla ca. 2.5 mm above base, glabrous; filaments lanceolate-subulate to narrowly subulate, ca. 3 mm; staminodes 2, ca. 0.5 mm. Disc 2-lobed, ca. 1.5 mm, glabrous. Pistil ca. 1 cm; ovary puberulent. Style ca. 7 mm, nearly glabrous; stigma obtrapeziform, ca. 0.5 mm, 2-lobed. Capsule narrowly ovoid, ca. 6 × 2.5 mm. Fl. Jul–Aug, fr. Aug.

• Stony cliffs or rocks; 400–500 m. S Anhui (Xiuning Xian).

4. *Chiritopsis confertiflora* W. T. Wang, Bull. Bot. Res., Harbin 1(3): 25. 1981.

密小花苣苔 *mi xiao hua ju tai*

Petiole 2.5–5.5 cm, puberulent to pilose; leaf blade rhombic-ovate to nearly elliptic, 7.5–11 × 4.5–7 cm, puberulent to villous, base cuneate to broadly cuneate, margin dentate to crenate, apex acute to obtuse; lateral veins conspicuous. Cymes dense, 7–12-flowered; peduncle 8–14 cm, spreading puberulent; bracts narrowly lanceolate to elliptic, 5–7 × 1–1.2 mm, margin entire. Pedicel 0.2–2 mm, densely spreading puberulent. Calyx segments narrowly linear-lanceolate, ca. 4.5 × 0.7–0.8 mm, outside puberulent, inside sparsely puberulent. Corolla yellowish, ca. 7.2 mm, inside sparsely puberulent below abaxial lip; tube ca. 5 × 3 mm; limb distinctly 2-lipped; adaxial lip ca. 0.8 mm; abaxial lip ca. 2.2 mm. Stamens adnate to corolla ca. 2 mm above base, glabrous; filaments linear, ca. 3 mm; staminodes 2, ca. 1 mm. Disc ringlike, ca. 0.5 mm, glabrous. Pistil ca. 5 mm, puberulent. Style ca. 2.8 mm; stigma obtrapeziform, ca. 0.3 mm, 2-lobed. Fruit and seeds unknown. Fl. Jun.

• Rocks by rivers in montane regions; ca. 300 m. NW Guangdong (Yangshan Xian).

5. *Chiritopsis cordifolia* D. Fang & W. T. Wang in W. T. Wang, Bull. Bot. Res., Harbin 2(4): 54. 1982.

心叶小花苣苔 *xin ye xiao hua ju tai*

Petiole 5.5–16.5 cm, densely puberulent; leaf blade ovate to reniform, 4–8.5 × 3–9 cm, puberulent, base cordate, margin repand-crenate to obtusely dentate, apex acute to rounded; lateral veins conspicuous. Cymes lax, 8–18-flowered; peduncle ca. 5 cm, densely puberulent; bracts linear, 2–3 × ca. 0.3 mm, margin entire. Pedicel 0.4–1.8 cm, densely puberulent. Calyx segments triangular, 3.5–4 × 0.8–1 mm, outside puberulent, inside glabrous. Corolla white, ca. 1.4 cm, inside puberulent along 2 longitudinal lines below abaxial lip; tube ca. 11 × 5 mm; limb indistinctly 2-lipped; adaxial lip ca. 3 mm; abaxial lip ca. 3.5 mm. Stamens adnate to corolla ca. 3 mm above base, sparsely puberulent; filaments linear, ca. 3.5 mm;

staminodes 2, 2.8–3 mm. Disc ringlike, ca. 0.8 mm, glabrous. Pistil ca. 1 cm; ovary densely brownish puberulent. Style ca. 6.5 mm, puberulent near base; stigma obtrapeziform, ca. 0.6 mm, 2-lobed. Fruit and seeds unknown. Fl. Apr.

• Cliffs in limestone hills. C Guangxi (Liujiang Xian).

6. *Chiritopsis subulata* W. T. Wang, Guihaia 6: 8. 1986.

钻丝小花苣苔 zuan si xiao hua ju tai

Petiole 3–7 cm, spreading pubescent to pilose; leaf blade ovate to broadly so, 3–4 × 2.2–3.6 cm, pubescent and pilose, base cordate to rounded, margin remotely denticulate to entire, apex acute to obtuse; lateral veins inconspicuous. Cymes dense or lax, 9- to many flowered; peduncle 8–9 cm, spreading pubescent to pilose; bracts linear to lanceolate, 5.5–7 × 1.8–2 mm, margin entire. Pedicel 1.5–3.5 mm, brownish pubescent. Calyx segments lanceolate-linear, 4.5–5 × 0.6–1 mm, puberulent to pilose. Corolla white, ca. 1 cm, inside puberulent along longitudinal lines on abaxial lip; tube ca. 8 × 4 mm; limb indistinctly 2-lipped; adaxial lip ca. 1.2 mm; abaxial lip ca. 2 mm. Stamens adnate to corolla 1–1.5 mm above base, puberulent; filaments subulate, 3.5–4 mm; staminodes absent. Disc ringlike, ca. 0.6 mm, glabrous. Pistil ca. 8.5 mm, puberulent. Style ca. 5.7 mm; stigma obtrapeziform, ca. 0.9 mm, 2-lobed. Fruit and seeds unknown. Fl. Jun–Sep.

• Caves in limestone hills; ca. 100 m. S Guangdong (Yangchun Xian, Zhaoqing Xian).

- 1a. Leaf blade base cordate to nearly so, apex acute to obtuse; cymes dense, branched 2 ×, ca. 9-flowered 6a. var. *subulata*
1b. Leaf blade base truncate-cordate to rounded, apex obtuse; cymes lax, branched 4 ×, ca. 35-flowered 6b. var. *yangchunensis*

6a. *Chiritopsis subulata* var. *subulata*

钻丝小花苣苔(原变种) zuan si xiao hua ju tai (yuan bian zhong)

Leaf blade base cordate to nearly cordate, apex acute to obtuse. Cymes dense, branched 2 ×, ca. 9-flowered. Fl. Jun.

• Cave walls in limestone hills; ca. 100 m. S Guangdong (Zhaoqing Xian).

6b. *Chiritopsis subulata* var. *yangchunensis* W. T. Wang, Guihaia 12: 299. 1992.

阳春小花苣苔 yang chun xiao hua ju tai

Leaf blade base truncate-cordate to rounded, apex obtuse. Cymes lax, branched 4 ×, ca. 35-flowered. Fl. Aug–Sep.

• Rocks in caves in limestone hills. SW Guangdong (Yangchun Xian).

7. *Chiritopsis bipinnatifida* W. T. Wang, Bull. Bot. Res., Harbin 1(3): 26. 1981.

羽裂小花苣苔 yu lie xiao hua ju tai

Petiole 2–6.5 cm, puberulent to pilose; leaf blade ovate to rhombic, 2–6 × 1.5–4 cm, puberulent to pilose, base broadly cuneate, margin pinnatifid, lobes 3 or 4 pairs, each narrowly ovate to triangular, 1- or 2-lobed or entire, apex acute to obtuse; lateral veins inconspicuous. Cymes lax, 5–7-flowered; peduncle 7–8 cm, sparsely puberulent; bracts lanceolate, ca. 4.5 × 1.5 mm, margin entire. Pedicel 4–10 mm, puberulent. Calyx segments narrowly triangular, 4–5 × ca. 1 mm, outside densely puberulent, inside sparsely puberulent. Corolla white, ca. 1 cm, inside sparsely puberulent above; tube ca. 7 × 3.5 mm; limb distinctly 2-lipped; adaxial lip ca. 1.2 mm; abaxial lip ca. 3.5 mm. Stamens adnate to corolla ca. 2 mm above base, glabrous; filaments linear, ca. 4 mm; staminodes 3, ca. 0.8 mm. Disc ringlike, ca. 0.3 mm, glabrous. Pistil ca. 8 mm, puberulent. Style ca. 5 mm; stigma obtrapeziform, ca. 0.5 mm, 2-lobed. Capsule ovoid, ca. 3 × 2 mm. Fl. Jun, fr. Oct.

• Limestone hills. NE Guangxi (Lingui Xian).

8. *Chiritopsis lobulata* W. T. Wang, Bull. Bot. Res., Harbin 2(4): 55. 1982.

浅裂小花苣苔 qian lie xiao hua ju tai

Petiole 2.2–5(–8) cm, white puberulent to sparsely pilose; leaf blade ovate to orbicular or reniform, 2–3.5 × 2.5–3.8 cm, adaxially puberulent to pilose, abaxially more densely puberulent along veins, base cordate, margin nearly palmately lobed, lobes 4–6 pairs, each broadly ovate, apex rounded to obtuse, 5-veined or basal veins not touching, apex obtuse; lateral veins conspicuous to inconspicuous. Cymes lax, ca. 7-flowered; peduncle 6–10 cm, sparsely white puberulent to pilose; bracts oblanceolate to linear, 4–8 × 0.8–3 mm, margin entire to few denticulate apically. Pedicel 3–10 mm, white puberulent. Calyx segments linear-lanceolate, 3–4 × 0.4–0.7 mm, outside white puberulent to pilose, inside glabrous. Corolla white, ca. 7.8 mm, inside glabrous; tube ca. 5 × 3 mm; limb distinctly 2-lipped; adaxial lip ca. 1.4 mm; abaxial lip ca. 2.5 mm. Stamens adnate to corolla ca. 2 mm above base, glabrous; filaments linear, ca. 3 mm; staminode 1, ca. 0.2 mm. Disc 2-lobed, ca. 0.8 mm, glabrous. Pistil ca. 4.2 mm, sparsely puberulent. Style ca. 3 mm; stigma obtrapeziform, ca. 0.2 mm, 2-lobed. Capsule ellipsoid, ca. 2.5 × 1.2 mm. Fl. May–Jun, fr. Jun.

• Shaded rocks in limestone hills; ca. 300 m. NW Guangdong (Yangshan Xian).

9. *Chiritopsis glandulosa* D. Fang, L. Zeng, & D. H. Qin, Acta Phytotax. Sin. 31: 470. 1993.

紫腺小花苣苔 zi xian xiao hua ju tai

Petiole 7–10 cm, glandular pubescent and purple glandular; leaf blade reniform to orbicular, 3–12 × 3–16.3 cm, glandular puberulent and purple glandular, base cordate, margin palmately lobed, lobes 4–8 pairs and ovate to broadly so, 5-veined, apex rounded to obtuse; lateral veins conspicuous. Cymes lax, 7- to many flowered; peduncle 7–18 cm, glandular pubescent and purple

glandular; bracts leaflike, obovate to oblong or narrowly lanceolate, 0.4–1.8 × 0.2–1.5 cm, margin serrate to entire. Pedicel 1.5–6 cm, glandular pubescent and purple glandular. Calyx segments lanceolate, 3–8 × 1.3–2 mm, outside glandular puberulent and purple glandular, inside nearly glabrous. Corolla white, 1.1–1.3 cm, inside sparsely pubescent; tube 7–8 × 4–5 mm; limb distinctly 2-lipped; adaxial lip ca. 1.5 mm; abaxial

lip 3–4 mm. Stamens adnate to corolla ca. 2.5 mm above base, sparsely pubescent; filaments linear, 3.5–4 mm; staminodes 2 or 3, seldom absent, ca. 0.5 mm. Disc ringlike, ca. 0.7 mm, glandular. Pistil ca. 1 cm, glandular puberulent. Style ca. 7.5 mm; stigma obtrapeziform, ca. 0.6 mm, 2-lobed. Capsule narrowly ovoid, 3–5 × ca. 1.5 mm. Fl. May–Jun, fr. Jun.

•Rocks in limestone hills; 200–300 m. NE Guangxi (Pingle Xian).

34. PETROCODON Hance, J. Bot. 21: 167. 1883.

石山苣苔属 shi shan ju tai shu

Herbs, perennial, terrestrial or epipetric, rhizomatous, stemless. Leaves few, basal; leaf blade strigose, base cuneate. Inflorescences umbel-like, dense, axillary, few- to many-flowered cymes; bracts 2, opposite. Calyx actinomorphic, 5-sect from base; segments equal. Corolla white, zygomorphic, inside glabrous; tube suburceolate-tubular, not swollen, longer than limb, 1–2.5 mm in diam.; limb indistinctly 2-lipped; adaxial lip 2-lobed, slightly shorter than abaxial lip; abaxial lip 3-lobed, lobes equal, apex acute. Stamens 2, adnate to abaxial side of corolla tube slightly above base, included; anthers dorsifixed, coherent apically, thecae divaricate, confluent at apex, dehiscing longitudinally; connective not projecting; staminodes 1–3, adnate to adaxial side of corolla tube. Disc ringlike. Ovary linear, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigma 1, terminal, nearly globose, undivided. Capsule straight in relation to pedicel, linear, much surpassing calyx, dehiscing loculicidally to base; valves 2, straight, not twisted. Seeds unappendaged.

•One species: endemic to China.

1. *Petrocodon dealbatus* Hance, J. Bot. 21: 167. 1883.

石山苣苔 shi shan ju tai

Petiole 2–4(–11) cm, short strigose; leaf blade oblanceolate, elliptic, sometimes falcate, 5–13(–16) × 1.5–4(–6.8) cm, short strigose, margin nearly entire to dentate, denticulate, or crenulate, apex acute to acuminate. Peduncle 4–11 cm, short strigose; bracts linear, 3–9 mm. Calyx segments linear, 2–5 × 0.2–0.3 mm, outside sparsely short strigose. Corolla 4–8 mm; tube 3–5 mm; lobes triangular, (0.8–)1–2.1(–3) mm. Stamens glabrous; filaments 2–4 mm; anthers 1.8–2.2 mm; staminodes ca. 0.3 mm. Pistil 6–9 mm, glabrous. Style 3.8–4.8 mm. Capsule 1.2–22 cm. Fl. Jun–Sep.

•Rocks in shaded areas in valley, forests on limestone hills; 200–1000 m. N Guangdong, N Guangxi, E Guizhou, SW Hubei, Hunan.

- 1a. Leaf blade margin nearly entire to denticulate or crenulate 1a. var. *dealbatus*
1b. Leaf blade margin dentate 1b. var. *denticulatus*

1a. *Petrocodon dealbatus* var. *dealbatus*

石山苣苔(原变种) shi shan ju tai (yuan bian zhong)
Petrocodon longistylus Kraenzlin.

Leaf blade margin nearly entire to denticulate or crenulate.

•Rocks in shaded areas in valley, forests on limestone hills; 200–1000 m. N Guangdong, N Guangxi, E Guizhou, SW Hubei, Hunan.

1b. *Petrocodon dealbatus* var. *denticulatus* (W. T. Wang)

W. T. Wang, Fl. Reipubl. Popularis Sin. 69: 420. 1990.

齿缘石山苣苔 chi yuan shi shan ju tai

Petrocodon denticulatus W. T. Wang, Acta Phytotax. Sin. 13: 101. 1975.

Leaf blade margin dentate.

•E Guizhou (Liping Xian), W Hunan (Qianyang Xian).

35. DIDYMOCARPUS Wallich, Edinburgh Philos. J. 1: 378. 1819, nom. cons.

长蒴苣苔属 chang shuo ju tai shu

Roettlera Vahl (1804), not Willdenow (1797).

Herbs, rarely shrubs or subshrubs (outside China), perennial, terrestrial or epipetric, rhizomatous, stemless or simple stemmed. Leaves few to many, along stem, then opposite, whorled, or alternate or basal, equal to subequal in a pair; leaf blade sparsely to densely puberulent to pubescent, rarely nearly glabrous, short strigose, or woolly, base cuneate to cordate, rarely auriculate. Inflorescences axillary, sometimes umbel-like, lax or sometimes dense, 1- to many-flowered cymes; bracts 2, opposite. Calyx actinomorphic and 5-fid, or zygomorphic and 2-lipped or 5- or 3-sect from base to shallowly lobed; segments equal to unequal. Corolla blue to wine-red, rarely pink, white, or yellow, zygomorphic, inside glabrous, rarely sparsely puberulent; tube cylindrical to funnelform-tubular, not swollen, rarely saccate at base, longer than limb, 2–13 mm in diam.; limb 2-lipped; adaxial lip 2-lobed, 1.5–3 × shorter than abaxial

lip; abaxial lip 3-lobed, lobes equal or central lobe longer, apex rounded, rarely obtuse to acute. Stamens 2, adnate to abaxial side of corolla tube near or above middle, included; anthers dorsifixed, coherent by adaxial surfaces, thecae divaricate, confluent at apex, dehiscing longitudinally; connective not projecting; staminodes (absent or) 2 or 3, adnate to adaxial or adaxial and abaxial sides of corolla tube. Disc ringlike, rarely cupular. Ovary linear, 1-loculed; placentas 2, parietal, slightly projecting inward, 2-cleft. Stigma 1, terminal, depressed-globose to disclike or truncate, undivided. Capsule straight in relation to pedicel, usually linear, much surpassing calyx, dehiscing loculicidally to base; valves 2 or 4, straight, not twisted. Seeds unappendaged.

About 180 species: SE Asia; 31 species in China.

The delimitation of *Chirita* and *Didymocarpus* is somewhat problematic. As defined here, the genera are based entirely on stigma shape. Thus, more than a few Chinese taxa described in *Didymocarpus* (see especially Wang et al., Edinburgh J. Bot. 49: 54. 1991) and some included here (e.g., *D. cortusifolius* and *D. heucherifolius*) were included in *Chirita* by other recent workers (see D. Wood, Notes Roy. Bot. Gard. Edinburgh 33: 123–205. 1974).

Didymocarpus nigrescens H. Léveillé & Vaniot and *D. violaceus* H. Léveillé (1912, not Ridley 1896) cannot be placed reliably in any genus because they are only known from fruiting specimens. The senior author suggests that both taxa probably belong in *Didymocarpus*, but Burt suggested that *D. nigrescens* belongs in *Petrocodon* (Notes Roy. Bot. Gard. Edinburgh 38: 471. 1980) or *Tengia* (Notes Roy. Bot. Gard. Edinburgh 22: 314. 1958).

1a. Herbs stemless.

- 2a. Leaf blade elliptic to oblong, ovate, or oblanceolate, not lobed, base cuneate to rounded, pinnately veined, herbaceous or papery; calyx 5-sect from base.
- 3a. Leaf blade shorter than 5 cm, densely white woolly; calyx segments 2–2.5 mm 24. *D. niveolanosus*
- 3b. Leaf blade 2.2–20 cm (mostly over 5 cm), densely appressed puberulent or short strigose; calyx segments 2.5–7 mm.
 - 4a. Leaf blade to 20 × 10.5 cm, densely appressed puberulent; filaments sparsely puberulent and glandular; pistil puberulent; corolla yellow 22. *D. mollifolius*
 - 4b. Leaf blade to 10 × 3.6 cm, sparsely short strigose; filaments glabrous; pistil sparsely glandular; corolla pale purple 23. *D. hancei*
- 2b. Leaf blade ovate to orbicular, triangular, obovate, or reniform, often lobed, base cordate to truncate, palmately veined (then leaf blade papery) or rarely pinnately veined (then leaf blade leathery); calyx shallowly 5-lobed (rarely 5-sect from or near base).
 - 5a. Calyx divided from or near base; tube to 2 mm.
 - 6a. Leaf blade not lobed, margin obtusely dentate or double dentate, apex obtuse; corolla yellow, tube funnelform-cylindric, mouth 3–4 mm in diam. 25. *D. subpalmatinervis*
 - 6b. Leaf blade distinctly or indistinctly multilobed, margin denticulate to serrate or entire, apex rounded; corolla pink, tube funnelform-tubular to campanulate, mouth 1–1.3 cm in diam.
 - 7a. Calyx lobes broadly lanceolate, oblanceolate-linear, or triangular, 3–4 mm, margin sparsely denticulate; corolla 2.5–3.2 cm, puberulent outside; anthers puberulent; staminodes 3; leaf blade 3–9 × 3.5–11 cm, eglandular 26. *D. heucherifolius*
 - 7b. Calyx lobes spatulate-linear or narrowly obovate, 6–8 mm, margin entire; corolla 1.5–1.8 cm, glabrous outside; anthers white woolly; staminodes 2; leaf blade 1.8–4.6 × 1.6–4 cm, sparsely yellow glandular 27. *D. sinoprimuminus*
 - 5b. Calyx divided from or near middle, tube at least 4 mm.
 - 8a. Leaf blade leathery, pinnately veined; calyx slightly zygomorphic, ca. 13 mm, lobes unequal, abaxial lobe ca. 7 mm, others 2.5–3.5 mm; anthers glabrous; staminodes 2 28. *D. yuenlingensis*
 - 8b. Leaf blade papery, palmately veined; calyx actinomorphic, 7–9 mm, lobes equal, 1–3 mm; anthers white woolly or puberulent; staminodes 3.
 - 9a. Bracts semiorbicular, adaxially pubescent, abaxially villous; calyx lobes depressed oblong, overlapping; filaments ca. 15 mm; anthers ca. 5 mm; staminodes 2–3 mm; style glabrous..... 31. *D. salviiflorus*
 - 9b. Bracts ovate to elliptic or narrowly oblong, abaxially puberulent to sparsely so; calyx lobes ovate-triangular to triangular, not overlapping; filaments 6–10 mm; anthers 2.5–3 mm; staminodes 0.5–0.8 mm; style puberulent or sparsely so.

- 10a. Leaf blade orbicular-ovate to orbicular or triangular, 4.6–10 × 3.2–9 cm; bract margin entire; pedicel 4–10 mm; calyx lobe margin denticulate; corolla white, puberulent outside, adaxial lip 5–6 mm, abaxial lip 7–9 mm; anthers white woolly ... 29. *D. cortusifolius*
- 10b. Leaf blade reniform or orbicular-reniform, 2–4.5 × 3.5–7.5 cm; bract margin few crenate; pedicel 11–18 mm; calyx lobe margin entire; corolla pink, glabrous outside, adaxial lip ca. 1 cm, abaxial lip ca. 1.6 mm; anthers sparsely puberulent 30. *D. reniformis*
- 1b. Herbs with stems (0.7–)3–62 cm.
- 11a. Calyx divided from base into 3 or 5 segments, without a tube.
- 12a. Calyx actinomorphic or slightly zygomorphic, 5-sect, segments of same width.
- 13a. Stems to 5.5 cm; petiole 3–12 cm; leaf blade broadly ovate to orbicular, base cordate to truncate, palmately veined; peduncle 6–15 cm; calyx slightly zygomorphic, segments unequal in length
3. *D. margaritae*
- 13b. Stems 10–30 cm; petiole 0.2–5 cm; leaf blade elliptic to ovate or oblong, base rounded to cuneate, pinnately veined; peduncle 2.3–7 cm; calyx actinomorphic, segments equal in length.
- 14a. Leaf blade 2.5–4.8 cm; lateral veins 6 or 7 on each side of midrib; peduncle glabrous;
corolla 2.5–3 cm; filaments ca. 7 mm; pistil ca. 2 cm 1. *D. medogensis*
- 14b. Leaf blade 4–18.5 cm; lateral veins 8–11 on each side of midrib; peduncle sparsely glandular puberulent or pilose; corolla 1.6–2.2 cm; filaments ca. 3.5 mm; pistil ca. 1.1 cm 2. *D. glandulosus*
- 12b. Calyx zygomorphic, 3-sect, adaxial lip 2–3 × wider than abaxial 2 segments.
- 15a. Calyx 2–3 mm, adaxial segment 3-lobed from near middle, outer surface glabrous 4. *D. zhenkangensis*
- 15b. Calyx 4–5 mm, adaxial segment shallowly 3-lobed, outer surface puberulent or sparsely glandular puberulent.
- 16a. Leaf blade to 9 cm wide; cymes 3–15-flowered; peduncle 4–8 cm; adaxial calyx lip ca. 3 mm wide, lobes triangular, 2 abaxial calyx segments oblong, ca. 1.5 mm wide; corolla adaxial lip ca. 3 mm, abaxial lip ca. 7 mm; anthers puberulent; staminodes 2 5. *D. pseudomengtze*
- 16b. Leaf blade to 4.3 cm wide; cymes 1–3-flowered; peduncle 1.8–3.5 cm; adaxial calyx lip ca. 1.5 mm wide, lobes lanceolate-linear, 2 abaxial calyx segments narrowly lanceolate, 0.8–0.9 mm wide; corolla adaxial lip ca. 1.8 mm, abaxial lip ca. 4 mm; anthers glabrous; staminodes absent 6. *D. stenocarpus*
- 11b. Calyx not divided from base, 2-lipped or 5-lobed, tube 1.5–9 mm.
- 17a. Calyx actinomorphic, 2–3 mm, 5-lobed nearly from middle; corolla mouth ca. 2.5 mm in diam.; staminodes absent; ovary appressed puberulent 8. *D. silvarum*
- 17b. Calyx slightly to strongly zygomorphic, 3–12 mm, indistinctly to distinctly 2-lipped; corolla mouth 3–10 mm in diam.; staminodes 1–3 (unknown in *D. nanophyton*); ovary glabrous, rarely densely glandular puberulent, minutely glandular, or sparsely puberulent.
- 18a. Calyx tuberculate outside; stems 2.5–7 cm; leaf blade 2.5–4.5 × 1.5–3 cm 15. *D. nanophyton*
- 18b. Calyx smooth outside; stems 3–30(–62) cm; leaf blade 1–15(–26) × 1–10(–16) cm.
- 19a. Corolla 2.5–4.5 cm.
- 20a. Calyx 10–12 mm; pistil sparsely puberulent or minutely glandular.
- 21a. Petiole to 2.5(–5) cm; leaf blade to 5.5 cm wide, adaxially densely appressed puberulent; peduncle glandular puberulent; corolla ca. 3 cm, mouth ca. 3.5 mm in diam.; anthers glabrous; ovary minutely glandular 20. *D. praeteritus*

- 21b. Petiole to 11 cm; leaf blade to 10.5(–16) cm wide, adaxially sparsely appressed puberulent to glabrous; peduncle glabrous; corolla 3.2–4.5 cm, mouth 9–10 mm in diam.; anthers puberulent; ovary sparsely puberulent 21. *D. purpureobracteatus*
- 20b. Calyx 3–6 mm; pistil glabrous, eglandular.
- 22a. Corolla sparsely pubescent outside, mouth 4–6 mm in diam.; adaxial leaf surface eglandular; bracts 2–20 mm, often leaflike, margin crenate to entire 19. *D. yunnanensis*
- 22b. Corolla glabrous outside, mouth 7–8 mm in diam.; adaxial leaf surface with yellow or orange glands (at least sparsely); bracts 3–6 mm, never leaflike, margin entire.
- 23a. Stem leaves in 2 whorls; petiole to 7 cm; leaf blade adaxially sparsely yellow glandular, base oblique, cuneate to cordate; peduncle to 4 cm; bracts free; calyx 3–4.5 mm; staminodes 3, 1.8–3.6 mm 12. *D. pulcher*
- 23b. Stem leaves opposite; petiole to 2.5 cm; leaf blade adaxially orange glandular, base oblique, broadly cuneate; peduncle 5.5–9 cm; bracts connate at base; calyx 5–6 mm; staminodes 2, ca. 6 mm 17. *D. leiboensis*
- 19b. Corolla to 2.4 cm.
- 24a. Leaves crowded near stem apex, nodes indistinct; leaves sparsely yellow glandular on both surfaces; staminode 1.
- 25a. Stems spreading villous; lateral veins 3 or 4 on each side of midrib; bracts ca. 2 mm; calyx tube 2.2–2.5 mm 11. *D. villosus*
- 25b. Stems sparsely appressed puberulent; lateral veins 6–8 on each side of midrib; bracts 4–7 mm; calyx tube 3.5–4 mm 13. *D. primulifolius*
- 24b. Leaves spread along stem or sometimes apical nodes dense, opposite, rarely whorled or basal few alternate, nodes 1–5; leaves eglandular, sometimes sparsely yellow, red, or purple glandular; staminodes 2 or 3.
- 26a. Abaxial leaf surface sparsely red glandular; petiole 0.5–10 cm; leaf blade ovate to reniform; pedicel ca. 2 mm 14. *D. grandidentatus*
- 26b. Abaxial leaf surface yellow glandular or eglandular; petiole 0.1–3.5(–4.7) cm; leaf blade elliptic to broadly ovate or obovate, rarely triangular, oblong, or rhombic; pedicel usually over 2 mm.
- 27a. Adaxial leaf surface sparsely purple glandular; bracts connate basally; anthers glabrous; ovary ca. 6 mm, densely glandular puberulent 18. *D. adenocalyx*
- 27b. Adaxial leaf surface eglandular or yellow glandular; bracts free or sometimes connate basally (in some *D. stenanthos*); anthers glabrous, rarely puberulent; ovary 10–15 mm, glabrous.
- 28a. Corolla puberulent outside, tube funnellform, mouth ca. 6 mm in diam.; filaments ca. 6 mm; leaf blade base cordate-auriculate 9. *D. zhufengensis*
- 28b. Corolla glabrous outside, tube cylindrical or nearly tubular, mouth 3–4 mm in diam.; filaments 3–4 mm; leaf blade base cuneate to cordate.
- 29a. Leaves mostly opposite, basal 2 often alternate, leaf blade 2–6.8(–11) × 1.3–4.2(–5.6) cm, sometimes yellow glandular; cymes 2–5-flowered; calyx slightly

- zygomorphic, 5-lobed, lobes nearly equal, sparsely glandular puberulent outside; staminodes 2.5–4 mm 10. *D. aromaticus*
- 29b. Leaves opposite, leaf blade 2–11.5(–15) × 1.8–6.8 cm, adaxial surface eglandular, abaxial surface eglandular or sometimes very sparsely yellow glandular; cymes 5- to many flowered; calyx zygomorphic, 2-lipped from near middle, adaxial lip 3 lobed, abaxial lip 2-lobed, glabrous outside; staminodes 0.3–1.2 mm.
- 30a. Leaf blade abaxial surface sparsely pubescent and very sparsely yellow glandular; bracts free; anthers glabrous
..... 7. *D. mengtze*
- 30b. Leaf blade abaxial surface puberulent along veins, eglandular; bracts connate at base or free; anthers nearly glabrous 16. *D. stenanthos*

1. *Didymocarpus medogensis* W. T. Wang, Bull. Bot. Res., Harbin 2(4): 41. 1982.

墨脱长蒴苣苔 mo tuo chang shuo ju tai

Stems 11–13 cm, densely retrorse pubescent. Leaves opposite; petiole 0.2–1.8 cm; leaf blade slightly oblique, ovate to elliptic-ovate, 2.5–4.8 × 1.5–2.2 cm, papery, adaxially densely appressed puberulent, eglandular, abaxially puberulent along veins, eglandular, base rounded to cuneate, margin denticulate, apex acute; lateral veins 6 or 7 on each side of midrib. Cymes 1–8-flowered; peduncle 4.5–7 cm, glabrous; bracts free, orbicular-ovate, ca. 2.5 mm, glabrous, margin entire. Pedicel 0.9–2 cm. Calyx actinomorphic, 5-sect from base; segments equal, narrowly lanceolate to linear, ca. 3 × 1–1.2 mm, glabrous, margin entire. Corolla purple, 2.5–3 cm, glabrous; tube narrowly funnelform, 1.7–2 cm × 4–5 mm; adaxial lip ca. 4 mm; abaxial lip ca. 1 cm. Stamens glabrous; filaments ca. 7 mm; anthers ca. 2.5 mm; staminodes 2, ca. 3.2 mm. Pistil ca. 2 cm, glabrous; ovary ca. 1.8 cm. Fruit unknown. Fl. Jun.

• Waysides in montane regions; ca. 1600 m. SE Xizang (Medog Xian).

2. *Didymocarpus glandulosus* (W. W. Smith) W. T. Wang, Acta Bot. Yunnan. 6: 14. 1984.

腺毛长蒴苣苔 xian mao chang shuo ju tai

Stems 10–30 cm, appressed puberulent. Leaves opposite; petiole 0.2–5 cm; leaf blade slightly to strongly oblique, elliptic to oblong or ovate to narrowly ovate, 4–18.5 × 2.7–7.6 cm, herbaceous, adaxially puberulent, eglandular, abaxially sparsely puberulent, densely puberulent along veins, eglandular, base oblique, cuneate to rounded, margin denticulate to serrate, apex narrowly to broadly acute; lateral veins 8–11 on each side of midrib. Cymes 5–12-flowered; peduncle 2.3–4.5 cm, sparsely glandular puberulent; bracts free, broadly ovate, ca. 3 mm, glabrous, glandular, margin entire. Pedicel 3–12 mm. Calyx actinomorphic, 5-sect from base; segments equal, lanceolate, 2–2.5 × ca. 1 mm, glabrous, inside glandular, margin entire. Corolla purple-red, 1.6–2.2 cm, glabrous;

tube subtubular, 1.2–1.7 cm × ca. 3 mm; adaxial lip ca. 2.5 mm; abaxial lip ca. 7 mm. Filaments ca. 3.5 mm, glabrous; anthers ca. 1.8 mm, glabrous to puberulent; staminodes 2, ca. 1.5 mm. Pistil ca. 1.1 cm, glabrous; ovary ca. 9 mm. Capsule 1.6–2.9 cm. Fl. Jul–Aug, fr. Aug–Dec.

• Rocky areas, streamside forests and forest margin in valleys; 500–2200 m. Guangxi, S Guizhou, Sichuan, SE Yunnan.

1a. Anthers glabrous 2a. var. *glandulosus*

1b. Anthers puberulent.

2a. Corolla ca. 2.2 cm 2b. var. *lasiantherus*

2b. Corolla ca. 1.6 cm 2c. var. *minor*

2a. *Didymocarpus glandulosus* var. *glandulosus*

腺毛长蒴苣苔(原变种) xian mao chang shuo ju tai
(yuan bian zhong)

Didymocarpus silvarum W. W. Smith var. *glandulosus* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 5: 151. 1912.

Corolla 1.8–2 cm. Anthers glabrous. Fl. Aug, fr. Dec.

• Streamside forests in valleys; 1000–2200 m. SW Sichuan (Mabian Xian), SE Yunnan.

2b. *Didymocarpus glandulosus* var. *lasiantherus* (W. T. Wang) W. T. Wang, Acta Bot. Yunnan. 6: 16. 1984.

毛药长蒴苣苔 mao yao chang shuo ju tai

Didymocarpus silvarum W. W. Smith var. *lasiantherus* W. T. Wang, Bull. Bot. Res., Harbin 2(4): 41. 1982.

Corolla ca. 2.2 cm. Anthers puberulent. Fl. Jun–Oct.

• Rocks by streams, forest margin in valleys; 500–1300 m. Sichuan.

2c. *Didymocarpus glandulosus* var. *minor* (W. T. Wang) W. T. Wang, Acta Bot. Yunnan. 6: 17. 1984.

短萼长蒴苣苔 duan e chang shuo ju tai

Didymocarpus silvarum W. W. Smith var. *minor* W. T. Wang in W. T. Wang & K. Y. Pan, Bull. Bot. Res., Harbin 2(2): 130. 1982.

Corolla ca. 1.6 cm. Anthers puberulent. Fl. Jul, fr. Aug.

• Rocks in valley forests; 800–1200 m. Guangxi (Lingyun Xian, Rongshui Xian), S Guizhou.

3. *Didymocarpus margaritae* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 5: 151. 1912.

短茎长蒴苣苔 duan jing chang shuo ju tai

Stems 0.7–5.5 cm, puberulent near base, glabrous above. Leaves opposite; petiole 3–12 cm; leaf blade broadly ovate to orbicular, 2–9 × 2.7–8.5 cm, herbaceous, adaxially appressed puberulent, eglandular, abaxially nearly glabrous, sparsely puberulent along veins, eglandular, base cordate to truncate, margin serrate to crenate, apex acute to rounded, basal veins 5 or 6; lateral veins 2 or 3 on each side of midrib. Cymes 4–20-flowered; peduncle 6–15 cm, glabrous; bracts free, ovate to elliptic, 2–4 mm, glabrous, glandular abaxially, margin entire. Pedicel 2–4 mm. Calyx slightly zygomorphic, 5-sect from base; segments unequal, lanceolate to linear, 3–5 × 0.6–1 mm, glabrous, margin entire. Corolla orange, drying purplish, ca. 2 cm, glabrous; tube cylindrical, ca. 1.3 cm × 3–4 mm; adaxial lip ca. 3 mm; abaxial lip ca. 7 mm. Stamens glabrous; filaments ca. 2.8 mm; anthers ca. 1.8 mm; staminodes absent. Pistil ca. 1.2 cm, glabrous; ovary ca. 9 mm. Capsule 1.9–2.3 cm.

• Steep, montane cliffs; 1500–1600 m. S Yunnan (Simao Xian).

4. *Didymocarpus zhenkangensis* W. T. Wang in W. T. Wang & K. Y. Pan, Bull. Bot. Res., Harbin 2(2): 131. 1982.
镇康长蒴苣苔 *zhen kang chang shuo ju tai*
Didymocarpus mengtze W. W. Smith var.
zhenkangensis (W. T. Wang) H. W. Li.

Stems 5–22 cm, densely puberulent. Leaves opposite; petiole 0.1–2(–3.8) cm; leaf blade elliptic to broadly ovate or obovate, 1.3–7 × 0.9–3.5 cm, herbaceous, adaxially puberulent, eglandular, abaxially puberulent along veins, glandular, base oblique, cuneate to rounded, margin irregularly crenulate to dentate or serrulate, apex acute to rounded; lateral veins 4–7 on each side of midrib. Cymes 1–15-flowered; peduncle 1.5–3.5 cm, sparsely glandular puberulent; bracts free, broadly ovate to orbicular-ovate, 2.5–5 mm, nearly glabrous, margin entire. Pedicel 3–11 mm. Calyx zygomorphic, 2–3 mm, 3-sect from base; adaxial lip 3-lobed from near middle, broadly obovate, ca. 3 mm wide, lobes narrowly triangular, ca. 1 mm wide, 2 abaxial segments narrowly elliptic, 1–1.2 mm wide, glabrous, margin entire. Corolla purple to brick red, 1.8–2.4 cm, glabrous; tube nearly tubular, 1.3–1.6 cm × ca. 3 mm; adaxial lip 3–4 mm; abaxial lip 5–7.5 mm. Stamens glabrous; filaments ca. 3.5 mm; anthers ca. 1.5 mm; staminodes 2, ca. 0.3 mm. Pistil ca. 1.5 cm, glabrous; ovary ca. 1.2 mm. Immature capsule ca. 2.3 cm. Fl. Jul–Aug, fr. Aug.

• Rocks in valley forests; 1200–2700 m. SW Yunnan.

5. *Didymocarpus pseudomengtze* W. T. Wang, Acta Bot. Yunnan. 6: 19. 1984.

凤庆长蒴苣苔 *feng qing chang shuo ju tai*

Stems 8–18 cm, densely appressed pubescent. Leaves opposite; petiole 0.2–3.8 cm; leaf blade oblique, elliptic to ovate or obovate, 3.5–16 × 2–9 cm, herbaceous, appressed pilose, eglandular, base oblique, cuneate to rounded, margin double dentate to serrate, apex acute to rounded; lateral veins 5–8 on each side of midrib.

Cymes 3–15-flowered; peduncle 4–8 cm, sparsely glandular puberulent; bracts free, orbicular to ovate, 3–4 mm, glabrous or with very few short glandular hairs, margin entire. Pedicel 3–10 mm. Calyx zygomorphic, 4.5–5 mm, 3-sect from base; adaxial lip shallowly 3-lobed, broadly obtusely-trapeziform, ca. 3 mm wide, lobes triangular, ca. 1 mm wide, 2 abaxial segments oblong, ca. 1.5 mm wide, outside sparsely glandular puberulent, inside glabrous, margin entire. Corolla purple to purplish red, 2–2.5 cm, glabrous; tube cylindrical, ca. 1.8 cm × 3 mm; adaxial lip ca. 3 mm; abaxial lip ca. 7 mm. Filaments ca. 3.5 mm, glabrous; anthers ca. 1.5 mm, puberulent; staminodes 2, 0.8–1 mm. Pistil ca. 1.6 cm, glabrous; ovary ca. 1.1 cm. Capsule 1.8–3 cm. Fl. Jul, fr. Oct.

• Forests, on rocks in montane regions; 2100–2700 m. SW Yunnan.

6. *Didymocarpus stenocarpus* W. T. Wang, Acta Bot. Yunnan. 6: 17. 1984.

细果长蒴苣苔 *xi guo chang shuo ju tai*

Stems 8.5–12 cm, densely pubescent. Leaves opposite; petiole 0.2–3 cm; leaf blade often oblique, elliptic to ovate, 2.4–10.5 × 1.5–4.3 cm, herbaceous, eglandular, adaxially puberulent, abaxially puberulent along veins, base oblique, cuneate, margin denticulate, apex acute to abruptly acuminate; lateral veins 6–10 on each side of midrib. Cymes 1–3-flowered; peduncle 1.8–3.5 cm, glandular puberulent; bracts early deciduous. Pedicel 5–10 mm. Calyx zygomorphic, ca. 4 mm, 3-sect from base; adaxial lip shallowly 3-lobed, obtusely-trapeziform, ca. 1.5 mm wide, lobes lanceolate-linear, ca. 0.5 mm wide, 2 abaxial segments narrowly lanceolate, 0.8–0.9 mm wide, outside appressed puberulent, inside glabrous, margin entire. Corolla blue, ca. 1.8 cm, glabrous; tube cylindrical, ca. 1.4 cm × 2 mm; adaxial lip ca. 1.8 mm; abaxial lip ca. 4 mm. Stamens glabrous; filaments ca. 3 mm; anthers ca. 1 mm; staminodes absent. Pistil ca. 1.4 cm, glabrous; ovary ca. 1.1 cm. Capsule 2.2–2.8 cm. Fl. Jul–Aug, fr. Aug.

• Dense forests; ca. 1100 m. W Yunnan (Yingjiang Xian).

7. *Didymocarpus mengtze* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 5: 152. 1912.

蒙自长蒴苣苔 *meng zi chang shuo ju tai*

Stems 11–20 cm, sparsely to densely appressed puberulent. Leaves opposite; petiole 0.2–3.2 cm; leaf blade elliptic to ovate or obovate, 5.7–11.5 × 4–6.6 cm, herbaceous, adaxially appressed puberulent to pilose, eglandular, abaxially sparsely pubescent, very sparsely yellow glandular, base oblique, broadly cuneate to rounded, margin dentate to serrate or double dentate to serrate, apex acute to obtuse; lateral veins 5–8 on each side of midrib. Cymes 5–11-flowered; peduncle 4–7.2 cm, sparsely glandular puberulent; bracts free, broadly elliptic to obovate, ca. 4 mm, adaxially puberulent, abaxially sparsely glandular puberulent, margin entire. Pedicel 2–8 mm. Calyx zygomorphic, 4–6 mm; limb 2–

lipped; tube 1.5–2 mm; adaxial lip 3-lobed, obtrapeziform, 3–4 mm wide, lobes ovate-orbicular, ca. 1 mm wide; abaxial lip 2-lobed, obtrapeziform, ca. 4.5 mm, lobes triangular, 1.5–2 mm wide, glabrous, margin entire. Corolla purple to purplish red, ca. 2 cm, glabrous; tube cylindric, ca. 1.6 cm × 3 mm; adaxial lip ca. 3 mm; abaxial lip ca. 6 mm. Filaments ca. 3 mm, glabrous; anthers ca. 1.6 mm, nearly glabrous; staminodes apparently absent, ca. 1.2 mm. Pistil ca. 1.7 cm, glabrous; ovary ca. 1.2 cm. Capsule 2–2.5 cm. Fl. Jul, fr. Oct.

• Montane regions; 1200–2700 m. SE Yunnan (Mengzi Xian).

8. *Didymocarpus silvarum* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 5: 150. 1912.

林生长蒴苣苔 *lin sheng chang shuo ju tai*

Stems 7–15 cm, densely appressed pubescent. Leaves opposite; petiole 1.5–6.5 cm; leaf blade elliptic to ovate or obovate, 1.5–20 × 1–10.5 cm, herbaceous, adaxially puberulent, eglandular, abaxially puberulent along veins, glandular, base oblique, rounded to cordate, margin dentate to serrate, apex acute to rounded; lateral veins 8–10 on each side of midrib. Cymes to 20-flowered; peduncle 5–7 cm, glabrous; bracts free, orbicular-ovate, ca. 2 mm, glabrous, adaxially glandular, margin entire. Pedicel 5–12 mm. Calyx actinomorphic, 2–3 mm; limb 5-lobed; tube ca. 1.5 mm; segments equal, lobes broadly ovate, ca. 1.5 × 1 mm, glabrous, adaxially glandular, margin entire. Corolla purple to pink, 1.8–2 cm, glabrous; tube cylindric, ca. 1.4 cm × 2–3 mm; adaxial lip ca. 3 mm; abaxial lip ca. 6 mm. Stamens glabrous; filaments ca. 3.5 mm; anthers ca. 1.5 mm; staminodes absent. Pistil ca. 1.2 cm; ovary ca. 9 mm, appressed puberulent. Style glabrous. Immature capsule ca. 2 cm.

• Forests of montane regions; 1200–1300 m. S Yunnan (Simao Xian).

9. *Didymocarpus zhufengensis* W. T. Wang, Bull. Bot. Res., Harbin 4(1): 13. 1984.

珠峰长蒴苣苔 *zhu feng chang shuo ju tai*

Stems ca. 29 cm, appressed puberulent. Leaves mostly opposite, basal 2 alternate; petiole to 3 cm; leaf blade broadly ovate to elliptic, 4.5–8.5 × 3.4–5.5 cm, herbaceous, adaxially appressed puberulent, eglandular, abaxially puberulent along veins, eglandular, base cordate-auriculate, margin irregularly double denticulate, apex obtuse to rounded; lateral veins ca. 4 on each side of midrib. Cymes 4–6-flowered; peduncle ca. 5 cm, glandular puberulent; bracts free, orbicular-rhombic, ca. 4 mm, ciliate, margin entire. Pedicel 3–7 mm. Calyx zygomorphic, 5–5.5 mm; limb 2-lipped; tube 2–2.5 mm; adaxial lip 3-lobed, broadly trapeziform, ca. 3 mm, lobes deltoid, ca. 1 mm wide; abaxial lip 2-lobed, broadly trapeziform, ca. 3 mm, lobes triangular, ca. 1.5 mm wide, glabrous or sparsely ciliate, margin entire. Corolla purple, ca. 2 cm, outside puberulent, inside glabrous; tube funnelform, ca. 1.4 cm × 6 mm; adaxial lip ca. 3.5 mm; abaxial lip ca. 7 mm.

Stamens glabrous; filaments ca. 6 mm; anthers ca. 1.5 mm; staminodes 3, 0.8–1.5 mm. Pistil ca. 1.5 cm, glabrous; ovary ca. 1.2 cm. Fruit unknown. Fl. Jun.

• Damp cliffs; ca. 2900 m. S Xizang (Zhumulangma Shan, Dinggye Xian).

10. *Didymocarpus aromaticus* Wallich ex D. Don, Prodr. Fl. Nepal. 123. 1825, p.p.

互叶长蒴苣苔 *hu ye chang shuo ju tai*

Didymocarpus subalternans Wallich ex R. Brown; *Henckelia aromatica* (Wallich ex D. Don) Sprengel.

