

75. LIPARIS Richard, De Orchid. Eur. 21, 30, 38. 1817, nom. cons.

羊耳蒜属 yang er suan shu

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Alipis Hoffmannsegg; *Anistylis* Rafinesque; *Diteilis* Rafinesque; *Dituilis* Rafinesque; *Empusa* Lindley; *Empusaria* Reichenbach; *Iebine* Rafinesque; *Leptorkis* Thouars; *Malaxis* sect. *Platystylis* Blume; *Mesoptera* Rafinesque; *Paliris* Dumortier; *Platystylis* (Blume) Lindley (1830), not Sweet (1828); *Pseudorchis* Gray (1821), not Séguier (1754); *Sturmia* Reichenbach (1826), not Hoppe (1799).

Herbs, terrestrial, lithophytic, or epiphytic, rhizomatous, rarely mycotrophic and leaves reduced to scales. Stems pseudobulbous, sometimes appearing as a many-noded, fleshy stem, clustered or not, when young covered by sterile bracts. Leaves 1 to several, linear to ovate or elliptic, plicate or not, thinly textured to leathery, basal or cauline (terrestrial species), or arising from apex or subterminal nodes of pseudobulbs (epiphytic species), articulate or not at base. Inflorescences erect to pendulous, racemose, laxly or densely many flowered; floral bracts persistent, small. Flowers small or medium-sized, yellow, green, orange, or purple, often translucent, usually resupinate. Sepals spreading, dorsal sepal free, lateral sepals sometimes fused for part or all of their length. Petals free, often reflexed, often linear and unlike sepals; lip often reflexed, ovate, oblong, or flabellate, entire or lobed, usually with a basal callus, lacking a spur. Column incurved-arcuate, clavate, long, winged at apex and sometimes at base; anther cap attached by a slender filament, 2-locular; pollinia 4 in 2 pairs, waxy, ovoid, bilaterally flattened, each pair with a small viscidium; rostellum thinly textured, blunt. Capsule subglobose to ellipsoid, often ± with 3 obtuse ridges.

About 320 species: well represented in tropical Asia, New Guinea, Australia, SW Pacific islands, and the subtropical and tropical Americas, with a single species in Europe and two in North America; 63 species (20 endemic) in China.

Liparis gibbosa Finet (Bull. Soc. Bot. France 55: 342. 1908) was recorded from Yunnan by Y. M. Shui and W. H. Chen (Seed Pl. Karst Region China, 241. 2006). This species is easily recognizable by its distichous floral bracts and gibbous lip. It has a wide distribution (Indonesia, Laos, Malaysia, Myanmar, New Guinea, Thailand, Vietnam; Pacific islands) and so could well be present in S China. However, the present authors could not substantiate the Chinese record because they found no relevant specimens.

- 1a. Leaves herbaceous or membranous, not articulate at base; plants usually terrestrial.
 - 2a. Leaf solitary.
 - 3a. Floral bracts lanceolate, 5–9 mm.
 - 4a. Leaf cordate; lip with 2 small basal calli; column strongly arcuate, base with 2 low oblong mounds 28. *L. petiolata*
 - 4b. Leaf oblong to oblong-elliptic; lip without calli; column weakly arcuate, base with 2 subglobose mounds 4. *L. glossula*
 - 3b. Floral bracts triangular, 0.5–1 mm.
 - 5a. Leaves (3–)6–17 cm, cordate at base; raceme many flowered; lip broadly obovate, with 2 small calli 1. *L. cordifolia*
 - 5b. Leaves 1–2 cm, base not cordate; raceme 1- or 2-flowered; lip ovate-orbicular with 2 low ridges 3. *L. amabilis*
 - 2b. Leaves 2 to many.
 - 6a. Plants with an elongate rhizome, pseudobulbs 2–5 cm or more apart.
 - 7a. Floral bracts 1.5–2.5 mm; lip apex usually broadly rounded, sometimes apiculate 7. *L. auriculata*
 - 7b. Floral bracts 5–6 mm; lip apex broadly triangular, acute 28. *L. petiolata*
 - 6b. Plants with an abbreviated rhizome, pseudobulbs sequentially close together.
 - 8a. Lip rectangular-cuneate, apex deeply erose to pectinate 27. *L. barbata*
 - 8b. Lip not as above, at most shallowly dentate.
 - 9a. Ovary with 6 prominent wavy wings 24. *L. regnieri*
 - 9b. Ovary wingless or with narrow straight wings.
 - 10a. Plants with stemlike pseudobulbs (2–)5–30 cm.
 - 11a. Flowers greenish yellow; lip with a deep median channel flanked by lamellate callus ridges 23. *L. sootzenanensis*
 - 11b. Flowers greenish or greenish purple to black-purple; lip base with 2 calli lacking lamellate extensions.
 - 12a. Column with triangular wings, basal margins of wings forming an acute to right angle with axis of column 20. *L. formosana*
 - 12b. Column almost wingless or with narrow rounded wings.
 - 13a. Flowers dark purple throughout; dorsal sepal 18–20 mm 21. *L. gigantea*
 - 13b. Flowers greenish, tinged with purple, never dark purple throughout; dorsal sepal shorter than 16 mm.
 - 14a. Dorsal sepal 10–15 mm; lip 9–15 mm; column 5–6 mm 22. *L. henryi*

- 14b. Dorsal sepal 8–9 mm; lip 3.5–6.5 mm; column 3.5–4 mm 19. *L. nervosa*
- 10b. Plants with ovoid, globose, or fusiform pseudobulbs shorter than 3.5 cm.
- 15a. Leaves 3–6, linear to linear-lanceolate.
- 16a. Petals 3-veined; lip papillose adaxially 26. *L. hensoaensis*
- 16b. Petals 1-veined; lip not papillose adaxially.
- 17a. Leaf blade 3–5 × as long as wide 16. *L. odorata*
- 17b. Leaf blade 8–10 × as long as wide 25. *L. ferruginea*
- 15b. Leaves 2 or 3, ligulate to cordate.
- 18a. Lip without a basal callus.
- 19a. Column with 2 short teeth projecting from sides at base; lip elliptic-obovate to broadly obovate-obcordate 13. *L. rostrata*
- 19b. Column without projecting basal teeth; lip cuneate to narrowly obovate.
- 20a. Sepals 10–12 × 2.5–3.5 mm; lip 10–12 mm; column 5–6 mm 5. *L. elongata*
- 20b. Sepals 5–9 × to 2 mm; lip 6–7 mm; column 2.5–3.5 mm 6. *L. campylostalis*
- 18b. Lip with a basal callus or lamellae.
- 21a. Floral bracts 4–15 mm.
- 22a. Lip elliptic, rounded; callus extending 2/3 medially along lip as a glossy dark green thickening 14. *L. tchangii*
- 22b. Lip broadly obovate or with an emarginate, transversely elliptic blade; callus without a thickened extension.
- 23a. Inflorescence with a dense pyramidal raceme; lip with a transversely elliptic, emarginate blade 15. *L. siamensis*
- 23b. Inflorescence with a narrow, laxer raceme; lip blade broadly obovate to subquadrate.
- 24a. Leaves 2, opposite, blades lying on ground, base subcordate, sessile; petals 1-veined; lip callus shallowly bilobed, lobules obtuse 2. *L. oppositifolia*
- 24b. Leaves 2 or 3, suberect to erect, base cuneate, with elongate sheathing base; petals 3-veined; lip callus deeply bilobed, lobules acute 16. *L. odorata*
- 21b. Floral bracts 0.3–3 mm.
- 25a. Lip with an ovate, acuminate blade.
- 26a. Lip apparently with a lamellate basal callus, margin of blade entire or sparsely minutely ciliate 12. *L. krameri*
- 26b. Lip with a large, convex, frontally excavate basal callus, margin of blade conspicuously white ciliate 11. *L. sasakii*
- 25b. Lip with blade suborbicular or elliptic to obovate, apex apiculate to emarginate.
- 27a. Inflorescence many flowered; lip broadly obovate to suborbicular.
- 28a. Flowers blackish purple; callus restricted to base of lip, not forming a hollow 10. *L. dunnii*
- 28b. Flowers green, base of column and most of lip purple; callus obscure, forming a basal hollow and from there a shallow groove extending onto blade flanked by low keels 8. *L. cathcartii*
- 27b. Inflorescence 1–6-flowered; lip subquadrate, obovate-elliptic, or oblong-subpandurate.
- 29a. Leaves 2.7–9 cm, with exposed or evident petioles; lip obovate-elliptic 9. *L. pauliana*
- 29b. Leaves shorter than 2 cm, without exposed or evident petioles.
- 30a. Lip subquadrate, ca. 8.5 × 7 mm; column ca. 4 mm 18. *L. brunnea*
- 30b. Lip oblong-subpandurate, 5–7 × ca. 3 mm; column 2–2.5 mm 17. *L. pygmaea*
- 1b. Leaves papery to thickly papery, articulate at base; plants usually epiphytic or lithophytic.
- 31a. Pseudobulbs 1-leaved.

- 32a. Lip strongly 3-lobed 44. *L. mannii*
- 32b. Lip entire or apex bilobed.
- 33a. Lip apex deeply bilobed, lobules minutely lobulate with ciliate-pubescent margins 43. *L. latifolia*
- 33b. Lip apex acute to shallowly emarginate, without ciliate-pubescent margins.
- 34a. Pseudobulbs prostrate or distinctly wider than long.
- 35a. Lip obovate, base with a fleshy bilobed callus 40. *L. chapaensis*
- 35b. Lip cuneate-subpandurate, base with 2 separate low ridges.
- 36a. Leaves subsessile; dorsal sepal connate to margins of lateral sepals for ca. 2/3 of length 63. *L. seidenfadeniana*
- 36b. Leaves petiolate, petiole 3–12 mm; dorsal sepal free from lateral sepals 42. *L. fargesii*
- 34b. Pseudobulbs erect or ascending, ca. as wide as long to elongate.
- 37a. Flowers very small, sepals 1.5–2.5 mm.
- 38a. Sepals 1.5–1.8 mm; lip with an indistinct basal callus; column 0.8–1.2 mm 36. *L. cespitosa*
- 38b. Sepals ca. 2.5 mm; lip with separated calli on each side above base; column ca. 2 mm 41. *L. pumila*
- 37b. Flowers larger, sepals 3.5–11.5 mm.
- 39a. Column apex unwinged or narrowly winged.
- 40a. Floral bracts ca. 3 mm; sepals 3.5–5.3 mm; lip apex bilobed to truncate-emarginate 30. *L. averyanoviana*
- 40b. Floral bracts 5–10 mm; sepals 5–10 mm; lip apex truncate to shovel-shaped.
- 41a. Sepals 8–10 mm; lip subpandurate, apex shovel-shaped, 4.7–6 mm wide 35. *L. esquirolii*
- 41b. Sepals 5–6 mm; lip rectangular, apex truncate, 2.5–3 mm wide 57. *L. sparsiflora*
- 39b. Column apex with triangular to hook-shaped wings.
- 42a. Lateral sepals connate to middle; lip without a callus; column with an additional pair of apical triangular wings 38. *L. inaperta*
- 42b. Lateral sepals free; lip with a basal callus or a low medial thickening; column without additional apical wings.
- 43a. Pseudobulbs 1.5–5 cm apart.
- 44a. Leaves 9–11 × 1.6–1.8 cm; lip ca. 7.5 × 10 mm; calli confluent basally; column curved, ca. 4 mm 32. *L. bautingensis*
- 44b. Leaves 8.3–11.5 × 3–4 cm; lip 10–11 × ca. 10 mm; calli separate, not confluent; column straight, 4.8–5 mm 33. *L. superposita*
- 43b. Pseudobulbs close together.
- 45a. Leaves 3.4–4 cm wide; lip callus divided into a pair of narrowly conic, acute lobes 34. *L. rockii*
- 45b. Leaves 0.5–3.3 cm wide; lip callus not as above, sometimes with digitate extensions but these obtuse.
- 46a. Lip ca. 2 mm wide.
- 47a. Lip apex with irregular margins, basal half with a low medial thickening 37. *L. laurisilvatica*
- 47b. Lip apex with entire margins, basal half with a quadrate, rarely indistinct callus 39. *L. kwangtungensis*
- 46b. Lip 3–13 mm wide.
- 48a. Sepals 5–8 mm; lip 5–7 × 4–5 mm, cuneate to cuneate-obovate; anther cap ca. 1 mm 29. *L. bootanensis*
- 48b. Sepals 9–13 mm; lip 8–12 × 9–13 mm, suborbicular to broadly obovate; anther cap ca. 2 mm 31. *L. balansae*
- 31b. Pseudobulbs 2–5-leaved.
- 49a. Pseudobulbs (2 or) 3–5-leaved.
- 50a. Leaves linear, 1–2 mm wide 58. *L. perpusilla*
- 50b. Leaves ligulate to oblong-lanceolate, 4–11 mm wide.
- 51a. Column with a single pair of broad wings, each with a retrorse thread; lip apex shortly calceolate 62. *L. resupinata*
- 51b. Column with 2 pairs of wings; lip apex not calceolate.
- 52a. Lip with a complicate callus, appearing to be in 2 bilobed parts 60. *L. platyrachis*

- 52b. Lip callus simpler, U-shaped or frontally excavate.
 53a. Sepals 2.5–3.5 mm; lip blade transversely elliptic-suborbicular 59. *L. delicatula*
 53b. Sepals 4.5–5.8 mm; lip blade cuneate-obovate 61. *L. assamica*
- 49b. Pseudobulbs 2-leaved.
 54a. Lip blade broadly obovate 48. *L. distans*
 54b. Lip not as above.
 55a. Pseudobulbs cylindrical to narrowly conic-cylindric, longer than 5 cm.
 56a. Pseudobulbs well spaced on a slender rhizome, 2–4 cm apart; lip margins minutely pubescent-ciliate 46. *L. condylobulbon*
 56b. Pseudobulbs clustered, on a short rhizome; lip margins glabrous.
 57a. Sepals 2–3.5 mm; lip without a callus 45. *L. viridiflora*
 57b. Sepals 5–6 mm; lip with a bifurcate basal callus 47. *L. bistrata*
- 55b. Pseudobulbs globose to ovoid, shorter than 5 cm.
 58a. Lip apex deeply bilobed.
 59a. Leaf apex obtuse; scape without peduncular bracts below middle; lip with 2 divergent ridges in basal 1/4 54. *L. grossa*
 59b. Leaf apex acute; scape with several peduncular bracts below middle; lip with 2 longitudinal lamellae from base to middle 55. *L. fissilabris*
- 58b. Lip apex not as above.
 60a. Pseudobulbs compressed globose; lip ovate-elliptic, apex subacuminate, lacking a basal callus 52. *L. elliptica*
 60b. Pseudobulbs globose to ovoid; lip not as above, usually with some form of callus or thickening.
 61a. Lip with a medial longitudinal ridge with a bilobed or sulcate basal callus.
 62a. Lip transversely elliptic-suborbicular, 8–10 mm wide, basal callus bilobed and disjunct from medial ridge 51. *L. latilabris*
 62b. Lip cuneate, ca. 3 mm wide, basal callus sulcate and continuous with a short ridge 56. *L. luteola*
- 61b. Lip without a longitudinal ridge but either a bilobed callus or an obscure quadrate thickening.
 63a. Sepals (5.5–)7–12 mm; lip cuneate to subpandurate 49. *L. nakaharae*
 63b. Sepals 1.5–6 mm; lip not as above.
 64a. Leaves 1.2–4.5 cm; lip transversely elliptic-suborbicular; column with 2 pairs of wings 59. *L. delicatula*
 64b. Leaves 4–46 cm; lip ovate-oblong, rectangular to broadly obdeltate; column with 1 pair of wings.
 65a. Inflorescence 4–8-flowered; lip rectangular 57. *L. sparsiflora*
 65b. Inflorescence many flowered; lip not as above.
 66a. Lip broadly obdeltate 50. *L. stricklandiana*
 66b. Lip ovate-oblong 53. *L. somae*