Stems 7–12(–25) cm, appressed puberulent. Leaves mostly opposite, basal 2 often alternate; petiole 0.1–3.5 cm; leaf blade ovate to elliptic, rarely triangular, 2–6.8(–11) × 1.3–4.2(–5.6) cm, thin papery to papery, adaxially appressed puberulent, sometimes yellow glandular, abaxially puberulent along veins, sometimes yellow glandular, base broadly cuneate to subcordate, margin dentate to serrate or crenate, apex acute to obtuse; lateral veins 4 or 5 on each side of midrib. Cymes 2–5-flowered; peduncle 2.5–3.5(–7) cm, sparsely glandular puberulent; bracts free, ovate to orbicular-ovate, 2–2.5(–5) mm, sparsely glandular puberulent, margin entire. Pedicel 5–14 mm. Calyx slightly zygomorphic, 3–4 mm; limb indistinctly 2-lipped, 5-lobed; tube ca. 2.5 mm; lobes nearly equal, triangular, 1.5–3 × ca. 1.5 mm, outside sparsely glandular puberulent, inside glabrous, margin entire. Corolla purple-red, ca. 1.6 cm, glabrous; tube nearly tubular, ca. 1.2 cm × 4 mm; adaxial lip ca. 2.2 mm; abaxial lip ca. 5.5 mm. Stamens glabrous; filaments ca. 4 mm; anthers ca. 2 mm; staminodes 3, 2.5–4 mm. Pistil ca. 1.3 cm, glabrous; ovary ca. 1 cm. Capsule 2.5–3 cm. Fl. Aug.

Grassy slopes, on rocks; 2500–2800 m. S Xizang [N India, Nepal].

11. *Didymocarpus villosus* D. Don, Prodr. Fl. Nepal. 123. 1825.

长毛长蒴苣苔 *chang mao chang shuo ju tai*

Henckelia villosa (D. Don) Sprengel; *Roettlera villosa* (D. Don) Kuntze.

Stems to 9 cm, spreading villous. Leaves crowded near stem apex; petiole 1–16 mm; leaf blade elliptic to rhombic, ovate, or obovate, 2.5–7.2 × 2–5 cm, herbaceous to papery, adaxially densely villous to appressed puberulent, sparsely yellow glandular, abaxially densely villous to sparsely puberulent, sparsely yellow glandular, base oblique, broadly cuneate to subcordate, margin irregularly double dentate to crenate, apex acute to rounded; lateral veins 3 or 4 on each side of midrib. Cymes 2–5-flowered; peduncle 2–5 cm, glabrous; bracts connate at base, broadly ovate, ca. 2 mm, glabrous, margin entire. Pedicel 5–10 mm. Calyx slightly zygomorphic, ca. 4 mm; limb indistinctly 2-lipped, 5-lobed; tube 2.2–2.5 mm; lobes nearly equal, triangular to orbicular, 1–1.5

mm, glabrous, margin entire. Corolla dark purple, to 2.2 cm, glabrous; tube cylindrical, ca. 1.5 cm × 4 mm; adaxial lip ca. 3 mm; abaxial lip ca. 7 mm. Stamens glabrous; filaments ca. 1.8 mm; anthers ca. 1.2 mm; staminode 1, ca. 0.6 mm. Pistil ca. 1.3 cm, glabrous; ovary ca. 1 cm. Capsule 1.4–2 cm. Fl. Jun–Jul.

Stony cliffs in valleys; 2100–2700 m. S Xizang [Nepal].

12. *Didymocarpus pulcher* C. B. Clarke in A. & C. de Candolle, Monogr. Phan. 5: 79. 1883.

美丽长蒴苣苔 *mei li chang shuo ju tai*

Stems 17–26 cm, densely appressed puberulent. Leaves whorled; petiole to 7 cm; leaf blade ovate to broadly ovate, 2–10(–15) × 2–6.2(–7.8) cm, herbaceous, adaxially sparsely to densely appressed puberulent, sparsely yellow glandular, abaxially sparsely puberulent along veins, sparsely yellow glandular, base oblique, cuneate to cordate, margin crenate to serrate, apex acute; lateral veins 5–7 on each side of midrib. Cymes 7–9-flowered; peduncle (1.6–)3–4 cm, sparsely glandular puberulent; bracts free, broadly ovate, ca. 3 mm, nearly glabrous, margin entire. Pedicel 2–5 mm. Calyx slightly zygomorphic, 3–4.5 mm; limb indistinctly 2-lipped, 5-lobed; tube 2–3 mm; lobes nearly equal, triangular, 1–2 mm, glabrous or outside glandular pubescent, margin entire. Corolla purple, ca. 2.8 cm, glabrous; tube cylindrical, ca. 2.2 cm × 7 mm; adaxial lip ca. 4 mm; abaxial lip 6.5–8 mm. Filaments ca. 7 mm, glabrous; anthers ca. 2.5 mm, puberulent; staminodes 3, 1.8–3.6 mm. Pistil ca. 2.2 cm, glabrous; ovary ca. 1.1 cm. Capsule 2.5–4 cm. Fl. Jul–Aug.

Forests near waysides; 1200–2600 m. SE Xizang [Bhutan, India, Nepal, Sikkim].

13. *Didymocarpus primulifolius* D. Don, Prodr. Fl. Nepal. 123. 1825.

藏南长蒴苣苔 *zang nan chang shuo ju tai*

Henckelia primulifolia (D. Don) Sprengel.

Stems 4–16 cm, sparsely appressed puberulent. Leaves crowded near stem apex; petiole 0.6–2 cm; leaf blade ovate to broadly ovate, 3–8(–9.1) × 1.8–6.5 cm, thin papery, adaxially densely appressed puberulent, sparsely yellow glandular, abaxially sparsely appressed puberulent, densely puberulent along veins, sparsely yellow glandular, base oblique, broadly cuneate to cordate, margin irregularly dentate to serrate, apex acute; lateral veins 6–8 on each side of midrib. Cymes 6–15-flowered; peduncle 2.5–5 cm, sparsely pubescent, sometimes glandular; bracts slightly connate at base, red-purple, orbicular-ovate, 4–7 mm, glabrous to pubescent abaxially, margin entire. Pedicel 4–7 mm. Calyx slightly zygomorphic, 4.5–6 mm; limb indistinctly 2-lipped; tube 3.5–4 mm; adaxial lip 3-lobed, depressed trapeziform, 1–1.8 mm, lobes broadly triangular to orbicular, ca. 1.5 mm wide; abaxial lip 2-parted, depressed trapeziform, 1.5–2 mm, lobes broadly triangular, ca. 2 mm wide, glabrous, margin entire. Corolla deep purple, ca. 1.9 cm, glabrous; tube

cylindric, ca. 1.1 cm × 3 mm; adaxial lip ca. 1.6 mm; abaxial lip ca. 8 mm. Stamens glabrous; filaments ca. 2.2 mm; anthers ca. 1.4 mm; staminode 1, ca. 0.6 mm. Pistil ca. 1.1 cm, glabrous; ovary ca. 6 mm. Capsule 1.8–2.1 cm. Fl. Jun.

Rocks or cliffs in forests; 2100–2700 m. S Xizang [Nepal].

14. *Didymocarpus grandidentatus* (W. T. Wang) W. T. Wang, Acta Bot. Yunnan. 6: 23. 1984.

大齿长蒴苣苔 *da chi chang shuo ju tai*

Chirita grandidentata W. T. Wang, Acta Phytotax. Sin. 13: 104. 1975.

Stems 10–25 cm, spreading villous. Leaves opposite; petiole 0.5–10 cm; leaf blade ovate to reniform, 4.5–10 × 4–15 cm, herbaceous, adaxially densely puberulent, eglandular, abaxially puberulent along veins, sparsely red glandular, base cordate, margin coarsely double dentate or serrate to crenate, apex rounded; lateral veins 4–6 on each side of midrib. Cymes ca. 8-flowered; peduncle 4.5–7 cm, glandular puberulent; bracts free, ovate to orbicular-ovate, 5–8 mm, glabrous, margin entire. Pedicel ca. 2 mm. Calyx slightly zygomorphic, ca. 5.5 mm; limb indistinctly 2-lipped, 5-lobed; tube ca. 4.6 mm; lobes nearly equal, triangular, ca. 0.8 mm, glabrous, margin entire, glandular ciliate. Corolla purple-red, ca. 2.4 cm, glabrous; tube cylindrical, ca. 1.8 cm × 4 mm; adaxial lip ca. 4 mm; abaxial lip ca. 6 mm. Stamens glabrous; filaments ca. 3.5 mm; anthers ca. 1.8 mm; staminodes 2, ca. 3 mm. Pistil ca. 1.7 cm, glabrous; ovary ca. 1.3 cm. Fruit unknown. Fl. Jun.

• Valley forests; ca. 1300 m. S Yunnan (Menghai Xian).

15. *Didymocarpus nanophyton* C. Y. Wu ex H. W. Li, Bull. Bot. Res., Harbin 3(2): 32. 1983.

矮生长蒴苣苔 *ai sheng chang shuo ju tai*

Stems 2.5–7 cm, pubescent. Leaves opposite; petiole 0.2–3 cm; leaf blade oblique, ovate to oblong, 2.5–4.5 × 1.5–3 cm, herbaceous, adaxially puberulent, eglandular, abaxially puberulent along veins, eglandular, base rounded to broadly cuneate, margin denticulate to double denticulate, apex acute to rounded; lateral veins 7 or 8 on each side of midrib. Cymes 2–4-flowered; peduncle 4–5 cm, glandular puberulent; bracts deciduous, free, orbicular-ovate, ca. 2.5 mm, margin entire. Pedicel 4–6 mm. Calyx zygomorphic, ca. 4 mm; limb 2-lipped; tube ca. 2 mm; adaxial lip 3-lobed, trapezoid, ca. 1.8 mm, lobes triangular to narrowly ovate, ca. 1 mm wide; abaxial lip 2-lobed, trapezoid, ca. 1.8 mm, lobes triangular to narrowly ovate, 1.5–2 mm wide, glabrous; tube tuberculate, margin entire. Corolla, stamens, and pistil unknown. Capsule ca. 3 cm. Fr. Nov.

• Damp rocks in valleys; ca. 1800 m. S Yunnan (Yuanjiang Xian).

16. *Didymocarpus stenanthos* C. B. Clarke, Hooker's Icon. Pl. 18: pl. 1799. 1888.

狭冠长蒴苣苔 *xia guan chang shuo ju tai*

Stems 3–22 cm, puberulent. Leaves opposite; petiole 0.3–3.3(–4.7) cm; leaf blade slightly oblique, ovate to

elliptic or obovate, 2–11.5(–15) × 1.8–6.8 cm, herbaceous, adaxially puberulent, eglandular, abaxially puberulent along veins, eglandular, base oblique, cuneate to cordate, margin double or single denticulate to serrate, apex acute, rarely obtuse to rounded; lateral veins 6–8 on each side of midrib. Cymes 6- to many flowered; peduncle 2.5–8 cm, glandular puberulent to nearly glabrous; bracts connate at base or free, broadly ovate, 3–4 mm, sparsely glandular puberulent, margin entire. Pedicel 2–6(–13) mm. Calyx zygomorphic, 4.2–5 mm; limb 2-lipped; tube ca. 2.6 mm; adaxial lip 3-lobed, depressed trapeziform, ca. 1.2 mm; abaxial lip 2-lobed, depressed trapeziform, ca. 1.8 mm, all lobes broadly ovate, 1–1.5 × 0.8–1 mm, glabrous, margin entire. Corolla purple, 2–2.4 cm, glabrous; tube cylindric, 1.5–1.8 cm × 3–4 mm; adaxial lip ca. 3.5 mm; abaxial lip ca. 4.5 mm. Filaments ca. 3.5 mm, glabrous; anthers ca. 1.5 mm, puberulent; staminodes 3, 0.3–0.8 mm. Pistil ca. 1.9 cm, glabrous; ovary ca. 1.5 cm. Capsule 2.5–4 cm. Fl. Jun–Sep, fr. Aug.

•Rocks and cliffs in valleys; 700–2800 m. Guizhou, W Sichuan, E Yunnan.

- 1a. Stems, petiole, and adaxial leaf surface densely puberulent; bracts and bracteoles connate basally; upper calyx lip 3-lobed from to just above middle 16a. var. *stenanthos*
 1b. Stems, petiole, and adaxial leaf surface sparsely puberulent; bracts and bracteoles free; upper calyx lip 3-lobed from above middle 16b. var. *pilosellus*

16a. *Didymocarpus stenanthos* var. *stenanthos*

狭冠长蒴苣苔(原变种) xia guan chang shuo ju tai (yuan bian zhong)

Oreocharis micrantha H. Léveillé.

Stems densely puberulent. Petiole densely puberulent; leaf blade adaxially densely puberulent. Bracts and bracteoles connate at base. Adaxial calyx lip 3-lobed from to just above middle. Fl. Jul–Oct, fr. Jul–Nov.

•Rocks in valleys; 700–2200 m. W Sichuan, E Yunnan.

16b. *Didymocarpus stenanthos* var. *pilosellus* W. T. Wang in W. T. Wang & K. Y. Pan, Bull. Bot. Res., Harbin 2(2): 132. 1982.

疏毛长蒴苣苔 shu mao chang shuo ju tai

Stems sparsely puberulent. Petiole sparsely puberulent; leaf blade adaxially sparsely puberulent. Bracts and bracteoles free. Adaxial calyx lip 3-lobed from above middle. Fl. and fr. Aug.

•Rocks, cliffs in valley forests; 900–2800 m. Guizhou.

17. *Didymocarpus leiboensis* Z. P. Soong & W. T. Wang in W. T. Wang, Bull. Bot. Res., Harbin 4(1): 12. 1984.

雷波长蒴苣苔 lei bo chang shuo ju tai

Stems 4–17.5 cm, appressed puberulent and sparsely villous. Leaves opposite; petiole 0.2–2.5 cm; leaf blade oblique, elliptic to ovate, 2.5–8(–11) × 1.2–4(–5.5) cm, papery, adaxially puberulent, orange glandular, abaxially sparsely pubescent, eglandular, base oblique, broadly cuneate, margin irregularly denticulate to double dentate, apex acute to obtuse; lateral veins 6–9 on each side of midrib. Cymes (1 or)2–6-flowered; peduncle 5.5–9 cm, sparsely glandular puberulent; bracts connate at base, orbicular-ovate, adaxially glabrous, abaxially sparsely puberulent to glabrescent, margin entire. Pedicel 4–8 mm. Calyx zygomorphic, 5–6 mm; limb 2-lipped; tube ca. 3.6 mm; adaxial lip 3-lobed, depressed trapeziform, ca. 1 mm, lobes ovate, 1–2 mm wide; abaxial lip 2-cleft to middle, lobes ovate, 2.2–2.5 mm wide, glabrous, margin entire. Corolla purple, ca. 3.6 cm, glabrous; tube nearly tubular, ca. 2.8 cm × 8 mm; adaxial lip ca. 4 mm; abaxial lip ca. 8 mm. Filaments ca. 8 mm, glabrous; anthers ca. 2.6 mm, puberulent; staminodes 2, ca. 6 mm. Pistil ca. 2.5 cm, glabrous; ovary ca. 1.5 cm. Fruit unknown. Fl. Jun.

•Rocks in valleys; 700–1200 m. SW Sichuan (Leibo Xian).

18. *Didymocarpus adenocalyx* W. T. Wang, Guihaia 6: 11. 1986.

腺萼长蒴苣苔 xian e chang shuo ju tai

Stems ca. 20 cm, densely puberulent. Leaves opposite; petiole 0.4–1.1 cm; leaf blade elliptic to broadly elliptic, 1.8–4.2 × 1.5–2.4 cm, papery, adaxially densely puberulent, sparsely dark purple glandular, abaxially densely brown puberulent along veins, eglandular, base broadly cuneate to nearly rounded, margin denticulate, apex acute; lateral veins 6–9 on each side of midrib. Cymes ca. 5-flowered; peduncle 1.7–3.2 cm, nearly glabrous; bracts connate at base, orbicular-ovate, ca. 3 mm, glabrous, margin entire. Pedicel ca. 4 mm. Calyx zygomorphic, 5–6 mm; limb 2-lipped; tube ca. 2.6 mm; adaxial lip 3-lobed, oblong, ca. 4 mm, lobes ovate, 1–1.5 mm wide; abaxial lip 2-lobed, oblong, slightly shorter, lobes deltoid, 2.2–3 mm wide, glabrous, inside densely dark purple glandular below middle, margin entire. Corolla red-purple, ca. 2.2 cm, glabrous; tube cylindric, ca. 1.4 cm × 3 mm; adaxial lip ca. 4 mm; abaxial lip ca. 8 mm. Stamens glabrous; filaments ca. 4 mm; anthers ca. 1.4 mm; staminodes 2, 1.2–1.5 mm. Pistil ca. 1.4 cm; ovary ca. 6 mm, densely glandular puberulent. Style glabrous. Fruit unknown. Fl. Jul.

•Rocks in montane regions; ca. 2300 m. NW Yunnan (Bijiang Xian).

19. *Didymocarpus yunnanensis* (Franchet) W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 14: 337. 1924.

云南长蒴苣苔 yun nan chang shuo ju tai

Roettlera yunnanensis Franchet, Bull. Mus. Hist. Nat. (Paris) 5: 250. 1899; *R. yunnanensis* f. *cleistogama* Diels.

Stems 3–26(–48) cm, densely puberulent to glabrescent. Leaves opposite; petiole 0.2–14 cm; leaf blade narrowly ovate to ovate, oblong, or obovate, 1–14 × 1–10 cm, herbaceous, adaxially appressed puberulent, eglandular, abaxially puberulent along veins, eglandular, base oblique, broadly cuneate to cordate, margin crenate to crenulate or nearly entire, apex acute to rounded; lateral veins 5 or 6 on each side of midrib. Cymes 1–15-flowered; peduncle 1–12 cm, sparsely glandular puberulent; bracts free, ovate to orbicular, often leaflike, 0.2–2 cm, glabrous to puberulent, yellow glandular, margin crenate to entire. Pedicel 4–10 mm. Calyx slightly zygomorphic, 3–6 mm; limb indistinctly 2-lipped; tube 2–4 mm; adaxial lip 3-lobed, depressed trapeziform, ca. 2 mm, lobes triangular, 1–2 × ca. 1.2 mm; abaxial lip 2-lobed, depressed trapeziform, ca. 3 mm, lobes triangular, 1–2 × ca. 2 mm, outside sparsely puberulent, inside glabrous, margin entire. Corolla purple to reddish purple with darker stripes, 2.5–3.5 cm, outside sparsely pubescent, inside glabrous; tube narrowly funnelform, 2–2.8 cm × 4–6 mm; adaxial lip ca. 3.5 mm; abaxial lip ca. 7 mm. Filaments ca. 7 mm, glabrous; anthers ca. 2 mm, sparsely pubescent; staminodes 3, 1.2–5 mm. Pistil 2.3–3.2 cm, glabrous; ovary ca. 8 mm. Capsule 3–4.2 cm. Fl. Jun–Sep, fr. Jul–Oct.

Rocks, cliffs in valleys; 1500–3400 m. SW Sichuan, SE Xizang, NW and W Yunnan [NE India].

Didymocarpus yunnanensis is very similar to and is probably very closely related to *D. punduanus* Wallich ex R. Brown. The two species may be conspecific, and the former is retained because we have not seen adequate material of the latter.

20. *Didymocarpus praeteritus* B. L. Burtt & R. Davidson, Notes Roy. Bot. Gard. Edinburgh 21: 213. 1954.

片马长蒴苣苔 *pian ma chang shuo ju tai*

Stems 11–15(–30) cm, densely pubescent. Leaves opposite; petiole 0.2–2.5(–5) cm; leaf blade slightly oblique, narrowly ovate to elliptic, 4.5–10.5 × 2–5.5 cm, papery, adaxially densely appressed puberulent, eglandular, abaxially densely puberulent along veins, eglandular, base broadly cuneate, margin denticulate to serrate, apex acute to acuminate; lateral veins 6–9 on each side of midrib. Cymes 1–5-flowered; peduncle 4.5–7 cm, glandular puberulent; bracts free, orbicular-ovate, 5–7 mm, glabrous to sparsely pubescent, margin entire. Pedicel 3–7 mm. Calyx slightly zygomorphic, 9–10 mm; limb indistinctly 2-lipped; tube ca. 8 mm; adaxial lip 3-lobed, depressed trapeziform, 1.5–2 mm, lobes broadly ovate, ca. 1.8 mm wide; abaxial lip 2-parted, depressed trapeziform, ca. 2 mm, lobes broadly ovate, ca. 2.5 mm wide, outside glabrous, inside minutely puberulent below middle, margin entire. Corolla purple, ca. 3 cm, glabrous; tube cylindrical, ca. 2 cm × 3–4 mm; adaxial lip ca. 4 mm; abaxial lip ca. 1 cm. Stamens glabrous; filaments ca. 5 mm; anthers ca. 2 mm; staminodes 3, ca. 2.2 mm. Pistil ca. 2 cm, glabrous,

minutely glandular; ovary ca. 1.8 cm. Capsule ca. 4 cm. Fl. Jun–Jul.

Forested slopes; 1800–2200 m. W Yunnan [NE Myanmar].

21. *Didymocarpus purpureobracteatus* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 5: 153. 1912.

紫苞长蒴苣苔 *zi bao chang shuo ju tai*

Didymocarpus purpureobracteatus var. *veitchianus* (W. W. Smith) H. W. Li; *D. veitchianus* W. W. Smith.

Stems 11–62 cm, puberulent above, sparsely puberulent to glabrescent below. Leaves opposite; petiole 0.3–11 cm; leaf blade ovate to elliptic or obovate, 3–17(–26) × 1.6–10.5(–16) cm, herbaceous, adaxially sparsely appressed puberulent to glabrous, sparsely glandular, abaxially puberulent to nearly glabrous along veins, sparsely glandular, base sometimes oblique, cuneate to cordate, margin single to double serrate, apex acute to acuminate; lateral veins 5–9 on each side of midrib. Cymes 5–12-flowered; peduncle 4–10 cm, glabrous; bracts often connate at base, ovate to elliptic-ovate, 3–8 mm, glabrous, margin entire. Pedicel 1–5 mm. Calyx slightly zygomorphic, 1–1.2 cm; limb indistinctly 2-lipped; tube 8–9 mm; adaxial lip 3-lobed, depressed trapeziform, 2–3 mm, lobes semiorbicular, 2–3 × ca. 3 mm; abaxial lip 2-lobed, lobes semiorbicular, 2–3 × 4–5 mm, glabrous, margin entire. Corolla purple to pinkish purple with darker stripes, 3.2–4.5 cm, glabrous; tube funnelform, 2.9–3.3 × 0.9–1 cm; adaxial lip 3.5–4 mm; abaxial lip 0.9–1.2 cm. Filaments ca. 1 cm, glabrous; anthers ca. 3 mm, puberulent; staminodes 2, 1.5–3 mm. Pistil 2.2–2.4 cm, sparsely puberulent; ovary ca. 2.3 cm. Capsule 3.5–5.5 cm. Fl. Aug–Sep.

• Montane forests; 1400–2200 m. SE Yunnan.

22. *Didymocarpus mollifolius* W. T. Wang, Acta Bot. Yunnan. 6: 21. 1984.

柔毛长蒴苣苔 *rou mao chang shuo ju tai*

Plants stemless. Leaves basal; petiole 2.2–5 cm; leaf blade ovate to narrowly ovate or ovate-oblong, 5.5–20 × 3.3–10.5 cm, herbaceous, densely appressed puberulent, eglandular, base broadly cuneate, margin denticulate to crenate, apex acute to obtuse; lateral veins 5–7 on each side of midrib. Cymes 7–12-flowered; peduncle 6.5–10.5 cm, villous; bracts free, linear, 1.2–2 cm, densely puberulent, margin entire. Pedicel 0.5–1.5 cm. Calyx actinomorphic, 5-sect from base; segments equal, lanceolate-linear, ca. 5 × 1 mm, outside densely pubescent, inside puberulent, margin entire. Corolla yellow, ca. 2.2 cm, outside puberulent, inside glabrous; tube nearly tubular, ca. 1.2 cm × 4 mm; adaxial lip ca. 4 mm; abaxial lip ca. 1 cm. Filaments ca. 6.5 mm, sparsely puberulent and glandular; anthers ca. 1.5 mm, glabrous; staminodes 2, ca. 0.5 mm. Pistil ca. 1.7 cm, puberulent; ovary ca. 8 mm. Fruit unknown. Fl. Sep.

• Shaded cliffs near rivers; ca. 1000 m. SW Yunnan (Zhenkang Xian).

23. *Didymocarpus hancei* Hemsley in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 229. 1890.

东南长蒴苣苔 *dong nan chang shuo ju tai*

Plants stemless. Leaves basal; petiole 1.8–8 cm; leaf blade oblong to elliptic or oblanceolate, 2.2–10 × 1–3.6 cm, papery, short strigose, eglandular, abaxially denser along veins, base cuneate to broadly cuneate, margin denticulate to serrate, apex acute to acuminate; lateral veins 5–7 on each side of midrib. Cymes 4- to many flowered; peduncle 7–18 cm, sparsely puberulent to strigose; bracts free, linear, 5–14 mm, short strigose, margin entire. Pedicel 5–12 mm. Calyx actinomorphic, 5-sect from base; segments equal, linear to narrowly triangular, 2.5–7 × 0.5–1.2 mm, outside sparsely short strigose, inside nearly glabrous, margin entire. Corolla pale purple, 1.5–2 cm, outside sparsely puberulent, inside nearly glabrous; tube funnelform, 1.1–1.3 cm × 4–6 mm; adaxial lip 3–5 mm; abaxial lip 4–8.5 mm. Stamens glabrous; filaments 6–7 mm; anthers 1.5–3 mm; staminodes 2, ca. 0.5 mm. Pistil ca. 1.6 cm, sparsely glandular; ovary ca. 5.5 mm. Capsule 2–3.4 cm. Fl. Apr.

• Forests, on rocks, on stony cliffs in valleys; 400–1000 m. Fujian, N Guangdong, S Hunan, Jiangxi.

24. *Didymocarpus niveolanosus* D. Fang & W. T. Wang in W. T. Wang & K. Y. Pan, Bull. Bot. Res., Harbin 2(2): 133. 1982.

棉毛长蒴苣苔 *mian mao chang shuo ju tai*

Plants stemless. Leaves basal; petiole to 1 cm; leaf blade narrowly ovate, 3.4–4.6 × 1.7–2 cm, papery, densely white woolly, base broadly cuneate to rounded, margin repand-crenate, apex acute to rounded; lateral veins ca. 5 on each side of midrib. Cymes 5–10-flowered; peduncle 4.5–6 cm, white woolly; bracts free, narrowly triangular to linear, 3–3.5 mm, densely villous, margin entire. Pedicel 3–13 mm. Calyx actinomorphic, 5-sect from base; segments equal, segments linear-lanceolate, 2–2.5 × 0.5–0.7 mm, outside puberulent, inside nearly glabrous, margin entire. Corolla pink, ca. 1.8 cm, outside sparsely puberulent, inside glabrous; tube nearly tubular, ca. 1.1 cm × 3 mm; adaxial lip ca. 4 mm; abaxial lip ca. 7 mm. Stamens glabrous; filaments ca. 7 mm; anthers ca. 1.5 mm; staminodes 3, central 1 ca. 1 mm, lateral 2 ca. 6 mm. Pistil ca. 9 mm, sparsely puberulent to pubescent; ovary ca. 5.5 mm. Capsule 1–2 cm. Fl. Jul.

• Rocks in shaded areas in valleys; ca. 1100 m. NW Guangxi (Longlin Xian, Napo Xian), SW Guizhou.

25. *Didymocarpus subpalmatinervis* W. T. Wang in A. L. Weitzman et al., Novon 7: 428. 1998.

掌脉长蒴苣苔 *zhang mai chang shuo ju tai*

Plants stemless. Leaves basal; petiole 0.4–7.5 cm; leaf blade ovate to obovate, 2–4.5 × 1.8–5.4 cm, papery, adaxially densely appressed puberulent, eglandular, abaxially appressed puberulent, pilose along veins, eglandular, base cordate, margin obtusely to double dentate, apex obtuse, basal veins 3 or 4; lateral veins 2

or 3 on each side of midrib. Cymes 2–10-flowered; peduncle 4.5–11 cm, puberulent; bracts free, narrowly lanceolate to linear, 4–7 mm, puberulent, margin entire. Pedicel 2.5–11 mm. Calyx actinomorphic, 5-sect from base to near base; segments equal, linear-triangular, 5.2–7 × 1–1.2 mm, puberulent, margin entire. Corolla yellow, 2–2.5 cm, outside densely puberulent, inside lobes puberulent; tube funnelform-cylindric, 1.4–1.7 cm × 3–4 mm; adaxial lip 3–4 mm; abaxial lip 5–6 mm. Filaments ca. 5.5 mm, minutely puberulent; anthers ca. 1.5 mm, glabrous; staminodes 2, ca. 0.6 mm. Pistil ca. 1.4 cm; ovary ca. 4 mm, densely puberulent. Style sparsely puberulent. Fruit unknown. Fl. Jul.

• NW Yunnan.

26. *Didymocarpus heucherifolius* Handel-Mazzetti, Symb. Sin. 7: 881. 1936.

闽赣长蒴苣苔 *min gan chang shuo ju tai*

Chirita heucherifolia (Handel-Mazzetti) D. Wood.

Plants stemless. Leaves basal; petiole 2.5–(9.5) cm; leaf blade orbicular-ovate to triangular, multilobed, with lobules triangular, 3–9 × 3.5–11 cm, papery, adaxially pubescent and pilose, eglandular, abaxially pilose, sparsely glandular, base cordate, margin irregularly denticulate to serrate, apex rounded, basal veins 4 or 5; lateral veins 3 or 4 on each side of midrib. Cymes 3- to many flowered; peduncle (6–)10–18 cm, spreading villous; bracts free, elliptic, 5–10 mm, long ciliate, margin entire. Pedicel 0.4–2 cm. Calyx slightly zygomorphic, ca. 6 mm; limb 5-lobed; tube ca. 2 mm; lobes unequal, broadly lanceolate to oblanceolate-linear or triangular, 3–4 × 1–2 mm, outside puberulent to glandular puberulent, inside glabrous, margin sparsely denticulate. Corolla pink, 2.5–3.2 cm, outside puberulent, inside glabrous; tube funnelform-tubular, 1.8–2.2 × 1–1.3 cm; adaxial lip ca. 6.5 mm; abaxial lip ca. 1 cm. Filaments 8–10 mm, glandular; anthers 1.8–2.5 mm, puberulent; staminodes 3, 0.3–6 mm. Pistil 1.8–2.9 cm, pilose to puberulent; ovary ca. 1.5 cm, pilose to puberulent. Capsule 5.5–8 cm. Fl. May, fr. Jun.

• Waysides, on streamside rocks, forests; 500–1000 m. S Anhui, W Fujian, NE Guangdong, SE Hubei, Jiangxi, W Zhejiang.

27. *Didymocarpus sinoprimum* W. T. Wang, Acta Phytotax. Sin. 19: 142. 1981.

报春长蒴苣苔 *bao chun chang shuo ju tai*

Plants stemless. Leaves basal; petiole 1–4.5 cm; leaf blade triangular to orbicular-ovate, indistinctly multilobed, 1.8–4.6 × 1.6–4 cm, papery, adaxially white villous, sparsely yellow glandular, abaxially sparsely rust-brown villous, densely rust-brown villous along veins, sparsely yellow glandular, base cordate to truncate, lobe margin denticulate with 1 or 2 small teeth to dentate, apex rounded, basal veins 4 or 5; lateral veins ca. 3 on each side of midrib. Cymes 1–5-flowered; peduncle 7–12 cm, rust-brown villous; bracts free, narrowly ovate to linear, 3.5–7 mm, puberulent, margin entire. Pedicel 0.7–2.4 cm. Calyx slightly zygomorphic,

5-sect from near base; adaxial lobe largest, narrowly obovate, ca. 8 mm, other 4 lobes spatulate-linear, 6–7 mm, outside villous, inside glabrous, margin entire. Corolla pink, 1.5–1.8 cm, outside glabrous, inside with 2 lines of hairs above attachment of filaments; tube campanulate, 0.9–1.2 × ca. 1.2 cm; adaxial lip 5–9 mm; abaxial lip 8–10 mm. Filaments ca. 8 mm, sparsely puberulent toward apex; anthers 2.5–3 mm, white woolly; staminodes 2, 0.5–1 mm. Pistil 1.5–2.2 cm; ovary 1–1.6 cm, densely puberulent. Style glabrous. Capsule 6–8 cm. Fl. Mar–May, fr. May.

• Damp, stony, montane cliffs. W Hunan (Qianyang Xian).

28. *Didymocarpus yuenlingensis* W. T. Wang, Bull. Bot. Res., Harbin 2(4): 44. 1982.

沅陵长蒴苣苔 *yuan ling chang shuo ju tai*

Plants stemless. Leaves basal; petiole 2.5–4.5 cm; leaf blade ovate to orbicular, nearly pinnately lobed, 3–5 × 4.2–5.5 cm, leathery, adaxially appressed puberulent, eglandular, abaxially white puberulent and sparsely rust-brown villous along veins, sparsely concave punctate, base cordate, lobes triangular, margin denticulate, apex rounded; lateral veins 2 or 3 on each side of midrib. Cymes 4–8-flowered; peduncle 7–11 cm, densely spreading rust-brown villous and white puberulent; bracts free, nearly rhombic to orbicular-ovate, 6–10 mm, puberulent, margin crenulate. Pedicel 0.9–1.5 cm. Calyx slightly zygomorphic, ca. 1.3 cm; limb unequally 5-lobed; tube ca. 5 mm; abaxial lobe largest, oblong, ca. 7 mm, other 4 lobes broadly trapeziform to obtusiform, 2.5–3.5 mm, outside puberulent, inside glabrous, margin entire. Corolla ca. 2.1 cm, outside glabrous, inside sparsely puberulent; tube obliquely campanulate, ca. 1.1 cm × 7 mm; adaxial lip ca. 5 mm; abaxial lip ca. 1 cm. Stamens glabrous; filaments ca. 7.5 mm; anthers ca. 3 mm; staminodes 2, 0.2–0.6 mm. Pistil ca. 2.5 cm; ovary ca. 2.1 cm, densely puberulent. Style appressed puberulent with longer rigid brown hairs. Fruit unknown. Fl. May.

• NW Hunan (Xinhuang Xian, Yuanling Xian).

29. *Didymocarpus cortusifolius* (Hance) W. T. Wang, Fl. Reipubl. Popularis Sin. 69: 449. 1990.

温州长蒴苣苔 *wen zhou chang shuo ju tai*

Chirita cortusifolia Hance, J. Bot. 21: 324. 1883;
Roettlera cortusifolia (Hance) K. Fritsch.

Plants stemless. Leaves basal; petiole 1.4–4.6 cm; leaf blade orbicular-ovate to orbicular or triangular, multilobed, 4.6–10 × 3.2–9 cm, papery, adaxially densely pubescent, sparsely glandular, abaxially sparsely puberulent, rust-brown villous along veins, eglandular, base cordate, lobes triangular, margin irregularly denticulate, apex obtuse to rounded, basal veins 3; lateral veins 2 or 3 on each side of midrib. Cymes 2–10-flowered; peduncle 7.4–10 cm, rust-brown

villous and glandular puberulent; bracts free, ovate to elliptic, 3.5–7 mm, adaxially glabrous, abaxially puberulent, margin entire. Pedicel 4–10 mm. Calyx actinomorphic, 7–9 mm, 5-lobed; tube 4–6 mm; lobes equal, ovate-triangular, 1–3 × ca. 2 mm, outside puberulent to villous, inside sparsely puberulent toward apex, margin denticulate. Corolla white, 2.4–3 cm, outside puberulent, inside nearly glabrous; tube funnellform, 1.8–2.3 × 1–1.2 cm; adaxial lip 5–6 mm; abaxial lip 7–9 mm. Filaments 6–10 mm, nearly glabrous; anthers ca. 3 mm, white woolly; staminodes 3, central ca. 0.5 mm, laterals ca. 0.7 mm. Pistil 1.9–2.2 cm, puberulent; ovary ca. 19 mm. Capsule ca. 3.8 cm. Fl. May–Jun.

• Stony cliffs of montane regions. SE Zhejiang.

Some recent authors place this species in *Chirita*, however based on stigma morphology, it is included in *Didymocarpus* here.

30. *Didymocarpus reniformis* W. T. Wang in W. T. Wang & K. Y. Pan, Bull. Bot. Res., Harbin 2(2): 134. 1982.

肾叶长蒴苣苔 *shen ye chang shuo ju tai*

Plants stemless. Leaves basal; petiole 1–5.5 cm; leaf blade reniform to orbicular-reniform, 2–4.5 × 3.5–7.5 cm, papery, adaxially appressed puberulent, eglandular, abaxially sparsely pubescent along veins, eglandular, base cordate, margin coarsely dentate, teeth triangular, 1- or 2-denticulate to entire, apex rounded, basal veins 5; lateral veins ca. 2 on each side of midrib. Cymes ca. 4-flowered; peduncle ca. 10 cm, spreading pubescent; bracts free, narrowly oblong, ca. 5 mm, sparsely puberulent, margin few crenate. Pedicel 1.1–1.8 cm. Calyx actinomorphic, ca. 7 mm, shallowly 5-lobed; tube ca. 5 mm; lobes equal, triangular, 1.5–2 mm, outside puberulent, inside sparsely puberulent toward apex, margin entire. Corolla pink, ca. 3 cm, outside glabrous, inside sparsely puberulent; tube funnellform, ca. 1.8 × 0.9 cm; adaxial lip ca. 1 cm; abaxial lip ca. 1.6 cm. Filaments ca. 8 mm, with small glands; anthers ca. 2.5 mm, puberulent; staminodes 3, 0.6–0.8 mm. Pistil ca. 2.3 cm; ovary ca. 1.4 cm, densely puberulent. Style sparsely puberulent. Capsule 6.8–8.4 cm. Fl. Jun.

• SE Hunan (Chen Xian, Yongxing Xian).

31. *Didymocarpus salviiflorus* W. Y. Chun, Sunyatsenia 6: 294. 1946.

迭裂长蒴苣苔 *die lie chang shuo ju tai*

Plants stemless. Leaves basal; petiole 2.5–5.5 cm; leaf blade triangular-ovate to obovate, multilobed, 4.5–7 × 6–6.5 cm, papery, adaxially densely pilose, eglandular, abaxially appressed pubescent, villous along veins, eglandular, base cordate to truncate-cordate, lobes triangular, margin irregularly denticulate, apex obtuse to rounded, basal veins 4 or 5; lateral veins 2 on each side of midrib. Cymes 3–12-flowered; peduncle ca. 12 cm, spreading rust-brown villous and white puberulent; bracts free, semiorbicular, ca. 5 mm, adaxially

pubescent, abaxially villous, margin sparsely crenate. Pedicel 2–6 mm. Calyx actinomorphic, 7–9 mm, shallowly 5-lobed, outside ca. 5 mm; lobes equal, depressed oblong, overlapping at margin, 2–2.2 × 4–4.5 mm, outside sparsely puberulent, inside glabrous, margin denticulate to entire. Corolla purple, 2.5–3 cm, sparsely puberulent to glabrescent; tube funnelform, ca.

1.9 × 1 cm; adaxial lip ca. 5 mm; abaxial lip ca. 9 mm. Filaments ca. 1.5 cm, sparsely puberulent; anthers ca. 5 mm, white woolly; staminodes 3, 2–3 mm. Pistil 1.3–2.3 cm; ovary ca. 1.8 cm, densely glandular puberulent. Style glabrous. Capsule ca. 5.8 cm. Fl. Apr.

• Rocks in valleys; ca. 500 m. Zhejiang (Lishui Xian, Suichang Xian).

36. GYROCHEILOS W. T. Wang, Bull. Bot. Res., Harbin 1(3): 28. 1981.

圆唇苣苔属 yuan chun ju tai shu

Herbs, perennial, epipetric or terrestrial, rhizomatous, stemless. Leaves few, basal; leaf blade puberulent to pubescent, base cordate. Inflorescences lax, axillary, 5- to many-flowered cymes; bracts 2, opposite. Calyx actinomorphic or slightly zygomorphic, 5-sect from base, 2–5-lobed, or 2-lipped; segments equal to unequal. Corolla purple to reddish, zygomorphic, inside glabrous; tube broadly tubular, not swollen, nearly equalling limb, 3.5–4 mm in diam.; limb 2-lipped; adaxial lip undivided; ca. 1/2 × length of abaxial lip; abaxial lip 3-lobed, lobes equal, apex rounded, rarely obtuse. Stamens 2, adnate to abaxial side of corolla tube near base or rarely above middle, included; anthers dorsifixed, coherent by adaxial surfaces, thecae divaricate, confluent at apex, dehiscing longitudinally; connective not projecting; staminodes 2, adnate to adaxial side of corolla tube. Disc ringlike. Ovary linear, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigma 1, terminal, capitate, undivided. Capsule straight in relation to pedicel, linear, much surpassing calyx, dehiscing loculicidally to base; valves 2, straight, not twisted. Seeds unappended.

• Four species: endemic to China.

- 1a. Petiole and peduncle with antrorsely appressed hairs 0.2–0.6 mm; adaxial leaf blade surface with uniform hairs 0.1–0.2 mm 3. *G. microtrichus*
- 1b. Petiole and peduncle with spreading or retrorse hairs 0.2–2(–3.2) mm; adaxial leaf blade surface with hairs of 2 lengths, 0.2–0.5(–1.2) and 0.8–3 mm.
- 2a. Peduncle 4–7 cm; calyx sparsely pubescent outside from base to apex; pedicel spreading pubescent; adaxial corolla lip deltoid; filaments ca. 1.5 mm 2. *G. lasiocalyx*
- 2b. Peduncle 7–34 cm; calyx glabrous or sparsely pubescent outside near apex; pedicel glabrous; adaxial corolla lip semi-orbicular; filaments ca. 3 mm.
- 3a. Leaf blade 3–9.5 × 3–10 cm, apex rounded; petiole 3–8 cm; stamens and staminodes adnate to corolla 2–2.5 mm above base 1. *G. chorisepalus*
- 3b. Leaf blade 7–15.5 × 5.5–15.5 cm, apex acute to obtuse; petiole to 18 cm; stamens and staminodes adnate to corolla 4–5 mm above base 4. *G. retrotrichus*

1. Gyrocheilos chorisepalus W. T. Wang, Bull. Bot. Res., Harbin 1(3): 31. 1981.

圆唇苣苔 yuan chun ju tai

Petiole 3–8 cm, spreading pubescent, hairs 0.7–1.5 mm; leaf blade nearly orbicular to reniform, 3–9.5 × 3–10 cm, adaxially with mixed hairs 0.2–0.3 mm and 0.8–2.5 mm, abaxially sparsely pubescent, margin double dentate to deeply crenate, apex rounded. Peduncle 7–23 cm, pubescent, hairs 0.5–1.2 mm; bracts 4–6 × 3–4 mm, margin entire. Pedicel glabrous. Calyx 3–4 mm, 5-sect or 2–4-lobed; tube absent or 1–2 mm; segments equal to unequal, lanceolate-linear to obovate-oblong, 1–3 mm wide, outside sparsely pubescent near apex. Corolla reddish, ca. 1.2 cm; tube ca. 6 mm; adaxial lip semi-orbicular, ca. 2.8 mm; abaxial lip ca. 6 mm.

Stamens adnate to corolla ca. 2 mm above base; filaments ca. 3 mm; anthers ca. 2.5 mm; staminodes adnate to corolla ca. 2.5 mm above base, 0.8–0.9 mm. Pistil ca. 1.1 cm, glabrous; ovary ca. 5 mm. Capsule 2–3 cm. Fl. Apr–May, fr. Jul.

• Rocky streambanks, rocky hills, shaded cliffs in valleys; 700–900 m. W Guangdong, E and S Guangxi (Beiliu Xian, Shanglin Xian, Wuming Xian).

- 1a. Calyx 5-sect, segments equal, ca. 1 mm wide; leaf blade margin double dentate 1a. var. *chorisepalus*
- 1b. Calyx 2–4-lobed, lobes unequal, largest 2- or 3-lobed, 1–3 mm wide; leaf blade margin double dentate to deeply crenate 1b. var. *synsepalus*

1a. Gyrocheilos chorisepalus var. **chorisepalus**

圆唇苣苔(原变种) yuan chun ju tai (yuan bian zhong)

Leaf blade margin double dentate. Calyx 5-sect; tube absent; segments equal, ca. 1 mm wide.

• Rocky streamsides, shaded cliffs in valleys. S Guangxi (Shanglin Xian, Wuming Xian).

1b. *Gyrocheilos chorisepalus* var. *synsepalus* W. T. Wang in W. T. Wang & K. Y. Pan, Bull. Bot. Res., Harbin 2(2): 135. 1982.

北流圆唇苣苔 *bei liu yuan chun ju tai*

Leaf blade margin double dentate to deeply crenate. Calyx 2–4-lobed; tube 1–2 mm; lobes unequal, largest 2- or 3-lobed, 1–3 mm wide.

• Rocky hills; 700–900 m. W Guangdong, E Guangxi (Beiliu Xian).

2. *Gyrocheilos lasiocalyx* W. T. Wang in W. T. Wang & K. Y. Pan, Bull. Bot. Res., Harbin 2(2): 135. 1982.

毛萼圆唇苣苔 *mao e yuan chun ju tai*

Petiole 1.5–8.5 cm, spreading villous, hairs 1–3.2 mm; leaf blade broadly ovate to orbicular, 3–6.7 × 2.5–7.5 cm, adaxially with mixed hairs 0.2–0.4 mm and 1.2–3 mm, abaxially puberulent along veins, margin double dentate, apex acute to rounded. Peduncle 4–7 cm, spreading villous, hairs 1–3.2 mm; bracts 3–5 × 0.8–2 mm, margin denticulate to crenate. Pedicel spreading pubescent. Calyx ca. 4 mm, 5-sect from base or near base; segments equal, linear-lanceolate to narrowly triangular, 0.9–1 mm wide, outside sparsely pubescent. Corolla red, ca. 1 cm; tube ca. 5 mm; adaxial lip deltoid, ca. 2.8 mm; abaxial lip ca. 5 mm. Stamens adnate to corolla ca. 2.1 mm above base; filaments ca. 1.5 mm; anthers ca. 2.3 mm; staminodes adnate to 1.5–2 mm above corolla base, ca. 1 mm. Pistil ca. 9.5 mm; ovary ca. 2.8 mm, sparsely glandular. Style base sparsely glandular. Capsule 1.5–1.8 cm. Fl. Apr–May, fr. Jul.

• Shaded rocks in montane regions; ca. 1300 m. E Guangxi (Guiping Xian, Xiangzhou Xian).

3. *Gyrocheilos microtrichus* W. T. Wang, Bull. Bot. Res., Harbin 1(3): 32. 1981.

微毛圆唇苣苔 *wei mao yuan chun ju tai*

Petiole (6–)9–24 cm, hairs antrorsely appressed, hairs 0.2–0.6 mm; leaf blade broadly ovate to reniform, (3–)7.5–12 × (4.4–)8–12 cm, adaxially with sparse, appressed hairs 0.1–0.2 mm, abaxially glabrescent, puberulent along veins, margin double dentate, apex acute. Peduncle 8–23 cm, antrorsely appressed puberulent, hairs 0.2–0.6 mm; bracts 5–7.5 × 2–5 mm, margin entire to crenate. Pedicel glabrous. Calyx 3–5 mm, 5-sect from base or near base; segments equal, lanceolate-linear to narrowly ovate or oblong, 1–1.2 mm wide, outside glabrous or some segments with 1–3 short hairs near apex. Corolla rose-pink, ca. 1.1 cm; tube ca. 6.5 mm; adaxial lip semi-orbicular, ca. 2 mm; abaxial lip ca. 5 mm. Stamens adnate to corolla ca. 2.5 mm above base; filaments ca. 2.5 mm; anthers ca. 2 mm; staminodes adnate to 3–3.5 mm above corolla base,

ca. 1 mm. Pistil ca. 10 cm, glabrous; ovary ca. 5.5 mm. Fl. Apr.

• Rocky streamsides in valleys; ca. 1600 m. SW Guangdong (Xinyi Xian).

4. *Gyrocheilos retrotrichus* W. T. Wang, Bull. Bot. Res., Harbin 1(3): 34. 1981.

折毛圆唇苣苔 *zhe mao yuan chun ju tai*

Petiole to 18 cm, densely spreading or retrorsely pubescent, hairs 0.8–2 mm; leaf blade broadly ovate to reniform, 7–15.5 × 5.5–15.5 cm, adaxially with mixed hairs 0.2–1.2 and 1–2 mm, abaxially puberulent with longer hairs along veins, margin double dentate, apex acute to obtuse. Peduncle 8.5–34 cm, spreading pubescent, hairs 0.2–2 mm; bracts 6–8 × 2–3.5 mm, margin entire to crenate. Pedicel glabrous. Calyx 3–4 mm, 2-lipped or 4- or 5-lobed; tube 1–2 mm; lobes equal to unequal, narrowly ovate to obovate, 1–3 mm wide, outside glabrous or some lobes with 1–3 short hairs near apex. Corolla rose-pink, ca. 1.3 cm; tube ca. 7.5 mm; adaxial lip semi-orbicular, ca. 3 mm; abaxial lip ca. 5.5 mm. Stamens adnate to corolla ca. 4 mm above base; filaments ca. 3 mm; anthers ca. 2.5 mm; staminodes adnate to corolla ca. 5 mm above base, 0.5–1.5 mm. Pistil ca. 1.4 cm, glabrous; ovary ca. 6 mm. Capsule 2.5–3 cm. Fl. Mar–Jul, fr. May–Sep.

• Valley forests, shaded rocks in valleys; 400–1000 m. Guangdong, N Guangxi, SE Guizhou.

1a. Leaf blade adaxially with mixed hairs, 0.3–1.2 and 1.8–2 mm; calyx 5-lobed, lobes equal, 1–1.5 mm wide; staminodes clavate, ca. 1.5 mm; cymes many flowered, peduncle 9–34 cm, hairs

0.5–2 mm 4a. var. *retrotrichus*

1b. Leaf blade adaxially with mixed hairs, 0.2–0.5 and 1–2 mm; calyx 4-lobed or 2-lipped, lobes unequal, 1–3 mm wide; staminodes linear, ca. 0.5 mm; cymes 5- to many flowered, peduncle 8.5–19 cm, hairs 0.2–1.2 mm 4b. var. *oligolobus*

4a. *Gyrocheilos retrotrichus* var. *retrotrichus*

折毛圆唇苣苔(原变种) *zhe mao yuan chun ju tai*
(yuan bian zhong)

Leaf blade adaxially with mixed hairs 0.3–1.2 mm and 1.8–2 mm. Cymes many flowered; peduncle 9–34 cm, hairs 0.5–2 mm. Calyx 5-lobed; lobes equal, 1–1.5 mm wide, apex obtuse. Staminodes clavate, ca. 1.5 mm. Fl. Mar.

• Valley forests. W Guangdong (Xinyi Xian, Yunfu Xian).

4b. *Gyrocheilos retrotrichus* var. *oligolobus* W. T. Wang, Bull. Bot. Res., Harbin 1(3): 35. 1981.

稀裂圆唇苣苔 *xi lie yuan chun ju tai*

Leaf blade adaxially with mixed hairs 0.2–0.5 mm and 1–2 mm. Cymes 5- to many flowered; peduncle 8.5–19 cm, hairs 0.2–1.2 mm. Calyx 4-lobed or 2-lipped; lobes unequal, 1–3 mm wide, apex obtuse to rounded.

Staminodes linear, ca. 0.5 mm. Fl. Apr–Jul, fr. May–Sep.

• Forests, on shaded rocks in valleys; 400–1000 m. SW Guangdong, N Guangxi, SE Guizhou.

37. DOLICHOLOMA D. Fang & W. T. Wang in W. T. Wang, Bot. Res.

Academia Sinica 1: 18. 1983.

长檐苣苔属 chang yan ju tai shu

Herbs, perennial, epipetric, rhizomatous, stemless. Leaves few to many, basal; leaf blade pubescent, margin glandular pubescent, base broadly cuneate to rounded. Inflorescences lax, axillary, 1–4-flowered cymes; bracts 1 or 2, opposite. Calyx actinomorphic, 5-sect from base; segments equal. Corolla purplish, zygomorphic, inside sparsely puberulent toward apex of tube; tube nearly salverform, cylindrical below, not swollen, slightly shorter than to nearly equalling limb, ca. 1.2 mm in diam.; limb 2-lipped; adaxial lip 2-sect from near base, slightly shorter than abaxial lip; abaxial lip 3-sect from near base, lobes equal, apex acute. Stamens 2, adnate to abaxial side of corolla tube above middle, included; anthers dorsifixed, coherent by adaxial surfaces, thecae divaricate, confluent at apex, dehiscing longitudinally; connective not projecting; staminodes 2, adnate to adaxial side of corolla tube. Disc ringlike. Ovary narrowly ovoid, 1-loculed; placentas 2, parietal, slightly projecting inward, 2-cleft. Stigma 1, terminal, disclike, undivided. Capsule straight in relation to pedicel, narrowly ellipsoid, nearly as long as calyx, dehiscing loculicidally to base; valves 4, straight, not twisted. Seeds unappendaged.

• One species: endemic to China.

1. *Dolicholoma jasminiflorum* D. Fang & W. T. Wang in W. T. Wang, Bot. Res. Academia Sinica 1: 19. 1983.

长檐苣苔 chang yan ju tai

Petiole 1–4 cm, spreading white puberulent and glandular puberulent; leaf blade narrowly ovate to elliptic, 1.1–2.3 × 0.7–1.3 cm, white pubescent, margin subentire, glandular and ciliate, apex broadly acute to rounded. Peduncle 1.5–3 cm, spreading white and glandular puberulent; bracts linear, 1.5–2 mm, sparsely puberulent. Calyx segments linear, 3.8–4.1 × 0.4–0.5

mm, outside sparsely pubescent. Corolla purplish, yellowish in center, 1.5–1.7 cm; tube 7–8.5 mm; adaxial lip 5.5–6 mm; abaxial lip 7–9 mm, lobes narrowly triangular. Stamens glabrous; filaments ca. 1 mm; anthers ca. 1 mm; staminodes ca. 0.6 mm. Pistil ca. 6.5 mm, puberulent. Style ca. 4.8 mm. Capsule 5.5–6 mm. Fl. Apr.

• Shady cliffs in limestone hills. SW Guangxi (Napo Xian).

38. CALCAREOBOEA C. Y. Wu ex H. W. Li, Acta Bot. Yunnan. 4: 241. 1982.

朱红苣苔属 zhu hong ju tai shu

Herbs, perennial, epipetric, rhizomatous, stemless. Leaves few to many, basal; leaf blade puberulent to sericeous, base broadly cuneate to subcordate. Inflorescences umbel-like, dense, axillary, few- to many-flowered cymes; bracts more than 10, involucre. Calyx actinomorphic, 5-sect from base; segments equal. Corolla red, zygomorphic, inside sparsely puberulent; tube narrowly funnelform-tubular, not swollen, 4–5 × longer than limb, ca. 5 mm in diam.; limb 2-lipped; adaxial lip 4-lobed, longer than abaxial lip; abaxial lip undivided, apex acute to rounded. Stamens 2, adnate to abaxial side of corolla tube above middle, included; anthers dorsifixed, coherent by adaxial surfaces, thecae divaricate, confluent at apex, dehiscing longitudinally; connective not projecting; staminodes 2, adnate to adaxial side of corolla tube. Disc ringlike. Ovary linear, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigma 1, terminal, depressed globose, undivided. Capsule straight in relation to pedicel, linear, much surpassing calyx, dehiscing loculicidally to base; valves 4, straight, not twisted. Seeds unknown.

One species: China, N Vietnam.

1. *Calcareoboea coccinea* C. Y. Wu ex H. W. Li, Acta Bot. Yunnan. 4: 243. 1982.

朱红苣苔 zhu hong ju tai

Petiole 3–14.5 cm, appressed pubescent; leaf blade ovate, 4.5–11 × 2–4.2 cm, densely puberulent to sericeous, margin dentate, apex acute. Peduncle 9–22 cm, appressed pubescent; bracts lanceolate to ovate, 1–2 × 0.2–1.2 cm, appressed puberulent, margin entire to denticulate. Calyx segments linear, 3–7 × 0.3–0.8 mm, outside puberulent. Corolla 1.9–2.5 cm; tube 1.5–2.1

cm; adaxial lip ca. 4 mm, lobes deltoid, 1–1.5 mm; abaxial lip broadly triangular, 2–4 mm. Filaments 4–6 mm, sparsely glandular puberulent; anthers ca. 1.8 mm; staminodes ca. 0.5 mm. Pistil 2.1–2.5 cm; ovary glabrous. Style ca. 1 cm, sparsely glandular puberulent. Capsule 4.5–7 cm. Fl. Apr–Jun.

Rocks in forests on limestone hills; 1000–1500 m. W Guangxi, SE Yunnan [N Vietnam].

39. ALLOCHEILOS W. T. Wang, Acta Phytotax. Sin. 21: 321. 1983.

异唇苣苔属 *yi chun ju tai shu*

Herbs, perennial, epipetric, rhizomatous, stemless. Leaves few, basal; leaf blade puberulent to pilose, base cordate. Inflorescences lax, axillary, 2–5-flowered cymes; bracts 2, opposite. Calyx actinomorphic, 5-sect from base; segments equal. Corolla purple to rose, zygomorphic, inside glabrous; tube oblique, campanulate, not swollen, shorter than limb, ca. 3.5 mm in diam.; limb 2-lipped; adaxial lip 4-lobed, slightly shorter than abaxial lip; abaxial lip undivided, apex acute. Stamens 2, adnate to abaxial side of corolla tube near base, included; anthers dorsifixed, coherent by adaxial surfaces, thecae divaricate, confluent at apex, dehiscing longitudinally; connective not projecting; staminodes 2, adnate to adaxial side of corolla tube. Disc ringlike. Ovary nearly oblong, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigma 1, terminal, depressed-globose, undivided. Capsule straight in relation to pedicel, linear, much surpassing calyx, dehiscing loculicidally to base; valves 4, straight, not twisted. Seeds unappendaged.

• One species: endemic to China.

Burtt (pers. comm.) has suggested that there is another, as yet undescribed, species from Vietnam.

1. *Allocheilos cortusiflorus* W. T. Wang, Acta Phytotax. Sin. 21: 323, 1983.

异唇苣苔 *yi chun ju tai*

Petiole 0.3–4 cm, spreading pubescent to villous; leaf blade broadly ovate to orbicular, 0.9–2.2 × 1–2.4 cm, adaxially sparsely appressed puberulent to pilose, abaxially densely brownish pubescent, margin crenate, apex rounded. Peduncle 6–10 cm, sparsely pubescent to villous, sometimes glandular puberulent; bracts linear, 2–2.5 mm, puberulent. Calyx segments lanceolate-linear, 2.5–2.9 × 0.3–0.6 mm, outside sparsely brown

pubescent. Corolla 8.5–9.5 mm; tube 3–3.5 mm; adaxial lip 3.5–5 mm, lobes triangular, 1.5–2 mm; abaxial lip triangular, 5.5–7 mm. Filaments ca. 4 mm, puberulent to pilose near apex; anthers ca. 1.7 mm; staminodes 0.4–0.5 mm. Pistil ca. 1 cm; ovary densely brown pubescent. Style ca. 7 mm, sparsely pubescent to pilose. Capsule ca. 1 cm. Fl. Jul–Aug, fr. Aug–Sep.

• Rocks in limestone hills; ca. 1400 m. SW Guizhou (Xingyi Xian), E Yunnan (Luoping Xian).

40. PARABOEA (C. B. Clarke) Ridley, J. Straits Branch Roy. Asiat. Soc. 43: 4, 63. 1905.

蛛毛苣苔属 *zhu mao ju tai shu*

Didymocarpus Wallich sect. *Paraboea* C. B. Clarke in A. & C. de Candolle, Monogr. Phan. 5: 105. 1883;

Buxiphyllum W. T. Wang & C. Z. Gao; *Chlamydoeboea* Stapf.

Herbs, rarely subshrubs, perennial, epipetric or terrestrial, rhizomatous, stemmed or stemless. Leaves few to many, basal, clustered at stem apex, or spread along stem and opposite, rarely spirally arranged, equal to subequal in a pair; leaf blade adaxially woolly to glabrous, abaxially woolly, pannose, or velutinous, hairs dense, interwoven, usually branched at least near base, base attenuate to cuneate, rarely rounded to peltate-auriculate. Inflorescences cymes, sometimes umbel-like, corymbiform, or paniculate, lax, rarely dense, axillary or in terminal panicles, 1- to many flowered; bracts 1–3, opposite. Calyx actinomorphic, rarely slightly zygomorphic, 5-sect from base or from near base, rarely 2-lipped; segments equal. Corolla white, blue, or purple, zygomorphic, inside glabrous to glandular puberulent; tube oblique, campanulate, not swollen, longer than to occasionally nearly equalling limb, 2–13 mm in diam.; limb ± 2-lipped; adaxial lip 2-lobed; usually slightly shorter, rarely 1/4 × length to slightly longer than abaxial lip; abaxial lip 3-lobed, lobes equal or central lobe longer, apex rounded. Stamens 2, adnate to abaxial side of corolla tube near base, included; anthers dorsifixed, coherent, thecae divaricate, confluent at apex, dehiscing longitudinally; connective not projecting; staminodes 1–3, seldom absent, adnate to adaxial side of corolla tube. Disc inconspicuous. Ovary narrowly ovoid to oblong, rarely conical, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigma 1, terminal, capitate, seldom subligulate, undivided. Capsule straight in relation to pedicel, linear to narrowly oblong or lanceolate, much surpassing calyx, dehiscing loculicidally to base; valves 4, spirally twisted, seldom straight. Seeds unappendaged.

About 87 species: Bhutan, China, Indonesia, Malaysia, Myanmar, Philippines, Thailand, Vietnam; 18 species in China.

1a. Capsule not twisted (unknown in *P. clavisekala* and *P. tribracteata*).

2a. Subshrubs; peduncle 2–2.7 cm; bracts 1 or 2, ca. 0.3 mm; calyx segments 1–1.2 mm; corolla 4–5 mm, outside sparsely glandular puberulent; leaf blade 0.9–2.5 × 0.4–1 cm 1. *P. velutina*

2b. Herbs, rarely subshrubs; peduncle 2.5–21 cm; bracts 2(or 3), 2–25 mm; calyx segments 2–6 mm; corolla 9–18 mm, outside glabrous; leaf blade 1–33.5 × 0.3–10 cm.

3a. Stems 17–50 cm; leaves opposite, spread along stem; bracts 7–25 mm 9. *P. clavisekala*

3b. Stems to 10 cm or absent; leaves spiral near stem apex or basal; bracts 1–13 mm.

4a. Leaf blade base peltate-auriculate or peltate and rounded to cuneate, rarely merely cordate to cuneate; bracts 1–3(–4) mm.

- 5a. Leaf blade 6–33.5 × 3–14.3 cm; lateral veins 11–18 on each side of midrib; petiole 1–9 cm; calyx 2-lipped, adaxial lip 2-toothed, teeth ca. 0.7 mm, abaxial lip 3-sect from base, segments ca. 2 mm; staminodes 2, ca. 2 mm; ovary ca. 5 mm 2. *P. peltifolia*
- 5b. Leaf blade 1–5 × 0.3–2.2 cm; lateral veins 4–6 on each side of midrib; petiole 0.3–0.9 cm; calyx 5-sect from base, segments lanceolate, 2–3.5 mm; staminode 1, ca. 0.2 mm; ovary ca. 1.5 mm 3. *P. filipes*
- 4b. Leaf blade base attenuate to broadly cuneate, sometimes ultimately rounded; bracts 5–13 mm.
- 6a. Leaf blade narrowly oblanceolate, 1.7–2.4 cm wide; lateral veins 3 or 4 on each side of midrib; bracts and calyx glabrous outside; corolla red; bracts 3; staminodes 2 16. *P. tribracteata*
- 6b. Leaf blade oblanceolate or obovate, (1.5–)2.8–8.8 cm wide; lateral veins 5–11 on each side of midrib; bracts and calyx pannose or woolly outside; corolla purplish or purple-blue; bracts 2(or 3); staminodes 3.
- 7a. Plants stemless; leaf blade abaxially densely brownish woolly, veins margin rust-brown woolly; peduncle 2.5–9 cm, tomentose; filaments ca. 2 mm, glandular puberulent 4. *P. nutans*
- 7b. Plants stemless or stems to 10 cm; leaf blade abaxially pannose; peduncle 8–21 cm, pannose to sparsely pannose, glabrescent; filaments 6–7 mm, glabrous 15. *P. dictyoneura*
- 1b. Capsule spirally twisted.
- 8a. Leaves opposite, spread along stem.
- 9a. Bracts early deciduous or to 10 mm; corolla tube 3–5 mm; filaments 1.5–3 mm, anthers 2–2.5 mm; ovary 2.5–3 mm.
- 10a. Cymes appearing terminal; peduncle 5–13 cm; capsule 2–2.5 cm; leaf blade 4–14 × 2–5 cm, adaxially grayish woolly, glabrescent 5. *P. swinhoei*
- 10b. Cymes axillary; peduncle 4–5 cm; capsule 0.8–1.5 cm; leaf blade 2–7 × 1–3 cm, adaxially densely pubescent 6. *P. changjiangensis*
- 9b. Bracts (7–)10–50 mm; corolla tube 5–13 mm; filaments 6–10 mm, anthers 3–4 mm; ovary 4–6 mm.
- 11a. Calyx segments oblong-spatulate to flabellate or obovate, 7–15 × 4–7 mm; stems to 1 m; peduncle 2.5–6(–8) cm, brown pannose 7. *P. sinensis*
- 11b. Calyx segments lanceolate or narrowly oblong to narrowly triangular, 1.8–3 × 0.5–1 mm; stems to 40 cm; peduncle 5–20 cm, cobwebby-woolly, glabrescent.
- 12a. Bracts narrowly ovate to obovate, 3–5 × 1–2 cm; filaments glabrous to glandular puberulent; leaf blade apex obtuse to acute 11. *P. glutinosa*
- 12b. Bracts lanceolate to ovate, 0.7–3 × 0.4–1.3 cm; filaments bearded; leaf blade apex acuminate to acute 12. *P. martinii*
- 8b. Leaves basal or mostly crowded at stem apex.
- 13a. Corolla 4.5–5.2 mm; ovary and capsule mealy; capsule 0.6–1.2 cm 13. *P. thirionii*
- 13b. Corolla 8–25 mm; ovary sparsely glandular puberulent or puberulent to glabrous (unknown in *P. paramartinii*); capsule glabrous, 1.5–6.5 cm (unknown in *P. clavisepala* and *P. tribracteata*).
- 14a. Stems to 50 cm; petiole (0.5–)1–10 cm; leaf blade base decurrent to subcordate, sometimes oblique; filaments glandular puberulent to bearded, rarely glabrous (unknown in *P. paramartinii*).
- 15a. Peduncle 3–4 cm; bracts 2 at apex of peduncle, another pair at first branch 10. *P. paramartinii*
- 15b. Peduncle 4–20 cm; bracts 2.
- 16a. Leaf blade adaxially densely puberulent to pubescent, not cobwebby-woolly; bracts 7–12 × 4–11 mm 8. *P. rufescens*

- 16b. Leaf blade adaxially cobwebby-woolly, glabrescent, sometimes also strigose; bracts 7–50 × 2–20 mm.
- 17a. Leaf blade abaxially densely grayish woolly; calyx segments spatulate to suboblong, 3–4 mm 9. *P. claviseipala*
- 17b. Leaf blade abaxially brown pannose; calyx segments lanceolate or narrowly oblong to narrowly triangular, 1.8–3 mm.
- 18a. Bracts narrowly ovate to obovate, 3–5 × 1–2 cm; filaments glabrous to glandular puberulent; leaf blade apex obtuse to acute 11. *P. glutinosa*
- 18b. Bracts lanceolate to ovate, 0.7–3 × 0.4–1.3 cm; filaments bearded; leaf blade apex acuminate to acute 12. *P. martinii*
- 14b. Plants stemless or stems to 15 cm; petiole absent to 4.5 cm; leaf blade base attenuate to cuneate, sometimes ultimately rounded; filaments glabrous.
- 19a. Leaf blade narrowly oblanceolate, 1.7–2.4 cm wide; lateral veins 3 or 4 on each side of midrib; bracts 3, outside glabrous; corolla red 16. *P. tribracteata*
- 19b. Leaf blade oblanceolate to obovate or spatulate, rarely lanceolate or ovate, 1.2–8 cm wide; lateral veins 4–10 on each side of midrib; bracts 2(or 3), outside woolly or pannose; corolla bluish to deep purple.
- 20a. Leaf blade leathery, adaxially glabrous to glabrescent; corolla glandular puberulent outside; ovary puberulent; peduncle 12–30 cm; pedicel 1–4 cm 18. *P. hainanensis*
- 20b. Leaf blade thick papery, adaxially woolly, glabrescent; corolla glabrous outside; ovary glabrous; peduncle 3–21 cm; pedicel 0.5–2 cm.
- 21a. Bracts ovate to elliptic, ca. 1.5 mm; corolla adaxial lip lobes 0.5–2 mm; capsule 1.5–2.5 cm 14. *P. neurophylla*
- 21b. Bracts linear to subulate or lanceolate to narrowly oblong, 2–13 mm; corolla adaxial lip lobes 3–6 mm; capsule 1.5–6 cm.
- 22a. Leaf blade oblanceolate, rarely obovate; bracts 5–13 mm; calyx 3–6 mm, outside woolly; staminodes 3 15. *P. dictyoneura*
- 22b. Leaf blade spatulate, rarely lanceolate, obovate, or ovate, bracts 2–5 mm; calyx 2–3 mm, outside puberulent; staminodes 2 17. *P. crassifolia*

1. *Paraboea velutina* (W. T. Wang & C. Z. Gao) B. L. Burt, Notes Roy. Bot. Gard. Edinburgh 41: 440. 1984.

密叶蛛毛苣苔 mi ye zhu mao ju tai

Buxiphyllum velutinum W. T. Wang & C. Z. Gao in W. T. Wang, Bull. Bot. Res., Harbin 1(3): 37. 1981.

Subshrubs. Stems ca. 7 cm, brown to grayish velutinous. Leaves spirally arranged, crowded near branch apex; petiole 1–2(–4) mm; leaf blade oblanceolate, seldom spatulate, 0.9–2.5 cm × 4–10 mm, papery, adaxially cobwebby-woolly, glabrescent, abaxially grayish velutinous, base attenuate, margin indistinctly repand-crenulate, apex obtuse to rounded; lateral veins 4–7 on each side of midrib. Cymes axillary in pairs; peduncle 2–2.7 cm, glandular puberulent; bracts 1 or 2, subulate, ca. 0.3 mm, outside puberulent. Pedicel 3–5 mm. Calyx 5-sect from base; segments narrowly lanceolate, 1–1.2

× ca. 0.3 mm, outside glandular puberulent. Corolla white, 4–5 mm, outside sparsely glandular puberulent; tube 3–3.5 mm; adaxial lip ca. 2 mm, lobes ca. 1.5 × 1 mm; abaxial lip ca. 1.8 mm, lobes ca. 1.5 × 2.3 mm. Filaments ca. 1.4 mm, glabrous; anthers ca. 1.1 mm; staminodes 3, ca. 0.5 mm. Pistil sparsely glandular puberulent; ovary ca. 1.2 mm. Style ca. 2.8 mm. Capsule not twisted, 7–8 mm, glabrescent. Fl. Jun.

• Limestone rocks and cliffs among caves. Guangxi (Fengshan Xian).

2. *Paraboea peltifolia* D. Fang & L. Zeng in D. Fang, D. H. Qin, W. Y. Rao, & L. Zeng, Acta Phytotax. Sin. 33: 606. 1995.

钝叶蛛毛苣苔 dun ye zhu mao ju tai

Herbs. Stems 2–7 cm. Leaves spirally arranged; petiole 1–9 cm; leaf blade obovate to oblanceolate, spatulate,

or subpandurate, 6–33.5 × 3–14.3 cm, papery, adaxially cobwebby-woolly, abaxially densely brownish woolly, base peltate-auriculate, rarely cordate to cuneate, margin irregularly crenate-serrate, apex obtuse to rounded; lateral veins 11–18 on each side of midrib. Cymes axillary; peduncle 4–6 cm, densely brownish woolly; bracts 2, lanceolate-triangular, 2–3(–4) mm, outside densely brownish woolly. Pedicel ca. 6 mm. Calyx ca. 3.5 mm, 2-lipped; adaxial lip 2-toothed, teeth ca. 0.7 mm, abaxial lip 3-sect from base, segments ca. 2 × 1.5 mm, outside densely woolly. Corolla white, with lavender on abaxial lateral lobes, ca. 1.4 cm, outside glabrous; tube ca. 7 mm; adaxial lip ca. 5 mm; abaxial lip ca. 7 mm, lobes ca. 7 mm wide. Filaments ca. 3 mm, glabrous; anthers ca. 3 mm; staminodes 2, ca. 2 mm. Pistil lilac puberulent, densely so near base, sparsely above; ovary ca. 5 mm. Style ca. 7 mm. Capsule not twisted, 1–3.6 cm, glabrescent.

• Limestone; 300–400 m. Guangxi (Mashan Xian).

3. *Paraboea filipes* (Hance) B. L. Burtt, Notes Roy. Bot. Gard. Edinburgh 41: 429. 1984.

丝梗蛛毛苣苔 *si geng zhu mao ju tai*

?*Oreocharis filipes* Hance, J. Bot. 21: 166. 1883.

Herbs, stemless. Leaves basal; petiole 3–9 mm; leaf blade obovate to obovate-oblong, elliptic, or spatulate, 1–5 × 0.3–2.2 cm, papery, adaxially glabrescent to sparsely grayish woolly, glabrescent, abaxially brownish pannose, base slightly peltate and rounded to cuneate, margin nearly entire, involute, apex obtuse to rounded; lateral veins 4–6 on each side of midrib. Cymes axillary; peduncle 3–7 cm, glabrescent; bracts 2, narrowly oblong-ovate, ca. 1 mm, outside glabrous. Pedicel 1.5–3.5 cm. Calyx 5-sect from base; segments lanceolate, 2–3.5 × ca. 0.6 mm, outside glabrescent. Corolla purplish, ca. 1 cm, outside glabrous; tube ca. 5 mm; adaxial lip lobes ca. 3.5 mm; abaxial lip lobes 2.5–3.5 mm. Filaments ca. 2.5 mm, glabrous; anthers ca. 1.9 mm; staminode 1, ca. 0.2 mm. Pistil glabrous; ovary ca. 1.5 mm. Style ca. 4.5 mm. Capsule not twisted, 5–11 mm, glabrous. Fl. Sep–Oct, fr. Oct.

• Limestone cliffs; 100–300 m. Guangdong (Lian Xian).

4. *Paraboea nutans* D. Fang & D. H. Qin in D. Fang, D. H. Qin, W. Y. Rao, & L. Zeng, Acta Phytotax. Sin. 33: 604. 1995.

垂花蛛毛苣苔 *chui hua zhu mao ju tai*

Herbs, stemless. Leaves basal; petiole (absent or) 0.5–3 cm; leaf blade obovate, (2.7–)4–16.5 × (1.5–)2.8–8.8 cm, thin leathery, adaxially cobwebby-woolly, abaxially densely brownish woolly, margin rust-brown woolly along veins, base attenuate to broadly cuneate, margin crenate to subentire, apex rounded to obtuse; lateral veins 7–11 on each side of midrib. Cymes axillary; peduncle 2.5–9 cm, brownish woolly; bracts 2, oblong, 5–8 mm, outside tomentose. Pedicel 6–11 mm. Calyx 5-sect from base; segments oblong or lanceolate-oblong, 5–6 × 2.5–3 mm, outside sparsely brownish

woolly. Corolla purple-blue, 1–1.1 cm, outside glabrous; tube ca. 7 mm; adaxial lip ca. 3 mm; abaxial lip ca. 4 mm. Filaments ca. 2 mm, glandular puberulent; anthers ca. 3 mm; staminodes 3, 1–1.5 mm. Pistil glabrous; ovary ca. 5 mm. Style 6–7 mm. Capsule not twisted, 1–2.5 cm, glabrous.

• Limestone; 900–1200 m. Guangxi (Napo Xian).

5. *Paraboea swinhoei* (Hance) B. L. Burtt, Notes Roy. Bot. Gard. Edinburgh 41: 439. 1984.

锥序蛛毛苣苔 *zhui xu zhu mao ju tai*

Boea swinhoei Hance, Ann. Sci. Nat. Bot., sér. 5, 5: 231. 1866.

Subshrubs. Stems 30–60 cm, densely brownish woolly, glabrescent. Leaves opposite, spread along stem; petiole 1–5 cm; leaf blade narrowly elliptic to elliptic-lanceolate, narrowly ovate, or narrowly obovate, 4–14 × 2–5 cm, papery, adaxially grayish woolly, glabrescent, abaxially brownish pannose, base sometimes oblique, cuneate to subcordate, margin subentire to serrate, apex abruptly acuminate to rounded; lateral veins 5–11 on each side of midrib. Cymes appearing terminal; peduncle 5–13 cm, brownish woolly; bracts 2, ovate-oblong, 3–10 mm, outside brownish pannose. Pedicel 5–8 mm. Calyx 1.5–2.5 mm, 5-sect from near base; segments narrowly oblong, 1.2–2.3 × 0.5–1 mm, outside pannose to glabrous. Corolla white, 4–6 mm, outside glabrous; tube 3–4 mm; adaxial lip 1.5–3 mm, lobes 1–2.5 × ca. 3.5 mm; abaxial lip 3–3.5 mm, lobes 2–2.5 × 2.5–3.5 mm. Filaments 2–3 mm, glabrous; anthers ca. 2 mm; staminodes 2 or 3, ca. 1.5 mm. Pistil glabrous; ovary 2.5–3 mm. Style 3–4 mm. Capsule spirally twisted, 2–2.5 cm, glabrous. Fl. Jun–Sep, Feb, fr. Jul–Sep.

Shady and damp rocks under forests; 300–1000 m. Guangxi, S Guizhou, Taiwan [Philippines, Thailand, Vietnam].

6. *Paraboea changjiangensis* F. W. Xing & Z. X. Li, Acta Bot. Yunnan. 15: 121. 1993.

昌江蛛毛苣苔 *chang jiang zhu mao ju tai*

Subshrubs. Stems 9–40 cm, densely gray woolly. Leaves opposite, spread along stem; petiole 1–2.5 cm; leaf blade elliptic to oblong, 2–7 × 1–3 cm, thick papery, adaxially densely pubescent, abaxially densely gray woolly, base cuneate, margin dentate, apex obtuse; lateral veins 5–7(or 8) on each side of midrib. Cymes axillary; peduncle 4–5 cm, densely puberulent when young, glabrescent; bracts early deciduous. Pedicel 0.5–1 cm. Calyx 5-sect from base; segments lanceolate, 1.5–2 × 0.5–1 mm, outside puberulent. Corolla pale purple; tube 3–5 mm; adaxial lip lobes 3–3.5 mm; abaxial lip central lobe ca. 5 mm, lateral lobes ca. 3 × 2.6 mm. Filaments 1.5–2 mm; anthers 2–2.5 mm; staminodes 2. Pistil glabrous; ovary ca. 3 mm. Style ca. 6 mm. Capsule spirally twisted, 0.8–1.5 cm, glabrous. Fl. Jul, fr. Sep.

• Limestone hills; ca. 600 m. Hainan (Changjiang Xian).

7. *Paraboea sinensis* (Oliver) B. L. Burtt, Notes Roy. Bot. Gard. Edinburgh 38: 471. 1980.

蛛毛苣苔 zhu mao ju tai

Phylloboea sinensis Oliver, Hooker's Icon. Pl. 18: pl. 1721. 1887; *Boea chaffanjonii* H. Léveillé; *Chlamydoboea sinensis* (Oliver) Stapf; *C. sinensis* f. *macra* Stapf; *C. sinensis* f. *macrophylla* Stapf; *Paraboea sinensis* f. *macra* (Stapf) C. Y. Wu ex H. W. Li; *P. sinensis* f. *macrophylla* (Stapf) C. Y. Wu ex H. W. Li.

Subshrubs. Stems to 1 m, brown pannose, glabrescent. Leaves opposite, spread along stem; petiole 2–10 cm; leaf blade narrowly elliptic or oblong to ovate or obovate, 5.5–26 × 2–10 cm, papery, adaxially grayish to brown pannose to puberulent, subglabrescent, abaxially brownish pannose, base sometimes oblique, cuneate to subcordate, margin subentire to serrulate, apex acute to acuminate; lateral veins 10–15 on each side of midrib. Cymes axillary, near branch apices; peduncle 2.5–6(–8) cm, brown pannose; bracts 2, suborbicular to broadly ovate, 1–1.5 × 0.8–1.2 cm, outside glandular puberulent to glabrous. Pedicel 5–12 mm. Calyx 5-sect from base or near base; segments oblong-spatulate to flabellate or obovate, 7–15 × 4–7 mm, outside glandular puberulent to glabrous. Corolla blue-purple to purple-red, 1.5–2 cm, outside glabrous; tube 1–1.3 cm; lobes 4–5 × ca. 5 mm. Filaments 6–9 mm, pubescent to glabrous; anthers ca. 4 mm; staminodes 1–3, 0.5–3 mm. Pistil glabrous; ovary 5–6 mm. Style 1.5–5 mm. Capsule spirally twisted, 2.5–5.6 cm, glabrous. Fl. May–Jul, fr. May–Nov.

Crevices of rocks or on cliffs in forests; 600–2500 m. SW Guangxi, Guizhou, W Hubei, SE Sichuan, SW and SE Yunnan [Myanmar, Thailand, Vietnam].

Paraboea sinensis varies geographically from SW to NE: the leaves gradually diminish in size, their shape varies from elliptic or narrowly elliptic to narrowly oblong, and the number of flowers per inflorescence gradually decreases.

8. *Paraboea rufescens* (Franchet) B. L. Burtt, Notes Roy. Bot. Gard. Edinburgh 38: 471. 1980.

锈色蛛毛苣苔 xiu se zhu mao ju tai

Subshrubs or herbs. Stems to 30 cm, brown pannose, glabrescent. Leaves opposite, mostly crowded near stem apex; petiole (0.5–)1–10 cm; leaf blade elliptic to obovate, ovate, or oblong, 3–20 × 1.5–10 cm, papery, adaxially densely puberulent to pubescent, abaxially densely rust-brown to gray pannose, base broadly cuneate to cordate, margin densely crenate-serrate, apex acute to rounded; lateral veins 5–10 on each side of midrib. Cymes axillary; peduncle 4–12 cm, rust-brown pannose; bracts 2, ovate to suborbicular, 7–12 × 4–11 mm, outside pannose. Pedicel 5–10 mm. Calyx 5-sect from base; segments narrowly oblong to lanceolate or linear, 3–4 × 0.5–1 mm, outside pannose, glabrescent. Corolla white to purplish, seldom purple-red, 1–1.3 cm, outside glabrous to sparsely glandular puberulent; tube

6–8 mm; adaxial lip ca. 3.5 mm, lobes ca. 3 × 4–5 mm; abaxial lip ca. 6.5 mm, lobes 3–4 × 4–5 mm. Filaments 3–5 mm, glandular puberulent; anthers 3–4 mm; staminodes 2, 1–1.5 mm. Pistil sparsely glandular puberulent to glabrous; ovary ca. 6 mm. Style ca. 4 mm. Capsule spirally twisted, 2.5–5 cm, glabrous. Fl. Jun–Sep, fr. Jun–Oct.

On rocks of limestone hills and valley forests; 200–1500 m. Guangdong, SW Guangxi, S Guizhou, E and S Yunnan [Thailand, N Vietnam].

1a. Internodes to 1.5(–6) cm; leaves usually crowded near stem apex, leaf blade 3–10 × 1.5–5.5 cm 8a. var. *rufescens*

1b. Internodes 3–10(–13) cm; leaves spaced along stem, leaf blade 5–20 × 3–10 cm 8b. var. *umbellata*

8a. *Paraboea rufescens* var. *rufescens*

锈色蛛毛苣苔(原变种) xiu se zhu mao ju tai (yuan bian zhong)

Boea rufescens Franchet, Bull. Mens. Soc. Linn. Paris 1: 449. 1885; *B. rufescens* var. *seguini* (H. Léveillé & Vaniot) H. Léveillé; *Didymocarpus seguini* H. Léveillé & Vaniot; *Dorcoceras rufescens* (Franchet) Schlechter; *Phylloboea henryi* Duthie ex Beddome.

Internodes to 1.5(–6) cm. Leaves usually crowded near stem apex; leaf blade elliptic to obovate, ovate, or oblong, 3–10 × 1.5–5.5 cm. Peduncle 3–12 cm. Fl. Jun–Sep, fr. Jul–Oct.

Crevices of rocks of limestone hills; 700–1500 m. Guangdong, SW Guangxi, S Guizhou, E and S Yunnan [Thailand, Vietnam].

8b. *Paraboea rufescens* var. *umbellata* (Drake) K. Y. Pan, Fl. Reipubl. Popularis Sin. 69: 467. 1990.

伞花蛛毛苣苔 san hua zhu mao ju tai

Boea umbellata Drake, Bull. Soc. Philom. Paris, sér. 8, 2: 129. 1890; *Paraboea umbellata* (Drake) B. L. Burtt. Internodes 3–10(–13) cm. Leaves spread along stem; leaf blade ovate to obovate or oblong, 5–20 × 3–10 cm. Peduncle 5.5–13 cm. Fl. Jun–Jul, fr. Jun–Aug.

Rocks in valley forests; 200–1200 m. SW Guangxi [Vietnam].

9. *Paraboea clavisepala* D. Fang & D. H. Qin in D. Fang, D. H. Qin, W. Y. Rao, & L. Zeng, Acta Phytotax. Sin. 33: 602. 1995.

棒萼蛛毛苣苔 bang e zhu mao ju tai

Herbs. Stems 17–50 cm, woolly. Leaves opposite, mostly crowded near stem apex, some basal; petiole 5–11 mm; leaf blade oblong to narrowly elliptic, rarely ovate, 4.5–29 × 2–10 cm, papery, adaxially densely strigose and cobwebby-woolly, abaxially densely grayish woolly, base broadly cuneate to rounded, margin serrate, apex acute; lateral veins 11–14 on each side of midrib. Cymes axillary, near branch apices; peduncle (4–)6–16 cm, woolly; bracts 2, ovate, 0.7–2.5 cm × 2.5–3 mm, outside woolly. Pedicel 4–10 mm.

Calyx 5-sect from base; segments spatulate to suboblong, 3–4 × ca. 2 mm, outside glabrous. Corolla white, ca. 1.8 cm, outside glabrous; tube ca. 1 cm;

adaxial lip ca. 6 mm; abaxial lip ca. 8 mm, lobes 7–8 mm wide. Filaments ca. 5 mm, glandular puberulent; anthers ca. 4 mm; staminodes 2, ca. 2 mm. Pistil glabrous; ovary ca. 6 mm. Style ca. 3 mm. Fruit unknown. Fl. Jul.

• Limestone; ca. 800 m. Guangxi (Napo Xian).

10. *Paraboea paramartinii* Z. R. Xu & B. L. Burtt, Edinburgh J. Bot. 48: 10. 1991.

思茅蛛毛苣苔 si mao zhu mao ju tai

Subshrubs or herbs. Stems to 20 cm, pannose to woolly, glabrescent. Leaves opposite, mostly crowded near stem apex, some basal; petiole 2–13 cm; leaf blade ovate to oblong or elliptic, 10–26 × 6–12 cm, papery, adaxially glabrous to pubescent, abaxially puberulent to pannose, pannose-woolly along veins, base often oblique, broadly cuneate to subcordate, margin crenate-serrate, apex obtuse; lateral veins 10–15 on each side of midrib. Cymes axillary, near branch apices, flowers unknown; fruiting peduncle 3–4 cm, glabrescent; bracts 2 at apex of peduncle, another pair at first branch, lanceolate to ovate, 1.1–3 cm × 4–8 mm, outside pannose. Pedicel 0.4–2 cm. Calyx 5-sect from base; segments narrowly oblong, 2.5–3 × 0.5–1 mm, outside sparsely glandular puberulent, glabrescent. Capsule spirally twisted, 2–3.5 cm, glabrous. Fr. Oct.

Limestone cliffs in forests; ca. 1500 m. Yunnan (Simao Xian) [Thailand].

11. *Paraboea glutinosa* (Handel-Mazzetti) K. Y. Pan in A. L. Weitzman et al., Novon 7: 431. 1998.

白花蛛毛苣苔 bai hua zhu mao ju tai

Boea glutinosa Handel-Mazzetti, Sinensia 7: 620. 1936.

Subshrubs or herbs. Stems to 40 cm, gray-brown cobwebby-woolly. Leaves opposite, mostly crowded near stem apex or spread along stem; petiole 3–7 cm; leaf blade obovate to elliptic, ovate, or oblong, 7–18 × 3–9 cm, papery, adaxially cobwebby-woolly, glabrescent, abaxially brown pannose, base sometimes oblique, decurrent to rounded, margin serrate to subentire, apex obtuse to acute; lateral veins 10–14 on each side of midrib. Cymes terminal or axillary; peduncle 7–17 cm, cobwebby-woolly, glabrescent; bracts 2, narrowly ovate to obovate, 3–5 × 1–2 cm, outside pannose. Pedicel 1–2(–3) cm. Calyx 5-sect from base; segments lanceolate to narrowly triangular, 1.8–3 × 0.5–1 mm, outside glandular puberulent to glabrous. Corolla white to pink or lilac, 1–2 cm, outside glabrous; tube 5–10 mm; adaxial lip 2–3 mm, lobes 2–3 × ca. 3 mm; abaxial lip 2.5–4.5 mm, lobes ca. 2.5 × 3.5 mm. Filaments 7–9 mm, glabrous to glandular puberulent; anthers 3–4 mm; staminodes 2, 1.2–2 mm. Pistil glabrous; ovary 4–5 mm. Style 3–4 mm. Capsule spirally twisted, 3.5–4.5 cm, glabrous. Fl. Jun–Aug, fr. Aug.

Rocks of slopes; 400–1400 m. NW Guangxi, Guizhou (Luodian Xian), Yunnan [Myanmar].

12. *Paraboea martinii* (H. Léveillé & Vaniot) B. L. Burtt, Notes Roy. Bot. Gard. Edinburgh 38: 470. 1980.

髯丝蛛毛苣苔 ran si zhu mao ju tai

Didymocarpus martinii H. Léveillé & Vaniot in H. Léveillé, Compt. Rend. Assoc. Franç. Avancem. Sci. 34: 426. 1906; *Boea martinii* (H. Léveillé & Vaniot) H. Léveillé; *Chirita martinii* H. Léveillé & Vaniot; *Paraboea barbatipes* K. Y. Pan.

Subshrubs or herbs. Stems to 30 cm, gray-brown cobwebby-woolly to pannose. Leaves opposite, mostly crowded near stem apex or spread along stem; petiole 2–10 cm; leaf blade elliptic to ovate or oblanceolate, 6–14 × 3–7.5 cm, papery, adaxially cobwebby-woolly, glabrescent, abaxially brown pannose, base sometimes oblique, cuneate to rounded, margin serrulate to crenulate, apex acuminate to acute; lateral veins 7–11 on each side of midrib. Cymes terminal or axillary; peduncle 5–20 cm, cobwebby-woolly, glabrescent; bracts 2, lanceolate to ovate, 0.7–3 cm × 4–13 mm, outside pannose. Pedicel 0.7–1.5(–2) cm. Calyx 5-sect from base; segments narrowly oblong to narrowly triangular, 2–3 × 0.5–1 mm, outside sparsely puberulent. Corolla purplish to blue, 1.5–2.5 cm, outside glabrous to puberulent; tube 7–10 mm; adaxial lobes ca. 3 × 4 mm; abaxial lip ca. 8 mm, lobes 2.5–6 mm. Filaments ca. 1 cm, bearded; anthers ca. 4 mm; staminodes 2, ca. 3 mm. Pistil glabrous; ovary 5–6 mm. Style 4–6 mm. Capsule spirally twisted, 2.5–6.5 cm, glabrous. Fl. May, fr. Jul–Aug.

• Limestone in forests; 400–1500 m. Guangxi (Napo Xian), Guizhou (Libo Xian), Yunnan (Xichou).

13. *Paraboea thirionii* (H. Léveillé) B. L. Burtt, Notes Roy. Bot. Gard. Edinburgh 38: 471. 1980.

小花蛛毛苣苔 xiao hua zhu mao ju tai

Boea thirionii H. Léveillé, Repert. Spec. Nov. Regni Veg. 11: 301. 1912.

Herbs, rarely subshrubs. Stems to 3 cm, brown pannose. Leaves basal, rarely opposite, mostly crowded near stem apex; petiole 1–12 cm; leaf blade ovate to elliptic or obovate, 4–12 × 2.5–9 cm, papery, adaxially sparsely pubescent to glabrescent, abaxially rust-brown pannose, base often oblique, cuneate to subcordate, margin serrate or serrate-crenate to repand, apex acute to rounded; lateral veins 6–15 on each side of midrib. Cymes axillary; peduncle 3.5–26 cm, rust-brown pannose, glabrescent; bracts 2, elliptic, 1–1.5 × ca. 1 mm, outside rust-brown woolly to pannose. Pedicel 2–10 mm. Calyx 5-sect from base; segments lanceolate, 1–3 × 0.3–1 mm, outside sparsely puberulent. Corolla white, 4.5–5.2 mm, outside sparsely puberulent; tube 1–3 mm; adaxial lip lobes 1.2–2.5 × ca. 3 mm; abaxial lip

lobes 2–2.8 × ca. 3 mm. Filaments 1–3 mm, glabrous; anthers 1.8–2 mm; staminodes apparently absent. Ovary 2–2.5 mm; grayish mealy. Style 3–5 mm, glabrous. Capsule spirally twisted, 0.6–1.2 cm, mealy. Fl. Jul.

• Shady and damp rocks; ca. 300 m. Guangxi (Tian'e Xian), Guizhou (Luodian Xian).

Paraboea thirionii is similar to and sometimes treated as a synonym of *P. multiflora* (R. Brown) B. L. Burtt.

14. *Paraboea neurophylla* (Collet & Hemsley) B. L. Burtt, Notes Roy. Bot. Gard. Edinburgh 41: 434. 1984.

云南蛛毛苣苔 yun nan zhu mao ju tai

Didymocarpus neurophyllus Collet & Hemsley, J. Linn. Soc., Bot. 28: 102. 1891.

Herbs. Stemless or stems to 10 cm, pannose, glabrescent. Leaves basal or crowded near stem apex; petiole 0.5–4.5 cm; leaf blade oblanceolate to obovate, (2.5–)6–12 × 1.5–7 cm, thick papery, adaxially woolly, glabrescent, abaxially densely woolly to pannose, base narrowly cuneate, ultimately rounded, margin crenate, involute, apex rounded to acute; lateral veins 5 or 6 on each side of midrib. Cymes axillary; peduncle 6.5–13 cm, woolly, glabrescent; bracts 2, ovate to elliptic, ca. 1.5 × 0.5 mm, outside woolly. Pedicel 5–10 mm. Calyx 5-sect from base; segments linear to lanceolate, 2–5 × 0.5–1 mm, outside sparsely woolly. Corolla bluish, 1–1.2 cm, outside glabrous; tube 5–6 mm; adaxial lip 0.5–2 mm, lobes 0.5–2 × ca. 4 mm; abaxial lip 3–5 mm, lobes 2–3 × 3–3.5 mm. Filaments ca. 3 mm, glabrous; anthers 3–3.5 mm; staminodes 1–2, ca. 2 mm. Pistil glabrous; ovary 3.5–5 mm. Style 5–6 mm. Capsule spirally twisted, 1.5–2.5 cm, glabrous. Fl. May–Aug, Jan, fr. Jun–Sep.