1. *Liparis cordifolia* J. D. Hooker, Hooker's Icon. Pl. 19: ad t. 1811. 1889.

心叶羊耳蒜 xin ye yang er suan

Leptorkis cordifolia (J. D. Hooker) Kuntze; *Liparis argen-topunctata* Averyanov; *L. keitaoensis* Hayata.

Herbs, terrestrial or lithophytic. Pseudobulbs clustered, ovoid, somewhat flattened, 2–3 cm × 5–12 mm, ± enclosed by white membranous sheaths. Leaf 1; petiole 2–3 cm, sheathlike, amplexicaul, not articulate; blade green or occasionally white spotted, ovate to cordate, (3–)6–10(–17) × (2–)3.5–8(–14.5) cm, membranous or herbaceous, base cordate and decurrent to petiole, apex acuminate. Inflorescence 6–12(–25) cm; peduncle slightly compressed, with narrow wings on both sides; rachis often more than 10-flowered; floral bracts deltoid-lanceolate, usually 0.5–1 mm. Flowers green or pale green, often densely

arranged; pedicel and ovary 6–10 mm. Sepals linear-lanceolate or sublinear, 6–7 × ca. 1.8 mm, 3-veined, midvein rather conspicuous, margin revolute, apex obtuse or acute. Petals filiform or narrowly linear, 6–7 × ca. 0.5 mm, 1-veined; lip obovate-triangular, 6–7 × ca. 6 mm, narrowed toward base, with a hollow near base and above hollow a pair of inconspicuous calli, midvein thickened and ± raised, margin ± undulate and apically erose-denticulate, apex truncate and mucronate. Column curved, 4–5 mm, upper part with broad wings, base dilated and thick; wings subquadrate, one side ca. 1 mm wide. Fl. Oct–Dec. $2n = 20$.

Humus-rich soil in forests, soil-covered crevices or forks of trees; 1000–2000 m. Guangxi, Taiwan, SE Xizang, SE Yunnan [Bhutan, N India, Nepal, Vietnam].

2. *Liparis oppositifolia* Szlachetko, Fragm. Florist. Geobot. 38(2): 458. 1993.

对叶羊耳蒜 *dui ye yang er suan*

Herbs, terrestrial. Pseudobulbs clustered, ovoid to conic, 1.6–2.4 × 1–1.3 cm, probably partly or wholly subterranean. Leaves 2, broadly ovate-elliptic, 5.5–12.5 × 4.5–11 cm, base subcordate, apex acute to subacute, inner leaf much larger than outer leaf, lying on ground, sessile. Inflorescence to 32 cm; peduncle ca. 15 cm; peduncular bracts 7, deflexed, lanceolate, to 8 mm, acute; rachis to 18 cm, successively many flowered; floral bracts lanceolate, 4–11 mm, apex acute. Flowers green; pedicel and ovary 5–6 mm. Dorsal sepal oblong, ca. 6.5 × 1.8 mm, 5-veined, obtuse; lateral sepals obliquely ovate-lanceolate, ca. 6 × 2.6 mm, 5-veined, apex subacute. Petals linear-oblongate, ca. 6.5 × 0.6 mm, 1-veined, obtuse; lip suborbicular-subquadrate from a narrower subquadrate base, ca. 6.5 × 6.5 mm, margin entire to shallowly erose, apex truncate to shallowly emarginate, shortly apiculate, base with a fleshy bilobed callus. Column partly deflexed near apex, to 3.5 mm, with narrow subquadrate wings. Fl. Aug.

Dense woods; ca. 1100 m. Yunnan [Cambodia, Laos, ?Vietnam].

3. *Liparis amabilis* Fukuyama, Bot. Mag. (Tokyo) 52: 245. 1938.

白花羊耳蒜 *bai hua yang er suan*

Herbs, terrestrial, small. Pseudobulbs clustered, globose, somewhat flattened, ca. 1 cm in diam., ± enclosed by white membranous sheaths. Leaf 1; petiole short, not articulate; blade ovate or ovate-elliptic, 1–2 cm, membranous or herbaceous, base decurrent into petiole, apex acute or obtuse. Inflorescence 3–4 cm, 1- or 2-flowered; floral bracts triangular, very small. Flowers large, white, lip with purplish red veins; pedicel and ovary 6–10 mm. Sepals linear, ca. 1.2 × 3 mm, 3-veined. Petals filiform or narrowly linear, nearly as long as sepals, ca. 0.5 mm wide, 1-veined; lip orbicular or ovate-orbicular, ca. 1.2 cm, base slightly contracted, margin minutely ciliate, apex rounded or mucronate, with 2 rather thick longitudinal lamellae from base extending to above middle. Column arcuate, ca. 5 mm, base dilated. Fl. Apr.

• Forests; ca. 900 m. N Taiwan (Taibei).

4. *Liparis glossula* H. G. Reichenbach, Linnaea 41: 44. 1877.

方唇羊耳蒜 *fang chun yang er suan*

Leptorkis glossula (H. G. Reichenbach) Kuntze.

Herbs, terrestrial. Pseudobulbs clustered, ovoid, ca. 10 × 6–8 mm, ± enclosed by white membranous sheaths. Leaf 1; petiole sheathlike, 4.5–12 cm, amplexicaul, not articulate; blade oblong or elliptic-oblong, 8–15 × 2–5 cm, membranous or herbaceous, base subcuneate and decurrent into petiole, apex obtuse or subacute. Inflorescence 12–22 cm; peduncle somewhat compressed, narrowly winged on either side; rachis 3–12 cm, several to 20-flowered, winged, wings along rachis nearly as wide as rachis itself when dried; floral bracts lanceolate, 6–9 mm. Flowers purplish red, slightly spaced; pedicel and ovary 1–1.6 cm. Sepals linear-lanceolate, 10–13 × ca. 3 mm, 3-veined, midvein rather conspicuous, margin revolute, apex subacute. Petals filiform or narrowly linear, 10–12 × ca. 0.7 mm, 1-veined; lip subquadrate or broadly oblong, ca. 10 × 8–9 mm,

base slightly contracted, with a deeply colored central longitudinal band, without a callus, margin minutely ciliate, apex subtruncate and mucronate. Column slightly curved, 4–5 mm, upper part winged, base with 2 callus-shaped projections; anther cap beaked. Fl. Jul. $2n = 20$.