Limestone, shady places near roads; ca. 2100 m. C Yunnan [N Myanmar].

15. *Paraboea dictyoneura* (Hance) B. L. Burtt, Notes Roy. Bot. Gard. Edinburgh 41: 427. 1984.

网脉蛛毛苣苔 wang mai zhu mao ju tai

Boea dictyoneura Hance, J. Bot. 21: 169. 1883; *B. hancei* C. B. Clarke.

Subshrubs or herbs, stemless or with stems to 10 cm, pannose, glabrescent. Leaves basal or crowded near stem apex; petiole (absent or) 1–4 cm; leaf blade oblanceolate, rarely obovate, 7–19 × 2–8 cm, thick papery, adaxially woolly, glabrescent, abaxially pannose, base attenuate to cuneate, sometimes ultimately rounded, margin irregularly serrate to dentate or subentire, involute, apex acute to rounded; lateral veins 5–10 on each side of midrib. Cymes axillary; peduncle 8–21 cm, pannose to sparsely pannose, glabrescent; bracts 2 (or 3), lanceolate to narrowly oblong, 5–13 × 2.5–3 mm, outside pannose. Pedicel 0.5–2 cm. Calyx 5-sect from base or near base; segments linear to narrowly triangular, 3–6 × 0.3–1 mm,

outside woolly. Corolla purplish, 1.2–1.5 cm, outside glabrous; tube 6–7 mm; adaxial lip lobes 4.5–6 × ca. 5 mm; abaxial lip ca. 8 mm; abaxial lip lobes 3–6 × 6–8 mm. Filaments 6–7 mm, glabrous; anthers ca. 3.5 mm; staminodes 3, 2–4.5 mm. Pistil glabrous; ovary ca. 6 mm. Style ca. 4 mm. Capsule spirally twisted to nearly straight, 1.5–6 cm, glabrous. Fl. Jan–May, fr. May–Jun.

Rocks in forests; 100–800 m. NW Guangdong, Guangxi (Lingui Xian) [Thailand, Vietnam].

16. *Paraboea tribracteata* D. Fang & W. Y. Rao in D. Fang, D. H. Qin, W. Y. Rao, & L. Zeng, Acta Phytotax. Sin. 33: 607. 1995.

三苞蛛毛苣苔 san bao zhu mao ju tai

Herbs, stemless. Leaves basal, sessile; leaf blade narrowly oblanceolate, 9–13.5 × 1.7–2.4 cm, adaxially cobwebby-woolly, glabrescent, abaxially densely grayish woolly, base attenuate, margin serrulate, apex acute; lateral veins 3–4 on each side of midrib. Cymes axillary; peduncle 12–14 cm, glabrous, rarely tomentose near base; bracts 3, ovate, 6–7 × 2.2–3 mm, outside glabrous. Pedicel 4–10 mm. Calyx 5-sect from base; segments lanceolate to oblong, 3–4 × ca. 1.2 mm, outside glabrous. Corolla red, ca. 9 mm, outside glabrous; tube ca. 5 mm; adaxial lip ca. 3.5 mm; abaxial lip ca. 4 mm, lobes ca. 4 mm wide. Filaments 5–6 mm, glabrous; anthers ca. 4 mm; staminodes 2, ca. 3 mm. Pistil glabrous; ovary ca. 5 mm. Style ca. 3 mm. Fruit unknown. Fl. Jul.

• Limestone. Guizhou (Libo Xian).

17. *Paraboea crassifolia* (Hemsley) B. L. Burtt, Notes Roy. Bot. Gard. Edinburgh 41: 427. 1984.

厚叶蛛毛苣苔 hou ye zhu mao ju tai

Boea crassifolia Hemsley in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 233. 1890; *Dorcoceras crassifolium* (Hemsley) Schlechter.

Herbs, rarely subshrubs, stemless or with stems to 15 cm, pannose, glabrescent. Leaves basal or crowded near stem apex, petiole (absent or) 0.5–2 cm; leaf blade spatulate, rarely lanceolate, obovate, or ovate, 3–16 × 1.5–7 cm, thick papery, adaxially grayish woolly, glabrescent, abaxially densely cobwebby-woolly to pannose, base attenuate to cuneate, margin crenate to dentate or subentire, often undulate, sometimes involute, apex rounded to acute; lateral veins 4–9 on each side of midrib. Cymes axillary; peduncle 3–12 cm, woolly to pannose, glabrescent; bracts 2, linear to subulate, 2–5 × ca. 0.5 mm, outside woolly. Pedicel 0.5–1.5 cm. Calyx 2–3 mm, 5-sect from near base; segments narrowly triangular to linear, 1–2.5 × ca. 0.5 mm, outside puberulent. Corolla purplish, 1–1.4 cm, outside glabrous; tube 6–7 mm; adaxial lip ca. 4 mm, lobes 3–4 × ca. 5 mm; abaxial lip ca. 6 mm, lobes 3–5 × 4–6 mm. Filaments 3–7 mm, glabrous; anthers 2.5–3 mm;

staminodes 2, 2–2.5 mm. Pistil glabrous; ovary 3–4 mm. Style 5.5–6 mm. Capsule spirally twisted, 2–4.5 cm, glabrous. Fl. Mar–Jul, fr. Sep.

• Stony cliffs; 700–3200 m. Guizhou, W Hubei, SE Sichuan, Yunnan.

18. *Paraboea hainanensis* (W. Y. Chun) B. L. Burt, Notes Roy. Bot. Gard. Edinburgh 41: 429. 1984.

海南蛛毛苣苔 hai nan zhu mao ju tai

Boea hainanensis W. Y. Chun, Fl. Hainan. 3: 588. 1974.

Herbs, stemless or with stems to 5 cm, pannose, glabrescent. Leaves basal or crowded near stem apex; petiole to 1.5 cm; leaf blade oblanceolate to obovate, 5–18 × 1.2–6 cm, leathery, adaxially glabrous to glabrescent, abaxially brown cobwebby-woolly, base attenuate to cuneate, margin crenulate to serrate, often

involute, apex rounded to acute; lateral veins 5–9 on each side of midrib. Cymes axillary; peduncle 12–30 cm, brown woolly, glabrescent; bracts 2(or 3), narrowly lanceolate to lanceolate, 3–10 × 0.5–1 mm, outside brown woolly. Pedicel 1–4 cm. Calyx 5-sect from base; segments lanceolate to ovate, 1.5–2 × ca. 0.5 mm, outside glandular puberulent to pubescent. Corolla bluish to deep purple, 0.8–1.2 cm, outside glandular puberulent; tube ca. 4 mm; adaxial lip lobes ca. 6 × 5 mm; abaxial lip ca. 1 cm, abaxial lip lobes 4–6 × ca. 5 mm. Filaments 4–6 mm, glabrous; anthers 2–3 mm; staminodes apparently absent or 1, minute. Ovary ca. 4 mm, puberulent. Style ca. 5 mm, glabrous. Capsule spirally twisted, 3–4.5 cm, glabrous. Fl. and fr. Jul–Sep.

• Shady and damp rocks under mixed forest; ca. 800 m. Hainan.

41. **BOEA** Commerson ex Lamarck, Encyl. Méth., Bot. 1: 401. 1785.

旋蒴苣苔属 xuan shuo ju tai shuo

Dorcoceras Bunge.

Herbs, perennial, epipetric or terrestrial, rhizomatous, stemless [or stemmed]. Leaves few to many, along stem, then opposite, sometimes spirally arranged or basal (in China), equal to subequal in a pair; leaf blade villous to puberulent, hairs unicellular, long, seldom short or glandular, base attenuate to cordate. Inflorescences lax, axillary, sometimes umbel-like, 1- to many-flowered cymes; bracts 2, opposite. Calyx actinomorphic, 5-sect from near base, rarely 5-lobed from middle; segments equal to slightly unequal. Corolla white, blue, or purple, zygomorphic, inside densely puberulent or glandular puberulent to glabrous, outside campanulate to broadly campanulate, not swollen, longer than to nearly equalling limb, 4–10 mm in diam.; limb distinctly or indistinctly 2-lipped; adaxial lip 2-lobed, shorter than abaxial lip; abaxial lip 3-lobed, lobes equal or subequal, apex rounded. Stamens 2, adnate to abaxial side of corolla tube near base, included; anthers dorsifixed, coherent, thecae divaricate, confluent at apex, dehiscing longitudinally from arcuate slits; connective not projecting; staminodes 2 or 3, adnate to adaxial side of corolla tube. Disc inconspicuous. Ovary oblong, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigma 1, terminal, capitate, undivided. Capsule straight in relation to pedicel, narrowly oblong, much surpassing calyx, dehiscing loculicidally to base; valves 2, spirally twisted. Seeds unappendaged.

About 20 species: Australia, China, E India, Malaysia, Myanmar, Philippines, Polynesia, Vietnam; three species in China.

1a. Corolla 1.4–2.2 cm; calyx 5-lobed from middle, 6–9 mm; petiole to 10 cm 3. *B. clarkeana*

1b. Corolla 0.7–1.3 cm; calyx 5-sect from near base, 1.5–3 mm; petiole to 1 cm.

2a. Leaf venation pinnate, distinct midrib; blade obovate to narrowly elliptic-spatulate or rhombic,

1.5–5(–8) × 1–2(–3) cm, base attenuate to cuneate; corolla purplish to dark red or white 1. *B. philippensis*

2b. Leaf venation palmate, midrib indistinct; blade suborbicular to ovate, 0.7–7 × 0.5–5.5 cm, base

cuneate to

truncate; corolla blue-purple or blue to white or pink 2. *B. hygrometrica*

1. *Boea philippensis* C. B. Clarke in A. & C. de Candolle, Monogr. Phan. 5: 146. 1883.

地胆旋蒴苣苔 di dan xuan shuo ju tai

Boea elephantopoides W. Y. Chun; *Dorcoceras philippense* (C. B. Clarke) Schlechter.

Petiole to 1 cm; leaf blade obovate to narrowly elliptic-spatulate or rhombic, 1.5–5(–8) × 1–2(–3) cm, adaxially grayish villous to pubescent, abaxially densely villous, base attenuate to cuneate, margin subentire to irregularly serrate or crenate-serrate, apex acute to rounded; venation pinnate, lateral veins 3 or 4

on each side of midrib. Peduncle (4–)6–13 cm, sparsely villous to glandular puberulent; bracts narrowly oblong, 1.5–3.5 mm. Calyx 5-sect from near base; segments narrowly lanceolate, 1.5–2.5 × ca. 0.5 mm, outside sparsely glandular pubescent, inside sparsely puberulent. Corolla purplish to dark red or white, 7–10 mm, outside puberulent, inside glabrous; tube ca. 5 × 4–6 mm; adaxial lip lobes 2–3 mm; abaxial lip lobes 2.5–5 mm. Filaments 1–1.5 mm, glabrous; staminodes 2. Pistil ca. 6 mm; ovary 3–4 mm; glandular puberulent. Style glabrous. Capsule 2–3.5 cm. Fl. May–Jun, fr. May–Jul.

Shady and damp rocks in forests; 100–800 m. Guangdong, Guangxi, Guizhou, Hainan, Hunan [Philippines, Vietnam].

2. *Boea hygrometrica* (Bunge) R. Brown, On *Cyrtandrea* 120. 1839.

旋蒴苣苔 *xuan shuo ju tai*

Dorcoceras hygrometrica Bunge, Enum. Pl. China Bor. 54. 1833.

Petiole to 0.5 cm; leaf blade suborbicular to ovate, 0.7–7 × 0.5–5.5 cm, adaxially white villous to sparsely villous, abaxially densely white to brownish woolly, base cuneate to truncate, margin denticulate or dentate to crenulate, apex rounded to obtuse; venation palmate, nearly parallel, veins 3–9. Peduncle (1–)4–12 cm, puberulent to pubescent; bracts linear to lanceolate, ca. 1–3 mm. Calyx 5-sect from near base; segments narrowly triangular to narrowly lanceolate, 1.5–3 × 0.6–1 mm, outside puberulent, inside glandular puberulent. Corolla blue-purple or blue to white or pink, 0.8–1.3 cm, outside sparsely puberulent, inside sparsely to densely glandular puberulent, especially near base; tube ca. 5 × 6 mm; adaxial lip lobes ca. 4 mm; abaxial lip lobes 5–6 mm. Filaments ca. 1 mm, glabrous to puberulent; staminodes 3. Pistil 7–10 mm; ovary 3–5 mm; pubescent to puberulent. Style glabrous. Capsule 1.1–3.5(–5) cm. Fl. Apr–Aug, fr. Apr–Sep.

• Rocks in valleys, slopes, forests; 100–1500 m. Anhui, Fujian, N Guangdong, Guangxi, Hebei, Henan, Hubei, Hunan, Jiangxi, SW Liaoning, Shaanxi, Shandong, Shanxi, Sichuan, Yunnan, Zhejiang.

42. ORNITHOBOEA Parish ex C. B. Clarke in A. & C. de Candolle, Monogr. Phan. 5: 147. 1883.

喜鹊苣苔属 *xi que ju tai shu*

Brachiostemon Handel-Mazzetti; *Sinoboea* W. Y. Chun.

Herbs, perennial, epipetric or terrestrial, rhizomatous. Stems simple or branched. Leaves few, along stem, opposite, equal to unequal in a pair; leaf blade puberulent to woolly, base rounded to cordate. Inflorescences lax, axillary, few- to many-flowered cymes; bracts 2, opposite. Calyx actinomorphic, 5-sect from base or near base; segments equal. Corolla blue to purplish, zygomorphic, inside bearded, outside oblique, campanulate, not swollen, shorter than limb, 2.2–8 mm in diam.; limb 2-lipped; adaxial lip 2-lobed; usually shorter than or occasionally equalling abaxial lip; abaxial lip 3-lobed, lobes equal or subequal, apex rounded. Stamens 2, adnate to abaxial side of corolla tube near base, included; anthers dorsifixed, coherent, thecae divaricate, confluent at apex, dehiscing longitudinally from straight or arcuate slits; connective not projecting; staminodes 2(or 3), adnate to adaxial side of corolla tube. Disc inconspicuous or ringlike. Ovary ovoid to ovoid-conical, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigma 1, terminal, capitate, undivided. Capsule straight in relation to pedicel, narrowly oblong, slightly to 2 × longer than calyx, dehiscing loculicidally to base; valves 2 or 4, spirally twisted. Seeds unappendaged.

About 11 species: China, Malaysia, E Myanmar, Thailand, Vietnam; five species in China.

1a. Filaments forked toward apex, 1 branch with fertile anther, other with a thick yellow knob; calyx segments spreading; bracts 4–7 mm.

2a. Calyx 7–14 mm, pubescent to villous outside; staminodes 2; corolla abaxial lip lobes oblong; peduncle and pedicel villous 4. *O. wildeana*

2b. Calyx 6–8 mm, puberulent outside; staminodes 3; corolla abaxial lip lobes triangular; peduncle and pedicel densely pubescent 5. *O. calcicola*

1b. Filaments simple; calyx segments reflexed; bracts inconspicuous or 2–4 mm.

3. *Boea clarkeana* Hemsley in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 232. 1890.

大花旋蒴苣苔 *da hua xuan shuo ju tai*

Boea densihispidula S. B. Zhou & X. H. Guo; *B. mairei* H. Lévillé; *Streptocarpus clarkeanus* (Hemsley) Hilliard & Burtt.

Petiole to 10 cm; leaf blade ovate to broadly ovate, elliptic, or obovate, 2–10 × 1.4–7 cm, white to gray or yellowish appressed pubescent, base often oblique, broadly cuneate to cordate, margin crenate to serrate, apex acute to rounded; venation pinnate, lateral veins 5–7 on each side of midrib. Peduncle 3–18 cm, grayish puberulent to pubescent; bracts broadly ovate to narrowly ovate, 4–9 mm. Calyx 6–9 mm, 5-lobed from middle; lobes triangular or oblong to ovate-oblong, 3–4 × 2–2.5 mm, outside puberulent, inside glabrescent to puberulent and glandular puberulent. Corolla white to blue or blue-purple, 1.4–2.2 cm, outside glabrescent to densely pubescent to short villous, inside glandular puberulent to glabrescent; tube 1–1.5 × 0.7–1 cm; adaxial lip lobes 3–5 mm; abaxial lip lobes 4–5 mm. Filaments ca. 7 mm, glabrous to glandular puberulent toward anther; staminodes 2 or 3. Pistil 0.9–1.6 cm; ovary 5–8 mm; brownish puberulent to glandular puberulent. Style glandular puberulent to glabrous. Capsule 1.8–4.5 cm. Fl. Jun–Aug, fr. Jun–Oct.

• Crevices of rocks on slopes; 500–3100 m. Anhui, Hubei, Hunan, Jiangxi, S Shaanxi, Sichuan, NW Yunnan, Zhejiang.

- 3a. Stem, abaxial leaf blade surface, and peduncle cobwebby-woolly; bracts inconspicuous; calyx segments 8–10 mm; staminodes 3 1. *O. arachnoidea*
- 3b. Stem, abaxial leaf blade surface, and peduncle puberulent or pubescent to villous; bracts 2–4 mm; calyx segments 3.5–6 mm; staminodes 2.
- 4a. Peduncle 1.8–7 cm; calyx segments 1–2 mm wide 2. *O. feddei*
- 4b. Peduncle 0.8–1.5 cm; calyx segments 2–2.5 mm wide 3. *O. henryi*

1. *Ornithoboea arachnoidea* (Diels) Craib, Notes Roy. Bot. Gard. Edinburgh 11: 251. 1919.

蛛毛喜鹊苣苔 *zhu mao xi que ju tai*

Boea arachnoidea Diels, Notes Roy. Bot. Gard. Edinburgh 5: 225. 1912; *Ornithoboea forrestii* Craib.

Stems 5–45 cm, cobwebby-woolly. Petiole 3–10 cm; leaf blade ovate to broadly ovate, seldom narrowly elliptic to oblong, 3.5–15 × 3.5–10 cm, adaxially puberulent, abaxially puberulent, villous to cobwebby-woolly along veins, margin serrate, apex acute to obtuse. Peduncle 2–4 cm, cobwebby-woolly; bracts inconspicuous. Pedicel 0.5–2.5 cm. Calyx segments reflexed, ovate to obovate or oblong ovate, 8–10 × 2.5–4 mm, outside woolly. Corolla blue to blue-purple, ca. 1.5 cm, densely purplish ciliate inside adaxial lip, purplish bearded on abaxial lip from central lobe to mouth; tube 4–5 × 5–6 mm; adaxial lip 3–4 mm, lobes ca. 1 mm; abaxial lip 0.9–1.1 cm, lobes oblong, 4–5 mm. Stamens ca. 4 mm, glabrous; filaments simple; staminodes 3, ca. 2 mm. Ovary ovoid, ca. 2.5 mm, densely woolly to pubescent. Style 6.5–7.5 mm, sparsely puberulent. Capsule 1.2–2 cm. Fl. Jul–Aug, fr. Jul–Oct.

Crevices of rocks or slopes; 1800–2000 m. W Yunnan [NW Thailand].

2. *Ornithoboea feddei* (H. Léveillé) B. L. Burt, Notes Roy. Bot. Gard. Edinburgh 22: 296. 1958.

贵州喜鹊苣苔 *gui zhou xi que ju tai*

Boea feddei H. Léveillé, Repert. Spec. Nov. Regni Veg. 9: 449. 1911; *B. darrisii* H. Léveillé; *Ornithoboea darrisii* (H. Léveillé) Craib; *Sinoboea microcarpa* W. Y. Chun.

Stems 10–40 cm, densely pubescent, glabrescent. Petiole 1.5–8.5 cm; leaf blade ovate to broadly ovate, 3–10 × 2–6 cm, adaxially pubescent or pubescent and puberulent, abaxially puberulent, pubescent along veins, margin dentate-serrate, apex obtuse to acuminate. Peduncle 1.8–7 cm, villous to puberulent; bracts 2–3 mm. Pedicel 7–9 mm. Calyx segments reflexed, lanceolate to oblong-lanceolate, 3.5–6 × 1–2 mm, outside puberulent. Corolla pale purple, 0.9–1.4 cm, inside bearded on abaxial lip; tube 4–5 × 2.2–4 mm; adaxial lip 2.5–3.5 mm, lobes 1.2–2 mm; abaxial lip 5–7 mm, lobes oblong, 2–4 mm. Stamens 2.5–3.5 mm; filaments simple, glandular puberulent near apex;

staminodes 2, ca. 1.2 mm. Ovary ovoid-conical, 1.2–4 mm; pubescent. Style 2.5–4 mm, puberulent. Capsule 8–10 mm. Fl. and fr. Sep.

• Dry cliff, in shade. SW Guizhou.

3. *Ornithoboea henryi* Craib, Bull. Misc. Inform. Kew 1913: 115. 1913.

喜鹊苣苔 *xi que ju tai*

Stems 3–20 cm, pubescent to villous. Petiole 3–10.5 cm; leaf blade ovate to broadly ovate, 4.5–11 × 3.5–9 cm, puberulent, abaxially villous to pubescent along veins, margin dentate-serrate, sometimes double, apex obtuse to acuminate. Peduncle 0.8–1.5 cm, villous to pubescent; bracts 2.5–4 mm. Pedicel 7–10 mm. Calyx segments reflexed, lanceolate to obovate, 4–6 × 2–2.5 mm, outside puberulent and pubescent. Corolla blue-purple, ca. 1 cm, inside bearded at mouth, white bearded on abaxial lip central lobe; tube 4–5 × 5–7 mm; adaxial lip 2.5–3 mm, lobes 1–2 mm; abaxial lip 5–7 mm, lobes oblong, ca. 3 mm. Stamens 2–5 mm; filaments simple, glandular puberulent near apex; staminodes 2, ca. 1.2 mm. Ovary ovoid-conical, 2–2.5 mm, densely pubescent. Style ca. 3 mm, puberulent. Capsule 0.8–1.6 cm. Fl. Aug.

• Rock crevices; 700–1400 m. S Yunnan.

4. *Ornithoboea wildeana* Craib, Bull. Misc. Inform. Kew 1916: 268. 1916.

滇桂喜鹊苣苔 *dian gui xi que ju tai*

Brachistemon macrocalyx Handel-Mazzetti.

Stems 20–40 cm, villous to pubescent. Petiole 2–11 cm; leaf blade ovate to broadly ovate, seldom obovate, 5–13 × 2.5–10 cm, sparsely pubescent, abaxially villous along veins, margin dentate-serrate, sometimes double, apex acuminate to acute. Peduncle 1.7–3.6 cm, villous; bracts 4–7 mm. Pedicel 0.9–2 cm. Calyx segments spreading, lanceolate to narrowly obovate, 0.7–1.4 cm × 2–3 mm, outside pubescent to villous. Corolla white, flushed purplish, 1.2–1.5 cm; tube 6–9 × 6–8 mm; adaxial lip ca. 6 mm, glabrous inside, lobes ca. 2 mm; abaxial lip 3–7 mm, yellowish bearded, lobes oblong, 2–3.5 mm. Stamens ca. 3 mm; filaments forked apically, glandular puberulent near apex; 1 branch with fertile anther, other with a thick yellow knob; staminodes 2, 1–2.5 mm. Ovary ovoid to broadly ovoid, 2–3 mm,

villous. Style 4–9 mm, puberulent. Capsule 1.5–1.8 cm. Fl. and fr. Jul–Sep.

Rocks at forest margins; 300–1300 m. SW Guangxi, S Yunnan [NW Thailand].

5. *Ornithoboea calcicola* C. Y. Wu ex H. W. Li, Bull. Bot. Res., Harbin 3(2): 42. 1983.

灰岩喜鹊苣苔 *hui yan xi que ju tai*

Stems to 60 cm, villous. Petiole 1–10.5 cm; leaf blade ovate to broadly ovate, 3.5–10 × 2–6.5 cm, adaxially sparsely villous, abaxially densely puberulent, villous along veins, margin dentate-serrate, apex acuminate. Peduncle ca. 2.5 cm, densely pubescent; bracts 4–7 mm.

Pedicel to 1.5 cm. Calyx segments spreading, lanceolate to narrowly ovate, 6–8 × ca. 3 mm, outside puberulent. Corolla blue-purple, ca. 1.4 cm, inside central lobe of abaxial lip densely bluish bearded; tube ca. 8 mm; adaxial lip ca. 6 mm, lobes ca. 1 mm; abaxial lip ca. 6 mm, lobes triangular, ca. 1.5 mm. Stamens ca. 3.5 mm; filaments forked apically, glandular puberulent near apex; 1 branch with fertile anther, other with a thick yellow knob; staminodes 3, ca. 2.5 mm. Ovary ovoid-conical, ca. 3 mm, densely villous to pilose. Style ca. 7 mm, pubescent. Capsule ca. 2 cm. Fl. and fr. Sep.

• Limestone; ca. 1000 m. S Yunnan (Mengla Xian).

43. **TRISEPALUM** C. B. Clarke in A. & C. de Candolle, Monogr. Phan. 5: 138. 1883.

唇萼苣苔属 *chun e ju tai shu*

Dichiloboea Stapf.

Herbs, perennial, seldom annual, epipetric or terrestrial, rhizomatous or not rhizomatous, stemmed or stemless. Leaves many, along stem and opposite, or basal, equal to subequal in a pair; leaf blade adaxially puberulent, adaxially densely woolly to pannose, hairs branched, base subcordate to cuneate. Inflorescences monochasial or pseudo-paniculate, lax or rarely dense, axillary and terminal, few- to many-flowered cymes; bracts 2, opposite. Calyx zygomorphic, 2-lipped; adaxial lip 3-lobed; abaxial lip 2-sect from base. Corolla white, pink, or purplish, zygomorphic, inside glabrous; tube oblique, campanulate, not swollen, longer than limb, 3.5–6 mm in diam.; limb slightly 2-lipped; adaxial lip 2-lobed, slightly shorter than abaxial lip; abaxial lip 3-lobed, lobes subequal, apex rounded. Stamens 2, adnate to abaxial side of corolla tube near base, included; anthers dorsifixed, coherent, thecae divaricate, confluent at apex, dehiscing transversely; connective not projecting; staminode 1, adnate to adaxial side of corolla tube. Disc ringlike. Ovary oblong, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigma 1, terminal, lingulate, undivided. Capsule straight in relation to pedicel, narrowly oblong to narrowly ovoid, ca. 2 × longer than calyx, dehiscing loculicidally to base; valves 4, spirally twisted. Seeds unappendaged.

About 13 species: China, Malaysia, Myanmar, Thailand; one species in China.

1. *Trisepalum birmanicum* (Craib) B. L. Burtt, Notes Roy. Bot. Gard. Edinburgh 41: 446. 1984.

唇萼苣苔 *chun e ju tai*

Boea birmanica Craib, Bull. Misc. Inform. Kew 1913: 114. 1913; *B. paniculata* Handel-Mazzetti (1925), not Ridley (1896); *Dichiloboea birmanica* (Craib) Stapf.

Perennials. Stems 15–50 cm, appressed woolly to pannose. Petiole 0.6–5(–6) cm; leaf blade ovate to elliptic, 2.5–5(–8.5) × 1.2–3(–6.5) cm, adaxially densely appressed puberulent, abaxially appressed woolly to pannose, margin serrulate to crenulate, apex acute; lateral veins 5–7 on each side of midrib. Peduncle 0.5–3.5(–6) cm, appressed woolly to pannose. Calyx 6–11 mm; adaxial lip lobes 0.7–2 × ca. 1 mm;

abaxial lip segments narrowly triangular, 5–10 × 1–2 mm, outside appressed woolly to pannose, inside glabrous. Corolla pinkish, seldom white, ca. 7–10 × 5–9 mm, outside glabrous; tube ca. 4–6 × 3.5–6 mm; lobes suborbicular, 2–4 mm. Filaments 1.5–2.5 mm; staminode 0.3–1 mm. Pistil 1–1.1 cm, glabrous. Style 3–6 mm. Capsule 1–2 cm. Fl. Sep, fr. Oct.

Rocks in thickets; 1000–1700 m. SW Sichuan (Yanyuan Xian), S Yunnan [Myanmar, Thailand].

Chlamydoboea connata Craib (Notes Roy. Bot. Gard. Edinburgh 10: 211. 1918) and *Paraboea connata* (Craib) C. Y. Wu ex H. W. Li (Fl. Yunnanica 5: 628. 1991) are probably synonyms of *Trisepalum birmanicum*; however, the type of *C. connata* has never been found (see Burtt, Notes Roy. Bot. Gard. Edinburgh 41: 448. 1984).

44. **RHABDOTHAMNOPSIS** Hemsley in Dunn, J. Linn. Soc., Bot. 35: 517. 1903.

长冠苣苔属 *chang guar ju tai shu*

Subshrubs, epipetric or terrestrial, not rhizomatous. Stems branched from base or simple. Leaves few to many, opposite, equal to subequal in a pair; leaf blade puberulent, base cuneate. Flowers solitary, axillary; bracts 2, opposite. Calyx actinomorphic, 5-sect from base; segments equal. Corolla purple to blue or white to pale yellow, zygomorphic, inside glabrous; tube campanulate-tubular, not swollen, longer than limb, 0.7–1.3 cm in diam.; limb 2-lipped; adaxial lip 2-lobed, slightly shorter than abaxial lip; abaxial lip 3-lobed, lobes subequal, apex rounded. Stamens 2, adnate to abaxial side of corolla tube near middle, included; anthers dorsifixed, coherent, thecae

divaricate, confluent at apex, dehiscing longitudinally; connective projecting slightly; staminodes 2, adnate to adaxial side of corolla tube. Disc ringlike. Ovary narrowly oblong, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigmas 2, unequal, subsemiorbicular to ligulate or ringlike, emarginate. Capsule straight in relation to pedicel, narrowly oblong to nearly linear, much surpassing calyx, dehiscing loculicidally to base; valves 2, spirally twisted. Seeds unappendaged.

• One species: endemic to China.

1. *Rhabdothamnopsis sinensis* Hemsley in Dunn, J. Linn. Soc., Bot. 35: 517. 1903.

长冠苣苔 *chang guan ju tai*

Boea cavaleriei H. Léveillé & Vaniot; *B. rubicunda* H. Léveillé; *Rhabdothamnopsis chinensis* (Franchet) Handel-Mazzetti; *R. chinensis* var. *ochroleuca* (W. W. Smith) Handel-Mazzetti; *R. limprichtiana* Lingelsheim & Borza; *R. sinensis* var. *ochroleuca* W.W. Smith; *Streptocarpus chinensis* Franchet.

Leaves sometimes crowded near stem apex; petiole subsessile to 9 mm; leaf blade narrowly elliptic to ovate or obovate, 1–4 × (0.5–)0.8–2.6 cm, puberulent, margin serrulate to crenulate, apex acute to rounded, rarely acuminate; lateral veins 3–5 on each side of midrib. Peduncle 0.8–2.8 cm, densely puberulent to pilose. Calyx segments narrowly lanceolate to narrow

triangular, 5–7 × 0.6–1 mm, outside puberulent. Corolla purple to blue or white to pale yellow, with purple stripes, 1.9–3.9 × 0.7–1.3 cm, outside puberulent; tube 1.3–3 cm; adaxial lip 2–6 mm, lobes suborbicular, 1.5–4 mm; abaxial lip 0.5–1.5 cm, lobes oblong to suborbicular, 4–8 mm. Filaments 3–10 mm, bearded; staminodes ca. 2.5 mm. Pistil 1.5–2.5 cm, glandular puberulent. Capsule (1–)1.5–2.5 cm. Fl. May–Aug, fr. Jun–Oct.

• Limestone in forests; 1600–4600 m. W Guizhou, W and SW Sichuan, C and N Yunnan.

Boea esquirolii H. Léveillé & Vaniot (Bull. Soc. Bot. France 53: 551. 1906) is probably a synonym of *Rhabdothamnopsis sinensis*; however, since the type has never been found, we cannot be sure of this placement.

45. ANNA Pellegrin, Bull. Soc. Bot. France 77: 46. 1930.

大苞苣苔属 *da bao ju tai shu*

Tumidinodus H. W. Li.

Subshrubs, epipetric or terrestrial, rhizomatous. Stems branched, branchlets sometimes angled. Leaves few, along stem, opposite, unequal in each pair; leaf blade puberulent to glabrescent, base narrowly cuneate to rounded. Inflorescences lax to dense, axillary, 2–8-flowered cymes; bracts 2, deciduous, opposite. Calyx actinomorphic, 5-sect from base; segments equal. Corolla white to yellowish, zygomorphic, inside with 2 arcuate projections abaxially; tube subtubular, gibbous abaxially near limb, longer than limb, 0.7–1.7 cm in diam.; limb 2-lipped; adaxial lip 2-lobed; usually shorter than abaxial lip; abaxial lip 3-lobed, lobes equal to unequal, apex rounded to obtuse. Stamens 4, adnate to corolla tube near middle, included; anthers basifixed, coherent in pairs, thecae slightly divergent, confluent at apex, dehiscing longitudinally; connective not projecting; staminode 1, adnate to adaxial side of corolla tube. Disc ringlike. Ovary linear, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigma 1, terminal, disclike, undivided. Capsule straight in relation to pedicel, linear, much longer than calyx, dehiscing loculicidally to base; valves 2, straight, not twisted. Seeds with 1 subulate appendage at each end.

Three species: China, N Vietnam; all three species in China.

According to the protologue, *Anna* has 2 stigmas. A specimen from Chapa (N Vietnam), the type locality of *A. submontana*, has persistent, entire, and disclike stigmas.

Tumidinodus H. W. Li was based on two specimens from SE Yunnan. An examination of the type (*Wang Shou-zheng* 879), as well as *Fang Ding* 25490 from Guangxi and a specimen from N Vietnam (collector unknown), reveal that they belong to *Anna submontana*.

1a. Leaf blade usually falcate, lanceolate, 4–13 × 1.1–4.5 cm, margin indistinctly denticulate; lateral veins 6–8 on each side of midrib; internodes 0.2–5 cm; petiole 0.7–2 cm; bracts and calyx white; seed appendages ca. 0.5 mm

..... 3. *A. ophiorrhizoides*
1b. Leaf blade asymmetric (at least slightly), elliptic to broadly ovate, 6.5–22 × 3.2–9.5 cm, subentire to shallowly serrate; lateral veins 8–15(–17) on each side of midrib; internodes 1–15 cm; petiole 0.7–5.5 cm; bracts and calyx red; seed appendages 0.1–0.2 mm.

2a. Peduncle (4–)8–15 cm, glabrescent; leaf blade glabrescent, veins abaxially often appressed puberulent; calyx segments narrowly obovate to oblanceolate, ca. 10 × 2–4.5 mm; corolla 3–4 cm; pistil ca. 1.5 cm 1. *A. submontana*

2b. Peduncle 1.2–2.2 cm, densely puberulent; leaf blade ± densely puberulent; calyx segments obovate, 10–12 × 4.5–6 mm; corolla 4.5–5.8 cm; pistil ca. 2.5 cm 2. *A. mollifolia*

1. *Anna submontana* Pellegrin, Bull. Soc. Bot. France 77: 46. 1930.

大苞苳苔 da bao ju tai

Tumidinodus purpureoruber H. W. Li.

Stems with internodes 1–15 cm. Petiole 1–4.5 cm; leaf blade asymmetric (at least slightly), elliptic to broadly ovate, 9–18 × 4.5–8 cm, glabrescent, abaxially often appressed puberulent along veins, margin subentire, apex acuminate; lateral veins 11–15(–17) on each side of midrib. Peduncle (4–)8–15 cm, glabrescent; bracts deciduous, red, ca. 1.2 × 1 cm. Calyx red; segments narrowly obovate to oblanceolate, ca. 10 × 2–4.5 mm, outside sparsely glandular puberulent, apex obtuse to rounded. Corolla white to pink, 3–4 cm, outside glabrous, 2.5–3.5 × 0.7–1 cm; adaxial lip lobes rounded, 5–6 mm; abaxial lip ca. 1 cm, lobes suborbicular, ca. 5 mm. Adaxial stamens 8–10 mm, abaxial ones 0.9–1.3 cm; staminode ca. 2 mm. Pistil ca. 1.5 cm, sparsely puberulent near apex, glabrous basally. Capsule 6–7 cm. Seed appendages ca. 0.2 mm. Fl. Jun–Oct, fr. Oct–Feb.

Limestone or in shady areas of forests; 900–1700 m. SW Guangxi, SE Yunnan [N Vietnam].

2. *Anna mollifolia* (W. T. Wang) W. T. Wang & K. Y. Pan in K. Y. Pan, Fl. Reipubl. Popularis Sin. 69: 487. 1990.

软叶大苞苳苔 ruan ye da bao ju tai

Lysionotus mollifolius W. T. Wang, Guihaia 3: 262. 1983.

Stems with internodes 1–8 cm. Petiole 0.7–5.5 cm; leaf blade asymmetric (at least slightly), elliptic to broadly ovate, 6.5–22 × 3.2–9.5 cm, puberulent to densely so, margin subentire to shallowly serrulate, apex acute to acuminate; lateral veins 8–14 on each side of midrib. Peduncle 1.2–2.2 cm, densely puberulent; bracts deciduous, red, ca. 1.2 × 1 cm. Calyx red; segments obovate, 1–1.2 cm × 4.5–6 mm, outside glabrescent,

apex acute to rounded. Corolla white, 4.5–5.8 cm, outside glabrescent, 3.5–4.5 × 1.5–1.7 cm; lobes suborbicular, ca. 7 mm. Adaxial stamens ca. 1.5 cm, abaxial ones ca. 1.8 cm; staminode ca. 0.6 mm. Pistil ca. 2.5 cm, glabrescent. Capsule 5.5–8 cm. Seed appendages 0.1–0.2 mm. Fl. Aug, fr. Sep.

• Rock crevices in limestone hills; 1100–1500 m. SW Guangxi (Napo Xian), SE Yunnan (Xichou Xian, Malipo Xian).

3. *Anna ophiorrhizoides* (Hemsley) B. L. Burtt & R. Davidson, Notes Roy. Bot. Gard. Edinburgh 21: 233. 1955.

白花大苞苳苔 bai hua da bao ju tai

Lysionotus ophiorrhizoides Hemsley in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 224. 1890;

Didissandra sinophiorrhizoides W. T. Wang;

Didymocarpus cavaleriei H. Léveillé (1911), not *D.*

cavaleriei (H. Léveillé & Vaniot) H. Léveillé (1906).

Stems with internodes 0.2–5 cm. Petiole 0.7–2 cm; leaf blade usually falcate, lanceolate, 4–13 × 1.1–4.5 cm, adaxially sparsely appressed puberulent, abaxially sparsely puberulent along veins, margin indistinctly denticulate, apex acuminate; lateral veins 6–8 on each side of midrib. Peduncle 1.5–4 cm, glabrous; bracts deciduous, white, ca. 1.5 × 1.3 cm. Calyx white; segments obovate to oblong, 0.9–1.2 cm × 3–6 mm, outside glandular pubescent to glabrous, apex rounded, rarely emarginate. Corolla white to yellowish, ca. 4–5 cm, outside puberulent to glabrous, 2.5–3.5 × 1–1.5 cm; adaxial lobes rounded, ca. 5 mm; abaxial lip 1.3–1.5 cm, lobes suborbicular, central lobe 8–10 mm, lateral lobes ca. 5 mm. Adaxial stamens ca. 1 cm, abaxial ones ca. 1.4 cm; staminode ca. 1.2 mm. Pistil 2.2–2.6 cm, glabrous to glandular puberulent. Capsule 6–8 cm. Seed appendages ca. 0.5 mm. Fl. Jul–Oct, fr. Oct.

• Grassy slopes, rock crevices in forests by streams; 900–1700 m. S Guizhou (Luodian Xian), W and SE Sichuan.

46. LOXOSTIGMA C. B. Clarke in A. & C. de Candolle, Monogr. Phan. 5: 59. 1883.

紫花苳苔属 zi hua ju tai shu

Herbs, perennial, epiphytic, epipetric, or terrestrial, rhizomatous. Stems simple or branched. Leaves few, spread along stem, rarely crowded near apex, opposite, unequal or subequal, rarely equal in a pair; leaf blade glabrous to pubescent or strigose, base cuneate to subcordate. Inflorescences lax, often dichotomously branched, axillary, 1- to many-flowered cymes; bracts 2, opposite. Calyx actinomorphic, 5-sect from base or near base; segments equal. Corolla white, yellowish, purple, or pinkish, often spotted within, zygomorphic, inside glabrous to subglabrous; tube broadly tubular, gibbous abaxially, 2–4 × longer than limb, 1–2 cm in diam.; limb 2-lipped; adaxial lip 2-lobed; at least slightly shorter than abaxial lip; abaxial lip 3-lobed, lobes equal or central lobe longer, apex rounded to obtuse. Stamens 4, adnate to corolla tube near base or near middle, included; anthers basifixed, coherent in pairs at apex, thecae subparallel, confluent or not at apex, dehiscing longitudinally; connective not projecting; staminode 1 or absent, adnate to adaxial side of corolla tube. Disc ringlike. Ovary oblong to linear, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigmas 2, equal, oblong to suborbicular, undivided. Capsule straight in relation to pedicel, narrowly oblong to linear, much longer than calyx, dehiscing loculicidally to base; valves 2, straight, not twisted. Seeds (when known) with 1 hairlike appendage at each end.

Seven species: Bhutan, China, India, Myanmar, Nepal, Sikkim, N Vietnam; all seven species in China.

1a. Leaf blade drying papery or thick papery; bract margin entire.

2a. Leaf blade drying thick papery, villous to hirsute, margin serrate; peduncle to 7.5 cm, densely villous and glandular pubescent; calyx segments 7–9 mm, margin shallowly dentate 3. *L. mekongense*

2b. Leaf blade drying papery, glabrous, except veins abaxially sparsely puberulent, margin entire to indistinctly denticulate or repand; peduncle 6–16 cm, sparsely puberulent; calyx segments 4.5–7 mm, margin entire.

3a. Leaf blade elliptic or nearly so; peduncle 6–13.5 cm; corolla white outside, purple inside, outside pubescent 4. *L. glabrifolium*

3b. Leaf blade ovate to ovate-oblong; peduncle 14–16 cm; corolla purple, outside sparsely puberulent

..... 5. *L. brevipetiolatum*

1b. Leaf blade drying herbaceous; bract margin entire to denticulate or serrate.

4a. Cymes branched 1–5 ×, 2–18-flowered; bracts broadly ovate to narrowly lanceolate, 3–10 × 1–8 mm, margin denticulate to repand or irregularly dentate; style glabrous.

5a. Corolla yellowish, purplish to brownish spotted inside, 3–4.2 cm; capsule 6.5–10 cm; bracts 3–6 ×

1–2.5 mm 1. *L. griffithii*

5b. Corolla white to lavender, purple spotted inside, 4.2–4.8 cm; capsule 5–6 cm; bracts 5–10 × 1.6–8 mm

..... 6. *L. fimbrisepalum*

4b. Cymes unbranched to branched 3 ×, 1–7-flowered; bracts linear to ovate-lanceolate, 1–4 × 0.5–1.5 mm, margin entire or serrulate; style densely puberulent to pubescent or glandular pubescent.

6b. Ovary densely puberulent; leaf blade 2–16 × 1–7.5 cm; bracts linear, 1–2 × ca. 0.5 mm; bract and calyx

margin entire; pedicel 0.8–1.7 cm 2. *L. cavaleriei*

6a. Ovary glabrous; leaf blade 4.5–9.5 × 1.5–4 cm; bracts ovate-lanceolate, to 4 × 1.5 mm; bract and calyx

margin serrulate; pedicel ca. 0.6 cm 7. *L. musetorum*

1. *Loxostigma griffithii* (Wight) C. B. Clarke in A. & C. de Candolle, Monogr. Phan. 5: 60. 1883.

紫花苣苔 *zi hua ju tai*

Didymocarpus griffithii Wight, Ill. Ind. Bot. 2: 182.

1850; *Dichrotrichum griffithii* (Wight) C. B. Clarke.

Stems to 1 m, pubescent, glabrescent, branched. Leaves opposite, spread along stem, unequal to subequal in a pair; petiole 0.5–5 cm, puberulent; leaf blade elliptic to ovate or obovate, often oblique, 4–19 × 1.8–10.5 cm, adaxially sparsely appressed pubescent, abaxially sparsely puberulent to glabrescent, puberulent along veins, base oblique, cuneate to subcordate, margin serrate to crenate-serrulate, apex acuminate to acute.

Cymes branched 1–5 ×, 2–10-flowered; peduncle 2–13 cm, puberulent; bracts ovate to narrowly lanceolate, 3–6 × 1–2.5 mm, margin irregularly dentate. Pedicel 0.8–2 cm. Calyx 5-sect from near base; segments equal, narrowly lanceolate to broadly ovate or oblanceolate, 5–9 × 1.5–7 mm, margin denticulate to entire. Corolla yellowish, purplish to brownish spotted inside, 3–4.2 cm, outside sparsely glandular puberulent to pubescent, inside puberulent; tube 2.8–3 × 1.6–2 cm; adaxial lip lobes semiorbicular, 5–6 × ca. 5 mm; abaxial lip lobes oblong to ovate, 4–10 × 5–8 mm. Adaxial stamens ca. 1.4 cm, abaxial ones ca. 1.8 cm, glabrous; staminode ca.

1.5 mm. Pistil 1.9–3.1 cm, glabrous. Style 7–12 mm.

Capsule 6.5–10 cm. Seed appendages 1–2 mm. Fl. Sep–Dec, fr. Nov–Mar.

On trees or rocks in forests; 600–2600 m. Guangxi, Guizhou, SW Sichuan, Xizang (Medog Xian), SW and SE Yunnan [Bhutan, NE India, Myanmar, Nepal, N Vietnam].

2. *Loxostigma cavaleriei* (H. Léveillé & Vaniot) B. L. Burtt, Notes Roy. Bot. Gard. Edinburgh 22: 310. 1958.

滇黔紫花苣苔 *dian qian zi hua ju tai*

Didissandra cavaleriei H. Léveillé & Vaniot in H. Léveillé, Compt. Rend. Assoc. Franç. Avancem. Sci. 34: 425. 1906; *Briggsia cavaleriei* (H. Léveillé & Vaniot) Craib; *Didymocarpus cavaleriei* (H. Léveillé & Vaniot) H. Léveillé (1906), not *D. cavaleriei* H. Léveillé (1911).

Stems 7–30 cm, pubescent to puberulent, usually simple. Leaves opposite, spread along stem or crowded near apex, unequal to subequal in a pair; petiole 0.5–3(–4.2) cm, densely pubescent to puberulent; leaf blade narrowly elliptic to narrowly ovate or narrowly obovate, 2–16 × 1–7.5 cm, adaxially sparsely appressed puberulent, abaxially very sparsely puberulent, denser along veins, base oblique, cuneate to subcordate, margin serrate to crenulate, apex acuminate to acute. Cymes unbranched to branched 3 ×, 1–7-flowered;

peduncle 1.3–6 cm, glandular puberulent; bracts linear, 1–2 × ca. 0.5 mm, margin entire. Pedicel 0.8–1.7 cm. Calyx 5-sect from base to near base; segments equal, lanceolate to ovate, 5–6 × 1–2 mm, margin entire. Corolla pink to white, inside sometimes red, purple, or brown spotted, 3.5–4 cm, outside pubescent, inside subglabrous; tube 2.5–3 × 1.4–1.7 cm; adaxial lip lobes semiorbicular, ca. 4.5 mm; abaxial lip lobes obovate, 1–1.1 cm × 5–6 mm. Adaxial stamens ca. 1 cm, abaxial ones ca. 1.5 cm, glabrous; staminode ca. 3.5 mm. Pistil 1.2–2.5 cm, densely puberulent. Style ca. 5 mm. Capsule 3.8–6 cm. Seed appendages 0.4–1 mm. Fl. Jul–Sep, fr. Oct–Nov.