Forests, forest margins, thickets; 2200–3200 m. S Xizang, SE Yunnan [NE India, Nepal].

5. *Liparis elongata* Fukuyama, Rep. (Annual) Taihoku Bot. Gard. 3: 82. 1933.

宝岛羊耳蒜 *bao dao yang er suan*

Liparis derchiensis S. S. Ying.

Herbs, terrestrial. Pseudobulbs clustered, ovoid, 1.8–3 × 1.5–2.5 cm, enclosed by 2 or 3 membranous sheaths. Leaves 2; petiole 5–9 cm, base sheathing, not articulate; blade ovate to oblong, 6–13 × 4–6 cm, base contracted into petiole, apex obtuse. Inflorescence 23–40 cm; peduncle 5–20 cm, 3-ridged; rachis 18–20 cm, laxly 10–20-flowered; floral bracts triangular, 2–3 mm, apex acute. Flowers widely opening, pale green, center of lip often tinged purple; pedicel and ovary ca. 15 mm. Dorsal sepal reflexed, linear, 10–12 × 2.5–3 mm, keeled dorsally, 3-veined, margin revolute, apex obtuse; lateral sepals obliquely ligulate-lanceolate, 10–12 × 3–3.5 mm, parallel below lip, keeled dorsally, 3-veined, margin revolute, apex acute. Petals linear, 10–12 × ca. 1 mm, margins revolute, deflexed lower than lateral sepals but upcurved from middle; lip recurved abruptly at middle, cuneate-obovate, 10–12 × 7–10 mm, base contracted and without a callus, margin entire to indistinctly serrulate, apex truncate-rounded, minutely apiculate. Column curved, 5–6 mm, base dilated into 2 rounded mounds, apex with obtuse wings. Fl. Jun–Jul.

• Forests; 1800–2000 m. E and N Taiwan.

This species may be conspecific with *Liparis makinoana* Schlechter, from Japan, given that the descriptions of the two coincide. In Japan, the name *L. makinoana* has been misapplied to different taxa (e.g., by Tsutsumi & Yukawa, Bull. Natl. Mus. Nat. Sci., Tokyo, B, 34: 89–94. 2008).

6. *Liparis campylostalis* H. G. Reichenbach, Linnaea 41: 45. 1877.

羊耳蒜 *yang er suan*

Leptorkis campylostalis (H. G. Reichenbach) Kuntze; *Liparis giraldiana* Kraenzlin; *L. pauciflora* Rolfe; *L. yuana* Ormerod.

Herbs, terrestrial, rarely epiphytic. Pseudobulbs clustered, ovoid to globose, 5–12 × 3–8 mm, enclosed by 2 or 3 membranous sheaths. Leaves 2; petiole 1.5–8 cm, base sheathing, not articulate; blade ovate or ovate-oblong to subelliptic, (2–)5–10(–16) × (1–)2–4(–7) cm, base contracted into petiole, margin entire, occasionally wavy, apex acute to obtuse. Inflorescence 10–25 cm; peduncle 3.5–15 cm, winged; rachis 2–17 cm, laxly to subdensely few to many flowered; floral bracts lanceolate, 1–5.5 mm, apex acute. Flowers greenish, often tinted pink to purple or light purple; pedicel and ovary 5–10 mm. Dorsal sepal ligulate-lanceolate, 5–9 × 1.8–2 mm, 3-veined, apex subacute; lateral sepals parallel below lip, obliquely oblong-lanceolate,

4.5–8.5 × 1.5–2 mm, 3-veined, apex subacute. Petals deflexed, parallel to and below lateral sepals, linear, 5–7 × ca. 0.5 mm; lip cuneate to oblong-obovate, 5–6 × 3–3.5 mm, base contracted, without a callus, margin entire to irregularly suberose, apex broadly apiculate, truncate to emarginate. Column weakly curved, 2.5–3.5 mm, base dilated, apex with small subquadrate wings. Fl. Aug–Oct.

Forests, thickets, grasslands; 1100–2800(–3400) m. Gansu, Guizhou, Hebei, Heilongjiang, Henan, W Hubei, Jilin, Liaoning, Nei Mongol, Shandong, S Shanxi, Sichuan, Taiwan, Xizang, Yunnan [Japan, Korea, Russia (Far East)].

Tsutsumi and Yukawa (Bull. Natl. Mus. Nat. Sci., Tokyo, B, 34: 89–94. 2008) argue that the name *Liparis japonica* (Miquel) Maximowicz is actually a synonym of *Malaxis monophyllos*. The next available name for the “*L. japonica*” of authors is *L. campylostalix*. We have not followed Lang and Tsi (in Wu, Fl. Xizang, 5: 842–844. 1987) in separating “*L. japonica*” (larger plants, entire lip) from *L. campylostalix* (small plants, entire lip) given that intermediates exist.

7. *Liparis auriculata* Blume ex Miquel, Ann. Mus. Bot. Lugduno-Batavi 2: 203. 1866.

玉簪羊耳蒜 yu zan yang er suan

Leptorkis auriculata (Blume ex Miquel) Kuntze; *Liparis yakusimensis* Masamune.

Herbs, terrestrial, often forming large clusters. Pseudobulbs borne 3–5 cm apart, ovoid, slightly compressed, 1–2 × ca. 1.5 cm. Leaves 2; petiole sheathlike, 4–6 cm, not articulate; blade ovate, broadly ovate, or cordate, 4–10 × 3–8 cm, base rounded to cordate and decurrent into petiole, apex acute. Inflorescence 20–30 cm; rachis several to more than 10-flowered; floral bracts lanceolate, 1.5–2.5 mm. Flowers ca. 1 cm in diam., greenish, purplish, or deep purplish red; pedicel and ovary 5–6 mm. Dorsal sepal linear, 6–7 × 1.5–2 mm, apex acute; lateral sepals similar to dorsal sepal, slightly shorter and broader. Petals subfiliform, ca. 6 × 0.5 mm; lip orbicular or ovate-orbicular, 5.5–6 × ca. 5 mm, with 2 subtriangular small calli near base, apex rounded or sometimes apiculate. Column recurved at apex, 3–5 mm, slender, narrowly winged, base dilated. Fl. May–Jul.

Dense forests, damp places; 1000–2500 m. C and N Taiwan [Japan (Ryukyu Islands)].

8. *Liparis cathcartii* J. D. Hooker, Hooker's Icon. Pl. 19: ad t. 1808. 1889.

二褶羊耳蒜 er zhe yang er suan

Leptorkis cathcartii (J. D. Hooker) Kuntze.

Herbs, terrestrial. Pseudobulbs ovoid, 5–6 × 4–5 mm, ± enclosed by white membranous sheaths. Leaves 2; petiole sheathlike, 2–5.5 cm, amplexicaul, not articulate; blade elliptic, ovate, or ovate-oblong, 3.5–8 × 1.7–4 cm, base contracted and decurrent into petiole, margin slightly crisped or nearly entire, apex acute or obtuse. Inflorescence 7–25 cm; peduncle slightly compressed cylindrical, narrowly winged on either side; rachis several to more than 10-flowered; floral bracts ca. 1 mm. Flowers pink, occasionally green or purple; pedicel and ovary 7–8 mm. Sepals narrowly oblong, 7–9 × ca. 2.5 mm, inconspicuously 3-veined, apex obtuse; lateral sepals slightly oblique. Pet-

als nearly filiform, 7–9 × ca. 0.4 mm, 1-veined; lip obovate to elliptic-obovate, 8–9 × 7–8 mm, base contracted, usually with 2 short longitudinal lamellae, very rarely lamellae inconspicuous, margin irregularly toothed, apex subtruncate and mucronate. Column arcuate, 3–3.5 mm, base dilated and thick, apex winged. Capsule obovoid-oblong, 1.1–1.3 cm × ca. 5 mm; fruiting pedicel 6–9 mm. Fl. Jun–Jul, fr. Oct.