• On tree trunks in forests; 600–1600 m. Guangxi (Napo Xian, Rongshui Xian), S Guizhou, Yunnan (Xichou Xian).

According to Burtt & Lauener (Notes Roy. Bot. Gard. Edinburgh 38: 469. 1980), another possible synonym is *Lysionotus cavaleriei* H. Léveillé (1909), not H. Léveillé (1911). Unfortunately, its type has not been found (Burtt, pers. comm.).

3. *Loxostigma mekongense* (Franchet) B. L. Burtt, Notes Roy. Bot. Gard. Edinburgh 22: 310. 1958.

澜沧紫花苣苔 lan cang zi hua ju tai

Roettlera mekongensis Franchet, Bull. Mus. Hist. Nat. (Paris) 5: 252. 1899; *Loxostigma forrestii* J. Anthony. Stems to 60 cm, densely villous, usually simple. Leaves opposite, spread along stem, unequal in a pair; petiole 0.8–2.5 cm, villous; leaf blade ovate to broadly ovate, 4–15 × 2–7 cm, villous to hirsute, base oblique, broadly cuneate to cordate, margin serrate, apex acuminate to acute. Cymes branched 2–4 ×, 5–12-flowered; peduncle to 7.5 cm, densely villous and glandular pubescent; bracts ovate to narrowly oblong, 4–6 × 1.3–2 mm, margin entire. Pedicel 0.8–2 cm. Calyx 5-sect from base; segments equal, lanceolate, 7–9 × ca. 2 mm, margin shallowly dentate. Corolla white, flushed purple, 3.5–4 cm, outside glandular puberulent, inside glabrous; tube 1.8–2.8 × 1.4–1.7 cm; adaxial lip lobes semiorbicular, 2–5 × 2–4 mm; abaxial lip lobes oblong, 3–4 × ca. 4 mm. Adaxial stamens ca. 1.5 cm, abaxial ones ca. 1 cm, glabrous. Pistil 2–3 cm; ovary glabrescent. Style ca. 1 cm, pubescent to densely pubescent. Immature capsule to 5.5 cm. Fl. Jul, Oct, fr. Oct.

• Rocks or cliffs in valleys; ca. 2100 m. NW Yunnan.

4. *Loxostigma glabrifolium* D. Fang & K. Y. Pan ex W. T. Wang & K. Y. Pan, Bull. Bot. Res., Harbin 2(2): 140. 1982.

光萼紫花苣苔 guang e zi hua ju tai

Stems 10–22 cm, sparsely puberulent, glabrescent, simple, several borne from a node of rhizome. Leaves opposite, spread along stem, unequal to subequal in a pair; petiole 0.5–3 cm, sparsely pubescent; leaf blade elliptic or nearly so, 7–24.5 × 3–10.5 cm, glabrous, abaxially sparsely puberulent along veins, base oblique,

cuneate to slightly rounded, margin entire to indistinctly denticulate, apex acuminate. Cymes branched 2–5 ×, 3–10-flowered; peduncle 6–13.5 cm, sparsely puberulent; bracts lanceolate to oblong, 2–5 × 0.6–1.5 mm, margin entire. Pedicel 0.5–2.5 cm. Calyx 5-sect from near base; segments equal, lanceolate to triangular, 5–7 × 1–2 mm, margin entire. Corolla white, inside purple, 2.5–4 cm, outside pubescent, inside glabrous; tube 2.2–3.5 × 1.3–1.7 cm; adaxial lip lobes semiorbicular, 5–6 × 5–6 mm; abaxial lip ca. 7 mm, lobes semiorbicular, 5–6 × 7–10 mm. Adaxial stamens ca. 8 mm, abaxial ones ca. 1 cm, glabrous; staminode ca. 0.5 mm. Pistil 2–2.1 cm; ovary densely puberulent to glandular pubescent. Style ca. 1.2 mm, minutely pilose to densely glandular pubescent. Capsule 7.5–8 cm. Seed appendages 0.4–0.5 mm. Fl. Oct.

• Trees, limestone cliffs; ca. 1200 m. SW Guangxi (Napo Xian), Guizhou (Zhenfeng Xian), SE Yunnan (Hekou Xian).

5. *Loxostigma brevipetiolatum* W. T. Wang & K. Y. Pan, Bull. Bot. Res., Harbin 2(2): 142. 1982.

短柄紫花苣苔 duan bing zi hua ju tai

Stems ca. 45 cm, sparsely puberulent, subglabrescent, sometimes branched. Leaves opposite, spread along stem, subequal in a pair; petiole 0.5–2.5 cm, sparsely puberulent; leaf blade ovate to ovate-oblong, 9–17 × 4–7.2 cm, glabrous, abaxially sparsely puberulent along veins, base oblique, rounded to cuneate, margin repand, apex acuminate. Cymes branched 2–5 ×, ca. 10-flowered; peduncle 14–16 cm, sparsely puberulent; bracts lanceolate to ovate, 3–4 × 1.5–1.8 mm, margin entire. Pedicel 1.6–2 cm. Calyx 5-sect from near base; segments equal, lanceolate, 4.5–6 × ca. 2 mm, margin entire. Corolla purple, ca. 3.3 cm, outside sparsely puberulent, inside glabrous; tube 1.8–2 × 1–1.7 cm; adaxial lip lobes semiorbicular, 4–5 × ca. 5 mm; abaxial lip ca. 1.5 cm, central lobe broadly ovate, ca. 8 × 10 mm, lateral ones ovate, 6–7 × ca. 8 mm. Adaxial stamens ca. 1 cm, abaxial ones ca. 1.3 cm, glabrous; staminode ca. 2 mm. Pistil ca. 1.6 cm; ovary densely puberulent. Style ca. 1 cm, sparsely puberulent. Fruit unknown. Fl. Nov.

• Mixed forest; 1200–1500 m. Guangxi (Bose Xian), SE Yunnan.

6. *Loxostigma fimbrisepalum* K. Y. Pan in W. T. Wang & K. Y. Pan, Bull. Bot. Res., Harbin 2(2): 143. 1982.

齿萼紫花苣苔 chi e zi hua ju tai

Stems 60–100 cm, sparsely puberulent, glabrescent, usually simple. Leaves opposite, spread along stem, unequal to subequal in a pair; petiole 0.5–4 cm, sparsely pubescent; leaf blade ovate to broadly elliptic, 8–19 × 3.2–8 cm, adaxially sparsely appressed puberulent, abaxially glabrous to sparsely appressed

puberulent, base oblique, cuneate to slightly rounded, margin repand to serrulate, apex acuminate. Cymes branched 2–5 ×, 5–18-flowered; peduncle 5–18 cm, sparsely puberulent, glabrescent; bracts ovate to broadly ovate, 5–10 × 1.6–8 mm, margin denticulate to repand. Pedicel 1–2 cm. Calyx 5-sect from near base; segments equal, ovate to broadly triangular, 6–8 × 3–5 mm, margin denticulate to entire. Corolla white to lavender, purple spotted inside, 4.2–4.8 cm, outside sparsely pubescent, inside glabrous; tube 3–3.5 × 1.5–2 cm; adaxial lip ca. 6 mm, lobes semiorbicular, 4–5 × 4–5 mm; abaxial lip 1–1.2 cm, lobes semiorbicular, 4–5 × 6–7 mm. Adaxial stamens ca. 1.7 cm, abaxial ones ca. 2.5 cm, glabrous; staminode ca. 2 mm. Pistil 2.2–2.5 cm, glabrous. Style 1.1–1.3 cm. Capsule 5–6 cm. Seed appendages 1.1–1.2 mm. Fl. Sep–Nov.

• Rock crevices, on limestone, or epiphytic in forests; 900–1600 m. Guangxi (Bose Xian), SE Yunnan.

7. *Loxostigma musetorum* H. W. Li, Bull. Bot. Res., Harbin 3(2): 3. 1983.

蕉林紫花苣苔 jiao lin zi hua ju tai

Stems 20–30 cm, densely puberulent, simple. Leaves opposite, spread along stem, unequal to subequal in a pair; petiole 0.5–2 cm, densely puberulent; leaf blade narrowly ovate to ovate, 4.5–9.5 × 1.5–4 cm, adaxially pubescent, abaxially glabrescent except puberulent veins, base oblique, cuneate to rounded, margin serrate, apex acuminate. Cymes unbranched to branched 2 ×, 1–4-flowered; peduncle to 4.5 cm, densely puberulent; bracts ovate-lanceolate, to 4 × 1.5 mm, margin serrulate. Pedicel ca. 0.6 cm. Calyx 5-sect from near base; segments equal, ovate-lanceolate, ca. 7 × 4 mm, margin serrulate. Corolla white, purple spotted inside, ca. 3 cm, outside densely glandular puberulent, inside glabrous; tube ca. 2 × 1.2 cm. Adaxial stamens ca. 9 mm, abaxial ones ca. 1 cm, glabrous; staminode ca. 3 mm. Pistil ca. 1.5 cm; ovary glabrous. Style 6–7 mm, puberulent to pubescent. Fruit unknown. Fl. Oct.

• *Musa* thickets; ca. 1300 m. SE Yunnan (Maguan Xian).

47. AESCHYNANTHUS Jack, Trans. Linn. Soc. London 14: 42. 1823 (1825).

芒毛苣苔属 mang mao ju tai shu

Trichosporum D. Don.

Shrubs or climbers, epiphytic or epipetric, not rhizomatous. Stems often pendent, branched or unbranched. Leaves usually many, along stem, opposite, sometimes whorled, equal to subequal in a pair; leaf blade glabrous, rarely puberulent or pubescent, base cuneate to rounded or attenuate. Inflorescences umbel-like, lax or sometimes dense, axillary or pseudoterminal, 1–10-flowered cymes; bracts 2, opposite. Calyx actinomorphic, 5-sect from base to 5-lobed; segments equal, rarely unequal. Corolla red to orange, seldom greenish, yellow, or white, zygomorphic, inside sparsely puberulent, sparsely glandular puberulent, glabrous, or with a hair ring; tube narrowly tubular to funnellform-tubular, often curved, not swollen, much longer than limb, 0.4–1.5 cm in diam.; limb indistinctly or distinctly 2-lipped; adaxial lip 2-lobed; usually equalling, occasionally to 1/2 × length of abaxial lip; abaxial lip 3-lobed, lobes equal or subequal, apex rounded to acute. Stamens 4, adnate to corolla tube near or above middle, usually exserted; anthers basifixed, usually coherent in pairs at apex, thecae parallel, not confluent, dehiscing longitudinally; connective not projecting; staminode 1 or absent, adnate to adaxial side of corolla tube. Disc ringlike. Ovary linear, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigma 1, terminal, capitate to depressed-globose, undivided. Capsule straight in relation to pedicel, linear, much longer than calyx, dehiscing loculicidally to base; valves 2 or 4, straight, not twisted. Seeds with 1(or 2–50) hairlike appendages, opposite end with 1 hairlike appendage, seldom 1 linear appendage at each end.

About 140 species: Asia, Pacific Islands; 34 species in China.

The flowers of *Aeschynanthus* are strongly protandrous. Consequently, the length of filaments and pistil will vary greatly during the duration of an individual flower. The measurements included in this treatment do not always reflect this variability, and diagnostic use of these characters should be avoided.

1a. Corolla inside with 5 tufts of hairs above base; seeds with 25–50 hairlike appendages at hilar end (unknown in *A. sinolongicalyx*).

2a. Calyx 3–3.3 cm; corolla 2.4–2.8 cm; stems to 5 m 34. *A. sinolongicalyx*

2b. Calyx to 1.5 cm; corolla 1.8–2 cm; stems to 40 cm.

3a. Calyx and corolla glabrous outside; calyx segments ca. 15 mm; corolla yellow-green; seeds with ca. 25 hairlike appendages at hilar end; leaves always opposite; leaf blade with adaxial surface drying wrinkled

..... 32. *A. longicaulis*

3b. Calyx glandular puberulent outside, ca. 5 mm; corolla red, sparsely puberulent outside; seeds with ca. 50

- hairlike appendages at hilar end; leaves opposite or in whorls of 3; leaf blade with adaxial surface drying nearly smooth 33. *A. poilanei*
- 1b. Corolla inside glabrous to pubescent or glandular, without tufts of hairs (unknown in *A. maculatus*); seeds with
 1 or 2 hairlike or linear appendages at hilar end (unknown in *A. angustoblongus*, *A. angustissimus*, *A. dolichanthus*,
A. lancilimbus, *A. lasianthus*, *A. lasiocalyx*, *A. medogensis*, *A. pachytrichus*, *A. planipetiolatus*, and *A. tubulosus*).
- 4a. Leaf blade puberulent to pubescent at least on one surface, often glabrescent.
- 5a. Leaf blades drying papery, margin often 1- or 2-denticulate near apex, abaxially rust-brown pubescent;
 stems 20–50 cm; pedicel ca. 3 mm; corolla yellow to white; anthers of 4 stamens coherent at apex,
 ca. 3 mm 22. *A. denticuliger*
- 5b. Leaf blades drying leathery, margin entire, abaxially puberulent; stems to 30 cm; pedicel 4–10 mm;
 corolla red, often with yellow spots on central abaxial lip lobe; anthers coherent in pairs, 1–2 mm.
- 6a. Stems puberulent to glabrescent; petiole to 2 mm; leaf blade adaxially drying or wrinkled.
- 7a. Leaf blade adaxially glabrous, base attenuate to broadly cuneate; cymes pseudoterminal;
 calyx 5-lobed from near or above middle, segments 2–2.5 mm; corolla inside with short, thick hairs near base, adaxial lip nearly erect; staminode ca. 1 mm; capsule 4.5–6 cm;
 seed appendages 6–10 mm 17. *A. humilis*
- 7b. Leaf blade adaxially puberulent, glabrescent, base cuneate to rounded; cymes axillary;
 calyx 5-sect from base, segments ca. 4 mm; corolla inside glabrous, adaxial lip reflexed;
 staminode ca. 6.5 mm; capsule 9–12 cm; seed appendages 15–20 mm 20. *A. gracilis*
- 6b. Stems densely spreading hispid, sometimes glabrescent; petiole 1–15 mm; leaf blade adaxially drying smooth.
- 8a. Leaves mostly clustered near stem apex; petiole 1–(–8) mm; leaf blade obovate to oblong obovate
 or elliptic, base attenuate to cuneate; cymes pseudoterminal, 2–5-flowered; calyx glabrous outside; corolla 1.7–2 cm, inside puberulent basally; capsule 6–8 cm ... 18. *A. andersonii*
- 8b. Leaves in whorls of 3; petiole 10–15 mm; leaf blade narrowly ovate to ovate, base rounded;
 cymes axillary, 1-flowered; calyx sparsely puberulent outside; corolla ca. 2.9 cm, inside glabrous; capsule ca. 12 cm 19. *A. mengxingensis*
- 4b. Leaf blade glabrous.
- 9a. Stems pubescent, sericeous, or glandular at least near branch apices.
- 10a. Leaf blade 0.7–2 cm, apex acute to rounded; stems glabrous, glandular near apex; leaves opposite or in whorls of 3; corolla mouth oblique, limb distinctly 2-lipped, adaxial lip ca. 1/2 × length of abaxial lip
 21. *A. buxifolius*
- 10b. Leaf blade 2.9–12.2 cm, apex attenuate to acute; stems pubescent or sericeous, often glabrescent;
 leaves opposite; corolla mouth not oblique, limb indistinctly 2-lipped, lips nearly equal.
- 11a. Stems rust-brown pubescent; petiole 2–3 mm; leaf blade linear to narrowly oblanceolate, 0.4–0.7 cm wide, base attenuate; peduncle 5.2–10 cm; calyx lobes 3.2–4.5 mm wide; corolla glabrous outside 8. *A. angustissimus*
- 11b. Stems brown-sericeous, glabrescent; petiole 3.5–10 mm; leaf blade narrowly ovate to ovate or elliptic, 1.4–2.9 cm wide, base cuneate to rounded; peduncle absent; calyx lobes 0.6–2 mm
 wide; corolla pilose outside 15. *A. lasianthus*
- 9b. Stems glabrous even when young.
- 12a. Calyx (3–)5-lobed, tube at least 2 mm.
- 13a. Leaf blade 4–6.3 cm, abaxially sparsely punctate; calyx tube ca. 2 mm in diam. at mouth; ovary puberulent 10. *A. lancilimbus*

- 13b. Leaf blade 5–23 cm, abaxially not punctate; calyx tube 3–8 mm in diam. at mouth; ovary glabrous.
- 14a. Calyx lobes 5–9 mm; leaf blade papery; lateral veins distinct 24. *A. dolichanthus*
- 14b. Calyx lobes 1–5(–7) mm; leaf blade papery to thick leathery; lateral veins indistinct or invisible.
- 15a. Pedicels and outer calyx surface puberulent or glandular puberulent; calyx 4–7 mm.
- 16a. Leaf blade nearly linear to narrowly oblanceolate or narrowly elliptic, 0.8–2(–3) cm wide, base attenuate, adaxially drying wrinkled; stems ca. 100 cm 31. *A. tengchungensis*
- 16b. Leaf blade narrowly elliptic or oblong to oblanceolate-oblong, 1.8–4.5 cm wide, base cuneate, adaxially drying smooth or nearly smooth; stems ca. 30 cm.
- 17a. Corolla ca. 5.8 cm; leaf blade 7–9 × 1.8–3.3 cm, papery to thin leathery; petiole 5–9 mm; pedicel ca. 12 mm; calyx ca. 7 mm, lobes 3.2–5 mm; style puberulent 25. *A. lasiocalyx*
- 17b. Corolla ca. 3 cm; leaf blade 11–13 × 2.8–4.5 cm, thick leathery; petiole 9–15 mm; pedicel 4–5 mm; calyx ca. 4 mm, lobes 1.5–1.8 mm; style glabrous 26. *A. medogensis*
- 15b. Pedicels glabrous; calyx 9–15 mm.
- 18a. Corolla 2–3 cm; calyx red-purple or tinged red-purple.
- 19a. Leaf blade 2.3–4 cm wide, base broadly cuneate, apex acuminate; bracts 5–9 mm 29. *A. hookeri*
- 19b. Leaf blade 1–2.5 cm wide, base attenuate, apex caudate or caudate-acuminate; bracts ca. 3 mm 30. *A. maculatus*
- 18b. Corolla 4–5.5 cm; calyx green.
- 20a. Calyx 9–10 mm; corolla abaxial lip ca. 1 cm, inside with subulate and triangular hairs basally; staminode ca. 0.5 mm; style ca. 3.2 cm; leaf blade papery to thin leathery; cymes 2–4-flowered 28. *A. pachytrichus*
- 20b. Calyx 12–15 mm; corolla abaxial lip 5–6 mm, inside puberulent below middle or sparsely pubescent basally; staminode 5–6 mm; style 1–1.8 cm; leaf blade leathery; cymes 2–11-flowered.
- 21a. Leaf blade adaxial surface drying smooth; bracts deciduous; corolla mouth not oblique; anthers 1.2–2 mm; seeds with 1 hairlike appendage at hilar end 16. *A. macranthus*
- 21b. Leaf blade adaxial surface drying wrinkled; bracts persistent; corolla mouth slightly oblique; anthers 3–4 mm; seeds with 2 hairlike appendages at hilar end 27. *A. mimetes*
- 12b. Calyx 5-sect from base, without tube.
- 22a. Leaf blade 10–20 × 4.4–10.5 cm; cymes 5–15-flowered; bracts persistent, 4–5.5 cm; calyx segments 2–3 cm; corolla 5.5–8.5 cm; capsule 32–52 cm 6. *A. superbus*
- 22b. Leaf blade 1.7–13 × 0.6–6.1 cm; cymes 1–7-flowered; bracts deciduous or persistent, 0.2–3 cm; calyx segments 0.2–1.9 cm; corolla 1.5–4.2 cm; capsule 3–29 cm (unknown in *A. planipetiolatus* and *A. angustiblonsus*).
- 23a. Bracts persistent, ovate to suborbicular; calyx segments ovate to ovate-oblong or obovate.
- 24a. Leaves 1.4–3(–5) cm wide; peduncle 0.8–3 cm; bracts and calyx reddish, bracts 3–9 × 4–10 mm; corolla 1.5–2.2 cm; anthers 1.5–2 mm; style glabrous; capsule 6.5–16 cm 1. *A. acuminatus*

- 24b. Leaves (1.8–)2.4–5.5 cm wide; peduncle (3.5–)7–14 cm; bracts and calyx green, bracts 6–10 × 4–5 mm; corolla 2.8–3 cm; anthers ca. 3 mm; style puberulent; capsule 12–29 cm 2. *A. moningeriae*
- 23b. Bracts persistent or deciduous, linear to ovate; calyx segments linear to lanceolate, linear-oblongate, elliptic, or subulate.
- 25a. Leaf blade to 3 cm; capsule 3–3.5 cm 11. *A. tubulosus*
- 25b. Leaf blade 1.8–13 cm; capsule 5–26 cm (unknown in *A. angustiblougus* and *A. planipetiolatus*).
- 26a. Bracts persistent, rarely deciduous, red to purple, 10–30 mm; calyx red, 11–19 mm.
- 27a. Leaf blade broadly lanceolate to elliptic, ovate, or obovate, 1.5–6.1 cm wide, base cuneate to rounded or subcordate; bracts lanceolate to ovate, 15–30 × 6–14 mm; corolla glabrous inside; ovary glandular puberulent 5. *A. bracteatus*
- 27b. Leaf blade narrowly to broadly oblanceolate or rarely lanceolate, 0.6–2.5(–3.3) cm wide, base cuneate to attenuate; bracts lanceolate, 10–18 × 4–5(–8) mm; corolla inside sparsely glandular puberulent above; ovary glabrous 7. *A. linearifolius*
- 26b. Bracts deciduous, rarely persistent, green, 2–13 mm; calyx green, sometimes tinged reddish or reddish, 3–11 mm.
- 28a. Petiole 6–21 mm; leaf blade 5–12 cm; cymes 1–4-flowered.
- 29a. Bracts lanceolate to narrowly ovate, 6–13 mm; calyx segments 7–9 mm, outside glabrous; corolla outside glabrous, inside sparsely glandular puberulent below abaxial lip; capsule 7–10 cm; seed appendages 1 at each end, 1.5–2 mm; peduncle absent to 0.5(–1) cm; leaf blade margin entire to shallowly crenulate 4. *A. wardii*
- 29b. Bracts linear to lanceolate, ca. 6 mm; calyx segments 4–7 mm, outside glabrous to rust-brown pubescent; corolla outside sparsely puberulent, inside glabrous; capsule 15–25 cm; seed appendages 2 at hilar end, 8–12 mm, 1 at opposite end, 15–20 mm; peduncle absent; leaf blade margin entire 23. *A. lineatus*
- 28b. Petiole 2–10 mm; leaf blade (1.8–)3–7.4 cm; cymes 1–3-flowered.
- 30a. Pedicel 4–8 mm, sparsely puberulent; calyx outside puberulent to glabrous 14. *A. austroyunnanensis*
- 30b. Pedicel 5–22 mm, glabrous; calyx glabrous outside.
- 31a. Pedicel 10–22 mm; leaf blade base attenuate, papery; corolla puberulent outside 13. *A. angustiblougus*
- 31b. Pedicel 5–11 mm; leaf blade base cuneate to rounded, thick leathery to papery; corolla glabrous outside.
- 32a. Cymes 1–3-flowered; peduncle 2.2–5(–7) cm; corolla mouth slightly to strongly oblique; stems 60–100 cm 3. *A. stenosepalus*
- 32b. Cymes 1-flowered; without peduncle; corolla mouth not oblique; stems to 30 cm.
- 33a. Petiole 3–4 mm; leaf blade 1.4–2.5 cm wide, thin leathery; calyx segments 7.5–10 mm; style glabrous 9. *A. acuminatissimus*

1. *Aeschynanthus acuminatus* Wallich ex A. P. de Candolle, Prodr. 9: 263. 1845.

芒毛苣苔 mang mao ju tai

Aeschynanthus acuminatus var. *chinensis* (Gardner & Champion) C. B. Clarke; *A. chinensis* Gardner & Champion.

Stems 25–150 cm, glabrous. Leaves opposite; petiole 2–11 mm; leaf blade lanceolate to elliptic or narrowly oblanceolate, rarely oblong, 4.5–12 × 1.4–3(–5) cm, thin papery to leathery, glabrous, adaxially drying smooth, abaxially sparsely punctate, base cuneate to narrowly cuneate, margin entire to shallowly crenulate, apex acuminate; lateral veins indistinct. Cymes axillary or pseudoterminal, 1–3-flowered; peduncle 0.8–3 cm; bracts persistent, reddish, suborbicular, 3–9 × 4–10 mm. Pedicel 7–12 mm, glabrous. Calyx red, 5-sect from base; segments ovate to ovate-oblong or obovate, 2.5–5(–7) × 2–3 mm, outside glabrous. Corolla red, rarely greenish, 1.5–2.2 cm, outside glabrous, inside puberulent at base of abaxial lip, without tufts of hairs, mouth strongly oblique; limb distinctly 2-lipped; adaxial lip erect, ca. 4.5 mm; abaxial lip reflexed, ca. 5 mm. Stamens exserted; filaments 1.2–2.2 cm; anthers coherent in pairs at apex, 1.5–2 mm; staminode 1.2–2 mm. Pistil 1.6–2 cm; ovary glabrous. Style ca. 4 mm, glabrous. Capsule 6.5–16 cm. Seeds with 1 hairlike appendage at each end, appendages 1.5–4 mm. Fl. Oct–Mar, fr. Dec–May.

On trees, streamside rocks in forested valleys; 200–1900 m. Guangdong, Guangxi, Sichuan, Taiwan, SE Xizang, S and SE Yunnan [Bhutan, N India, Laos, Malaysia, Myanmar, Nepal, Thailand, N Vietnam].

2. *Aeschynanthus moningeriae* (Merrill) W. Y. Chun, Fl. Hainan. 3: 587. 1974.

红花芒毛苣苔 hong hua mang mao ju tai

Trichosporum moningeriae Merrill, Philipp. J. Sci. 19: 677. 1921.

Stems 1–2(–12) m, glabrous. Leaves opposite; petiole 3–16 mm; leaf blade narrowly elliptic to ovate or obovate, rarely oblong, 7–13 × (1.8–)2.4–5.5 cm, papery to thin leathery, glabrous, adaxially drying smooth, abaxially sparsely punctate, base cuneate to broadly cuneate, margin entire, apex acuminate; lateral veins indistinct. Cymes axillary or pseudoterminal, 2–4(–7)-flowered; peduncle (3.5–)7–14 cm; bracts persistent, green, ovate to broadly so, 6–10 × 4–5 mm. Pedicel 3–10(–20) mm, glabrous. Calyx green, 5-sect from base; segments ovate to oblong ovate, 3–5 × 2–3 mm, outside glabrous. Corolla red, 2.8–3 cm, outside glabrous, inside sparsely puberulent, without tufts of hairs, mouth strongly oblique; limb indistinctly 2-lipped;

33b. Petiole 5–10 mm; leaf blade 2–3.4 cm wide, thick leathery; calyx segments ca. 5 mm; style glandular puberulent 12. *A. planipetiolatus*

adaxial lip erect, ca. 6 mm; abaxial lip reflexed, ca. 6 mm. Stamens exserted; filaments ca. 1.5 cm; anthers coherent in pairs at apex, ca. 3 mm; staminode ca. 0.6 mm. Pistil ca. 2 cm; ovary glabrous. Style ca. 3 mm, puberulent. Capsule 12–29 cm. Seeds with 1 hairlike appendage at each end, appendages 0.8–1.2 mm. Fl. Sep–Feb, fr. Jan–May.

• On trees in forests, streamside rocks in valleys; 300–1200 m. Guangdong, Hainan.

3. *Aeschynanthus stenosepalus* J. Anthony, Notes Roy. Bot. Gard. Edinburgh 18: 191. 1934.

尾叶芒毛苣苔 wei ye mang mao ju tai
Aeschynanthus tenuis Handel-Mazzetti.

Stems 60–100 cm, glabrous. Leaves opposite; petiole 2–5 mm; leaf blade narrowly elliptic to lanceolate or ovate, 2.2–6 × 0.8–2.3 cm, leathery to papery, glabrous, adaxially drying slightly wrinkled, abaxially few punctate, base cuneate to rounded, margin entire, apex long acuminate to caudate; lateral veins indistinct. Cymes axillary, 1–3-flowered; peduncle 2.2–5(–7) cm; bracts usually deciduous, green, linear, 2–6 × 0.8–1 mm. Pedicel 5–11 mm, glabrous. Calyx green, sometimes tinged red, 5-sect from base; segments lanceolate-linear, 3–7 × 0.6–0.8 mm, outside glabrous. Corolla red, 2.5–3.2 cm, outside glabrous, inside glandular puberulent, without tufts of hairs, mouth slightly to strongly oblique; limb indistinctly 2-lipped; adaxial lip erect, 3–4 mm; abaxial lip 3–4 mm. Stamens exserted; filaments ca. 1 cm; anthers coherent in pairs at apex, ca. 1.2 mm; staminode ca. 1.6 mm. Pistil ca. 1.6 cm; ovary glabrous. Style ca. 2 mm, puberulent. Capsule 5.4–8.4 cm. Seeds with 1 hairlike appendage at each end, appendages 0.8–1.2 mm. Fl. Jul–Oct, fr. Oct.

On trees, rocks in forest margins; 1500–2500 m. SE Xizang (Medog Xian), NW Yunnan [N Myanmar].

4. *Aeschynanthus wardii* Merrill, Brittonia 4: 173. 1941.

狭花芒毛苣苔 xia hua mang mao ju tai

Stems 1–2 m, glabrous. Leaves opposite; petiole 0.7–1.5 cm; leaf blade narrowly elliptic to ovate or obovate, 5.5–10 × 1.6–3.9 cm, leathery to papery, glabrous, adaxially drying smooth, abaxially few punctate, base cuneate to rounded, margin entire to shallowly crenulate, apex caudate to acuminate; lateral veins indistinct. Cymes axillary, 1–4-flowered; peduncle absent to 0.5(–1) cm; bracts persistent or deciduous, green, lanceolate to narrowly ovate, 6–13 × 2–5 mm. Pedicel 4–10 mm, glabrous. Calyx green, 5-sect from base; segments lanceolate-linear, 7–9 × 1.1–1.5 mm, outside glabrous. Corolla red to orange, ca. 3.5 cm, outside glabrous, inside sparsely glandular puberulent below abaxial lip, without tufts of hairs,

mouth oblique; limb indistinctly 2-lipped; adaxial lip erect, ca. 4.5 mm; abaxial lip reflexed, ca. 4.5 mm. Stamens exerted; filaments 1.4–2 cm; anthers coherent in pairs at apex, 1.5–2 mm; staminode ca. 0.6 mm. Pistil ca. 3.5 cm; ovary sparsely glandular puberulent. Style ca. 7 mm, sparsely glandular puberulent. Capsule 7–10 cm. Seeds with 1 hairlike appendage at each end, appendages 1.5–2.5 mm. Fl. Sep–Nov, fr. Oct.

Trees in forests, rocks in river valleys; 900–2800 m. NW and W Yunnan [N Myanmar].

5. *Aeschynanthus bracteatus* Wallich ex A. P. de Candolle, Prodr. 9: 261. 1845.

显苞芒毛苣苔 xian bao mang mao ju tai

Aeschynanthus bracteatus var. *orientalis* W. T. Wang; *A. bracteatus* var. *peelii* (J. D. Hooker & T. Thomson) C. B. Clarke; *A. peelii* J. D. Hooker & Thomson. Stems 25–150 cm, glabrous. Leaves opposite; petiole 5–20 mm; leaf blade broadly lanceolate to elliptic, ovate, or obovate, 4.4–13 × 1.5–6.1 cm, leathery to papery, glabrous, adaxially drying wrinkled or smooth, abaxially few punctate, base cuneate to rounded or subcordate, margin entire to shallowly dentate, frequently undulate, sometimes revolute, apex caudate to acuminate; lateral veins indistinct. Cymes axillary or pseudoterminal, 2–7-flowered; peduncle (0.5–)3–7 cm; bracts usually persistent, red to purple, lanceolate to ovate, 1.5–3 × 0.6–1.4 cm. Pedicel 6–12(–20) mm, glabrous. Calyx red, 5-sect from base; segments linear to lanceolate, 1.2–1.9 cm × 2–4 mm, outside glabrous. Corolla red to pink or purple, 3.2–4.2 cm, glabrous, mouth strongly oblique; limb indistinctly 2-lipped; adaxial lip erect, 6–8 mm; abaxial lip reflexed, 6–8 mm. Stamens exerted; filaments ca. 2.5 cm; anthers coherent in pairs at apex, 1.8–2.5 mm; staminode ca. 0.5 mm. Pistil ca. 2.8 cm; ovary glandular puberulent. Style 4–6 mm, glandular puberulent. Capsule 7–16(–21) cm. Seeds with 1 hairlike appendage at each end, appendages 1.8–3 mm. Fl. Jun–Oct, fr. Jul–Jan.

On trees in forested valleys and on streamside cliffs; 900–3200 m. NW Guangxi, SE Xizang, Yunnan [Bhutan, NE India, Myanmar]. There are apparently two distinct races in *Aeschynanthus bracteatus* which have been called varieties. We do not consider the distinctions strong enough to recognize taxonomically; however, in SE Yunnan there is a race which can usually be distinguished from typical *A. bracteatus*. This race usually has leaf blades broader (elliptic to oblong or obovate) and thicker (leathery), and which dry flat adaxially and frequently abaxially cinnamon reddish. In contrast typical *A. bracteatus* specimens have leaf blades lanceolate to narrowly ovate and thin leathery to papery which dry rugose adaxially and abaxially usually yellowish green.

6. *Aeschynanthus superbus* C. B. Clarke, Commelyn. Cyrtandr. Bengal. 73. 1874.

华丽芒毛苣苔 hua li mang mao ju tai

Stems 50–100 cm, glabrous. Leaves opposite; petiole 5–14 mm; leaf blade elliptic to obovate, lanceolate or oblong, 10–20 × 4.4–10.5 cm, papery to leathery,

glabrous, adaxially drying smooth, abaxially sparsely punctate, base cuneate to rounded, margin entire, apex abruptly acuminate to acuminate or acute; lateral veins indistinct. Cymes axillary, 5–15-flowered; peduncle 1–3 cm; bracts persistent, pink to red, elliptic to ovate, 4–5.5 × 2–3 cm. Pedicel 0.8–1.2 cm, glabrous. Calyx orange-red to red, 5-sect from base; segments linear to lanceolate, 2–3 cm × 3.5–7 mm, outside glabrous. Corolla orange-red to dark red with darker stripes, 5.5–8.5 cm, outside glabrous, inside sparsely puberulent, without tufts of hairs, mouth oblique; limb indistinctly 2-lipped; adaxial lip erect, 1–1.6 cm; abaxial lip reflexed, 1–1.6 cm. Stamens exerted; filaments 3.2–3.5 cm; anthers coherent in pairs at apex, 3–4 mm; staminode ca. 1.5 mm. Pistil 4.2–7.6 cm; ovary with a few short hairs. Style 6–8 mm, sparsely puberulent. Capsule 32–52 cm. Seeds with 1 hairlike appendage at each end, appendages 4–8 mm. Fl. Aug–Sep.

On trees in forests; 1000–2500 m. SE Xizang (Medog Xian), SE and W Yunnan [Bhutan, NE India, N Myanmar].

7. *Aeschynanthus linearifolius* C. E. C. Fischer, Bull. Misc. Inform. Kew 1935: 321. 1935.

华丽芒毛苣苔 hua li mang mao ju tai

Aeschynanthus linearifolius var. *oblanceolatus* (J. Anthony) W. T. Wang; *A. oblanceolatus* (J. Anthony) C. E. C. Fischer; *A. peelii* J. D. Hooker & Thomson var. *oblanceolatus* J. Anthony.

Stems 50–100 cm, glabrous. Leaves opposite; petiole 3–8 mm; leaf blade narrowly to broadly oblanceolate or rarely lanceolate, 4.2–9 × 0.6–2.5(–3.3) cm, leathery, glabrous, adaxially drying wrinkled, abaxially sparsely punctate, base cuneate to attenuate, margin entire to nearly entire, apex acuminate to subcaudate; lateral veins indistinct. Cymes axillary, 1–4-flowered; peduncle 1.8–5 cm; bracts persistent, red, lanceolate, 1–1.8 cm × 4–5(–8) mm. Pedicel 3–10 mm, glabrous. Calyx red, 5-sect from base; segments lanceolate to elliptic, 1.1–1.3 cm × 3–4 mm, outside glabrous. Corolla red, 3–3.5 cm, outside glabrous, inside sparsely glandular puberulent above, without tufts of hairs, mouth slightly oblique; limb indistinctly 2-lipped; adaxial lip ca. 4 mm; abaxial lip ca. 5.5 mm. Stamens exerted; filaments 1.4–2 cm; anthers coherent in pairs at apex, ca. 2 mm; staminode ca. 1 mm. Pistil ca. 2.1 cm; ovary glabrous. Style ca. 2.5 mm, puberulent. Capsule 5–10 cm. Seeds with 1 hairlike appendage at each end, appendages ca. 1.5 mm. Fl. Jul–Sep, fr. Oct. On tree and rocks in forested valleys; 1900–3100 m. SE Xizang, Yunnan [NE India, N Myanmar].

The varieties of *Aeschynanthus linearifolius* were based on leaf shape and width. They are not recognized here because the variation in these characters is continuous.

8. *Aeschynanthus angustissimus* (W. T. Wang) W. T. Wang, Bull. Bot. Res., Harbin 2(4): 56. 1982.

狭叶芒毛苣苔 xia ye mang mao ju tai

Aeschynanthus linearifolius C. E. C. Fischer var. *angustissimus* W. T. Wang, Acta Phytotax. Sin. 17: 110. 1979.

Stems ca. 40 cm, rust-brown pubescent. Leaves opposite; petiole 2–3 mm; leaf blade linear to narrowly oblanceolate, 6.5–12.2 cm × 4–7 mm, leathery, glabrous, adaxially drying wrinkled, abaxially sparsely punctate, base attenuate, margin entire, apex attenuate; lateral veins invisible. Cymes axillary, 1–4-flowered; peduncle 5.2–10 cm; bracts persistent, red, lanceolate, 1.6–1.8 cm × 5–8 mm. Pedicel 0.8–1.8 cm, glabrous. Calyx red, 5-sect from base; segments narrowly oblong to lanceolate-oblong, 1.2–1.8 cm × 3.2–4.5 mm, outside puberulent. Corolla red, ca. 3.2 cm, outside glabrous, inside sparsely glandular puberulent apically, without tufts of hairs, mouth not oblique; limb indistinctly 2-lipped, lips nearly equal, ca. 5 mm. Stamens exerted; filaments 1.2–1.5 cm; anthers coherent in pairs at apex, ca. 2 mm; staminode ca. 2 mm. Pistil ca. 2.4 cm; ovary glabrous. Style ca. 2 mm, glandular puberulent. Capsule 4.8–7 cm. Seeds unknown. Fl. Aug.

• On trees and rocks in broad-leaved forests; ca. 2300 m. SE Xizang (Medog Xian).

9. *Aeschynanthus acuminatissimus* W. T. Wang, Acta Phytotax. Sin. 13: 64. 1975.

长尖芒毛苣苔 *chang jian mang mao ju tai*

Stems ca. 30 cm, glabrous. Leaves opposite; petiole 3–4 mm; leaf blade lanceolate to elliptic, 5.8–7.4 × 1.4–2.5 cm, thin leathery, glabrous, adaxially drying smooth, abaxially densely punctate, base broadly cuneate to nearly rounded, margin entire, apex long acuminate to caudate; lateral veins indistinct. Cymes axillary, 1-flowered; peduncle absent; bracts deciduous. Pedicel ca. 1 cm, glabrous. Calyx reddish, 5-sect from base; segments lanceolate-subulate, 7.5–10 × 0.8–1.1 mm, outside glabrous. Corolla red, ca. 2.8 cm, outside glabrous, inside puberulent, without tufts of hairs, mouth not oblique; limb indistinctly 2-lipped; adaxial lip ca. 5 mm; abaxial lip ca. 7 mm. Stamens exerted; filaments 0.9–1.1 cm; anthers coherent in pairs at apex, ca. 2 mm; staminode ca. 1 mm. Pistil ca. 2.9 cm; ovary glabrous. Style ca. 1 cm, glabrous. Capsule ca. 8 cm. Seeds with 1 hairlike appendage at each end, appendages 2.2–3.2 mm. Fl. Aug.

• On trees in densely forested valleys; 1200–1500 m. SE Yunnan (Xichou Xian).

10. *Aeschynanthus lancilimbus* W. T. Wang, Acta Phytotax. Sin. 13: 64. 1975.

披针芒毛苣苔 *pi zhen mang mao ju tai*

Stems ca. 50 cm, glabrous. Leaves opposite; petiole 3–6 mm; leaf blade lanceolate, rarely ovate, 4–6.3 × 1.4–2.5 cm, leathery to papery, glabrous, adaxially drying smooth, abaxially sparsely punctate, base broadly cuneate to rounded, margin entire, apex long acuminate to acuminate; lateral veins nearly invisible. Inflorescences unknown; bracts deciduous. Pedicel ca.

1.3 cm, glabrous. Calyx green, ca. 7 mm, 5-lobed from below middle; tube ca. 2 mm in diam. at mouth; lobes linear-lanceolate, ca. 5 × 1–1.5 mm, outside glabrous. Corolla red, ca. 2.7 cm, outside sparsely puberulent, inside glabrous, mouth not oblique; limb indistinctly 2-lipped; adaxial lip ca. 2.5 mm; abaxial lip ca. 3 mm. Stamens exerted; filaments 2.5–2.8 cm; anthers coherent in pairs at apex, ca. 2.5 mm; staminode ca. 2 mm. Pistil ca. 4.2 cm; ovary puberulent. Style ca. 2 cm, puberulent. Fruit and seeds unknown. Fl. Oct.

• Densely forested valleys; ca. 1200 m. SE Yunnan (Yanshan Xian).

This species is known only from the type specimen, which has only a detached flower.

11. *Aeschynanthus tubulosus* J. Anthony, Notes Roy. Bot. Gard. Edinburgh 18: 192. 1934.

筒花芒毛苣苔 *tong hua mang mao ju tai*

Stems 40–140 cm, glabrous. Leaves opposite; petiole 2–5 mm; leaf blade narrowly elliptic to narrowly ovate, 1.7–3 × 0.6–1.4 cm, thin leathery to papery, glabrous, adaxially drying smooth, abaxially punctate, base cuneate to broadly cuneate, margin entire, apex acute to acuminate; lateral veins invisible. Cymes axillary, 1-flowered; peduncle absent; bracts deciduous. Pedicel 4–7(–10) mm, glabrous. Calyx green, 5-sect from base; segments narrowly lanceolate to linear or narrowly triangular, 5–9 × 0.8–1.2 mm, outside glabrous. Corolla red, 3–3.7 cm, outside glabrous, inside sparsely puberulent basally, without tufts of hairs, mouth slightly oblique; limb indistinctly 2-lipped, lips nearly equal, 3–5 mm. Stamens exerted; filaments 2.3–3.1 cm; anthers coherent in pairs at apex, 2–3 mm; staminode ca. 1 mm. Pistil ca. 2.5 cm; ovary glabrous. Style ca. 9 mm, glabrous. Capsule 3–3.5 cm. Seeds unknown. Fl. Aug–Oct.

Rocks and trees in forests; 2200–2300 m. SW and W Yunnan [N Myanmar].

No material of var. *tubulosus* has been seen by the authors.

- 1a. Leaf blade elliptic or narrowly so; calyx segments linear-lanceolate, 5–6 × ca. 1.2 mm 11a. var. *tubulosus*
1b. Leaf blade narrowly ovate or narrowly elliptic; calyx segments narrowly linear, 6–9 × ca. 1 mm 11b. var. *angustilobus*

11a. *Aeschynanthus tubulosus* var. *tubulosus*

筒花芒毛苣苔(原变种) *tong hua mang mao ju tai*
(yuan bian zhong)

Leaf blade elliptic to narrowly so. Calyx segments linear-lanceolate, 5–6 × ca. 1.2 mm. Fl. Aug–Oct.

On trees in forests; ca. 2200 m. SW Yunnan [N Myanmar].

11b. *Aeschynanthus tubulosus* var. *angustilobus* J. Anthony, Notes Roy. Bot. Gard. Edinburgh 18: 192. 1934.

狭萼片芒毛苣苔 *xia e pian mang mao ju tai*

Leaf blade narrowly ovate to narrowly elliptic. Calyx segments linear, 6–9 × ca. 1 mm. Fl. Aug.

• Rocks and trees in forests; ca. 2300 m. W Yunnan.

12. *Aeschynanthus planipetiolatus* H. W. Li, Acta Bot. Yunnan. 5: 33. 1983.

扁柄芒毛苣苔 *bian bing mang mao ju tai*

Stems ca. 30 cm, glabrous. Leaves opposite; petiole 5–10 mm; leaf blade narrowly to broadly ovate or elliptic-oblong, 4–6.5 × 2–3.4 cm, thick leathery, glabrous, adaxially drying smooth, abaxially impressed punctate, base broadly cuneate to rounded, margin entire, apex acuminate to abruptly acuminate; lateral veins indistinct. Cymes axillary, 1-flowered; peduncle absent; bracts deciduous. Pedicel ca. 8 mm, glabrous. Calyx green, 5-sect from base; segments lanceolate-linear, ca. 5 × 1 mm, outside glabrous. Corolla red, 2.3–2.7 cm, glabrous, inside sparsely glandular near mouth, without tufts of hairs, mouth not oblique; limb indistinctly 2-lipped, lips nearly equal, ca. 3 mm. Stamens exerted; filaments 2–2.2 cm; anthers coherent in pairs at apex, ca. 2 mm; staminode ca. 1.5 mm. Pistil ca. 3.2 cm; ovary glabrous. Style ca. 1.5 cm, glandular puberulent. Fruit and seeds unknown. Fl. Sep.

• On trees on hills along roadsides; ca. 1600 m. S Yunnan (Menghai Xian).

The species is probably now extinct.

13. *Aeschynanthus angustoblongus* W. T. Wang, Acta Phytotax. Sin. 13: 64. 1975.

狭矩芒毛苣苔 *xia ju mang mao ju tai*

Stems 12–30 cm, glabrous. Leaves opposite; petiole 2–5 mm; leaf blade narrowly oblong to oblong lanceolate or narrowly elliptic, (1.8–)3–5.4 × (0.8–)1–1.5 cm, papery, glabrous, adaxially drying wrinkled, abaxially not punctate, base attenuate, margin entire, apex attenuate; lateral veins indistinct. Cymes axillary, 1-flowered; peduncle absent; bracts deciduous. Pedicel 1–2.2 cm, glabrous. Calyx green, 5-sect from base; segments narrowly lanceolate, 0.9–1.1 cm × 1.6–2.1 mm, outside glabrous. Corolla red, ca. 2.8 cm, outside puberulent, inside glabrous, mouth not oblique; limb indistinctly 2-lipped, lips equal, ca. 2.5 mm. Stamens exerted; filaments ca. 1.2 cm; anthers coherent in pairs at apex, 1.2–2 mm; staminode ca. 0.5 mm. Pistil ca. 3.2 cm; ovary glabrous. Style less than 16 mm, with a few short hairs. Fruit and seeds unknown. Fl. Sep.