Humid or grassy places along valleys; 1900–2500 m. Sichuan, C and NW Yunnan [Bhutan, NE India, Nepal].

9. *Liparis pauliana* Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 58: 65. 1921.

长唇羊耳蒜 chang chun yang er suan

Liparis cucullata S. S. Chien.

Herbs, terrestrial. Pseudobulbs ovoid or ovoid-oblong, 1–2.5 cm × 8–15 mm, ± enclosed by many white membranous sheaths. Leaves 2, very rarely 1; petiole sheathlike, 0.5–4 cm, amplexicaul, not articulate; blade ovate to elliptic, 2.7–9 × 1.5–5 cm, membranous or herbaceous, base contracted into petiole, margin crisped and irregularly serrate, apex acute or shortly acuminate. Inflorescence 7–28 cm; peduncle flattened cylindrical, narrowly winged on either side; rachis laxly several flowered, very rarely many flowered or 1- or 2-flowered; floral bracts ovate or ovate-lanceolate, 1.5–3 mm. Flowers pale purple, sepals often pale yellowish green; pedicel and ovary 1–1.8 cm. Sepals linear-lanceolate, 11.5–18 × 2–2.5 mm, 3-veined, apex acuminate; lateral sepals slightly oblique. Petals nearly filiform, 11.5–18 × ca. 0.3 mm, 1-veined; lip obovate-elliptic, 1.3–2 × 0.8–1.2 cm, often with 2 short longitudinal lamellae near base, sometimes lamellae inconspicuous, apex obtuse or sometimes mucronate. Column arcuate, 3.5–4.5 mm, base dilated and thick, apex winged. Capsule obovoid, ca. 1.7 cm × 7–8 mm, upper part with 6 wings ca. 1.5 mm wide, wings becoming narrower downward; fruiting pedicel 1–1.2 cm. Fl. May, fr. Oct–Nov.

• Damp places or crevices in forests; 600–2300 m. N Guangdong, N Guangxi, E Guizhou, Hubei, Hunan, Jiangxi, C Yunnan, Zhejiang.

10. *Liparis dunnii* Rolfe, J. Linn. Soc., Bot. 38: 368. 1908.

福建羊耳蒜 fu jian yang er suan

Herbs, terrestrial or lithophytic, with somewhat dilated base ± enclosed by white membranous sheaths. Leaves 2, ovate-oblong, ca. 13 × 6 cm, membranous or herbaceous, obtuse. Inflorescence 15–18 cm; rachis many flowered; floral bracts ovate, ca. 2 mm, apex acute. Pedicel and ovary ca. 1 cm. Dorsal sepal oblong-lanceolate, 9–10 × 2–2.5 mm, 3-veined, apex acute; lateral sepals obliquely oblong-lanceolate, to 9.5 × 2.5 mm, 3-veined, apex subacute. Petals linear, ca. 8.5 × 0.5–1 mm, 1-veined; lip suborbicular-obovate, 9.5–10 × ca. 8.5 mm, basal callus erect and bilobed, margin shallowly dentate, apex broadly apiculate. Column arcuate, clavate, 3.5–4 mm. Fl. Oct. $2n = 20^*$.

• Humid rocks; ca. 900 m. N and W Fujian.

11. *Liparis sasakii* Hayata, Icon. Pl. Formosan. 4: 32. 1914.

阿里山羊耳蒜 a li shan yang er suan

Liparis krameri Franchet & Savatier var. *sasakii* (Hayata) T. Hashimoto.

Herbs, terrestrial or lithophytic. Pseudobulbs flattened ovoid, 1.5–2.5 × 1–1.5 cm, ± enclosed by white membranous sheaths. Leaves 2, subsessile, not articulate, obovate, ca. 5 × 2.5 cm, membranous or herbaceous, base cuneate, apex acute or obtuse. Inflorescence ca. 8 cm; rachis ca. 2 cm, 5-flowered; floral bracts ovate-triangular, 2–3 mm. Flowers dark purple; pedicel and ovary ca. 8 mm. Sepals linear-lanceolate, 12–13 × 2–3 mm, 3-veined, margin revolute, apex acuminate; lateral sepals slightly oblique. Petals linear, 10–12 × ca. 1 mm; lip elliptic-ovate, 8–10 × 5–6 mm, indistinctly 3-lobed; lateral lobes erect; mid-lobe ovate, ca. 6 mm, margin minutely ciliate, apex with a short tail ca. 1.5 mm; disk with a basal callus. Column slightly arcuate, 3–4 mm, with narrow wings on both sides. Fl. May. $2n = 30^*$.

• Forests; 1500–2000 m. C Taiwan.

12. *Liparis krameri* Franchet & Savatier, Enum. Pl. Jap. 2: 509. 1878.

尾唇羊耳蒜 wei chun yang er suan

Leptorkis krameri (Franchet & Savatier) Kuntze; *Liparis krameri* var. *viridis* Makino.

Herbs, terrestrial. Pseudobulbs small, ± enclosed by white membranous sheaths. Leaves 2; petiole sheathlike, 0.5–3 cm, not articulate; blade broadly ovate or ovate, 2–3(–8) × 2–4 cm, membranous or herbaceous, base rounded and decurrent into petiole, margin conspicuously with irregular teeth, apex obtuse or subacute. Inflorescence 6–7 cm or longer, conspicuously longer than leaves; peduncle cylindrical, slightly compressed, narrowly winged; rachis several flowered; floral bracts ovate, ca. 1 mm. Flowers green or purplish red; pedicel and ovary 7–8 mm. Sepals linear or linear-lanceolate, 9–12 × 1.5–2 mm, 3-veined, apex subacute; lateral sepals slightly oblique. Petals filiform, 8–10 × ca. 0.5 mm; lip ± reflexed at lower 1/3, nearly ovate-oblong, 6–7 mm, with a large lamellate basal callus, apex shortly cuspidate, with a tail ca. 1 mm. Column slightly arcuate, ca. 2 mm, nearly wingless. Fl. Jun–Jul. $2n = 30, 36$.

Forests; ca. 1400 m. SW Hubei [Japan, Korea, Russia (Far East)].

13. *Liparis rostrata* H. G. Reichenbach, Linnaea 41: 44. 1877.

齿突羊耳蒜 chi tu yang er suan

Liparis diodon H. G. Reichenbach.

Herbs, terrestrial. Pseudobulbs ovoid, very small, ± enclosed by white membranous sheaths. Leaves 2; petiole sheathlike, 1–2 cm or longer, amplexicaul, not articulate; blade ovate, 3–3.5(–7.5) × 1.5–2.5 cm, membranous or herbaceous, base contracted and decurrent into petiole, margin entire, apex acute or obtuse. Inflorescence ca. 5 cm; peduncle cylindrical, slightly compressed, narrowly winged on either side; rachis several flowered; floral bracts ovate, ca. 1.5 mm. Flowers green or yellowish green; pedicel and ovary 5–10 mm. Sepals narrowly oblong-lanceolate or narrowly oblong, (5–)10–12 × ca. 2 mm, 3-veined, apex obtuse; lateral sepals somewhat oblique. Petals filiform or narrowly linear, 5–7 × ca. 0.3 mm, 1-veined; lip

broadly obovate-obcordate (elliptic-obovate in material from Yunnan), 5–7 × 4–5 mm, base contracted, without a callus, margin irregularly toothed, apex mucronate. Column slightly arcuate, 3–3.5 mm, with 2 thick dentate projections on ventral side, base dilated, apex winged. Fl. Jul. $2n = 28, 30$.

Soil-covered rocks in *Tsuga* forests along valleys; 2600–2700 m. S Xizang, Yunnan [N India, Nepal].

14. *Liparis tchangii* Schlechter, Repert. Spec. Nov. Regni Veg. 19: 380. 1924.

折苞羊耳蒜 zhe bao yang er suan

Liparis sutepensis Rolfe ex Downie.

Herbs, terrestrial. Pseudobulbs ovoid, 1–2 cm × 7–13 mm, noded, ± enclosed by white, membranous sheaths. Leaves 2; petiole sheathlike, 2–5.5 cm, amplexicaul, not articulate; blade spreading horizontally, ovate-elliptic to ovate, 5–13 × 2.5–7.3 cm, membranous or herbaceous, base contracted into petiole, margin entire, apex acuminate. Inflorescence 11–29 cm, conspicuously exceeding leaves; rachis 10–20-flowered; floral bracts reflexed, lanceolate, 4–6 mm. Flowers green; pedicel and ovary 8–9 mm. Dorsal sepal lanceolate-linear, 7–8 × ca. 1.5 mm, inconspicuously 3-veined, apex subobtuse; lateral sepals slightly shorter and broader. Petals narrowly linear or nearly filiform, 7–8 × ca. 0.5 mm, 1-veined; lip obovate to nearly broadly elliptic, 7–8 × 5–7 mm, base contracted, with a thick longitudinal band of dark color extending from base to above middle, band with 2 small basal calli ± united at base, margin irregularly denticulate in apical half, apex obtuse or subtruncate. Column slightly arcuate, 2.5–4 mm, upper part winged. Fl. Jul–Aug.

Forests; 1100–1700 m. SW Sichuan, NW to S Yunnan [Laos, Thailand, Vietnam].

15. *Liparis siamensis* Rolfe ex Downie, Bull. Misc. Inform. Kew 1925: 371. 1925.

滇南羊耳蒜 dian nan yang er suan

Herbs, terrestrial. Pseudobulbs ovoid, 1–2 cm × 8–15 mm, noded, ± enclosed by white membranous sheaths. Leaves 2; petiole sheathlike, 2–6 cm, amplexicaul, not articulate; blade ovate-elliptic or elliptic, 6.5–15.5 × 3–6.5 cm, membranous or herbaceous, base contracted into petiole, margin entire, apex acute or shortly acuminate. Inflorescence 10–20 cm; rachis several to more than 10-flowered; floral bracts ± reflexed, lanceolate, 4–7 mm. Flowers green; pedicel and ovary 1.1–1.5 cm. Dorsal sepal narrowly oblong, 7.5–8.5 × ca. 1.8 mm, 3-veined, apex obtuse; lateral sepals oblong-ovate, 6–7 × ca. 3 mm, slightly oblique, 5-veined, apex obtuse. Petals narrowly linear, 7–8 × ca. 0.7 mm, widened toward apex, 1-veined; lip broadly obovate to transversely oblong, 5–5.5 × ca. 7 mm, margin irregularly denticulate, apex emarginate, base narrowed into a short claw, with a basal callus; callus ca. 1 mm high, apex 2-lobed. Column arcuate, 3–3.5 mm, with narrow wings on both sides. Fl. Aug. $2n = 42$.

Forests; ca. 700 m. S Yunnan [Laos, Myanmar, Thailand].

16. *Liparis odorata* (Willdenow) Lindley, Gen. Sp. Orchid. Pl.

26. 1830.

香花羊耳蒜 xiang hua yang er suan

Malaxis odorata Willdenow, Sp. Pl. 4: 91. 1805; *Empusa paradoxa* Lindley; *Leptorkis odorata* (Willdenow) Kuntze; *Liparis longiscapa* (Rolfe ex Downie) Gagnepain & Guillaumin; *L. odorata* var. *longiscapa* Rolfe ex Downie; *L. paradoxa* (Lindley) H. G. Reichenbach; *L. paradoxa* var. *parishii* J. D. Hooker; *L. parishii* (J. D. Hooker) J. D. Hooker; *L. simeonis* Schlechter; *L. teniana* Kraenzlin; *L. tenii* Schlechter; *L. tonkinensis* Gagnepain.

Herbs, terrestrial. Pseudobulbs subovoid, 1.3–2.2 × 1–1.5 cm, noded, ± enclosed by white membranous sheaths. Leaves 2 or 3; petiole sheathlike, 2.5–10 cm, not articulate; blade narrowly elliptic, ovate-oblong, oblong-lanceolate, or linear-lanceolate, 6–17 × 2.5–6 cm, membranous or herbaceous, base contracted into petiole, margin entire, apex acuminate. Inflorescence 14–40 cm, conspicuously exceeding leaves; rachis laxly several to 10-flowered; floral bracts often spreading horizontally, lanceolate, 4–6 mm. Flowers greenish yellow or greenish brownish; pedicel and ovary 6–8 mm. Dorsal sepal linear, 7–8 × ca. 1.5 mm, inconspicuously 3-veined, margin revolute, apex obtuse; lateral sepals ovate-oblong, slightly oblique, 6–7 × ca. 2.5 mm, 3(or 4)-veined. Petals nearly narrowly linear, 6–7 × ca. 0.8 mm, widened toward apex, 1-veined, margin revolute; lip obovate-oblong, ca. 5.5 × 3.5–4.5 mm, with 2 triangular calli near base, apical margin denticulate, apex subtruncate and emarginate; calli ± united at base, ca. 0.8 mm tall. Column slightly arcuate, ca. 4.5 mm, with narrow wings on both sides, wings gradually widened toward column apex. Capsule obovoid-oblong or ellipsoid, 1–1.5 cm. Fl. Apr–Jul, fr. Oct. $2n = 36, 42$.

Forests, sparse forests, grassy slopes; 600–3100 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangxi, SW Sichuan, Taiwan, S Xizang, Yunnan, Zhejiang [Bhutan, India, Japan, Laos, Myanmar, Nepal, Thailand, Vietnam; Pacific islands (Guam)].

17. *Liparis pygmaea* King & Pantling, Ann. Roy. Bot. Gard. Calcutta 8: 34. 1898.

华西羊耳蒜 hua xi yang er suan

Herbs, terrestrial or lithophytic. Pseudobulbs clustered, narrowly ovoid, 5–10 × 2–5 mm, enclosed by 2 or 3 membranous sheaths. Leaves 2; petiole ca. 7 mm, broad, base sheathing, not articulate; blade ovate to elliptic, 8–15 × 3–5 mm, base contracted into petiole, apex acute. Inflorescence to 5 cm; peduncle 20–35 mm; rachis 0–15 mm, 1–3-flowered; floral bracts lanceolate, 2.7–3 mm, apex acute. Flowers yellow or pink; pedicel and ovary 3–6 mm. Dorsal sepal linear, 8–11 × ca. 2 mm, apex obtuse; lateral sepals parallel below lip, linear, 8–11 × 2–2.2 mm. Petals linear, 5–7 mm; lip 5–7 × ca. 3 mm, lower half cuneate, upper half oblong-elliptic, base with a fleshy bilobed callus, apex entire to obscurely dentate, apiculate. Column 2–2.5 mm, slender, base dilated, apex with small wings. Fl. Jul.