• On trees in forested valleys; ca. 1500 m. NW Yunnan (Gongshan Xian).

14. *Aeschynanthus austroyunnanensis* W. T. Wang, Acta Phytotax. Sin. 13: 63. 1975.

滇南芒毛苣苔 *dian nan mang mao ju tai*

Stems to 1 m, glabrous. Leaves opposite; petiole 3–8 mm; leaf blade elliptic to broadly elliptic, ovate, or obovate, 2.2–7.2 × 1.4–3.9 cm, thin leathery to papery, glabrous, adaxially drying wrinkled, abaxially not punctate, base cuneate to rounded, margin entire, apex acute to rounded or acuminate; lateral veins indistinct to somewhat distinct. Cymes axillary, 1- or 2-flowered; peduncle absent; bracts deciduous. Pedicel 4–8 mm, sparsely puberulent. Calyx green, 5-sect from base; segments linear-lanceolate, 4–5 × ca. 1 mm, outside puberulent to glabrous. Corolla red, 2–2.7 cm, outside puberulent to glabrous, inside glabrous, mouth not oblique; limb indistinctly 2-lipped; adaxial lip ca. 5 mm; abaxial lip ca. 7 mm. Stamens exerted; filaments 1.1–1.4 cm; anthers coherent in pairs at apex, 1.2–1.5 mm; staminode ca. 0.8 mm. Pistil 2.8–3.2 cm; ovary glabrous. Style ca. 1 cm, sparsely puberulent. Capsule 8–26 cm. Seeds with 1 hairlike appendage at each end, appendages 0.9–1.5 cm. Fl. Jul, Oct, fr. Dec.

• Riverside rocks, trees, and cliffs of limestone hills in forests; 400–1500 m. W Guangxi, SW Guizhou, S and SE Yunnan.

- 1a. Calyx and corolla puberulent outside, corolla 2.4–2.7 cm; leaf blade 2.5–7.2 × 2.2–3.9 cm; capsule 18.5–26 cm; seeds ca. 0.8–1.2 mm, hairlike appendages 1.2–1.5 cm 14a. var. *austroyunnanensis*
- 1b. Calyx and corolla glabrous or nearly glabrous outside, corolla 2–2.3 cm; leaf blade 2.2–5.8 × 1.4–3 cm; capsule 8–20 cm; seeds 1.2–1.5 mm, hairlike appendages 0.9–1.5 cm 14b. var. *guangxiensis*

14a. *Aeschynanthus austroyunnanensis* var. *austroyunnanensis*

滇南芒毛苣苔(原变种) *dian nan mang mao ju tai*
(yuan bian zhong)

Leaf blade 2.5–7.2 × 2.2–3.9 cm. Calyx outside puberulent. Corolla 2.4–2.7 cm, outside puberulent. Capsule 18.5–26 cm. Seeds 0.8–1.2 mm, appendages 1.2–1.5 cm. Fl. Oct, fr. Dec.

• Riverside rocks in forests; 500–1500 m. S and SE Yunnan.

14b. *Aeschynanthus austroyunnanensis* var. *guangxiensis* (W. Y. Chun ex W. T. Wang & K. Y. Pan) W. T. Wang, Fl. Reipubl. Popularis Sin. 69: 513. 1990.

广西芒毛苣苔 *guang xi mang mao ju tai*

Aeschynanthus guangxiensis W. Y. Chun ex W. T. Wang & K. Y. Pan, Bull. Bot. Res., Harbin 2(2): 146. 1982.

Leaf blade 2.2–5.8 × 1.4–3 cm. Calyx outside glabrous to nearly glabrous. Corolla 2–2.3 cm, outside glabrous

to nearly glabrous. Capsule 8–20 cm. Seeds 1.2–1.5 mm, appendages 0.9–1.5 cm. Fl. Jul, fr. Dec.

• On trees, rocks, and cliffs on limestone hills; 400–1000 m. W Guangxi, SW Guizhou (Zhenfeng Xian).

15. *Aeschynanthus lasianthus* W. T. Wang, Acta Phytotax. Sin. 13: 63. 1975.

毛花芒毛苣苔 mao hua mang mao ju tai

Stems 40–120 cm, brown sericeous, glabrescent. Leaves opposite; petiole 3.5–10 mm; leaf blade narrowly ovate to ovate or elliptic, 2.9–8 × 1.4–2.9 cm, thin leathery, glabrous, adaxially drying smooth or slightly wrinkled, abaxially not punctate, base cuneate to rounded, margin entire, apex acuminate to acute; lateral veins indistinct. Cymes axillary, 1- or 2-flowered; peduncle absent; bracts deciduous. Pedicel 0.8–1.4 cm, puberulent. Calyx green, 1–1.8 cm, 5-lobed from slightly below middle to -sect from near base in the same flower; tube 3.5–4 mm in diam. at mouth; lobes linear-lanceolate, 4.5–13 × 0.6–2 mm, outside sparsely to densely pilose. Corolla red, 2.5–2.8 cm, outside pilose, inside sparsely puberulent above base, without tufts of hairs, mouth not oblique; limb indistinctly 2-lipped; adaxial lip ca. 3 mm; abaxial lip ca. 2.5 mm. Stamens exerted; filaments 2.5–2.9 cm; anthers coherent in pairs at apex, 1.8–2.2 mm; staminode ca. 4 mm. Pistil 3.5–4.2 cm; ovary glabrous. Style 2–2.4 cm, sparsely puberulent. Capsule ca. 20 cm. Seeds unknown. Fl. Aug–Sep, fr. Sep.

• On trees at forest margins, rocky streamside cliffs; 1700–2600 m. NW Yunnan (Gongshan Xian).

16. *Aeschynanthus macranthus* (Merrill) Pellegrin, Bull. Soc. Bot. France 73: 413. 1926.

伞花芒毛苣苔 san hua mang mao ju tai

Trichosporum macranthum Merrill, Univ. Calif. Publ. Bot. 13: 141. 1926.

Stems over 40 cm, glabrous. Leaves opposite; petiole ca. 7 mm; leaf blade narrowly lanceolate to lanceolate, 10–13 × 2.4–2.8 cm, leathery, glabrous, adaxially drying smooth, abaxially not punctate, base cuneate to broadly cuneate, margin entire to indistinctly denticulate, apex attenuate; lateral veins indistinct. Cymes pseudoterminal, ca. 8-flowered; peduncle absent; bracts deciduous. Pedicel ca. 1 cm, glabrous. Calyx green, 1.2–1.5 cm, shallowly 5-lobed; tube 6.5–8 mm in diam. at mouth; lobes triangular, 2–3 × 1.5–2 mm, outside glabrous. Corolla orange-red, ca. 5.2 cm, outside sparsely puberulent apically, inside sparsely pubescent basally, without tufts of hairs, mouth not oblique; limb indistinctly 2-lipped; adaxial lip ca. 6 mm; abaxial lip ca. 5.5 mm. Stamens exerted; filaments 2.3–3.2 cm; anthers coherent in pairs at apex, 1.2–2 mm; staminode

ca. 5 mm. Pistil ca. 3 cm; ovary glabrous. Style ca. 1.8 cm, puberulent. Capsule 19–29 cm. Seeds with 1 hairlike appendage at each end, appendages ca. 1 cm. Fl. Jun.

On trees of forest margins in valleys; ca. 800 m. SE Yunnan [Laos, Thailand, N Vietnam].

17. *Aeschynanthus humilis* Hemsley in Dunn, J. Linn. Soc., Bot. 35: 516. 1903.

矮芒毛苣苔 ai mang mao ju tai

Stems 5–24 cm, puberulent to glabrescent. Leaves opposite or in whorls of 3; petiole to 2 mm; leaf blade oblanceolate to spatulate, 0.7–2.2 cm × 4–8(–12) mm, leathery, adaxially glabrous and drying finely wrinkled, abaxially puberulent, sparsely impressed-punctate, base attenuate to broadly cuneate, margin entire, apex rounded to obtuse, seldom acute; lateral veins invisible. Cymes pseudoterminal, 1–3-flowered; peduncle absent; bracts deciduous. Pedicel 4–10 mm, glabrous to sparsely puberulent. Calyx often tinged red-purple, 4–4.6 mm, 5-lobed from near to above middle; tube 3–4 mm in diam. at mouth; lobes narrowly triangular, 2–2.5 × 0.8–1 mm, outside puberulent. Corolla red, 1.6–2.7 cm, outside sparsely puberulent, inside with short thick hairs near base, without tufts of hairs, mouth slightly to strongly oblique; limb distinctly 2-lipped; adaxial lip nearly erect, 2–2.5 mm; abaxial lip 2–4.5 mm, 3-sect from to near base. Stamens exerted; filaments 0.9–2 cm; anthers coherent in pairs at apex, ca. 1.2 mm; staminode ca. 1 mm. Pistil 1.5–3 cm; ovary glabrous. Style 1.1–1.7 cm, sparsely puberulent. Capsule 4.5–6 cm. Seeds with 1 hairlike appendage at each end, appendages 6–10 mm. Fl. Sep–Jan.

• On trees in forested valleys; 1300–2100 m. Yunnan (Jingdong Xian, Pingbian Xian, Simao Xian).

18. *Aeschynanthus andersonii* C. B. Clarke, Commelyn. Cyrtandr. Bengal. 75. 1874.

轮叶芒毛苣苔 lun ye mang mao ju tai

Stems 10–20 cm, densely spreading short hispid, glabrescent. Leaves mostly clustered near stem apex; petiole 1–4(–8) mm; leaf blade obovate to oblong obovate or elliptic, 0.8–2.2 cm × 4–10 mm, leathery, puberulent, adaxially sometimes glabrescent, drying smooth, abaxially sparsely punctate, base attenuate to cuneate, margin entire, apex nearly rounded to acute, rarely attenuate; lateral veins obscure. Cymes pseudoterminal, 2–5-flowered; peduncle absent; bracts deciduous. Pedicel 7–10 mm, glabrous to sparsely ciliate. Calyx green tinged reddish, 5-sect from base; segments linear-lanceolate to narrowly triangular, 3–4 × ca. 0.5 mm, outside glabrous, margin ciliate. Corolla red, 1.7–2 cm, outside sparsely puberulent, inside puberulent basally, without tufts of hairs, mouth strongly oblique; limb distinctly 2-lipped; adaxial lip erect, indistinctly 4-lobed near apex, 5–8 mm; abaxial lip 4–7 mm, entire. Stamens exerted; filaments 1.3–2 cm; anthers coherent in pairs at apex, 1–2 mm; staminode ca. 0.5 mm. Pistil ca. 4 mm; ovary glabrous.

Style ca. 1.5 mm, puberulent. Capsule 6–8 cm. Seeds with 1 hairlike appendage at each end, appendages 1–1.3 cm. Fl. Jun–Aug, fr. Aug.

On trees in forested valleys; 1300–1700 m. SW and S Yunnan [NE Myanmar].

19. *Aeschynanthus mengxingensis* W. T. Wang, Bull. Bot. Res., Harbin 4(1): 27. 1984.

勐醒芒毛苣苔 meng xing mang mao ju tai

Stems ca. 20 cm, densely rust-brown spreading hispid. Leaves in whorls of 3; petiole 1–1.5 cm; leaf blade narrowly ovate to ovate, 1.8–2.6 × 0.9–1.1 cm, leathery, adaxially glabrous and drying smooth, abaxially sparsely white appressed puberulent, not punctate, base rounded, margin entire, apex apiculate; lateral veins invisible. Cymes axillary, 1-flowered; peduncle absent; bracts deciduous. Pedicel ca. 8 mm, puberulent. Calyx reddish, 5-sect from base; segments subulate-lanceolate, 3–6 × ca. 1 mm, outside sparsely puberulent. Corolla red, central abaxial lobe yellow spotted, ca. 2.9 cm, outside puberulent, inside glabrous, mouth very strongly oblique; limb distinctly 2-lipped; adaxial lip strongly reflexed, entire, oblong, ca. 4 mm; abaxial lip ca. 9 mm, 3-parted, central lobe oblong, lateral lobes oblique, deltoid. Stamens exerted; filaments 1.7–2.1 cm; anthers coherent in pairs at apex, ca. 2 mm; staminode ca. 2 mm. Pistil ca. 3.2 cm; ovary with small glands. Style ca. 1.5 cm, sparsely puberulent. Capsule ca. 12 cm. Seeds with 1 hairlike appendage at each end, appendages 6.5–12 mm. Fl. Apr–May, fr. May.

• Forest margins in valleys or on tree trunks in forests of limestone hills; 700–800 m. S Yunnan (Cangyuan Xian).

20. *Aeschynanthus gracilis* Parish ex C. B. Clarke, Commelyn. Cyrtandr. Bengal. 75. 1874.

细芒毛苣苔 xi mang mao ju tai

Aeschynanthus novogracilis W. T. Wang.

Stems ca. 30 cm, puberulent or spreading short hispid. Leaves opposite; petiole 1.5–2 mm; leaf blade elliptic to narrowly obovate, 0.8–2 × 0.4–1.1 cm, leathery, adaxially puberulent, glabrescent, drying wrinkled, abaxially puberulent, not punctate, base cuneate to rounded, margin entire, apex acute to rounded; lateral veins invisible. Cymes axillary, 1-flowered; peduncle absent; bracts deciduous. Pedicel ca. 8 mm, puberulent. Calyx green, 5-sect from base; segments narrowly triangular, ca. 4 × 1 mm, outside puberulent. Corolla red, central abaxial lobe yellow spotted, ca. 2.5 cm, outside puberulent, inside glabrous, mouth strongly oblique; limb distinctly 2-lipped; adaxial lip reflexed, ca. 4 mm; abaxial lip ca. 8.5 mm, 3-parted, central lobe oblong, lateral lobes oblique, deltoid. Stamens exerted; filaments 1.4–1.8 cm; anthers coherent in pairs at apex, ca. 2 mm; staminode ca. 6.5 mm. Pistil ca. 1.7 cm; ovary glabrous. Style ca. 5 mm, puberulent. Capsule 9–12 cm. Seeds with 1 hairlike appendage at each end, appendages 1.5–2 cm. Fl. Oct–Nov, fr. Apr.

On trees in forested valleys; 1300–1700 m. S Yunnan [Bhutan, N Myanmar, Sikkim, Thailand, N Vietnam].

21. *Aeschynanthus buxifolius* Hemsley in Dunn, J. Linn. Soc., Bot. 35: 515. 1903.

黄杨叶芒毛苣苔 huang yang ye mang mao ju tai

Stems 20–60 cm, glabrous, glandular near apex. Leaves opposite or in whorls of 3; petiole 2–3 mm; leaf blade elliptic to ovate, 0.7–2 × 0.5–1 cm, leathery, glabrous, adaxially drying wrinkled, abaxially not punctate, base broadly cuneate to rounded, margin entire, apex acute to rounded; lateral veins invisible. Cymes axillary, 1-flowered; peduncle absent; bracts persistent, green, linear, 3–4.5 × 0.6–1 mm. Pedicel 4–10 mm, glabrous. Calyx green, 5-sect from base; segments linear to lanceolate-linear, 3.5–6 × 0.8–1.1 mm, outside glabrous. Corolla purple-red, 1.8–3.1 cm, outside glabrous, inside sparsely glandular puberulent, without tufts of hairs, mouth oblique; limb distinctly 2-lipped; adaxial lip ca. 4.5 mm; abaxial lip ca. 8 mm, 3-parted from near base. Stamens exerted; filaments 2–2.9 cm; anthers coherent in pairs at apex, 1.6–2 mm; staminode ca. 1 mm. Pistil ca. 2.8 cm; ovary glabrous. Style ca. 5 mm, glabrous. Capsule 6.2–9.5 cm. Seeds with 1 flat, narrowly triangular appendage at each end, appendages 0.5–1 mm. Fl. Jun–Nov, fr. Nov.

On trees and rocks in forests; 1300–2200 m. Guangxi, SW Guizhou, Yunnan [Vietnam].

22. *Aeschynanthus denticuliger* W. T. Wang, Acta Phytotax. Sin. 13: 65. 1975.

小齿芒毛苣苔 xiao chi mang mao ju tai

Stems 20–50 cm, spreading rust-brown pubescent. Leaves opposite or in whorls of 3; petiole 1.5–2 mm; leaf blade narrowly elliptic to obovate, 1–2.1 × 0.6–1.1 cm, papery, adaxially nearly glabrous, drying wrinkled, abaxially rust-brown pubescent, not punctate, base cuneate to rounded, margin often 1- or 2-denticulate near apex, apex acute to nearly rounded; lateral veins invisible. Cymes axillary, 1-flowered; bracts deciduous. Pedicel ca. 3 mm, puberulent. Calyx green, deeply 5-lobed; lobes triangular-lanceolate, ca. 4–5 × ca. 1 mm, outside densely puberulent. Corolla yellow to white, ca. 3.4 cm, outside puberulent, inside glabrous, mouth not oblique; limb distinctly 2-lipped; adaxial lip ca. 7 mm; abaxial lip ca. 9 mm, 3-lobed from slightly below middle. Stamens included; filaments 0.8–1.2 cm; anthers of 4 stamens coherent at apex, ca. 3 mm; staminode ca. 5 mm. Pistil ca. 1.7 cm; ovary glabrous. Style ca. 3 mm, glabrous. Capsule ca. 8 cm. Seeds with 1 hairlike appendage at each end, appendages 5–8 mm. Fl. Feb, fr. Oct.

On trees in dense forests; 1200–1500 m. SE Yunnan [Laos, N Vietnam].

23. *Aeschynanthus lineatus* Craib, Bull. Misc. Inform. Kew 1913: 201. 1913.

线条芒毛苣苔 xian tiao mang mao ju tai

Aeschynanthus chorisepalus Orr.

Stems to 1 m, glabrous. Leaves opposite; petiole 6–21 mm; leaf blade narrowly to broadly elliptic or lanceolate to obovate, 5–12 × 2–4.2 cm, leathery to thin leathery, glabrous, adaxially drying wrinkled, abaxially not punctate, base broadly cuneate to cuneate, margin entire, apex acuminate; lateral veins indistinct. Cymes axillary, 1–4-flowered; peduncle absent; bracts persistent, green, linear to lanceolate, ca. 6 × 1–2 mm. Pedicel 3–20 mm, puberulent to glabrous. Calyx green, 5-sect from base; segments lanceolate-linear to linear-oblongate, 4–7 × 1.5–2 mm, outside glabrous to rust-brown pubescent. Corolla red to yellow, 1.9–3 cm, outside sparsely puberulent, inside glabrous, mouth not oblique; limb indistinctly 2-lipped, lips nearly equal, 3.8–4 mm. Stamens exerted; filaments 1.8–2 cm; anthers coherent in pairs at apex, 1.8–2.2 mm; staminode 0.5–1 mm. Pistil 2.4–3 cm; ovary with small glands. Style ca. 8 mm, puberulent. Capsule 15–25 cm. Seeds with 2 hairlike appendages at hilar end, appendages, 0.8–1.2 cm, opposite end with 1 hairlike appendage 1.5–2 cm. Fl. Jul–Oct, fr. Nov.

On trees in forested valleys; 1500–2500 m. S and W Yunnan [N Thailand].

24. *Aeschynanthus dolichanthus* W. T. Wang, Bull. Bot. Res., Harbin 2(4): 58. 1982.

长花芒毛苣苔 chang hua mang mao ju tai

Stems ca. 30 cm, glabrous. Leaves opposite; petiole 4–9 mm; leaf blade oblong to narrowly elliptic, 5–9.5 × 1.7–3.4 cm, papery, glabrous, adaxially drying smooth, abaxially not punctate, base cuneate, margin entire, apex acuminate; lateral veins distinct. Cymes pseudoterminal, ca. 6-flowered; peduncle absent; bracts persistent, green, linear, 2.8–4 × 0.8–1.2 mm. Pedicel 9–10 mm, glabrous. Calyx green, ca. 1.2 cm, 5-lobed from near to below middle; tube ca. 4 mm in diam. at mouth; lobes narrowly triangular, 5–9 × 1–1.2 mm, outside glabrous. Corolla red, ca. 5 cm, outside puberulent, inside above base with triangular hairs, without tufts of hairs, mouth not oblique; limb indistinctly 2-lipped; adaxial lip ca. 4 mm; abaxial lip ca. 5.5 mm. Stamens exerted; filaments 2.6–3.8 cm; anthers coherent in pairs at apex, 2.2–3 mm; staminode ca. 1.8 mm. Immature pistil glabrous. Fruit and seeds unknown. Fl. Jul.

•Riverside rocks in valleys; ca. 900 m. SE Xizang (Medog Xian).

25. *Aeschynanthus lasiocalyx* W. T. Wang, Bull. Bot. Res., Harbin 4(1): 29. 1984.

毛萼芒毛苣苔 mao e mang mao ju tai

Stems ca. 30 cm, glabrous. Leaves opposite; petiole 5–9 mm; leaf blade narrowly elliptic, 7–9 × 1.8–3.3 cm, papery to thin leathery, glabrous, adaxially drying smooth, abaxially not punctate, base cuneate, margin entire, apex acuminate; lateral veins indistinct. Cymes pseudoterminal, ca. 4-flowered; peduncle absent; bracts deciduous. Pedicel ca. 1.2 cm, puberulent. Calyx

greenish, ca. 7 mm, 5-lobed from near to below middle; tube ca. 5 mm in diam. at mouth; lobes triangular to triangular-linear, 3.2–5 × 1–2 mm, outside puberulent. Corolla red, ca. 5.8 cm, outside puberulent, inside with sparse triangular hairs basally, without tufts of hairs, mouth not oblique; limb indistinctly 2-lipped; adaxial lip ca. 5 mm; abaxial lip slightly longer. Stamens exerted; filaments 2.8–3.5 cm; anthers coherent in pairs at apex, 2–2.5 mm; staminode ca. 1 mm. Ovary glabrous. Style puberulent. Fruit and seeds unknown. Fl. Jul.

•Riverside rocks in forests; ca. 800 m. SE Xizang (Medog Xian).

26. *Aeschynanthus medogensis* W. T. Wang, Bull. Bot. Res., Harbin 2(4): 59. 1982.

墨脱芒毛苣苔 mo tuo mang mao ju tai

Stems ca. 30 cm, glabrous. Leaves opposite; petiole 0.9–1.5 cm; leaf blade oblong to oblanceolate-oblong, 11–13 × 2.8–4.5 cm, thick leathery, glabrous, adaxially drying nearly smooth, abaxially not punctate, base cuneate, margin entire, apex acuminate; lateral veins indistinct. Cymes pseudoterminal, ca. 4-flowered; peduncle absent; bracts persistent, green, linear, ca. 3 × 0.8 mm. Pedicel 4–5 mm, glandular puberulent. Calyx green, ca. 4 mm; 3–5-lobed from near middle; tube ca. 3 mm in diam. at mouth; lobes narrowly triangular, 1.5–1.8 × ca. 0.8 mm, outside glandular puberulent. Corolla red, ca. 3 cm, outside glandular puberulent, inside glandular below abaxial lip, without tufts of hairs, mouth not oblique; limb indistinctly 2-lipped; adaxial lip ca. 3 mm; abaxial lip ca. 3.5 mm. Stamens exerted; filaments 1.2–1.6 cm; anthers coherent in pairs at apex, 1.2–1.8 mm; staminode ca. 1.5 mm. Immature pistil glabrous. Fruit and seeds unknown. Fl. Jul.

•On trees in forests; ca. 1900 m. SE Xizang (Medog Xian).

27. *Aeschynanthus mimetes* B. L. Burtt, Bot. Mag. 162: pl. 9595. 1940.

大花芒毛苣苔 da hua mang mao ju tai

Stems 30–60(–100) cm, glabrous. Leaves opposite; petiole 3–11 mm; leaf blade narrowly elliptic to broadly ovate or obovate, 5.5–14 × 1.4–4.6 cm, leathery, glabrous, adaxially drying wrinkled, abaxially not punctate, base attenuate to rounded, margin entire, apex acuminate to narrowly acuminate; lateral veins indistinct. Cymes pseudoterminal, 2–11-flowered; peduncle absent; bracts persistent, green, triangular, 2–10 × 0.5–1.5 mm. Pedicel 7–12 mm, glabrous. Calyx green, 1.2–1.5 cm, shallowly 5-lobed; tube 4–6 mm in diam. at mouth; lobes narrowly triangular, 3–5 × 1.2–2 mm, outside glabrous. Corolla orange-red, 4–5.5 cm, outside glabrous to puberulent in apical half, inside puberulent below middle, without tufts of hairs, mouth slightly oblique; limb indistinctly 2-lipped, lips nearly equal, 5–6 mm. Stamens exerted; filaments 2.6–3.5 cm; anthers coherent in pairs at apex, 3–4 mm; staminode ca. 6 mm. Pistil ca. 5.2 cm; ovary glabrous. Style ca. 1 cm, puberulent apically. Capsule 16–34 cm. Seeds with 2

hairlike appendages at hilar end, appendages 1–1.5 cm, opposite end with 1 hairlike appendage 1–1.5 mm. Fl. Jun–Sep, fr. Oct–Nov.

On trees in forests; 1000–2500 m. SE Xizang, S and W Yunnan [NE India].

28. *Aeschynanthus pachytrichus* W. T. Wang, Acta Bot. Yunnan. 6: 24. 1984.

粗毛芒毛苣苔 cu mao mang mao ju tai

Stems ca. 20 cm, glabrous. Leaves opposite; petiole 4–8 mm; leaf blade lanceolate to narrowly oblong, 8.5–14.8 × 2–3.8 cm, papery to thin leathery, glabrous, adaxially drying nearly smooth, abaxially not punctate, base attenuate, margin entire, apex long acuminate; lateral veins indistinct. Cymes pseudoterminal, 2–4-flowered; peduncle absent; bracts persistent, green, subulate, ca. 1 × 0.2 mm. Pedicel 6–10 mm, glabrous. Calyx green, 9–10 mm, shallowly 5-lobed; tube ca. 5 mm in diam. at mouth; lobes slightly unequal, triangular, 3–5 × 1.8–2 mm, outside glabrous. Corolla red, 5–5.5 cm, outside sparsely puberulent apically, inside with subulate and triangular hairs basally, without tufts of hairs, mouth not oblique; limb indistinctly 2-lipped; adaxial lip ca. 5 mm; abaxial lip ca. 1 cm. Stamens exerted; filaments 3–4 cm; anthers coherent in pairs at apex, 3–3.5 mm; staminode ca. 0.5 mm. Pistil ca. 6.5 cm; ovary glabrous. Style ca. 3.2 cm, sparsely puberulent. Fruit and seeds unknown. Fl. Aug.

• On trees in forests of montane regions; ca. 1000 m. W Yunnan (Yingjiang Xian).

29. *Aeschynanthus hookeri* C. B. Clarke in A. & C. de Candolle, Monogr. Phan. 5: 21. 1883.

束花芒毛苣苔 shu hua mang mao ju tai

Stems ca. 40 cm, glabrous. Leaves opposite; petiole 6–10 mm; leaf blade narrowly elliptic to oblong, 7–9 × 2.3–4 cm, thick leathery, glabrous, adaxially drying smooth or wrinkled, abaxially not punctate, base broadly cuneate, margin entire, apex acuminate; lateral veins indistinct. Cymes pseudoterminal, 4–10-flowered; peduncle absent; bracts persistent, green, triangular to lanceolate, 5–9 × 1.5–3 mm. Pedicel 1–1.5 cm, glabrous. Calyx red or purple, 1–1.3 cm, 5-lobed from above to near middle; tube 5–6 mm in diam. at mouth; lobes ovate to broadly triangular, 3–7 × 2.2–3.2 mm, outside glabrous. Corolla scarlet to orange-scarlet, 2.5–3 cm, outside puberulent, inside glabrous, mouth slightly oblique; limb indistinctly 2-lipped, lips nearly equal, ca. 4.5 mm. Stamens exerted; filaments 2.6–3 cm; anthers coherent in pairs at apex, 2.5–3 mm; staminode ca. 1 mm. Pistil ca. 3 cm; ovary glabrous. Style ca. 1.2 cm, puberulent. Capsule (outside of China) ca. 30 cm. Seeds with 2 hairlike appendages at hilar end, to 13 mm, opposite end with 1 hairlike appendage to 7 mm. Fl. Jul.

On trees in forests of montane regions; 1200–2100 m. NW and S Yunnan [Bhutan, N India, N Myanmar].

30. *Aeschynanthus maculatus* Lindley, Edward's Bot. Reg. 27. 1841.

具斑芒毛苣苔 ju ban mang mao ju tai

Aeschynanthus maculatus var. *stenophyllus* C. B. Clarke.

Stems ca. 40 cm, glabrous. Leaves opposite; petiole 6–10 mm; leaf blade lanceolate to narrowly elliptic, 5–12.5 × 1–2.5 cm, leathery, glabrous, adaxially drying wrinkled, abaxially not punctate, base attenuate, margin entire, apex caudate to caudate-acuminate; lateral veins invisible. Cymes pseudoterminal, 2–6-flowered; peduncle absent; bracts persistent, green, lanceolate, ca. 3 × 1 mm. Pedicel 5–11 mm, glabrous. Calyx green tinged purple-red, ca. 1.4 cm, 5-lobed from above middle; tube ca. 5 mm in diam. at mouth; lobes triangular, ca. 4 × 2.2 mm, outside glabrous. Corolla red-orange, 2–2.5 cm; mouth not or slightly oblique; limb indistinctly 2-lipped, lips nearly equal. Stamens exerted; anthers 2–3 mm. Ovary glabrous. Style glandular puberulent. Capsule ca. 12 cm. Seeds with 2 hairlike appendages at hilar end, appendages to 1.5 cm, opposite end with 1 hairlike appendage to 1.5 cm.

On trees in forests; 2000–2500 m. S Xizang [Bhutan, Nepal]. Specimens from China are known only from flower buds.

31. *Aeschynanthus tengchungensis* W. T. Wang, Acta Bot. Yunnan. 6: 25. 1984.

腾冲芒毛苣苔 teng chong mang mao ju tai

Stems ca. 1 m, glabrous. Leaves opposite; petiole 5–10 mm; leaf blade nearly linear to narrowly oblanceolate or narrowly elliptic, (5–)17–23 × 0.8–2(–3) cm, leathery to thick leathery, glabrous, adaxially drying wrinkled, abaxially not punctate, base attenuate, margin entire, apex acuminate to narrowly acuminate; lateral veins invisible. Cymes pseudoterminal, 1–14-flowered; peduncle absent; bracts persistent, green tinged purple, lanceolate, ca. 5 × 2 mm. Pedicel 3–6 mm, puberulent. Calyx green tinged purple, ca. 5 mm, 5-lobed from above middle; tube ca. 4.5 mm in diam. at mouth; lobes triangular, 1–2 × ca. 1.6 mm, outside sparsely puberulent. Corolla red, 2.4–3.4 cm, outside puberulent, inside very sparsely puberulent, without tufts of hairs, mouth slightly oblique; limb indistinctly 2-lipped, lips nearly equal, ca. 5 mm. Stamens exerted; filaments 1.5–2 cm; anthers coherent in pairs at apex, 1–1.5 mm; staminode ca. 1.1 mm. Pistil ca. 2.5 cm; ovary glabrous. Style ca. 8 mm, glandular puberulent. Capsule 20–30 cm. Seeds with 2 hairlike appendages at hilar end, appendages ca. 3 cm, opposite end with 1 hairlike appendage ca. 3.5 cm. Fl. May–Jun, fr. Jul–Nov.

• On trees in broad-leaved forests; 1700–2300 m. Yunnan (Gongshan Xian, Tengchong Xian).

Nearly all of the Chinese material that has been determined as *Aeschynanthus maculatus* by previous authors is now included in *A. tengchungensis*.

32. *Aeschynanthus longicaulis* Wallich ex R. Brown, On Cyrtandreae 116. 1839.

长茎芒毛苣苔 chang jing mang mao ju tai

Aeschynanthus marmoratus T. Moore.

Stems to 40 cm, glabrous. Leaves opposite; petiole absent to 5 mm; leaf blade elliptic to lanceolate or oblanceolate, 6.5–12 × 2.1–3.3 cm, papery to leathery, glabrous, adaxially drying wrinkled, abaxially sparsely punctate, base cuneate, margin crenulate and undulate, apex acuminate; lateral veins indistinct. Cymes axillary, 1–3-flowered; peduncle absent; bracts deciduous. Pedicel 0.5–1.7 cm, glabrous. Calyx green, 5-sect from base; segments lanceolate-linear, ca. 1.5 cm × 2 mm, outside glabrous. Corolla yellow-green, ca. 2 cm, outside glabrous, inside with 5 tufts of hairs below middle, mouth not oblique; limb indistinctly 2-lipped, lips nearly equal, ca. 4 mm. Stamens exerted; filaments ca. 1.6 cm; anthers coherent in pairs at apex, ca. 2.5 mm. Pistil ca. 3.4 cm; ovary glabrous. Style ca. 2 cm, sparsely puberulent. Capsule 17–32 cm. Seeds hilar end with ca. 25 hairlike appendages 1–2 cm, opposite end with 1 hairlike appendage 1–1.8 cm. Fl. Nov.

On trees in forests; 500–1800 m. S Yunnan [Malaysia, Myanmar, Thailand, Vietnam].

33. *Aeschynanthus poilanei* Pellegrin, Bull. Soc. Bot. France 72: 822. 1925.

药用芒毛苣苔 yao yong mang mao ju tai

Stems ca. 30 cm, glabrous. Leaves opposite or in whorls of 3; petiole 3–6 mm; leaf blade narrowly oblong, 7–10 × 1.6–3 cm, leathery, glabrous, adaxially drying nearly smooth, abaxially not punctate, base attenuate, margin repand-crenulate, apex acuminate; lateral veins invisible. Cymes axillary, 1-flowered; peduncle absent; bracts deciduous. Pedicel ca. 1 cm, glabrous. Calyx 5-sect from base; segments broadly lanceolate, ca. 5 × 2 mm, outside glandular puberulent.

Corolla red, 1.8–2 cm, outside sparsely puberulent, inside with 5 tufts of hairs above base, mouth not oblique; limb indistinctly 2-lipped, lips nearly equal, ca. 2 mm. Stamens exerted. Pistil ca. 8 mm; ovary glabrous. Style ca. 5 mm, sparsely glandular puberulent. Capsule ca. 27 cm. Seeds with ca. 50 hairlike appendages at hilar end, ca. 1.3 cm, opposite end with 1 hairlike appendage ca. 2 cm. Fr. Mar.

On tree trunks in forests; 900–1000 m. SE Yunnan [Vietnam].

Flower description is based on literature.

34. *Aeschynanthus sinolongicalyx* W. T. Wang, Acta Bot. Yunnan. 6: 26. 1984.

长萼芒毛苣苔 chang e mang mao ju tai

Aeschynanthus longicalyx H. W. Li (1983), not Ridley (1905).

Stems to 5 m, glabrous. Leaves opposite; petiole 3–10 mm; leaf blade oblong lanceolate, 6.5–13 × 2–3.5(–4) cm, papery to thin leathery, glabrous, adaxially drying smooth, abaxially not punctate, base cuneate, margin repand-crenate, apex long acuminate to caudate; lateral veins indistinct. Cymes axillary, 1–3-flowered; peduncle absent; bracts deciduous. Pedicel 1–1.3 cm, glabrous. Calyx reddish, 5-sect from base; segments lanceolate-linear, 3–3.3 cm × 1.5–2.5 mm, outside glabrous. Corolla red, 2.4–2.8 cm, outside puberulent, inside with 5 tufts of hairs above base, mouth not oblique; limb indistinctly 2-lipped, lips nearly equal, ca. 4 mm. Stamens exerted; filaments ca. 2.2 cm; anthers coherent in pairs at apex, 2.5–2.8 mm; staminode ca. 0.5 mm. Pistil 2–3.3 cm; ovary glabrous. Style ca. 1.5 cm, glabrous. Fruit and seeds unknown. Fl. Sep.

• Shrubs in forests and bamboo thickets of montane regions; ca. 800 m. SE Yunnan (Pingbian Xian).

48. *LYSIONOTUS* D. Don, Edinburgh Philos. J. 7: 85. 1822.

吊石苣苔属 diao shi ju tai shu

Evergreen subshrubs or climbing lianas, epiphytic, less frequently epipetric or terrestrial, not rhizomatous. Stems branched or simple. Leaves usually many, along stem, opposite or whorled, rarely alternate, equal to subequal in a pair; leaf blade glabrous, sometimes puberulent to pilose, base cuneate to subcordate or attenuate. Inflorescences lax, axillary, 1- to many-flowered cymes; bracts 2, opposite. Calyx actinomorphic, 5-sect from base or 5-lobed; segments equal. Corolla purple to reddish, white, or yellow, zygomorphic, inside glabrous, sometimes sparsely puberulent or sparsely glandular puberulent; tube funnelliform to tubular, not swollen, longer than limb, 0.3–1.5 cm in diam.; limb 2-lipped; adaxial lip 2-lobed, shorter than abaxial lip; abaxial lip 3-lobed, lobes equal or central lobe longer, apex rounded. Stamens 2, adnate to abaxial side of corolla tube near middle, seldom to near base, included; anthers basifixed, coherent, thecae nearly parallel, not confluent, dehiscing longitudinally; connective sometimes appendiculate; staminodes 2 or 3, adnate to adaxial side of corolla tube. Disc ringlike to cupular. Ovary linear, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigma 1, terminal, depressed globose, undivided. Capsule straight in relation to pedicel, linear, much surpassing calyx, dehiscing loculicidally to base; valves 2 or 4, straight, not twisted. Seeds with 1 hairlike or subulate appendage at each end.

About 25 species: Bhutan, China, N India, S Japan, Laos, Myanmar, Nepal, N Thailand, N Vietnam; 23 species in China.

1a. Calyx lobed from or above middle, tube 5–18 mm.

2a. Leaf blade 0.9–3.1 × 0.3–0.7 cm, leathery or thin leathery, oblanceolate or narrowly oblong; lateral veins obscure; adaxial corolla lip ca. 2 mm; pistil ca. 1.2 cm; capsule to 5.4 cm 22. *L. sangzhiensis*

2b. Leaf blade 4.5–13 × 2.2–6 cm, papery, narrowly elliptic to ovate, or oblong; lateral veins abaxially flat or prominent, obvious; adaxial corolla lip 5.5–6 mm; pistil 2–2.5 cm; capsule at least 6.5 cm.

3a. Flowers 2–11 in cymes; leaf margin serrate to dentate; calyx 0.9–1.2 cm, tube 6–10 mm; staminodes 3,

0.5–6 mm; anther connective appendage hornlike, 1.2–1.8 mm; capsule 9–13 cm; seed appendage

1.5–2 mm; subshrubs to 50 cm 21. *L. gamosepalus*

3b. Flowers solitary; leaf margin entire or denticulate with small glands; calyx 1.6–2.2 cm, tube 12–18 mm; staminodes 2, ca. 2 mm; anther connective unappendaged; capsule 6.5–9 cm; seed appendage 0.3–0.5

mm; prostrate herbs, scandent subshrubs, or lianas, stems sometimes thick corky, to 9 m 23. *L. chingii*

1b. Calyx divided from base, without a tube, or seldom lobed below middle, tube to 3.5 mm.

4a. Seed appendages 0.1–0.25 mm (unknown in *L. gracilis*).

5a. Corolla (2–)2.7–5.5 cm, outer surface glabrous, adaxial lip 3–6 mm, abaxial lip 8–14 mm; staminodes 2; peduncle 3–8 cm; bracts linear, linear-oblong, or lanceolate.

6a. Stamens ca. 12 mm; pedicel 1.5–2.9 cm 1. *L. longipedunculatus*

6b. Stamens 4–5 mm; pedicel 0.6–1 cm.

7a. Leaf blade 2.2–5.7 × 0.8–1.5 cm, leathery; peduncle 3–4.5 cm; calyx segments ca. 7 mm; corolla

inner surface glandular puberulent below abaxial lip, tube subtubular, ca. 1.5 cm, mouth ca.

5 mm in diam. 12. *L. gracilis*

7b. Leaf blade 8–14 × 2–4 cm, papery; peduncle 5.5–7.5 cm; calyx segments 4–5 mm; corolla

inner surface glabrous, tube funnelform-tubular, ca. 2 cm, mouth ca. 8 mm in diam. 10. *L. atropurpureus*

5b. Corolla 1.7–1.9 cm, outer surface at least sparsely puberulent, adaxial lip 2–3 mm, abaxial lip 5.5–7 mm; staminodes 3; peduncle

8a. Leaf blade margin subentire with small glands or indistinctly denticulate; peduncle 0.2–1 cm; corolla glabrous inside; calyx 6–7 mm 2. *L. oblongifolius*

8b. Leaf blade margin subentire to denticulate; peduncle 1–2.5(–9.5) cm; corolla abaxial lip sparsely puberulent inside; calyx 4–5 mm 3. *L. denticulosus*

4b. Seed appendages at least 0.5 mm long.

9a. Seed appendages 1.5–3.2 mm; capsule 13–21 cm 5. *L. wilsonii*

9b. Seed appendages 0.5–2 mm; capsule to 13 cm.

10a. Anther connective with hornlike appendage.

11a. Leaf blade herbaceous, seldom papery, 4–14(–18) cm; bracts ovate to orbicular, 4–8.5 mm

wide; corolla sparsely puberulent outside, sparsely glandular puberulent basally inside 20. *L. serratus*

11b. Leaf blade leathery, 1.2–10 cm; bracts linear to ovate, obovate, or oblanceolate, 0.4–3 mm

wide; corolla glabrous or puberulent basally outside, glabrous inside.

12a. Leaf blade apex abruptly acuminate to obtuse; calyx segments 9–12 mm; staminodes

8–10 mm 18. *L. kwangsiensis*

12b. Leaf blade apex acute to subtruncate; calyx segments (1–)2–7(–8) mm; staminodes

0.6–5(–8) mm 19. *L. pauciflorus*

10b. Anther connective unappendaged.

13a. Calyx 12–20 mm, deeply 5-lobed, tube 3–3.5 mm; peduncle ca. 0.8 cm 16. *L. metuoensis*

13b. Calyx 1.5–14 mm, 5-sect from base or near base, tube absent or 0.2–1 mm; peduncle (absent or) 1.5–10 cm.

14a. Stems glabrous.

- 15a. Bracts orbicular-ovate, nearly as long as wide; leaf blade 4–7 mm wide; ovary with a few short hairs; capsule 2–2.7 cm 8. *L. involucratus*
- 15b. Bracts linear, lanceolate to ovate, or elliptic, at least 2 × as long as wide; leaf blade (0.7–)1–8 cm wide; ovary glabrous; capsule 2.5–12 cm (fruits unknown in *L. atropurpureus*).
- 16a. Calyx segments 11–14 mm; corolla 5–6.5 cm; staminodes ca. 6 mm 7. *L. petelotii*
- 16b. Calyx segments 4–9 mm; corolla 1.7–5 cm; staminodes 0.6–3 mm.
- 17a. Leaf blade margin entire or repand, glandular; corolla 1.7–2.1 cm, sparsely glandular puberulent basally inside, tube 1–1.3 cm 4. *L. aeschynanthoides*
- 17b. Leaf blade margin serrulate to serrate or denticulate, eglandular; corolla 2.6–5 cm, glabrous inside, tube 1.7–3.4 cm.
- 18a. Peduncle 1.5–4.4 cm; bracts 1–1.5 mm; corolla white, purple striate; filaments 8–12 mm; pistil 1.8–2.8 cm 6. *L. heterophyllus*
- 18b. Peduncle 4.5–10 cm; bracts 2–8 mm; corolla purple; filaments 2.5–5 mm; pistil 1.2–1.4 cm.
- 19a. Leaf blade margin serrate; bracts lanceolate to ovate, 1.2–4 mm wide; corolla mouth 4–5 mm in diam., adaxial lip ca. 2.5 mm 9. *L. sessilifolius*
- 19b. Leaf blade margin denticulate; bracts linear, 0.2–0.8 mm wide; corolla mouth ca. 8 mm in diam., adaxial lip ca. 6 mm 10. *L. atropurpureus*
- 14b. Stems puberulent at least near apex.
- 20a. Leaf blade 0.35–2.2 × 0.25–0.9 cm; flowers solitary.
- 21a. Leaf blade 0.35–1.1 cm, apex obtuse; corolla ca. 1.3 cm, inner surface glabrous; staminodes 3; calyx segments 1.5–4 mm; pistil ca. 8 mm 17. *L. microphyllus*
- 21b. Leaf blade 0.8–2.2 cm, apex acute to acuminate; corolla 3.8–5 cm, inner surface sparsely puberulent near base or near filament bases; staminodes 2; calyx segments 4–8.5 mm; pistil 17–32 mm.
- 22a. Leaf blade glabrous, papery, narrowly elliptic to ovate; calyx segments 4–7 mm, glabrous on both sides; corolla outer surfaces glabrous; petiole 1–5 mm; disc ringlike, margin entire 14. *L. sulphureus*
- 22b. Leaf blade densely puberulent, leathery, lanceolate to narrowly lanceolate; calyx segments 7.5–8.5 mm, outside puberulent, inside glabrous; corolla outer surface sparsely puberulent; petiole 0.5–1 mm; disc cupular, margin shallowly dentate 15. *L. levipes*
- 20b. Leaf blade (1–)2–14 × (0.5–)1–4 cm; flowers solitary or in 2–6-flowered cymes.
- 23a. Bracts broadly obovate to ovate or deltoid; calyx segments narrowly ovate to obovate or oblong ovate; leaf blade abaxially sparsely pilose; corolla outer surface pilose; staminodes 5–6 mm 13. *L. pubescens*
- 23b. Bracts linear or linear-oblong; calyx segments lanceolate-linear to triangular-linear; leaf blade abaxially puberulent to glabrous; corolla outer surface glabrous or sparsely puberulent; staminodes 0.6–3 mm.
- 24a. Corolla inner surface glandular puberulent below abaxial lip, tube subtubular, ca. 1.5 cm, mouth ca. 5 mm in diam. 12. *L. gracilis*
- 24b. Corolla inner surface glabrous, tube funnellform-tubular to slender funnellform, 1.9–3.4 cm, mouth 6–12 mm in diam.

- 25a. Stems apically sparsely puberulent; calyx segments 4–5 mm; pistil ca. 12 mm 10. *L. atropurpureus*
- 25b. Stems apically puberulent to densely puberulent; calyx segments 4–13 mm; pistil 13–28 mm.
- 26a. Bracts 1–1.5 mm; calyx segments 4–8 mm; corolla mouth 9–12 mm in diam.; seeds 1–1.2 mm, appendages subulate, 0.5–0.8 mm 6. *L. heterophyllus*
- 26b. Bracts 2.2–4.5 mm; calyx segments (6–)8–13 mm; corolla mouth 6–9 mm in diam.; seeds ca. 0.8 mm, appendages hairlike, ca. 2 mm 11. *L. forrestii*

1. *Lysionotus longipedunculatus* (W. T. Wang) W. T. Wang, *Guihaia* 3: 261. 1983.

长梗吊石苣苔 *chang geng diao shi ju tai*

Chirita longipedunculata W. T. Wang, *Acta Phytotax. Sin.* 13: 104. 1975.