About 3100 m. “W China” [NE India, Nepal].

This new record for China is based on *E. H. Wilson 4579* (K), collected in W China in July 1904. We do not accept the view of Pearce and Cribb (Orchids Bhutan, 203. 2002) that *Liparis nana* Rolfe from

Vietnam is conspecific because it differs in having an erose, subquadrate lip with a U-shaped callus.

18. *Liparis brunnea* Ormerod, Taiwania 52: 309. 2007.

褐花羊耳蒜 he hua yang er suan

Herbs, ?terrestrial. Pseudobulbs clustered, elliptic to subquadrate, laterally compressed, 5–7 × 3–5 mm, apex truncate, enclosed by 3 sheaths. Leaves 1 or 2, ovate-elliptic to suborbicular, 10–17.5 × 7–11 mm, base contracted into a sheath, not articulate, apex subacute. Inflorescence 15–65 mm; peduncle 15–39 mm; rachis 0–26 mm, laxly 1–5-flowered; floral bracts ovate-lanceolate, to 0.8 mm, apex acute. Flowers brown; pedicel and ovary 7.5–11 mm. Dorsal sepal reflexed, linear, ca. 8.3 × 0.7–0.8 mm, apex subacute; lateral sepals linear, ca. 7 × 1 mm, 1-veined, apex obtuse. Petals reflexed, linear-filiform, ca. 7 × 0.5 mm, subacute; lip subquadrate, ca. 8.5 × 7 mm, base contracted, with a deeply bilobed callus, apex emarginate. Column arcuate, ca. 4 mm, slender, base dilated, apex narrowly winged. Fl. Mar.

• Swampy thickets. Guangdong.

19. *Liparis nervosa* (Thunberg) Lindley, Gen. Sp. Orchid. Pl. 26. 1830.

见血青 jian xue qing

Ophrys nervosa Thunberg in Murray, Syst. Veg., ed. 14, 814. 1784; *Bletia bicallosa* D. Don; *Epidendrum nervosum* (Thunberg) Thunberg; *Liparis bambusifolia* Makino; *L. bicallosa* (D. Don) Schlechter; *Malaxis nervosa* (Thunberg) Swartz; *Sturmia nervosa* (Thunberg) H. G. Reichenbach.

Herbs, terrestrial. Stem cylindrical, 2–8(–10) cm, 5–7(–10) mm in diam., thick, fleshy, with many nodes, usually ± enclosed by sheaths, upper part sometimes naked. Leaves 3–6; petiole sheathlike, 2–3(–5) cm, amplexicaul, long, not articulate; blade ovate to ovate-elliptic, 5–11(–16) × 3–5(–8) cm, membranous or herbaceous, base contracted and decurrent into petiole, margin entire, apex subacuminate. Inflorescence subterminal, 10–20(–25) cm; rachis several to 10-flowered, sometimes with very narrow wing; floral bracts deltoid, 1(–2) mm. Flowers purple; pedicel and ovary 8–16 mm. Dorsal sepal linear or broadly linear, 8–10 × 1.5–2 mm, inconspicuously 3-veined, margin revolute, apex obtuse; lateral sepals narrowly ovate-oblong, slightly oblique, 6–7 × 3–3.5 mm, 3-veined, apex obtuse. Petals reflexed, filiform, 7–8 × ca. 0.5 mm, 1-veined; lip oblong-obovate, 6–6.5 × 4.5–5 mm, base narrowed and with 2 suboblong calli, apex truncate and emarginate. Column 4–5 mm, rather stout, upper part distinctly or indistinctly with narrow wings. Capsule obovate-oblong or narrowly elliptic, ca. 1.5 cm × 6 mm; fruiting pedicel 4–7 mm. Fl. Feb–Jul, fr. Oct. $2n = 36, 40, 42$.

Forests, shaded places in grasslands or soil-covered rocks along streamsides; 1000–2100 m. N Fujian, Guangdong, Guangxi, Guizhou, Hubei, S Hunan, Jiangxi, S Sichuan, Taiwan, SE Xizang, Yunnan, S Zhejiang [widespread in Old and New World tropics].

Liparis nervosa is represented in China by the typical variety; *L. nervosa* var. *khasiana* (J. D. Hooker) P. K. Sarkar is restricted to NE India and is distinguished by having only two or three leaves and petals that are neither reflexed nor twisted.

20. *Liparis formosana* H. G. Reichenbach, Gard. Chron., n.s., 13: 394. 1880.

低地羊耳蒜 di di yang er suan

Liparis bituberculata (Hooker) Lindley var. *formosana* (H. G. Reichenbach) Ridley.

Herbs, terrestrial. Pseudobulbs clustered, cylindrical, 5–15 × 1–1.5 cm. Leaves 2–4, obliquely elliptic to ovate, 7–12 × 4–6 cm, acute. Inflorescence ca. 30 cm; peduncle ca. 15 cm, winged; rachis ca. 15 cm, 15–30-flowered; floral bracts triangular, 2–3 mm, apex acute. Flowers green, tinged with purple or purplish; pedicel and ovary 11–14 mm, with 6 sharp ridges. Dorsal sepal lanceolate, 10–12 × 2–2.5 mm, 3-veined, apex obtuse; lateral sepals obliquely oblong-lanceolate, 7–9 × 3–4 mm, 3-veined, apex acute. Petals linear, 9–10 × ca. 1 mm, 1-veined; lip obovate-elliptic, ca. 7 × 5 mm, above base with a bilobed erect callus, apex acute. Column curved, 4–5 mm, apex with 2 triangular, basally truncate wings. Fl. Feb–May.

Broad-leaved forests; 300–500 m. Hong Kong, Taiwan [Japan].

21. *Liparis gigantea* C. L. Tso, Sunyatsenia 1: 136. 1933.

紫花羊耳蒜 zi hua yang er suan

Liparis macrantha Rolfe (1895), not J. D. Hooker (1889).

Herbs, terrestrial or lithophytic. Stem green, cylindrical, 8–20 cm, ca. 1 cm in diam., thick, fleshy, with many nodes, lower part covered with several membranous sheaths. Leaves 3–6; petiole sheathlike, 2–5 cm, amplexicaul, not articulate; blade elliptic, ovate-elliptic, or ovate-oblong, often slightly oblique, 9–17 × 3.5–9 cm, membranous or herbaceous, base oblique and contracted into petiole, apex acuminate, shortly caudate, or sub-acute. Inflorescence subterminal, 18–45 cm; rachis 6–16 cm, several to 20-flowered, very narrowly winged; floral bracts ovate, 1–2 mm. Flowers deep purplish red; pedicel and ovary 1.6–1.8 cm. Dorsal sepal linear-lanceolate, 16–20 × 2.5–3 mm, 3-veined, apex obtuse; lateral sepals ovate-lanceolate, 15–17 × 4–5 mm, 5-veined, apex obtuse. Petals linear or narrowly linear, 16–18 × ca. 0.8 mm, 1-veined; lip obovate-elliptic or broadly obovate-oblong, 9–15 × 12–18 mm, base abruptly contracted and with a pair of backward spreading auricles, margin conspicuously denticulate, apex truncate and sometimes mucronulate; disk with 2 calli near base; calli triangular, 0.8–1 mm tall. Column 6–8 mm, with narrow wings on both sides; anther cap ca. 2 mm. Capsule obovoid-oblong, ca. 2.8 × 1 cm; fruiting pedicel 6–9 mm. Fl. Feb–May, fr. Nov.