Subshrubs, sometimes twining. Stems erect, 35–80 cm, apically puberulent. Petiole 0.9–2.5 cm; leaf blade narrowly elliptic or oblong lanceolate to oblanceolate, often falcate, 4–21 × 1.6–5.5 cm, papery, appressed pubescent, sometimes glabrescent, base cuneate to narrowly so, margin denticulate or subentire to serrate, apex acuminate; lateral veins 7–12 on each side of midrib, flat to abaxially prominent. Cymes 2–4-flowered; peduncle 4–8 cm, puberulent and sparsely glandular puberulent; bracts linear to lanceolate, 2–3(–8) × 1–2 mm. Pedicel 1.5–2.9 cm. Calyx 5-sect from base; segments 5–6 mm, outside puberulent, inside glabrous. Corolla purple with tube tinged yellow, (2–)2.7–3 cm, glabrous; tube tubular, 1.2–1.5 cm × 5–7 mm; adaxial lip 4–6 mm; abaxial lip 0.8–1.4 cm. Stamens ca. 1.2 cm; filaments ca. 1 cm; anthers subreniform; connective unappendaged; staminodes 2, 2.2–3.4 mm. Disc ringlike, margin entire. Pistil ca. 1.1 cm, glabrous. Capsule 2.8–3.2 cm. Seed appendages subulate, 0.1–0.25 mm. Fl. Sep–Oct, fr. Oct.

• Streamside, terrestrial or on rocks, stony cliffs near forests in valleys or on limestone; 500–1700 m. SE Yunnan (Pingbian Xian).

2. *Lysionotus oblongifolius* W. T. Wang, *Guihaia* 3: 263. 1983.

长圆吊石苣苔 *chang yuan diao shi ju tai*

Subshrubs. Stems erect, to 80 cm, apically densely rust-brown appressed puberulent. Petiole 1–4 cm; leaf blade oblong to obovate-oblong, 9–20 × 2.5–8 cm, papery, adaxially appressed puberulent, glabrescent, abaxially appressed puberulent, appressed pilose along veins, base cuneate, margin subentire with glands or indistinctly denticulate, apex acuminate; lateral veins 7–10 on each side of midrib, abaxially prominent. Cymes 4–7-flowered; peduncle 0.2–1 cm, densely rust-brown glandular pubescent; bracts narrowly triangular,

2–6 × ca. 0.7 mm. Pedicel 0.5–1.5 cm. Calyx 5-sect from base; segments 6–7 mm, outside rust-brown velutinous, inside glabrous. Corolla purple-red, ca. 1.9 cm, outside puberulent, inside glabrous; tube tubular, ca. 1.3 cm × 4–5 mm; adaxial lip ca. 2.2 mm; abaxial lip ca. 5.5 mm. Stamens ca. 5.5 mm; filaments ca. 4.5 mm; anthers ovoid; connective unappendaged; staminodes 3, 1–3 mm. Disc ringlike, margin entire. Pistil ca. 1 cm; ovary glabrous. Style glandular puberulent. Capsule 3–4 cm. Seed appendages subulate, 0.1–0.2 mm. Fl. Sep–Oct, fr. Oct.

• Terrestrial in forests on limestone hills; ca. 300 m. SW Guangxi.

3. *Lysionotus denticulosus* W. T. Wang, *Guihaia* 3: 264. 1983.

多齿吊石苣苔 *duo chi diao shi ju tai*

Subshrubs. Stems erect, 60–130 cm, apically densely rust-brown pubescent. Petiole 5–35(–41) mm; leaf blade oblong or lanceolate-oblong to ovate, 5.8–18(–25) × 2–6(–9) cm, papery, rust-brown to golden puberulent, base cuneate to broadly so, margin subentire to denticulate, apex acuminate; lateral veins 7–11 on each side of midrib, abaxially prominent. Cymes 3–7 (–10)-flowered; peduncle 1–2.5(–9.5) cm, rust-brown to golden glandular pubescent to pilose; bracts triangular, ca. 4 × 1.2 mm. Pedicel 0.3–1.8 cm. Calyx 5-sect from base; segments 4–5 mm, outside densely puberulent, inside glabrous. Corolla purple-red to white, ca. 1.7 cm, outside sparsely puberulent, inside sparsely puberulent on abaxial lip; tube subtubular, ca. 10 × 4–5 mm; adaxial lip 2–3 mm; abaxial lip 5.5–7 mm. Stamens ca. 7.2 mm; filaments ca. 6 mm; anthers subglobose; connective unappendaged; staminodes 3, 0.8–1.8 mm. Disc ringlike, margin entire. Pistil ca. 1.4 cm; ovary glabrous. Style sparsely glandular puberulent. Capsule 3.7–7.2 cm. Seed appendages subulate, 0.1–0.2 mm. Fl. Sep–Nov, fr. Nov.

• Forests, terrestrial or on limestone; 700–1800 m. W Guangxi, SE Yunnan (Malipo Xian).

4. *Lysionotus aeschynanthoides* W. T. Wang, *Guihaia* 3: 265. 1983.

桂黔吊石苣苔 *gui qian diao shi ju tai*

Subshrubs. Stems erect, to 1 m, glabrous. Petiole 2–35 mm; leaf blade sometimes asymmetric, narrowly elliptic to elliptic-ovate or obovate, 4.5–13.6 × 2.2–8 cm, papery, glabrous, base sometimes oblique, cuneate to rounded, margin entire to repand, glandular, apex acuminate to abruptly acuminate; lateral veins 4–7(–9) on each side of midrib, flat to prominent below. Cymes 2–8-flowered; peduncle 1–2 cm, glabrous; bracts elliptic, ca. 5 × 2.5 mm. Pedicel 2.5–4.5(–6) mm. Calyx 5-sect from base; segments 6–9 mm, glabrous. Corolla yellow to white, 1.7–2.1 cm, outside glabrous, inside sparsely glandular puberulent below; tube funnellform-tubular, 1–1.3 cm × 7 mm; adaxial lip ca. 4 mm; abaxial lip 7–8 mm. Stamens ca. 9 mm; filaments ca. 7.5 mm; anthers subglobose; connective unappendaged; staminodes 2, 2.2–3 mm. Disc ringlike, margin entire. Pistil 0.9–1.4 cm, glabrous. Capsule 5.4–10 cm. Seed appendages hairlike, 0.7–1.2 mm. Fl. Jun–Jul, fr. Jul–Nov.

• Terrestrial or on rocks, forests, thickets, by streams; 600–1200 m. W Guangxi, SW Guizhou, SE Yunnan.

5. *Lysionotus wilsonii* Rehder in Sargent, Pl. Wilson. 3: 388. 1916.

川西吊石苣苔 *chuan xi diao shi ju tai*

Subshrubs or woody vines. Stems often procumbent at base, at least 20–30 cm, glabrous. Petiole 3–10(–20) mm; leaf blade elliptic to ovate or narrowly obovate, 4.2–12.5 × (1.2–) 2.2–4.6 cm, leathery, glabrous, base cuneate to subrounded, margin entire with glands to denticulate, apex abruptly acuminate to obtuse; lateral veins 5 or 6 on each side of midrib, flat to obscure. Cymes 1- or 2-flowered; peduncle 0.6–2.2(–4) cm, glabrous; bracts linear, ca. 1.2 × 0.3 mm. Pedicel 5–7 mm. Calyx 5-sect from base; segments 5–9 mm, glabrous. Corolla white, 4–5.4 cm, basally sparsely puberulent; tube funnellform-tubular, 3–4.2 × 1–1.5 cm; adaxial lip 4–5 mm; abaxial lip 1–1.5 cm. Stamens ca. 1.5 cm; filaments ca. 1.3 cm; anthers globose; connective unappendaged or sometimes with small basal-abaxial swelling; staminodes 2, 4–7 mm. Disc ringlike, margin entire. Pistil 2–3 cm, glabrous. Capsule 13–21 cm. Seed appendages hairlike, 1.5–3.2 mm. Fl. Jul–Aug, fr. Aug–Nov.

• Rocks in forested valleys; 700–1800 m. W Sichuan, NE Yunnan.
6. *Lysionotus heterophyllus* Franchet, Bull. Mus. Hist. Nat. (Paris) 5: 249. 1899.

异叶吊石苣苔 *yi ye diao shi ju tai*

Subshrubs. Stems ca. 35 cm, glabrous or puberulent. Petiole 2–10(–20) mm; leaf blade narrowly elliptic to elliptic, oblong, oblong-ovate, lanceolate, to oblanceolate, 1.2–8.2 × 0.7–3.2 cm, leathery to papery, usually glabrous, abaxially sometimes puberulent, base cuneate to rounded, margin denticulate or serrulate to

serrate, apex acute to acuminate; lateral veins 3–6 on each side of midrib, flat to obscure. Cymes 1–4-flowered; peduncle 1.5–4.4 cm, glabrous to puberulent; bracts linear, 1–1.5 × ca. 0.8 mm. Pedicel 5–10 mm. Calyx 5-sect from base; segments 4–8 mm, outside glabrous to puberulent, inside glabrous. Corolla white, purple striate, 2.6–5 cm, outside glabrous to puberulent, inside glabrous; tube funnellform-tubular, 1.9–3.4 × 0.9–1.2 cm; adaxial lip 3–7 mm; abaxial lip 0.9–1.5 cm. Stamens 0.9–1.5 cm; filaments 0.8–1.2 cm; anthers subglobose; connective unappendaged; staminodes 2 or 3, 0.6–3 mm. Disc ringlike, margin entire. Pistil 1.8–2.8 cm, glabrous. Capsule 2.5–5.5 cm. Seed appendages subulate, 0.5–0.8 mm. Fl. Jun–Sep, fr. Aug–Oct.

• On trees in forested valleys, rocks in montane regions, valley streamsides; 1100–2800 m. N Guangxi, S and W Sichuan, NE Yunnan.

1a. Stems and pedicel glabrous; corolla outside glabrous to puberulent near base 6a. var. *heterophyllus*

1b. Stems densely puberulent or apically puberulent; pedicel densely puberulent or glabrous to sparsely puberulent near apex; corolla outside sparsely puberulent.

2b. Stems densely puberulent; petiole puberulent; leaf blade leathery, adaxially sparsely puberulent, glabrescent, abaxially puberulent; peduncle densely puberulent; pedicel densely puberulent 6b. var. *mollis*

2a. Stems apically puberulent; petiole puberulent adaxially, glabrous abaxially; leaf blade papery, glabrous; peduncle glabrous; pedicel glabrous to sparsely puberulent near apex 6c. var. *lasianthus*

6a. *Lysionotus heterophyllus* var. *heterophyllus*

异叶吊石苣苔(原变种) *yi ye diao shi ju tai* (yuan bian zhong)

Lysionotus brachycarpus Rehder.

Stems glabrous. Petiole puberulent adaxially, glabrous abaxially; leaf blade leathery to papery, glabrous, margin serrulate to serrate or denticulate. Peduncle glabrous. Pedicel glabrous. Corolla outside glabrous to puberulent near base. Fl. Jul–Aug, fr. Aug–Oct.

• On trees in forested valleys; 1700–2800 m. S and W Sichuan, NE Yunnan.

6b. *Lysionotus heterophyllus* var. *mollis* W. T. Wang, Acta Phytotax. Sin. 13: 69. 1975.

毛叶吊石苣苔 *mao ye diao shi ju tai*

Stems densely puberulent. Petiole puberulent; leaf blade leathery, adaxially sparsely puberulent, glabrescent, abaxially puberulent, margin serrulate, sometimes ciliate. Peduncle and pedicel densely puberulent. Corolla outside sparsely puberulent. Fl. Jul–Sep.

•Rocks in montane regions; 1600–1700 m. W Sichuan (Emei Xian, Hongya Xian).

6c. *Lysionotus heterophyllus* var. *lasianthus* W. T. Wang, Guihaia 3: 267. 1983.

龙胜吊石苣苔 long sheng diao shi ju tai

Lysionotus pauciflorus Maximowicz var. *lasianthus* W. T. Wang.

Stems apically puberulent. Petiole puberulent adaxially, glabrous abaxially; leaf blade papery, glabrous, margin denticulate to serrulate. Peduncle glabrous. Pedicel glabrous to sparsely puberulent near apex. Corolla outside sparsely puberulent. Fl. Jun–Jul.

•Terrestrial or on trees in forests in stream valleys; 1100–1700 m. N Guangxi (Longsheng Xian, Xing'an Xian).

7. *Lysionotus petelotii* Pellegrin in Lecomte, Fl. Indo-Chine 4: 503. 1930.

细萼吊石苣苔 xi e diao shi ju tai

Subshrubs. Stems 12–50 cm, glabrous. Petiole 0.4–1.7(–3) cm; leaf blade lanceolate to lanceolate-oblong, oblong, or ovate, seldom oblanceolate to obovate, 1.5–9(–11) × 1–2.5(–4.6) cm, leathery to papery, glabrous, base cuneate to rounded, margin serrulate, denticulate, or crenulate to subentire, apex acuminate; lateral veins 4 or 5 on each side of midrib, flat. Cymes 1–3-flowered; peduncle 2–6 cm, glabrous; bracts lanceolate, ca. 3–4 × 0.8–1 mm. Pedicel 0.7–1.7 cm. Calyx 5-sect from base; segments 1.1–1.4 cm, glabrous. Corolla purplish to yellow, 5–6.5 cm, glabrous; tube funnelform-tubular, 3.6–4 × 1.2–1.4 cm; adaxial lip 1–1.1 cm; abaxial lip 1.2–1.8 cm. Stamens ca. 1 cm; filaments ca. 9 mm; anthers broadly ovoid; connective unappendaged; staminodes 2, ca. 6 mm. Disc ringlike, margin entire. Pistil ca. 2.8 cm, glabrous. Capsule 6–12 cm. Seed appendages subulate, 0.9–1 mm. Fl. Sep, fr. Oct.

Terrestrial or epiphytic in forested valleys and montane forests; 1600–2500 m. SE Yunnan [N Vietnam].

8. *Lysionotus involucratus* Franchet, Bull. Mus. Hist. Nat. (Paris) 5: 249. 1899.

圆苞吊石苣苔 yuan bao diao shi ju tai

Subshrubs. Stems at least 20 cm, glabrous. Petiole 2–3.5 mm; leaf blade oblanceolate to narrowly oblong, 1.2–2.4 cm × 4–7 mm, leathery, glabrous, base narrowly cuneate, margin serrate, apex acute to subtruncate; lateral veins 3–5 on each side of midrib, inconspicuous. Cymes 1- or 2-flowered; peduncle 2–6 cm, glabrous; bracts orbicular-ovate, ca. 4 × 4 mm. Pedicel 3–5 mm. Calyx 5-sect from base; segments 6–9.5 mm, glabrous. Corolla purple, 2–2.6 cm, glabrous; tube slender funnelform, 1.3–1.7 cm × ca. 5 mm; adaxial lip ca. 3.5 mm; abaxial lip 7–9 mm. Stamens ca. 9.5 mm; filaments ca. 8 mm; anthers subglobose; connective unappendaged; staminodes 2, ca. 2.5 mm. Disc ringlike, margin entire. Pistil ca. 9 mm; ovary with a few short hairs. Style glabrous. Capsule 2–2.7 cm. Seed appendages subulate, 0.5–0.7 mm. Fl. Jul, fr. Sep.

•Rocks in valleys; ca. 1300 m. NW Hunan, NE Sichuan.

9. *Lysionotus sessilifolius* Handel-Mazzetti, Kaiserl. Akad. Wiss. Wien, Math.-Naturwiss. Kl., Anz. 61: 21. 1925.

短柄吊石苣苔 duan bing diao shi ju tai

Subshrubs, sometimes climbing. Stems 25–45 cm or more, glabrous. Petiole 1–6 mm or absent; leaf blade oblong to narrowly elliptic, lanceolate, or ovate, 3.5–14 × 2–5.8 cm, thin leathery to papery, glabrous, base broadly cuneate to subcordate, margin serrate, apex acute to acuminate; lateral veins 5–9 on each side of midrib, flat to prominent below. Cymes 2–7-flowered; peduncle 4.5–10 cm, glabrous or with a few hairs; bracts lanceolate to ovate, 3–8 × 1.2–4 mm. Pedicel 4–10 mm. Calyx 5-sect from base; segments 4–6 mm, glabrous, sometimes margin sparsely ciliate. Corolla purple, 2.8–3.4 cm, glabrous; tube slender funnelform, 1.7–2.8 cm × 4–5 mm; adaxial lip ca. 2.5 mm; abaxial lip ca. 9 mm. Stamens 3.5–6 mm; filaments 2.5–5 mm; anthers broadly ovoid; connective unappendaged; staminodes 2, ca. 1 mm. Disc ringlike, margin entire. Pistil ca. 1.4 cm, glabrous. Capsule 5–7.5 cm. Seed appendages hairlike, ca. 1.5 mm. Fl. Aug–Oct, fr. Sep–Oct.

•Terrestrial, epipetric, or epiphytic in forests and streamsides in valleys; 1200–2800 m. NE Yunnan.

10. *Lysionotus atropurpureus* Hara, J. Jap. Bot. 48: 359. 1973.

深紫吊石苣苔 shen zi diao shi ju tai

Subshrubs. Stems ca. 25 cm, glabrous or sparsely puberulent near apex. Petiole 4–10 mm; leaf blade oblong to narrowly elliptic, 8–14 × 2–4 cm, papery, glabrous, base cuneate to broadly cuneate, margin denticulate, apex acuminate to long acuminate; lateral veins 5–8 on each side of midrib, flat. Cymes 2–4-flowered; peduncle 5.5–7.5 cm, glabrous; bracts linear, 2–4 × 0.2–0.8 mm. Pedicel to 10 mm. Calyx 5-sect from base; segments 4–5 mm, glabrous. Corolla purple, ca. 3 cm, glabrous; tube tubular-funnelform, ca. 2 × 0.8 cm; adaxial lip ca. 6 mm; abaxial lip ca. 1 cm. Stamens ca. 5 mm; filaments ca. 4 mm; anthers oblate; connective unappendaged; staminodes 2, ca. 2 mm. Disc ringlike, margin entire. Pistil ca. 1.2 cm, glabrous. Capsule 6–7.5 cm. Seed appendages to 2 mm. Fl. Aug.

On trees in broad-leaved forests; ca. 2000 m. SE Xizang (Medog Xian) [Bhutan, NE India, Nepal, Sikkim].

11. *Lysionotus forrestii* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 185. 1918.

滇西吊石苣苔 dian xi diao shi ju tai

Subshrubs. Stems 30–60 cm or more, apically puberulent. Petiole 0.3–1.8 cm; leaf blade narrowly elliptic to narrowly ovate or narrowly obovate, 4–11.6 × 1.2–3.6 cm, papery to herbaceous, adaxially glabrous; midrib abaxially puberulent, glabrescent, base cuneate to broadly cuneate, margin denticulate to serrulate, apex

acute to acuminate; lateral veins 4–8 on each side of midrib, flat. Cymes 1–4-flowered; peduncle 3–6.4 cm, basally sparsely puberulent to glabrescent; bracts linear, 2.2–4.5 × 0.3–0.5 mm. Pedicel 3–8(–15) mm. Calyx 5-sect from base; segments (0.6–)0.8–1.3 cm, glabrous. Corolla purple, 3.2–4.8 cm, glabrous; tube slender funnellform, 1.9–3 cm × 6–9 mm; adaxial lip ca. 6 mm; abaxial lip 1.2–1.4 cm. Stamens 5–10 mm; filaments 3–8 mm; anthers oblate; connective unappendaged; staminodes 2, ca. 1 mm. Disc ringlike, margin entire. Pistil 1.3–2 cm, glabrous. Capsule 3.8–6.6 cm. Seed appendages hairlike, ca. 2 mm. Fl. Jul–Sep, fr. Oct.

• Terrestrial or epiphytic in forested valleys; 2200–3100 m. SE Xizang, NW and W Yunnan.

12. *Lysionotus gracilis* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 186. 1918.

纤细吊石苣苔 *xian xi diao shi ju tai*

Subshrubs. Stems 15–30 cm, apically appressed puberulent. Petiole 3–11 mm; leaf blade narrowly oblong to lanceolate, 2.2–5.7 × 0.8–1.5 cm, leathery, adaxially glabrous, abaxially glabrous, midrib sometimes puberulent, base cuneate to subrounded, margin repand-denticulate to serrate, apex acuminate to acute; lateral veins 4–6 on each side of midrib, flat.

Cymes 1–6-flowered; peduncle 3–4.5 cm, sparsely puberulent to glabrescent; bracts linear-oblong, 2–3 × 0.2–0.5 mm. Pedicel ca. 6 mm. Calyx 5-sect from base; segments ca. 7 mm, glabrous. Corolla white, purplish striate, ca. 2.8 cm, outside glabrous, inside glandular puberulent below abaxial lip; tube subtubular, ca. 1.5 cm × 5 mm; adaxial lip ca. 3 mm; abaxial lip ca. 1.2 cm. Stamens ca. 4 mm; filaments ca. 3 mm; anthers oblate; connective unappendaged; staminodes 2, ca. 0.6 mm. Disc ringlike, margin entire. Pistil ca. 1.1 cm, glabrous. Capsule 6–10 cm. Seeds unknown. Fl. Jul–Aug, fr. Aug.

On trees in evergreen, broad-leaved forests; 2100–2400 m. W Yunnan [N Myanmar].

13. *Lysionotus pubescens* C. B. Clarke, J. Linn. Soc., Bot. 25: 5. 1889.

毛枝吊石苣苔 *mao zhi diao shi ju tai*

Lysionotus gracilipes C. E. C. Fischer; *L. wardii* W. W. Smith.

Subshrubs. Stems 15–45 cm or more, apically puberulent. Petiole 1–6 mm; leaf blade oblong to elliptic-ovate or broadly lanceolate, 1–5.2 × 0.5–1.9 cm, papery to herbaceous, adaxially glabrous to sparsely appressed pilose, abaxially sparsely pilose, base cuneate to rounded, margin repand-denticulate to subentire, rarely serrate, apex acuminate to acute; lateral veins 3–5 on each side of midrib, flat. Cymes 1–4-flowered; peduncle 3.2–6.5 cm, glabrous or basally puberulent; bracts broadly obovate to ovate or deltoid, 2.2–4 × 2–4 mm. Pedicel 4–7 mm. Calyx 5-sect from base; segments 2.5–4.5 mm, glabrous. Corolla white to purplish, purple striate, 3.7–4.4 cm, outside pilose, inside glabrous; tube funnellform-tubular, 2.5–2.7 ×

0.8–1 cm; adaxial lip 6–7 mm; abaxial lip 0.9–1.2 cm. Stamens 0.9–1.4 cm; filaments 0.8–1.2 cm; anthers oblate; connective unappendaged; staminodes 2, 5–6 mm. Disc ringlike, margin entire. Pistil 2–2.2 cm; ovary glabrous to slightly puberulent. Style glabrous. Capsule 3–6.8 cm. Seed appendages hairlike to subulate, 0.6–1 mm. Fl. Aug–Sep, fr. Oct.

On trees or rocks in forests; 1500–2500 m. SE Xizang (Medog Xian), NW and SE Yunnan [Bhutan, NE India, N Myanmar].

14. *Lysionotus sulphureus* Handel-Mazzetti, Kaiserl. Akad. Wiss. Wien, Math.-Naturwiss. Kl., Anz. 61: 20. 1925.

黄花吊石苣苔 *huang hua diao shi ju tai*

Subshrubs. Stems 20–30 cm or more, apically puberulent. Petiole 1–5 mm; leaf blade narrowly elliptic to ovate, 0.8–2.2 cm × 4–9 mm, papery, glabrous, base cuneate, margin denticulate to serrulate, apex acute to acuminate; lateral veins obscure. Cymes 1-flowered; peduncle 2.3–4 cm, glabrous or sparsely puberulent; bracts linear, 1–2 × ca. 0.5 mm. Pedicel ca. 5 mm. Calyx 5-sect from base; segments 4–7 mm, glabrous. Corolla yellowish to pale purple with darker markings and yellow base, 3.8–4.6 cm, outside glabrous, inside sparsely puberulent at filament bases; tube funnellform-tubular, 2.7–3.2 cm × ca. 9 mm; adaxial lip ca. 4 mm; abaxial lip 1.1–1.3 cm. Stamens ca. 1.3 cm; filaments ca. 1 cm; anthers oblate; connective unappendaged; staminodes 2, ca. 5 mm. Disc ringlike, margin entire. Pistil ca. 1.7 cm, glabrous. Capsule 2.8–8 cm. Seed appendages subulate, 0.6–1.1 mm. Fl. Jul–Sep, fr. Sep.

• Forests, on trees or rocks near streams; 2300–2900 m. NW Yunnan.

15. *Lysionotus levipes* (C. B. Clarke) B. L. Burtt in O. M. Hilliard & B. L. Burtt, Edinburgh J. Bot. 52: 220. 1995.

狭萼吊石苣苔 *xia e diao shi ju tai*

Aeschynanthus levipes C. B. Clarke in A. & C. de Candolle, Monogr. Phan. 5: 28. 1883; *Lysionotus angustisepalus* W. T. Wang.

Subshrubs. Stems 30–60 cm, apically densely spreading puberulent. Petiole 0.5–1 mm; leaf blade lanceolate to narrowly so, 1.2–2.2 cm × 2.5–4 mm, leathery, densely puberulent, base cuneate, margin sparsely denticulate or glandular, apex acuminate to acute; lateral veins obscure. Cymes 1-flowered; bracts apparently absent. Pedicel ca. 6 mm. Calyx 5-sect from base; segments 7.5–8.5 mm, outside puberulent, inside glabrous. Corolla light purple with darker veins, ca. 5 cm, outside sparsely puberulent, inside below sparsely puberulent; tube slender funnellform, ca. 3.6 × 0.9 cm; adaxial lip ca. 3 mm; abaxial lip ca. 1.4 cm. Stamens ca. 1.4 cm; filaments ca. 1.2 cm; anthers broadly ovoid; connective unappendaged; staminodes 2, ca. 5 mm. Disc cupular, ca. 1.2 mm, margin shallowly dentate. Pistil ca. 3.2 cm, glabrous. Capsule 5–8.5 cm. Seed appendages hairlike, 1.2–1.8 mm. Fl. Aug–Sep, fr. Sep.

On trees in forested valleys; 1200–2400 m. SE Xizang (Nyingchi Xian), NW Yunnan (Gongshan Xian) [NE India, Laos, N Myanmar].

16. *Lysionotus metuoensis* W. T. Wang, Acta Phytotax. Sin. 17: 110. 1979.

墨脱吊石苣苔 mo tuo diao shi ju tai

Subshrubs. Stems ca. 34 cm, densely spreading pubescent. Leaves nearly sessile; leaf blade linear-oblong to narrowly elliptic, 2.4–3.5 cm × 4–7 mm, leathery, densely puberulent, base cuneate, margin sparsely denticulate to subentire, apex acuminate to acute; lateral veins obscure. Cymes 1-flowered; peduncle ca. 8 mm, densely puberulent; bracts narrowly elliptic to narrowly ovate, ca. 9 × 2–3.2 mm. Pedicel ca. 1 cm. Calyx 1.2–2 cm, 5-lobed; tube 3–3.5 mm; lobes 0.9–1.7 cm, outside densely puberulent, inside sparsely puberulent. Corolla white, 4.2–5 cm, outside sparsely puberulent, inside glabrous; tube funnellform-tubular, 2.4–3.5 × ca. 1.2 cm; adaxial lip ca. 3 mm; abaxial lip 8–10 mm. Stamens 1.2–1.6 cm; filaments 1–1.4 cm; anthers broadly ovoid; connective unappendaged; staminodes 2, 4–7 mm. Disc ringlike, margin entire. Pistil 2–2.8 cm, sparsely puberulent. Capsule 6.5–13 cm. Seed appendages hairlike, ca. 1.5 mm. Fl. and fr. Aug–Sep.

• On trees in broad-leaved forests; ca. 1300 m. SE Xizang (Medog Xian).

17. *Lysionotus microphyllus* W. T. Wang, Guihaia 3: 270. 1983.

小叶吊石苣苔 xiao ye diao shi ju tai

Subshrubs. Stems 25–30 cm, sparsely puberulent. Petiole 0.3–1.5 mm; leaf blade obovate to elliptic, 3.5–11 × 3–6 mm, leathery, adaxially puberulent near margin or glabrous, abaxially glabrous, base cuneate to rounded, margin 1–3-denticulate to crenate or entire, apex obtuse; lateral veins obscure. Cymes 1-flowered; peduncle 1.8–2.6 cm, glabrous; bracts subulate, ca. 0.8 × 0.2 mm. Pedicel 1–1.2 cm. Calyx 5-sect from base; segments 1.5–4 mm, glabrous. Corolla ca. 1.3 cm, glabrous; tube funnellform-tubular, ca. 9 × 3–4 mm; adaxial lip ca. 2 mm; abaxial lip ca. 4.5 mm. Stamens ca. 7 mm; filaments ca. 5 mm; anthers subglobose; connective unappendaged; staminodes 3, central 1 ca. 0.4 mm, laterals ca. 1.5 mm. Disc ringlike, margin entire. Pistil ca. 8 mm, glabrous. Capsule 6.5–8 cm. Seed appendages subulate, 0.5–0.7 mm. Fl. Jul, fr. Jul, Sep.

• On trees or rocks, valleys, forests by streams; 1300–1500 m. SW Hubei (Xianfeng Xian), NW Hunan (Sangzhi Xian), Sichuan (Emei Xian).

- 1a. Leaf blade 3.5–8.5 × 3–5 mm, margin 1–3-denticulate; calyx ca. 1.5 mm, segments triangular 17a. var. *microphyllus*
1b. Leaf blade 4–11 × 3–6 mm, margin 1- or 2-crenate apically to entire; calyx 3–4 mm, segments triangular-linear 17b. var. *omeiensis*

17a. *Lysionotus microphyllus* var. *microphyllus*

小叶吊石苣苔(原变种) xiao ye diao shi ju tai (yuan bian zhong)

Stems ca. 30 cm. Leaf blade 3.5–8.5 × 3–5 mm, margin 1–3-denticulate. Calyx segments triangular, ca. 1.5 mm. Fl. and fr. Jul.

• On trees or rocks in forests by streams; ca. 1300 m. SW Hubei (Xianfeng Xian), NW Hunan (Sangzhi Xian).

17b. *Lysionotus microphyllus* var. *omeiensis* (W. T. Wang) W. T. Wang in A. L. Weitzman et al., Novon 7: 429. 1998.

峨眉吊石苣苔 e mei diao shi ju tai

Lysionotus omeiensis W. T. Wang, Guihaia 3: 271. 1983.

Stems ca. 25 cm. Leaf blade 4–11 × 3–6 mm, margin 1- or 2-crenate apically to entire. Calyx segments narrowly triangular, 3–4 mm. Fr. Sep.

• On trees in valleys; ca. 1500 m. Sichuan (Emei Xian).

18. *Lysionotus kwangsiensis* W. T. Wang, Acta Phytotax. Sin. 13: 68. 1975.

广西吊石苣苔 guang xi diao shi ju tai

Subshrubs. Stems ca. 30 cm, glabrous. Petiole 0.9–2.1 cm; leaf blade ovate to narrowly elliptic or narrowly oblong, 5–10 × 1.4–4.5 cm, leathery, glabrous, base rounded to broadly cuneate, margin denticulate to serrate or subentire, apex abruptly acuminate to obtuse; lateral veins 5–7 on each side of midrib, often obscure, flat. Cymes 1–4-flowered; peduncle 1.5–4 cm, glabrous; bracts linear to ovate or obovate, 4–5 × 1.2–3 mm. Pedicel 6–12(–20) mm. Calyx 5-sect from base; segments 0.9–1.2 cm, glabrous. Corolla purplish, ca. 4 cm, glabrous; tube slender funnellform, ca. 3 × 1 cm; adaxial lip ca. 5 mm; abaxial lip 1–1.3 cm. Stamens ca. 1.6 cm; filaments ca. 1.5 cm; anthers oblate; connective appendages hornlike, 0.5–1.5 mm; staminodes 2, 8–10 mm. Disc ringlike, margin entire. Pistil ca. 2.3 cm, glabrous. Capsule 5–6 cm. Seed appendages hairlike, 0.9–1.2 mm. Fl. Jul–Sep, fr. Jul–Oct.

• Forests on trees or rocks in montane regions; 1300–1700 m. N Guangxi (Rongshui Xian, Tiane Xian).

19. *Lysionotus pauciflorus* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 19: 534. 1874.

吊石苣苔 diao shi ju tai

Subshrubs. Stems 7–100 cm, glabrous to puberulent. Petiole 1–4(–15) mm; leaf blade linear to broadly elliptic, oblanceolate to obovate, or rarely lanceolate to ovate, 1.5–6(–9) × (0.4–)0.8–2(–3.8) cm, leathery, glabrous, rarely puberulent, base narrowly to broadly cuneate, rarely rounded, margin apically serrate to crenate, dentate, or subentire, basally subentire, apex acute to subtruncate; lateral veins 3–6 on each side of midrib, often obscure, flat. Cymes 1–3(–12)-flowered; peduncle 0.3–2.6(–5) cm, glabrous; bracts linear to ovate or oblanceolate, 1–4 × 0.4–1 mm. Pedicel 3–10(–17) mm. Calyx 5-sect from to near base; tube to 1 mm; segments (1–)2–7(–8) mm, glabrous, sometimes sparsely puberulent or with a few hairs at tip. Corolla white to light purple or pink, inside with purple lines

and sometimes yellow throat, 2.8–5.5 cm, outside glabrous to puberulent basally, inside glabrous; tube slender funnellform, 2.1–3.5 × (0.7–)1.2–1.5 cm; adaxial lip 3–5 mm; abaxial lip (0.7–)0.9–1.5 cm. Stamens 1–1.7 cm; filaments 1–1.6 cm; anthers obovate to broadly ovoid; connective appendage hornlike, ca. 0.5–1(–3) mm; staminodes (2 or)3, 0.6–5(–8) mm. Disc ringlike to cupular, to 4 mm, entire or with few acute to obtuse teeth. Pistil 1.2–2.8 cm, glabrous. Capsule (1.7–)4.5–13 cm. Seed appendages hairlike, 0.7–2 mm. Fl. Jun–Dec, fr. Aug–Jan.

Forests, thickets, rocks, or cliffs, terrestrial, on trees or rocks in hilly or montane regions; 300–2200 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, S Henan, Hubei, Hunan, S Jiangsu, Jiangxi, S Shaanxi, Sichuan, Taiwan, Yunnan, Zhejiang [Japan, N Vietnam].

1a. Stems and leaf blade puberulent .. 19b. var. *indutus*

1b. Stems glabrous or puberulent at apex; leaf blade glabrous.

2a. Corolla outside basally puberulent 19c. var. *ikedae*

2b. Corolla glabrous 19a. var. *pauciflorus*

19a. *Lysionotus pauciflorus* var. *pauciflorus*

吊石苣苔(原变种) diao shi ju tai (yuan bian zhong)

Aeschynanthus apicidens Hance; *Lysionotus apicidens* (Hance) Yamazaki; *L. carnosus* Hemsley; *L. cavaleriei* H. Léveillé (1911), not H. Léveillé (1909); *L. hainanensis* Merrill & W. Y. Chun; *L. montanus* Kao & Devol; *L. pauciflorus* var. *lancifolius* W. T. Wang; *L. pauciflorus* var. *latifolius* W. T. Wang; *L. pauciflorus* var. *linearis* Rehder; *L. warleyensis* Willmott; *L. wilsonii* Kraenzlin (1928), not Rehder (1916).

Stems glabrous or puberulent at apex. Leaf blade glabrous. Corolla outside glabrous. Fl. Jun–Dec, fr. Aug–Jan.

Forests, rocks, cliffs, on trees in hilly or montane regions; 300–2200 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, S Henan, Hubei, Hunan, S Jiangsu, Jiangxi, S Shaanxi, Sichuan, Taiwan, E Yunnan, Zhejiang [Japan, N Vietnam].

19b. *Lysionotus pauciflorus* var. *indutus* W. Y. Chun ex W. T. Wang, *Guihaia* 3: 275. 1983.

灰叶吊石苣苔 hui ye diao shi ju tai

Stems puberulent. Leaf blade puberulent. Flowers and fruits unknown.

• Hilly regions. W Guizhou (Weining Xian).

19c. *Lysionotus pauciflorus* var. *ikedae* (Hatusima) W. T. Wang in A. L. Weitzman et al., *Novon* 7: 430. 1998.

兰屿吊石苣苔 lan yu diao shi ju tai

Lysionotus ikedae Hatusima, *Mem. Fac. Agric. Kago-shima Univ.* 7: 324. 1970.

Stems glabrous. Leaf blade glabrous. Corolla outside basally puberulent.

• On trees. S Taiwan (Lanyu Island).

20. *Lysionotus serratus* D. Don, *Edinburgh Philos. J.* 7: 85. 1822.

齿叶吊石苣苔 chi ye diao shi ju tai

Subshrubs. Stems 10–100 cm, glabrous. Petiole 1–16(–28) mm; leaf blade elliptic to lanceolate, ovate, or obovate, 4–14 (–18) × 2–4.8(–5.5) cm, herbaceous, seldom papery, glabrous, base cuneate to rounded, margin dentate to serrate or crenulate, apex acuminate to obtuse; lateral veins 5–8(–10) on each side of midrib, flat to prominent. Cymes 3–15-flowered; peduncle 3.5–10 cm, glabrous; bracts ovate to orbicular, 3.5–10 × 4–8.5 mm. Pedicel 3–11 mm. Calyx 5-sect from base; segments 4–8 × 1.5–4 mm, glabrous. Corolla purplish to white, 2.5–4.5 cm, outside sparsely puberulent, inside sparsely glandular puberulent basally; tube slender funnellform, 2.2–3 × 0.8–1 cm; adaxial lip ca. 4 mm; abaxial lip 8–10 mm. Stamens 0.8–1.2 mm; filaments 7–10 mm; anthers subglobose; connective appendage hornlike, ca. 1 mm; staminodes 3, 0.5–6 mm. Disc ringlike, margin entire. Pistil ca. 2.2 mm, glabrous. Capsule 7–11 cm. Seed appendages hairlike, 1–1.2 mm. Fl. Jul–Sep, fr. Aug–Jan.

Terrestrial, on trees or rocks in forests, streamsides, grassy slopes, valleys; 300–2800 m. NW Guangxi, SW Guizhou, SE Xizang, Yunnan [Bhutan, N India, N Myanmar, Nepal, Thailand, N Vietnam].

1a. Stems not angled, wingless 20a. var. *serratus*

1b. Stems longitudinally angled, winged

along angles 20b. var. *pteroaulis*

20a. *Lysionotus serratus* var. *serratus*

齿叶吊石苣苔(原变种) chi ye diao shi ju tai (yuan bian zhong)

Didymocarpus esquirolii H. Léveillé; *Hemiboea himalayensis* H. Léveillé; *Lysionotus himalayensis* (H. Léveillé) W. T. Wang & Z. Y. Li; *L. ternifolius* Wallich. Stems not angled, wingless. Fl. Jul–Sep, fr. Sep–Jan.

On trees or rocks in forests, streamsides, grassy slopes; 900–2200 m. NW Guangxi, SW Guizhou, SE Xizang, S and W Yunnan [Bhutan, N India, N Myanmar, Nepal, Thailand, N Vietnam].

20b. *Lysionotus serratus* var. *pteroaulis* C. Y. Wu ex W. T. Wang, *Guihaia* 3: 277. 1983.

翅茎吊石苣苔 chi jing diao shi ju tai

Lysionotus pterocaulis (C. Y. Wu ex W. T. Wang) H. W. Li. Stems longitudinally angled, winged along angles. Fl.

Jul–Aug, fr. Aug–Oct.

On trees or rocks in valleys; 1100–1700 m. SE Yunnan (Pingbian Xian) [N Vietnam].

21. *Lysionotus gamosepalus* W. T. Wang, *Guihaia* 3: 278. 1983.

合萼吊石苣苔 he e diao shi ju tai

Subshrubs. Stems 18–50 cm, glabrous. Petiole 5–20 mm; leaf blade narrowly elliptic to ovate, 5–13 × 2.8–6 cm, papery, glabrous, base broadly cuneate to rounded, margin serrate to dentate, apex acuminate to acute; lateral veins 4–6 on each side of midrib, flat. Cymes 2–11-flowered; peduncle 1.5–5 cm, glabrous; bracts broadly ovate, base cordate, ca. 7 × 11 mm. Pedicel ca. 3 mm. Calyx 0.9–1.2 cm, 5-lobed from middle to above middle; tube 6–10 mm; lobes 2–6 × 3–5 mm, glabrous.

Corolla white or tinged purple, 3.6–4.2 cm, glabrous; tube funnellform-tubular, 2.6–3 × 0.9–1.2 cm; adaxial lip ca. 5.5 mm; abaxial lip 1–1.2 cm. Stamens ca. 1 cm; filaments 8–10 mm; anthers oblate; connective appendage hornlike, 1.2–1.8 mm; staminodes 3, 0.5–6 mm. Disc ringlike, margin entire. Pistil 2–2.2 cm, glabrous. Capsule 9–13 cm. Seed appendages hairlike, 1.5–2 mm. Fl. Jun–Jul, fr. Aug.

• Evergreen, broad-leaved forests, on stony cliffs, or rocks at waysides; 800–1600 m. SE Xizang (Zayu Xian, Medog Xian).

22. *Lysionotus sangzhiensis* W. T. Wang, *Guihaia* 6: 164. 1986.

桑植吊石苣苔 *sang zhi diao shi ju tai*

Subshrubs. Stems ca. 12 cm, glabrous or glabrescent, branches appressed puberulent. Petiole 1.2–4 mm; leaf blade oblanceolate to narrowly oblong, 0.9–3.1 cm × 3–7 mm, leathery to thin leathery, glabrous, base cuneate, margin serrulate to denticulate apically, apex acute to obtuse; lateral veins obscure. Cymes 1- or 2-flowered; peduncle 2–5 cm, glabrous; bracts orbicular-ovate to obovate, 3–6 × 2–4 mm. Pedicel 3–5.4 cm. Calyx 7–10 mm, 5-lobed from above middle; tube 5–8 mm; lobes 2–5 × 1.2–3 mm, glabrous. Corolla pink, ca. 3.7 cm, glabrous; tube funnellform-tubular, ca. 2.6 × 0.9 cm; adaxial lip ca. 2 mm; abaxial lip ca. 1.1 cm. Stamens ca. 1.2 cm; filaments ca. 1.2 cm; anthers oblate; connective abaxial-basal, with appendage protruding, ca. 0.4 mm; staminodes 3, central 1 ca. 1 mm, laterals ca. 7 mm,

with 1 small empty anther at apex. Disc ringlike, margin entire. Pistil ca. 12.5 mm, glabrous. Capsule 4–5.4 cm. Seed appendages subulate, 0.2–0.6 mm. Fl. Aug. • Rocks in forests; 700–1400 m. NW Hunan (Sangzhi Xian), SE Sichuan (Youyang Xian).

23. *Lysionotus chingii* W. Y. Chun ex W. T. Wang, *Guihaia* 3: 279. 1983.

攀援吊石苣苔 *pan yuan diao shi ju tai*

Prostrate herbs, climbing subshrubs or lianas. Stems sometimes thick corky, to 9 m, glabrous. Petiole 6–23 mm; leaf blade elliptic to narrowly elliptic or oblong, 4.5–13 × 2.2–5 cm, papery, glabrous, base broadly cuneate to cuneate, margin entire to denticulate with small glands, apex acuminate; lateral veins 4–6 on each side of midrib, abaxially prominent. Cymes 1-flowered; peduncle 1.4–2.8 cm, glabrous; bracts orbicular-ovate to ovate, 4–7 × 7–9 mm. Pedicel 2–7 mm. Calyx 1.6–2.2 cm, 5-lobed from above middle; tube 1.2–1.8 cm; lobes 4–5 × ca. 5 mm, glabrous. Corolla white or tinged greenish, ca. 4 cm, outside glabrous, inside puberulent basally; tube slender funnellform, ca. 3.3 × 1.2–1.4 cm; adaxial lip ca. 6 mm; abaxial lip ca. 7 mm. Stamens ca. 1.3 cm; filaments ca. 1 cm; anthers oblate; connective unappendaged; staminodes 2, ca. 2 mm. Disc ringlike, margin entire. Pistil ca. 2.5 cm, glabrous. Capsule 6.5–9 cm. Seed appendages subulate, 0.3–0.5 mm. Fl. Jul–Sep, fr. Sep.

On trees and rocks in forested valleys; 900–1500 m. S and W Guangxi, SE Yunnan [N Vietnam].

49. RHYNCHOTECHUM Blume, *Bijdr.* 775. 1826.

线柱苣苔属 *xian zhu ju tai shu*

Chiliandra Griffith.

Shrubs small, terrestrial, not rhizomatous. Stems branched or simple. Leaves usually few, along stem, opposite, seldom alternate, equal to subequal in a pair; leaf blade surfaces sericeous to hirsute or woolly, often glabrescent, base attenuate to rounded. Inflorescences lax, axillary, (few)- to many-flowered cymes; bracts 2, opposite. Calyx actinomorphic, 5-sect from base; segments equal. Corolla white to reddish or purple, zygomorphic, inside glabrous; tube campanulate tubular, not swollen, shorter than limb, 1–2 mm in diam.; limb indistinctly 2-lipped; adaxial lip 2-lobed, shorter than to equalling abaxial lip; abaxial lip 3-lobed, lobes equal or subequal, apex rounded to obtuse. Stamens 4, adnate to corolla tube near base or rarely near middle, included; anthers basifixed, free, thecae parallel, confluent at apex, dehiscing longitudinally; connective not projecting; staminode absent or 1, adnate to adaxial side of corolla tube. Disc ringlike or absent. Ovary ovoid, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigma 1, terminal, depressed globose, undivided. Berry ovoid to globose, slightly longer than calyx, indehiscent. Seeds unappendaged.

About 13 species: SE Asia, Pacific Islands; five species in China.

1a. Stems, petiole, peduncle, and calyx outside densely spreading yellowish hirsute; peduncle 0.8–1.5(–2.4) cm 5. *R. vestitum*

1b. Stems, petiole, peduncle, and calyx outside brown or rusty pubescent to villous or woolly; peduncle (0.9–)2–6.5 cm.

2a. Leaves alternate, or sometimes lower ones opposite; pedicel 1–4 mm; upper corolla lip ca. 3 mm 4. *R. discolor*

2b. All leaves opposite; pedicel 2–16(–22) mm; upper corolla lip 1–2 mm.

3a. Pistil and berry glabrous; cymes 15–70-flowered; bracts 3–13 mm; pistil 5–7 mm 1. *R. ellipticum*

3b. Pistil and berry at least sparsely puberulent near base of style; cymes 5–30-flowered; bracts 3–8 mm; pistil 4–5.2 mm.

- 4a. Corolla 4–5 mm; stamens adnate to corolla base; leaf blade (6.5–)13–30 × (2.5–)6.5–12 cm; peduncle rust-brown villous 2. *R. formosanum*
 4b. Corolla 3–3.5 mm; stamens adnate to corolla tube near middle, 0.8–1 mm above base; leaf blade 10–19 × 3.5–5.8 cm; peduncle brown pubescent 3. *R. longipes*

1. *Rhynchoetechum ellipticum* (Wallich ex D. Dietrich) A. de Candolle, Prodr. 9: 285. 1845.

线柱苳苔 xian zhu ju tai

Corysanthera elliptica Wallich ex D. Dietrich, Syn. Pl. 3: 582. 1842; *Chiliandra obovata* Griffith; *Rhynchoetechum latifolium* J. D. Hooker & Thomson ex C. B. Clarke; *R. obovatum* (Griffith) B. L. Burt.

Stems 0.7–2 m, basally glabrescent, apically densely appressed rust-brown to brown woolly. Leaves opposite; petiole 0.8–5 cm, appressed rust-brown to brown woolly; leaf blade oblanceolate to obovate or elliptic, 9.5–32 × 3–10 cm, adaxially rust-brown to brown woolly, glabrescent, abaxially densely woolly to fulvous pubescent, glabrescent except along veins, base cuneate to attenuate, rarely nearly rounded, margin denticulate to serrate, apex acute to acuminate. Cymes 15–70-flowered; peduncle 0.9–4 cm, densely appressed rust-brown to brown woolly to pubescent; bracts 3–13 mm. Pedicel 2–13 mm. Calyx segments lanceolate, 2.2–5 mm, outside brown woolly to pubescent, inside glabrous. Corolla white or tinged pink, 3.5–6 mm; tube 1.5–2.5 mm; adaxial lip 1.6–1.8 mm; abaxial lip 2.2–4 mm. Stamens adnate to corolla near base, 0.5–1.1 mm; staminode 0.2–0.3 mm. Pistil 5–7 mm, glabrous; ovary 1–2 mm. Berry white, 2–6 mm, glabrous. Fl. Jun–Oct, fr. Aug–Jan.

Forests, shaded streamsides; 100–1800 m. S Fujian, Guangdong, Guangxi, SW Guizhou, Hainan, S Sichuan, SE Xizang, Yunnan [Bhutan, Cambodia, NE India, Laos, Malaysia, Myanmar, Nepal, Thailand, Vietnam].

Rhynchoetechum ellipticum and *R. formosanum* are very closely related, and all of the characters used to distinguish them intergrade. Weitzman and Skog believe that they represent a single species.

2. *Rhynchoetechum formosanum* Hatusima, J. Jap. Bot. 15: 132. 1939.

冠萼线柱苳苔 guan e xian zhu ju tai

Lysimachia saurauifolia S. S. Ying; *Rhynchoetechum ellipticum* (Wallich ex D. Dietrich) A. de Candolle var. *saurauifolium* (S. S. Ying) S. S. Ying.

Stems 0.3–2 m, apically densely appressed, rust-brown woolly. Leaves opposite; petiole 0.5–2.5 cm, densely appressed, rust-brown woolly; leaf blade usually elliptic to obovate, rarely ovate, (6.5–)13–30 × (2.5–)6.5–12 cm, densely rust-brown woolly, glabrescent, abaxially veins remaining densely woolly, base cuneate to attenuate, rarely rounded, margin denticulate to serrate, apex abruptly acuminate to acute. Cymes 5–30-flowered; peduncle 1.2–3(–5.7) cm, rust-brown villous;

bracts 3–8 mm. Pedicel 3–9(–22) mm. Calyx segments lanceolate, 2–5 mm, outside rust-brown villous, inside glabrous. Corolla white to red or purple, 4–5 mm; tube ca. 2 mm; adaxial lip ca. 1 mm; abaxial lip ca. 2 mm. Stamens adnate to corolla base, ca. 1.4 mm; staminode ca. 0.2 mm. Pistil ca. 4 mm, puberulent at least sparsely near style base; ovary ca. 1 mm. Berry white to greenish, 3–4 mm, puberulent, at least sparsely. Fl. May–Sep, Jan, fr. Jul–Mar.

Dense forests, shaded streamsides, rocky areas in valleys; 200–1500 m. S Guangdong, SW Guangxi, S Guizhou, Hainan, Taiwan, SE Yunnan [N Thailand].

Cyrtandra hillii H. Léveillé (1911) is probably conspecific with *Rhynchoetechum formosanum*, but the combination in *Rhynchoetechum* has never been made.

3. *Rhynchoetechum longipes* W. T. Wang, Guihaia 4: 187. 1984.

长梗线柱苳苔 chang geng xian zhu ju tai

Stems ca. 35 cm, basally glabrescent, apically brown woolly. Leaves opposite; petiole 0.5–3 cm, brown woolly; leaf blade oblanceolate to obovate or elliptic, 10–19 × 3.5–5.8 cm, adaxially glabrescent, abaxially densely brown woolly, base attenuate, margin denticulate, apex acute to acuminate. Cymes 10–30-flowered; peduncle 3.5–6.5 cm, brown pubescent; bracts 6–7 mm. Pedicel 0.5–1.6 cm. Calyx segments narrowly lanceolate, 4.5–5.2 mm, outside densely appressed villous, inside glabrous. Corolla white, 3–3.5 mm; tube 1.3–1.8 mm; adaxial lip 1.5–2 mm; abaxial lip 2–3 mm. Stamens adnate to corolla tube near middle, 0.8–1 mm above base, ca. 1.2–1.5 mm; staminode 0.3–0.5 mm. Pistil 4–5.2 mm, puberulent; ovary 1–1.2 mm. Immature berry puberulent. Fl. Jul.

• S Guangxi (Ningming Xian, Shanglin Xian).

4. *Rhynchoetechum discolor* (Maximowicz) B. L. Burt, Notes Roy. Bot. Gard. Edinburgh 24: 37. 1962.

异色线柱苳苔 yi se xian zhu ju tai

Stems 15–60 cm, basally glabrescent, densely brown woolly. Leaves alternate or some opposite or nearly so; petiole 0.4–3.7 cm, densely appressed, brown woolly; leaf blade oblanceolate to obovate or elliptic, (4.5–)6.5–17 × (1.2–)2.5–6.5 cm, adaxially appressed villous, glabrescent, abaxially villous, glabrescent, woolly along veins, base sometimes oblique, attenuate, margin denticulate to serrulate or pinnately lobed to coarsely dentate, apex acute to acuminate. Cymes (5–)10–25-flowered; peduncle 1.8–6 cm, densely appressed brown woolly; bracts 5–10 mm. Pedicel 1–4 mm. Calyx segments linear to narrowly triangular, 4–6 mm, outside

densely appressed woolly, inside villous near apex. Corolla white, 4–5 mm; tube ca. 1 mm; adaxial lip ca. 3 mm; nearly equalling abaxial lip. Stamens adnate to corolla near base, ca. 2 mm; staminode ca. 0.5 mm. Pistil 3–3.5 mm, puberulent; ovary ca. 1.5 mm. Berry whitish to light brown, 5–8 mm, pilose basally, puberulent above, sometimes glabrescent. Fl. Feb–Sep, fr. Jul–Mar.

Shady areas in valley forests; near sea level to 1700 m. S Fujian, E Guangdong, Hainan, Taiwan [Japan, Philippines].

- 1a. Leaf blade margin denticulate to serrulate 4a. var. *discolor*
1b. Leaf blade margin pinnately lobed to coarsely dentate 4b. var. *incisum*

4a. *Rhynchochum discolor* var. *discolor*

异色线柱苣苔(原变种) *yi se xian zhu ju tai* (*yuan bian zhong*)

Isanthera discolor Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 19: 538. 1874.

Leaf blade margin denticulate to serrulate. Fl. Mar–Sep.

Shady areas in valley forests; near sea level to 1700 m. S Fujian, E Guangdong, Hainan, Taiwan [Japan, Philippines].

4b. *Rhynchochum discolor* var. *incisum* (Ohwi) Walker, J. Jap. Bot. 46: 69. 1971.

羽裂异色线柱苣苔 *yu lie yi se xian zhu ju tai*

Isanthera discolor Maximowicz var. *incisa* Ohwi, Acta Phytotax. Geobot. 7: 29. 1938.

Leaf blade margin pinnatifid to coarsely dentate. Fl. Feb.

Roadsides in montane regions. Taiwan (Pingdong Xian) [S Japan].

5. *Rhynchochum vestitum* Wallich ex C. B. Clarke, Commelyn. Cyrtandr. Bengal. 132. 1874.

毛线柱苣苔 *mao xian zhu ju tai*

Stems (0.2–)1–2 m, basally glabrescent, creamy yellow hirsute. Leaves opposite; petiole (1–)2–4.5(–6.5) cm, densely spreading yellowish hirsute; leaf blade ovate to elliptic or obovate, 13–28.5 × 5.4–12 cm, sericeous to hirsute, persistent, base broadly cuneate to rounded, margin denticulate, apex acuminate to abruptly acuminate. Cymes (3–)5–15-flowered; peduncle 0.8–1.5(–2.4) cm, densely spreading yellowish hirsute; bracts 4–7 mm. Pedicel 4–13 mm. Calyx segments narrowly triangular to narrowly lanceolate, 4–5 mm, outside spreading hirsute, inside spreading hirsute near apex. Corolla reddish, ca. 6 mm; tube 1.5–2 mm; adaxial lip ca. 2.5 mm; abaxial lip ca. 4 mm. Stamens adnate to corolla near base, ca. 1.6 mm; staminode ca. 0.3 mm. Pistil ca. 5.5 mm, glandular; ovary ca. 1 mm. Berry white, 3–5 mm, glabrescent. Fl. Jun–Aug, fr. Oct–Nov.

Forests, shaded streambanks in valleys; 800–1300 m. W Guangxi, NE Xizang (Medog Xian), S Yunnan [Bhutan, Sikkim].

50. CYRTANDRA J. R. Forster & G. Forster, Char. Gen. Pl. 3. 1775.

浆果苣苔属 *jiang guo ju tai shu*

Herbs (outside China), shrubs, or seldom small trees, perennial, terrestrial, not rhizomatous. Stems branched or simple. Leaves usually few, along stem, opposite, whorled, or rarely alternate, equal to subequal in a pair; leaf blade glabrous to densely pubescent, pilose, villous, or sericeous, base attenuate to cuneate, rarely to cordate. Inflorescences lax or dense, axillary or rarely cauliflorous, 1- to many-flowered cymes; bracts 2 or absent, opposite. Calyx actinomorphic or zygomorphic; 2–5(or 6)-lobed; lobes equal to unequal. Corolla white to yellow, occasionally green, orange, reddish, or purplish, zygomorphic or rarely actinomorphic, inside glabrous to pubescent; tube campanulate to salverform, funnelform, or cylindrical, not swollen, usually much longer than limb; limb usually 2-lipped; adaxial lip 2-lobed, shorter than to slightly exceeding abaxial lip; abaxial lip 3-lobed, lobes equal or central lobe longer, apex rounded or obtuse, rarely acute. Stamens 2, adnate to abaxial side of corolla tube near middle, usually included; anthers basifixed to dorsifixed, coherent or free, thecae slightly divergent to divergent, confluent or not, dehiscing longitudinally; connective not projecting or apiculate; staminodes 2 or 3, adnate to adaxial side of corolla tube. Disc ringlike or rarely cupular. Ovary ovoid to oblong, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigma 1, terminal, capitate to ovoid or obtriangular, undivided or sometimes 2-lobed. Berry fleshy to leathery, ovoid to oblong, slightly longer to shorter than calyx, indehiscent. Seeds unappendaged.

About 350–600 species: SE Asia, Pacific Islands; one species in China.

1. *Cyrtandra umbellifera* Merrill, Philipp. J. Sci. 3: 435. 1908.

浆果苣苔 *jiang guo ju tai*

Cyrtandra kotoensis Hosokawa.

Shrubs. Stems to 1.5 m, densely brownish pilose. Petiole 1–4 cm; leaf blade elliptic to broadly oblanceolate, 12–36 × 4–10.5 cm, adaxially glabrescent, puberulent along veins, abaxially glabrous to sparsely

puberulent, densely puberulent along veins, base cuneate, margin serrulate to undulate, apex acuminate. Peduncle 0.8–3 cm, densely rust-brown puberulent; bracts free, lanceolate, 4–12 mm, puberulent. Calyx 4–6 mm; tube 2–3 mm; lobes narrowly triangular, 2–3 mm. Corolla white, 1–1.3 cm; tube funnelform tubular, 6–8 mm; adaxial lip slightly longer than abaxial lip; abaxial lip central lobe suborbicular, ca. 4 × 4 mm, lateral lobes ca. 2 × 4 mm. Stamens subincluded, ca. 4 mm;

filaments glandular puberulent; anthers dorsifixed; staminodes 2, ca. 1 mm. Disc cupular, 1–1.8 mm. Pistil exserted or not, ca. 8 mm; ovary glabrous. Style 4–5

mm, sparsely glandular puberulent. Berries ellipsoid, ca. 8 mm. Fl. Feb–May, Dec, fr. May.

Moist shady forests; near sea level to 400 m. S Taiwan (Lanyu Island) [Philippines].

51. GYROGYNE W. T. Wang, Bull. Bot. Res., Harbin 1(3): 41. 1981.

圓果苳苔屬 *yuan guo ju tai shu*

Herbs, perennial, terrestrial, rhizomatous. Stems erect, simple. Leaves few, along stem, opposite, slightly unequal in a pair; leaf blade adaxially sparsely pubescent, abaxially sparsely puberulent, base broadly cuneate to rounded. Inflorescences dense, terminal, few-flowered cymes; bracts apparently absent. Calyx slightly zygomorphic, 5-lobed, plicate between adjoining lobes; lobes subequal. Corolla white, zygomorphic, inside glabrous; tube campanulate, saccate at base, slightly longer than limb, ca. 5 mm in diam.; limb 2-lipped; adaxial lip 2-lobed, ca. 1/2 length of abaxial lip; abaxial lip 3-lobed, central lobe longer, apex rounded. Stamens 4, adnate to corolla tube near base, included; anthers basifixed, free, thecae slightly divergent, not confluent, dehiscing longitudinally; connective projecting apically; staminode 1, adnate to adaxial side of corolla tube. Disc ringlike. Ovary depressed globose, 1-loculed; placentas 2, parietal, projecting together from 1 place on ovary wall into locule. Stigma 1, terminal, depressed-globose, undivided. Fruit and seeds unknown.

• One species: endemic to China.

1. Gyrogyne subaequifolia W. T. Wang, Bull. Bot. Res., Harbin 1(3): 43. 1981.

圓果苳苔 *yuan guo ju tai*

Stems 9.5–15.5 cm, brownish puberulent. Petiole 0.3–2.7 cm; leaf blade ovate, 4–8 × 3.4–5.8 cm, adaxially sparsely puberulent, abaxially sparsely puberulent along veins, base slightly oblique, broadly cuneate to rounded, margin irregularly dentate, apex acute to abruptly acuminate. Peduncle ca. 1 cm, puberulent. Calyx ca. 7

mm in diam.; tube ca. 2.5 mm; lobes triangular, ca. 2.5 mm. Corolla ca. 1 cm; tube ca. 5 mm; adaxial lip ca. 2.5 mm; abaxial lip ca. 4 mm. Stamens ca. 2.4 mm; staminode ca. 0.8 mm. Pistil ca. 5.5 mm, glabrous; ovary ca. 1.5 mm. Fl. Jun.

• Shaded waysides in hilly regions at low elevations. W Guangxi (Bose Xian).

52. STAURANTHERA Bentham, Scroph. Ind. 57. 1835.

十字苳苔屬 *shi zi ju tai shu*

Cyananthus Griffith.

Herbs, perennial, terrestrial, not rhizomatous. Stems branched or simple. Leaves few, along stem, alternate or opposite and strongly unequal; leaf blade glabrescent to sparsely puberulent, base strongly oblique, cuneate to rounded. Inflorescences lax, pseudoterminal, few- to many-flowered cymes; bracts 2, opposite. Calyx actinomorphic, 5-lobed, plicate between adjoining lobes; lobes equal. Corolla white, blue, or purple, zygomorphic, inside glabrous; tube campanulate, spurred or saccate at base, slightly longer than limb, ca. 4 mm in diam.; limb indistinctly 2-lipped; adaxial lip 2-lobed, nearly as long as abaxial lip; abaxial lip 3-lobed, lobes equal or subequal, apex rounded. Stamens 4, adnate to corolla tube near base, included; anthers basifixed, coherent laterally to form a shallow cone, thecae slightly divergent, confluent at apex, dehiscing longitudinally; connective not projecting; staminode unknown. Disc absent. Ovary subglobose, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigma 1, terminal, broadly funnelform, undivided. Capsule straight in relation to pedicel, depressed-globose, shorter than calyx, dehiscing transversely or irregularly. Seeds unappended.

About 10 species: SE Asia, Pacific Islands; one species in China.

1. Stauranthera umbrosa (Griffith) C. B. Clarke, Commelyn. Cyrtandr. Bengal. 126. 1874.

十字苳苔 *shi zi ju tai*

Cyananthus umbrosus Griffith, Not. Pl. Asiat. 4: 154. 1854.

Stems 4–22 cm, apically rust-brown puberulent. Normal leaves with petiole 0.5–1(–2.3) cm; leaf blade strongly oblique, often falcate, ovate to obovate, 7–28 × 3.5–10 cm, adaxially glabrescent, abaxially sparsely puberulent along veins, base oblique, cuneate to rounded, margin repand-crenate, apex acuminate;

reduced leaves sessile, oblique, obovate, 3–4 mm. Peduncle 2–4 cm, densely puberulent; bracts linear, 3–4 mm, adaxially puberulent. Calyx ca. 4 mm; lobes broadly triangular, ca. 2 mm. Corolla white to purple, 5–7 × ca. 1 cm in diam.; tube ca. 2.6 × 4 mm; adaxial lip ca. 4 mm; abaxial lip ca. 4.5 mm. Stamens 3.2–5.2 mm. Pistil ca. 2 mm; ovary densely puberulent. Fl. Feb–Jun.

Forests, forest margins in valleys; 400–1100 m. W Guangxi, Hainan, S Yunnan [NE India, Malaysia, Myanmar, Vietnam].

53. WHYTOCKIA W. W. Smith, Trans. & Proc. Bot. Soc. Edinburgh 27: 338. 1919.

异叶苣苔属 yi ye ju tai shu

Oshimella Masamune & Suzuki.

Herbs, perennial, terrestrial, not rhizomatous. Stems erect or ascending, simple or branched. Leaves few, along stem, opposite, very unequal in each pair; leaf blade sparsely puberulent, base strongly oblique, cuneate to cordate. Inflorescences lax, axillary or pseudoterminal, few- to many-flowered cymes; bracts apparently absent. Calyx actinomorphic, 5-sect from base or 5-lobed; segments equal, with many longitudinal secretory canals. Corolla white, reddish, or purple, zygomorphic, inside sparsely puberulent below abaxial lip or with lines of hairs; tube subtubular to funnelform-tubular, not swollen, longer than limb, 4–6 mm in diam.; limb 2-lipped; adaxial lip 2-lobed, slightly shorter than to subequal to abaxial lip; abaxial lip 3-lobed, lobes equal or central lobe longer, apex rounded. Stamens 4, adnate to corolla tube near base, included; anthers dorsifixed, coherent, thecae divergent, confluent at apex, dehiscing longitudinally; connective not projecting; staminode 1, adnate to adaxial side of corolla tube. Disc ringlike. Ovary ovoid to depressed globose, 2-loculed; placenta 1, axile, projecting inward, 2-cleft. Stigmas 2, equal, suborbicular, undivided, or 1, terminal, disclike, undivided. Capsule straight in relation to pedicel, subglobose, globose, or depressed globose, shorter than calyx, dehiscing loculicidally to base; valves 2, or dehiscing irregularly. Seeds unappendaged.

• Six species: endemic to China.

1a. Stigmas 2.

- 2a. Leaf blade margin denticulate; pistil ca. 1.4 cm; calyx glabrous outside; corolla ca. 2.5 cm; filaments 8–10 mm 1. *W. chiritiflora*
2b. Leaf blade margin irregularly repand-serrate; pistil ca. 8 mm; calyx puberulent outside; corolla 1.7–2 cm; filaments 4–6 mm 2. *W. bijieensis*

1b. Stigma 1.

- 3a. Stems erect; petiole to 10 mm; staminode linear.
4a. Calyx 5-sect from base, tube absent, glabrescent to sparsely puberulent outside; corolla 1–1.8 cm; filaments 2–5 mm; anthers ca. 0.7 mm wide; pistil 3–6 mm; cymes axillary 3. *W. tsiangiana*
4b. Calyx 5-lobed, tube ca. 1.5 mm, puberulent outside; corolla 1.8–2.1 cm; filaments 4–6.5 mm; anthers ca. 1.2 mm wide; pistil ca. 9 mm; cymes pseudoterminal 4. *W. hekouensis*
3b. Stems ascending, basally procumbent; petiole to 2(–3) mm; staminode ovate or broadly ovate.
5a. Peduncle sparsely white or brown puberulent; leaf blade green or greenish, adaxially sparsely puberulent, apex acuminate; calyx 2.5–3.5 mm, glabrescent outside; cymes axillary; corolla white, outside glabrous; pistil ca. 2.2 mm; stigma orbicular 5. *W. sasakii*
5b. Peduncle purple pubescent and purple glandular; leaf blade purple abaxially, adaxially pilose, apex acute to narrowly obtuse; calyx 3.5–5.5 mm, purple pubescent and purple glandular pubescent outside; cymes pseudoterminal; corolla blue-purple, outside purple pubescent and purple glandular; pistil 5–6.5 mm; stigma elliptic to reniform-elliptic 6. *W. purpurascens*

1. *Whytockia chiritiflora* (Oliver) W. W. Smith, Trans. & Proc. Bot. Soc. Edinburgh 27: 338. 1919.

异叶苣苔 yi ye ju tai

Stauranthera chiritiflora Oliver, Hooker's Icon. Pl. 25: pl. 2454. 1896.

Stems puberulent, glabrescent. Normal leaves sessile or short petioled; leaf blade pale green, oblique, oblong-ovate to oblong, to 15 × 6 cm, sparsely puberulent, base strongly oblique, cuneate on narrow side, rounded on other, margin denticulate, apex acuminate; reduced leaf blade ovate, to 2 cm. Cymes axillary; peduncle 3.5–6 cm, puberulent. Calyx 5-sect from base; segments ovate, ca. 4.5 mm, outside glabrous. Corolla pink, ca. 2.5 cm, outside glabrous, inside sparsely puberulent below abaxial lip; tube subtubular, ca. 1.5 × 0.9 cm; adaxial

lip ca. 4 mm; abaxial lip ca. 9 mm. Filaments 8–10 mm, apically puberulent; anthers ca. 1.2 mm wide; staminode up to 1.5 mm. Pistil ca. 1.4 cm, glabrous. Style ca. 1.1 cm; stigmas 2, capitate. Fl. Dec.

• SE Yunnan (Mengzi Xian).

2. *Whytockia bijieensis* Y. Z. Wang & Z. Y. Li, Acta Phytotax. Sin. 35: 67. 1997.

毕节异叶苣苔 bi jie yi ye ju tai

Stems 20–50 cm, erect, brownish pubescent and glandular, glabrescent. Normal leaves subsessile or with petiole to 4 mm; leaf blade oblique, narrowly ovate to narrowly ovate-oblong, 6–15 × 2–4 cm, sparsely pubescent, base strongly oblique, cuneate on narrow side, rounded to cordate on other, margin irregularly repand-serrate, apex acuminate; reduced leaves sessile

to subsessile, ovate to broadly ovate, 0.6–2.1 cm. Cymes axillary, often near branch apex; peduncle 2–6 cm, pubescent and glandular. Calyx 5-sect from base; segments ovate to triangular-ovate, 3–4 × ca. 2 mm, outside puberulent. Corolla reddish, 1.7–2 cm, outside glabrous, inside with orangish clavate hairs between abaxial lip lobes near mouth; tube funnelform-tubular, ca. 1 cm; adaxial lip ca. 3 mm; abaxial lip 5–6 mm. Adaxial filaments ca. 4 mm, abaxial ones ca. 6 mm, puberulent; anthers ca. 1.1 mm wide; staminode narrowly ovate, ca. 1.1 mm. Pistil ca. 8 mm, glabrous. Style ca. 4.8 mm; stigmas 2, ovate. Capsule ca. 6 mm in diam. Fl. and fr. Sep–Oct.

• Shady and moist places by streams; ca. 1500 m. W Guizhou (Bijie Xian).

3. *Whytockia tsiangiana* (Handel-Mazzetti) A. Weber, Notes Roy. Bot. Gard. Edinburgh 40: 365. 1982.

白花异叶苣苔 *bai hua yi ye ju tai*

Stems 14–30(–40) cm, erect, brownish to whitish puberulent, glabrescent. Normal leaves sessile or with petiole to 7 mm; leaf blade whitish to green or purplish, oblique, ovate to ovate-oblong, 3.2–13 × 1–4.5 cm, adaxially sparsely puberulent, abaxially sparsely puberulent along veins, base strongly oblique, cuneate on narrow side, subcordate to broadly cuneate on other, margin indistinctly or distinctly denticulate to serrate, seldom dentate, apex acute to acuminate; reduced leaf blade broadly ovate, 4–14 mm. Cymes axillary; peduncle 3–4.5(–6) cm, glandular puberulent. Calyx 5-sect from base; segments ovate, 3–4(–5) × 1.5–3 mm, outside glabrescent to sparsely puberulent. Corolla white to purplish or reddish, 1–1.8 cm, outside glabrous, inside sparsely puberulent basally and below abaxial lip; tube subtubular, 0.8–1.2 cm × 4–8 mm; adaxial lip 2–4.5 mm; abaxial lip ca. 4.8 mm. Filaments 2–5 mm, puberulent; anthers ca. 0.7 mm wide; staminode linear, ca. 0.8 mm. Pistil 3–6 mm, glabrous. Style 1–4 mm; stigma 1, elliptic. Capsule ca. 4 mm in diam. Fl. Jul–Sep, fr. Sep–Oct.

• Shaded streamside rocks, shaded areas in montane regions, valley forests; 500–2200 m. N Guangxi, Guizhou, SW Hubei, W Hunan, S and W Sichuan, SE Yunnan.

- 1a. Leaf blade to 9.5 cm, margin distinctly denticulate to dentate, teeth to 2 mm; corolla ca. 1.8 cm; filaments 4–5 mm; stems to 40 cm 3c. var. *wilsonii*
- 1b. Leaf blade to 13 cm, margin indistinctly denticulate to crenate, teeth 0.2–0.5 mm, or merely glands; corolla ca. 1 cm; filaments 2–3.5 mm; stems to 30 cm.
 - 2a. Corolla white; leaf blade green or greenish, to 13 cm 3a. var. *tsiangiana*
 - 2b. Corolla purplish or reddish; leaf blade purplish, to 11.5 cm 3b. var. *minor*

3a. *Whytockia tsiangiana* var. *tsiangiana*

白花异叶苣苔(原变种) *bai hua yi ye ju tai* (*yuan bian zhong*)

Stauranthera tsiangiana Handel-Mazzetti, Sinensia 5: 19. 1934.

Stems to 30 cm. Leaf blade whitish to green or purplish, to 13 cm, margin indistinctly denticulate to crenate, teeth 0.2–0.5 mm, or merely glands. Corolla white, ca. 1 cm. Filaments 2–3.5 mm. Fl. Aug–Sep, fr. Sep–Oct.

• Shaded streamside rocks, valley forests; 500–1500 m. N Guangxi, Guizhou, SW Hubei, W Hunan, S Sichuan, SE Yunnan.

3b. *Whytockia tsiangiana* var. *minor* (W. W. Smith) A. Weber, Notes Roy. Bot. Gard. Edinburgh 40: 365. 1982.

屏边异叶苣苔 *ping bian yi ye ju tai*

Whytockia chiritiflora (Oliver) W. W. Smith var. *minor* W. W. Smith, Trans. & Proc. Bot. Soc. Edinburgh 27: 338. 1919.

Stems to 30 cm. Leaf blade green or greenish, to 11.5 cm, margin indistinctly denticulate to crenate, teeth 0.2–0.5 mm, or merely glands. Corolla purplish or reddish, ca. 1 cm. Filaments 2–3.5 mm. Fl. Jul.

• Shaded rocks, valley forests; 1300–2200 m. SE Yunnan (Pingbian Xian).

3c. *Whytockia tsiangiana* var. *wilsonii* A. Weber, Notes Roy. Bot. Gard. Edinburgh 40: 365. 1982.

峨眉异叶苣苔 *e mei yi ye ju tai*

Stems to 40 cm. Leaf blade purplish, to 9.5 cm, margin distinctly denticulate to dentate, teeth to 2 mm. Corolla purplish or white, ca. 1.8 cm. Filaments 4–5 mm. Fl. Jul–Aug.

• Shaded areas in montane regions; 800–1200 m. W Guizhou (Bijie Xian), S and W Sichuan.

4. *Whytockia hekouensis* Y. Z. Wang, Acta Phytotax. Sin. 33: 300. 1995.

河口异叶苣苔 *he kou yi ye ju tai*

Stems 20–40 cm, erect, brownish pubescent and glandular, glabrescent. Normal leaves sessile or with petiole to 10 mm; leaf blade green or greenish, sometimes oblique, oblong to ovate-oblong, 4–13 × 2–5 cm, adaxially sparsely pubescent, abaxially pubescent along veins, base strongly oblique, cuneate on narrow side, cuneate to cordate on other, margin repand-serrulate and glandular, apex acuminate; reduced leaves sessile, broadly ovate to ovate, 0.8–2.5 cm. Cymes pseudoterminal; peduncle 2–5 cm, pubescent and glandular. Calyx ca. 4.5 mm, 5-lobed; tube ca. 1.5 mm; lobes broadly ovate to ovate-triangular, ca. 3 × 2.5–3 mm, outside puberulent. Corolla pink, 1.8–2.1 cm, outside glabrous, inside with 2 longitudinal series of yellowish green clavate hairs below mouth and between abaxial lip lobes; tube funnelform-tubular, ca. 1.4 cm ×

4 mm; adaxial lip ca. 3 mm; abaxial lip ca. 6 mm. Adaxial filaments ca. 4 mm, abaxial ones ca. 6.5 mm, puberulent near apex; anthers ca. 1.2 mm wide; staminode linear, ca. 1.5 mm. Pistil ca. 9 mm, glabrous. Style ca. 6 mm; stigma 1, elliptic. Capsule 5–6 mm in diam. Fl. Jul–Dec, fr. Dec–Jan.

• Shaded areas in stream valleys; ca. 1300 m. SE Yunnan (Hekou Xian).

5. *Whytockia sasakii* (Hayata) B. L. Burtt, Bull. Misc. Inform. Kew 1941: 33. 1941.

台湾异叶苣苔 tai wan yi ye ju tai

Rhynchoglossum sasakii Hayata, Icon. Pl. Formos. 6: 34. 1916; *Oshimella formosana* Masamune & Suzuki; *O. sasakii* (Hayata) Masamune & Suzuki.

Stems 18–50 cm, ascending, basally procumbent, brownish puberulent, glabrescent. Normal leaves sessile or petiole to 2(–3) mm; leaf blade green or greenish, oblique, ovate to ovate-oblong, 1.8–10.5 × 0.6–3.5 cm, adaxially sparsely puberulent, abaxially sparsely puberulent along veins, base strongly oblique, cuneate on narrow side, rounded, subcordate, or cuneate on other, margin indistinctly denticulate to serrate, apex acuminate; reduced leaf blade ovate to lanceolate, 0.5–1.5 cm. Cymes axillary; peduncle 0.8–4.5 cm, sparsely white or brown puberulent. Calyx 5-sect from base; segments ovate, 2.5–3.5 × 1.8–3 mm, outside glabrescent. Corolla white, 0.8–1.5 cm, outside glabrous, inside sparsely puberulent below abaxial lip; tube subtubular, 4–7 × 4–6 mm; adaxial lip 1.5–2 mm; abaxial lip 4–8 mm. Filaments 2–2.5 mm, puberulent; anthers ca. 0.6 mm wide; staminode ovate, ca. 0.6 mm. Pistil ca. 2.2 mm, glabrous. Style 1–2 mm; stigma 1,

orbicular. Capsule 2–4 mm in diam. Fl. Jun–Sep, fr. Sep–Oct.

• Forests on wet hillsides and streambanks; 500–1900 m. Taiwan.

Whytockia sasakii is unusual in having ovaries 2-loculed basally and 1-loculed above.

6. *Whytockia purpurascens* Y. Z. Wang, Acta Phytotax. Sin. 33: 297. 1995.

紫红异叶苣苔 zi hong yi ye ju tai

Stems ascending, basally procumbent, purple pubescent, glabrescent. Normal leaves sessile or with petiole to 1 mm; leaf blade purple abaxially, sometimes oblique, ovate to ovate-oblong, 6–14 × 3.3–6.7 cm, adaxially purple pilose, abaxially purple pubescent, base strongly oblique, cuneate on narrow side, rounded to auriculate on other, margin nearly entire to repand-crenate, apex acute to narrowly obtuse; reduced leaves sessile, ovate to broadly ovate, 3–13 mm. Cymes pseudoterminal; peduncle 2.6–4 cm, purple pubescent and purple glandular. Calyx 5-sect from base; segments narrowly oblong to ovate-lanceolate, 3.5–5.5 × 1–1.7 mm, outside purple pubescent and purple glandular pubescent. Corolla blue-purple, 1.5–1.8 cm, outside purple pubescent and purple glandular, inside with yellow-green clavate hairs between abaxial lip lobes near mouth; tube funnell-form-tubular, ca. 8 × 6 mm; adaxial lip ca. 2.5 mm; abaxial lip 5–7 mm. Adaxial filaments ca. 3 mm, abaxial ones ca. 4.5 mm, puberulent near apex; anthers ca. 0.9 mm wide; staminode broadly ovate, ca. 0.8 mm. Pistil 5–6.5 mm, glabrous. Style 4–4.7 mm; stigma 1, elliptic-reniform elliptic. Capsule 3–3.5 mm in diam. Fl. Jul–Dec, fr. Dec–Jan.

• Shaded and moist areas in stream valleys; ca. 1300 m. SE Yunnan (Hekou Xian).

54. RHYNCHOGLOSSUM Blume, Bijdr. 741. 1826, nom. conserv.

尖舌苣苔属 jian she ju tai shu

Klugia Schlechtendal.

Herbs, perennial or annual, terrestrial, not rhizomatous or rhizomatous. Stems branched or simple. Leaves few, along stem, alternate; leaf blade puberulent to glabrous, base sometimes strongly oblique, cuneate to cordate. Inflorescences racemose, lax and later appearing scorpioid, pseudoterminal and/or axillary, few- to many-flowered cymes; bract 1, opposite each flower, alternate [or absent]. Calyx actinomorphic, 5-lobed, sometimes winged; segments equal. Corolla blue to purple, zygomorphic, inside glabrous or sparsely puberulent near mouth; tube tubular to cylindrical, not swollen, slightly longer than limb, 1.5–4 mm in diam.; limb 2-lipped; adaxial lip 2-lobed, shorter than abaxial lip; abaxial lip 3-lobed, seldom undivided, lobes equal or subequal, apex rounded and mucronulate or acute to obtuse. Stamens 2 or 4, adnate to corolla tube near middle, if 2 on abaxial side, included; anthers basifixed or dorsifixed, coherent in pairs, thecae nearly parallel or divaricate, confluent at apex, dehiscing longitudinally; connective not projecting; staminodes 2, 3, or absent, adnate to adaxial or adaxial and abaxial sides of corolla tube. Disc cupular. Ovary ovoid, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigma 1, terminal, subglobose, undivided. Capsule straight in relation to pedicel, ovoid, shorter than calyx, dehiscing loculicidally to base; valves 2, straight, not twisted. Seeds unappended.

About 12 species: SE Asia, Pacific Islands; two species in China.

1a. Calyx 1.6–2 cm; corolla ca. 2.1 cm, inside glabrous; fertile stamens 4, thecae divergent; perennials, rhizomatous; leaves 6–22 cm; peduncle 0.6–0.8 cm; capsule ca. 9 mm 1. *R. omeiense*

1b. Calyx 3–8 mm; corolla 0.8–1 cm, inside puberulent near mouth; fertile stamens 2, thecae nearly parallel; annuals, not rhizomatous; leaves 4–12 cm; peduncle 2–5.5(–8) cm; capsule 3–4.5 mm 2. *R. obliquum*

1. *Rhynchoglossum omeiense* W. T. Wang in W. T. Wang & K. Y. Pan, Bull. Bot. Res., Harbin 2(2): 148. 1982.
峨眉尖舌苣苔 e mei jian she ju tai

Perennials, rhizomatous. Stems 40–90 cm, glabrous. Petiole 0.2–4 cm; leaf blade oblique, 1 side elliptic, other side ovate, 6–22 × 2–8 cm, adaxially sparsely puberulent, abaxially glabrous, base strongly oblique, cuneate on smaller side, broadly cuneate, rounded, or subtruncate on other, margin subentire, indistinctly denticulate, apex long acuminate. Cymes 2.5–6 cm, 2–12-flowered, puberulent, glabrescent; peduncle 6–8 mm, glabrous. Calyx 1.6–2 cm; lobes 5–8 mm. Corolla deep purple, ca. 2.1 cm, inside glabrous; tube ca. 1.5 cm × 4 mm; adaxial lip ca. 3.5 mm; abaxial lip ca. 5 mm, 3-lobed. Stamens 4; anthers ca. 1.8 mm, thecae divaricate; staminodes absent. Disc ca. 0.2 mm. Pistil ca. 6 mm, glabrous. Style ca. 2 mm. Capsule surrounded by persistent calyx, ca. 9 mm. Fl. Aug–Sep.

• Stream-sides, shaded areas on slopes in valleys; 900–1700 m. Sichuan (Emei Xian, Leibo Xian, Meigu Xian).

2. *Rhynchoglossum obliquum* Blume, Bijdr. 741. 1826.
尖舌苣苔 jian she ju tai

Loxotis obliqua (Wallich) Benth; *Rhynchoglossum hologlossum* Hayata; *R. obliquum* f. *albiflorum* Kuntze; *R. obliquum* f. *coeruleum* Kuntze; *R. obliquum* var. *hologlossum* (Hayata) W. T. Wang; *R. obliquum* var. *parviflorum* C. B. Clarke; *R. zeylanicum* W. J. Hooker; *Wulfenia obliqua* Wallich.

Annuals, not rhizomatous. Stems 18–100 cm, glabrous to sparsely puberulent. Petiole 0.5–1.5(–3.5) cm; leaf blade oblique, 1 side elliptic, other side ovate, 4–12 × 2–6 cm, adaxially glabrous, sometimes minutely sparsely puberulent, abaxially glabrous, base strongly oblique, cuneate to narrowly cordate on smaller side, cordate on other, margin entire to undulate, apex acuminate. Cymes 3–24 cm, 10–30-flowered, appressed puberulent, glabrescent; peduncle 2–5.5(–8) cm, glabrous. Calyx often tinged blue, 3–8 mm; lobes 1–3 mm. Corolla pale to dark purple or blue, 8–11 mm, inside puberulent near mouth; tube 5–6 × 1.5–2 mm; adaxial lip 1.5–2.5 mm; abaxial lip 3.5–5 mm, 3-lobed to undivided. Stamens 2; anthers 0.7–1 mm, thecae nearly parallel; staminodes 2, ca. 0.8 mm. Disc ca. 1 mm. Pistil ca. 6.5 mm, glabrous. Style 4–6 mm. Capsule 3–4.5 mm. Fl. Jul–Nov, fr. Aug–Nov.

Forest margins, forests, caves, shaded cliffs; 100–2800 m. W Guangxi, SW Guizhou, SW Sichuan, Taiwan, E Xizang, Yunnan [Cambodia, India, Indonesia, Malaysia, Myanmar, Nepal, Philippines, Sri Lanka, Thailand, Vietnam].

In recent treatments of *Rhynchoglossum* in China two varieties were recognized. However, the only character that separates them is lobing of the abaxial corolla lip, which varies from entire to deeply 3-lobed even on the same specimen. The entire-lipped variety was described from and previously reported only from Taiwan. Entire abaxial corolla lips have been observed in W Guangxi, SW Guizhou, SW Sichuan, S & W Yunnan, India, Philippines, and Thailand.

55. EPITHEMA Blume, Bijdr. 737. 1826.

盾座苣苔属 dun zuo ju tai shu

Herbs, possibly perennial, terrestrial, rhizomatous. Stems usually simple. Leaves 1 to few, lowest leaf unpaired, those near apex usually opposite, equal or nearly so; leaf blade puberulent, base cordate. Inflorescences scorpioid, dense, pseudoterminal or axillary, many-flowered cymes; bract 1. Flowers zygomorphic, often reduced, cleistogamous, sometimes autogamous and intermediate. Calyx actinomorphic, 5-lobed from just above middle; segments equal. Corolla blue to reddish or white, zygomorphic, inside sparsely puberulent centrally or with a ring of hairs; tube tubular, not swollen, longer than limb, 2–3 mm in diam.; limb 2-lipped; adaxial lip 2-lobed, nearly equalling abaxial lip; abaxial lip 3-lobed, lobes subequal, apex rounded. Stamens 2, adnate to adaxial side of corolla tube above middle, included; anthers dorsifixed, apically coherent, thecae divaricate, confluent at apex, dehiscing longitudinally; connective not projecting; staminodes 2, adnate to abaxial side of corolla tube. Disc ringlike, cupular, interrupted, or 2-lobed. Ovary ovoid to globose, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigma 1, terminal, subcapitate, undivided. Capsule straight in relation to pedicel, globose to subglobose, shorter than calyx, dehiscence circumscissile. Seeds with long deciduous funicle.

About 10 species: Africa, SE Asia; two species in China.

1a. Leaf blade of apical stem leaves (0.8–)3.5–8 × (0.5–)2–5.5 cm; stems (1.5–)8–16 cm; leaf blade of basal stem leaves (1–)7.5–12(–14) × (0.8–)4.5–6.5(–9.2) cm; bract hoodlike, obovate, 6–10 mm; pedicel 2–4 mm; corolla inside sparsely puberulent centrally, tube ca. 4.5 mm 1. *E. carnosum*

1b. Leaf blade of apical stem leaves 0.4–3 × 0.3–2.5 cm; stems 2–7 cm; leaf blade of basal stem leaves 2–5 × 1.2–4 cm; bract ovate, 4–6 mm; pedicel ca. 0.1 mm; corolla inside with a ring of hairs, tube ca. 2.5 mm 2. *E. taiwanensis*

1. *Epithema carnosum* Bentham, Scroph. Ind. 57. 1835.
盾座苳苔 *dun zuo ju tai*

Aikinia carnosa (Bentham) G. Don.

Stems (1.5–)8–16 cm, spreading puberulent. Basal stem leaves 1; petiole (0.3–)1.8–7.5 cm; leaf blade elliptic to ovate, (1–)7.5–12(–14) × (0.8–)4.5–6.5(–9.2) cm, puberulent, base sometimes slightly oblique, cordate, margin undulate-denticulate to serrate, apex obtuse; apical stem leaves usually 2, opposite, short petiolate or subsessile, leaf blade ovate-elliptic, (0.8–)3.5–8 × (0.5–)2–5.5 cm, base subcordate. Peduncle (0.2–) 2.2–5.5 cm; bract hoodlike, obovate, 6–10 mm. Pedicel 2–4 mm. Calyx 3.5–4 mm; lobes triangular. Corolla reddish to purplish or white, ca. 6 mm, inside sparsely puberulent centrally; tube ca. 4.5 mm; lips ca. 2 mm. Stamens ca. 2 mm; staminodes ca. 1 mm. Pistil ca. 3 mm; ovary puberulent toward style. Capsule ca. 2 mm in diam. Fl. Jun–Sep, fr. Sep.

Shaded rocks, caves in valleys; 300–1400 m. N Guangdong, Guangxi, SW Guizhou, Taiwan, SE Yunnan [Bhutan, NE India, Myanmar, Nepal, Thailand].

2. *Epithema taiwanensis* S. S. Ying, Coloured Illustr. Pl. Taiwan 4: 795. 1992.

台湾盾座苳苔 *tai wan dun zuo ju tai*

Epithema brunonis (Wallich) Decaisne var. *fasciculata* C. B. Clarke.

Stems 2–7 cm, puberulent. Basal stem leaves 1; petiole 0.3–2.5 cm; leaf blade ovate to broadly ovate, 2–5 × 1.2–4 cm, puberulent, base sometimes slightly oblique, cordate, margin obscurely crenulate to serrulate or denticulate, apex obtuse; apical stem leaves 2, opposite, subsessile, leaf blade broadly ovate, 0.4–3 × 0.3–2.5 cm, base subcordate. Peduncle 1–4 cm; bract ovate, 4–6 mm. Pedicel ca. 0.1 mm. Calyx ca. 3 mm; lobes triangular. Corolla pinkish white, ca. 4 mm, inside with a ring of hairs; tube ca. 2.5 mm; lips ca. 1.5 mm. Stamens ca. 1.5 mm; staminodes ca. 0.5 mm. Pistil 1.5–3 mm; ovary with straight hairs toward style. Capsule 2–3 mm in diam. Fl. Jul–Aug, fr. Sep.

Partially shaded, moist coral rock; 200–500 m. S Taiwan [Philippines].

56. TITANOTRICHUM Solereder, Ber. Deutsch. Bot. Ges. 27: 400. 1909.

台湾苳苔属 *tai min ju tai shu*

Matsumuria Hemsley.

Herbs, perennial, terrestrial, rhizomatous. Stems simple. Leaves few, along stem, opposite, those near apex sometimes alternate, often unequal in a pair; leaf blade puberulent to scabrous, base attenuate to rounded. Inflorescences compound racemose, lax, pseudoterminal, few to many flowered; bract 1, subtending each flower, alternate. Flowers zygomorphic, sometimes replaced by propagules in upper part of inflorescence. Calyx actinomorphic, 5-sect from base; segments equal. Corolla yellow, zygomorphic, inside glabrous; tube subtubular to funnelform-tubular, not swollen, longer than limb, 0.9–1.6 cm in diam.; limb 2-lipped; adaxial lip 2-lobed, slightly shorter than abaxial lip; abaxial lip 3-lobed, lobes subequal to unequal, apex rounded. Stamens 4, adnate to corolla tube near base, included; anthers basifixed, coherent in pairs, thecae parallel, not confluent, dehiscing longitudinally; connective not projecting; staminode 1, adnate to adaxial side of corolla tube. Disc ringlike. Ovary ovoid, 1-loculed; placentas 2, parietal, projecting inward, 2-cleft. Stigmas 2, strongly unequal; adaxial 1 small, deltoid to suborbicular, undivided; abaxial 1 narrowly obtriangular to ligulate, 2-lobed to emarginate. Capsule straight in relation to pedicel, ovoid, nearly as long as calyx, dehiscing loculicidally to base; valves 4, straight, not twisted. Seeds with scalelike membranous appendages at each end.

One species: China, Japan.

1. *Titanotrichum oldhamii* (Hemsley) Solereder, Ber. Deutsch. Bot. Ges. 27: 400. 1909.

台湾苳苔 *tai min ju tai*

Rehmannia oldhamii Hemsley in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 194. 1889; *Matsumuria oldhami* (Hemsley) Hemsley.

Rhizomes with fleshy scales. Stems 20–50 cm, pilose, glabrescent. Petiole 0.3–6.5 cm; leaf blade elliptic to ovate, (2.5–) 10–27 × (1.2–)4.5–12.5 cm, appressed puberulent to scabrous, base oblique, attenuate to

rounded, margin repand to coarsely double serrate or dentate, apex acute to acuminate. Inflorescences many flowered; rachis pilose; bracts lanceolate to linear, (2–)5–10 mm. Calyx segments lanceolate to narrowly triangular, 0.7–1.3 cm. Corolla yellow, inside purple spotted from lobes to base, 3–4.5 cm; tube 2.6–3.7 cm; adaxial lip 4.5–6 × ca. 5 mm; abaxial lip 6–8 × ca. 8 mm. Stamens glabrous; filaments 2.2–2.7 cm; staminode ca. 0.5 mm. Pistil 2–3 cm; ovary densely appressed puberulent. Style 1.8–2.8 cm, glabrous; adaxial stigma 0.4–0.8 mm, abaxial ca. 1.2 mm. Capsule 6–8 × 3–5.5 mm. Fl. Jul–Nov.

Shaded areas in valleys; 100–1200 m. Fujian, Taiwan [Japan (including Ryukyu Islands)].

Titanotrichum oldhamii, with its truly racemose inflorescence, scaly rhizomes, and appendiculate seeds, is distinct within the Gesneriaceae. Its relationship with other genera and its systematic position within the family are unclear.