• Broad-leaved evergreen forests, shaded and damp places, soil-covered rocks; 500–1700 m. E and N Guangdong, Guangxi, SW Guizhou, Hainan, Taiwan, SE Xizang, C and SE Yunnan.

Chinese records of *Liparis nigra* Seidenfaden (e.g., in FRPS 18: 73. 1999) should be referred to *L. gigantea*, whereas true *L. nigra* is distributed in Thailand. X. H. Jin (Taxon 54: 191. 2005) regarded the two taxa as conspecific and proposed the name *L. nigra* (1970) for conservation against the senior *L. gigantea*, but the Nomenclature Committee for Vascular Plants did not recommend conservation (Brummitt, Taxon 56: 590. 2007). It is not certain that *L. nigra* is the same as the Chinese taxon, and this group of large-flowered *Liparis* requires critical revision.

22. *Liparis henryi* Rolfe, Bull. Misc. Inform. Kew 1896: 193. 1896.

具棱羊耳蒜 ju leng yang er suan

Liparis shaoshunia S. S. Ying.

Herbs, terrestrial. Pseudobulbs cylindrical, 10–20 × 0.6–1.5 cm, fleshy. Leaves 3–5, ovate-elliptic to ovate-lanceolate, 5–15 × 3–6 cm, acute. Inflorescence 15–30 cm; peduncle 7–15 cm; rachis 8–15 cm; floral bracts triangular, 2–4 mm, apex acute. Flowers purplish red; pedicel and ovary 12–17 mm, with 6 sharp ridges. Dorsal sepal linear-oblong, 10–15 × 2–2.5 mm, 3-veined, apex obtuse; lateral sepals falcate-oblong, 8–12 × 2.5–3 mm, apex acute to obtuse. Petals linear, 10–13 × ca. 1 mm; lip obovate, 9–15 × 7–10 mm, base with 2 hornlike calli, margin denticulate, apex rounded. Column 5–6 mm, apex narrowly winged. Fl. unknown.

• Forests; low elevations. Taiwan.

23. *Liparis sootenzanensis* Fukuyama, Rep. (Annual) Taihoku Bot. Gard. 3: 84. 1933.

插天山羊耳蒜 cha tian shan yang er suan

Diteilis sootenzanensis (Fukuyama) M. A. Clements & D. L. Jones; *Liparis macrantha* Rolfe var. *sootenzanensis* (Fukuyama) S. S. Ying; *L. nigra* Seidenfaden var. *sootenzanensis* (Fukuyama) T. S. Liu & H. J. Su; *L. piriformis* Szlachetko; *L. tixieri* Guillaumin.

Herbs, terrestrial. Stem cylindrical, 15–25 cm, 2.5–3 cm in diam., stout, thick, fleshy, with many nodes, ± enclosed by sheaths. Leaves several; petiole sheathlike, amplexicaul, not articulate; blade 15–25 × 6–12 cm, base contracted into petiole, apex acuminate. Inflorescence 20–30 cm, stout, distinctly ridged; rachis 5–15-flowered; floral bracts green, ovate, 4–5 × ca. 2.3 mm. Flowers greenish yellow; pedicel and ovary ca. 1.4 cm. Sepals linear-oblong or narrowly elliptic, 13–16 × 3–4 mm, margin revolute, apex acute; lateral sepals slightly oblique. Petals filiform, ca. 1.4 cm; lip reflexed near middle, obovate, ca. 1.4 × 1.1 cm, base contracted, apical margin denticulate; disk with 2 carinae. Column arcuate, ca. 8 mm. Capsule pale green, ca. 2.7 cm × 9 mm; fruiting pedicel ca. 1.1 cm. Fl. Apr–May.

Broad-leaved forests; 500–1500 m. Taiwan [Vietnam].

24. *Liparis regnieri* Finet, Bull. Soc. Bot. France 55: 338. 1908.

翼蕊羊耳蒜 yi rui yang er suan

Liparis amplifolia Schlechter; *L. craibiana* Kerr; *L. dalatensis* Guillaumin.

Herbs, terrestrial. Leaves 3 or 4; petiole sheathlike, short, not articulate; blade elliptic to ovate, 15–20 × 7–10 cm, base decurrent into petiole, apex acuminate. Inflorescence 25–37 cm, usually conspicuously exceeding leaves; rachis densely many flowered; floral bracts lanceolate, very small. Flowers yellowish green; pedicel and ovary 8–10 mm. Sepals lanceolate, ca. 7 mm, 3-veined, apex obtuse; lateral sepals slightly oblique. Petals sublinear, ca. 6.5 mm, 1-veined; lip oblong, ca. 7 × 3 mm, toward base slightly narrowed, recurved, with 2 basal calli, apex subtruncate and mucronate. Column slightly arcuate, ca. 4 mm; ovary with 6 undulate wings. Fl. unknown.

C and SW Yunnan [Myanmar, Thailand, Vietnam].

25. *Liparis ferruginea* Lindley, Gard. Chron. 1848: 55. 1848.

锈色羊耳蒜 xiú sè yáng ěr suān

Empusa ferruginea (Lindley) M. A. Clements & D. L. Jones; *Leptorkis ferruginea* (Lindley) Kuntze.

Herbs, terrestrial. Pseudobulbs narrowly ovoid, very small. Leaves 3–6, linear to lanceolate, (13–)20–33 × 0.8–1.2 cm, membranous or herbaceous, base slightly contracted and decurrent into amplexicaul sheath, not articulate, apex acute or shortly acuminate. Inflorescence 35–55 cm, stout; rachis 8–20 cm, several to 10-flowered; floral bracts lanceolate, (2–)4–6 mm. Flowers yellow, lip pale yellowish brown slightly tinged with pale purple; pedicel and ovary 1–1.2 cm. Dorsal sepal linear, 6–7 × ca. 1.5 mm, 3-veined, margin revolute, apex obtuse; lateral sepals reflexed, obliquely ovate-oblong, ca. 6 × 2.5 mm, 5-veined. Petals nearly linear or narrowly oblanceolate-linear, ca. 6 × 1 mm, 1-veined, margin revolute; lip ± recurved, obovate-oblong, 4–5 × ca. 3 mm, with a pair of basal auricles backward spreading and 2 calli near base, apex broadly truncate, often emarginate and sinus apiculate. Column 3–4 mm, upper part with narrow wings on both sides. Capsule oblong or obovoid-oblong, ca. 1.5 cm × 6 mm; fruiting pedicel 8–10 mm. Fl. Jul. $2n = 42$.

Shallow water along streamsides, paddy fields, swamps. SE Fujian, S and W Hainan, Hong Kong [Cambodia, Indonesia, Malaysia, Thailand, Vietnam].

26. *Liparis hensoaensis* Kudô, J. Soc. Trop. Agric. 2: 237. 1930.

日月潭羊耳蒜 rì yuè tán yáng ěr suān

Cestichis hensoaensis (Kudô) F. Maekawa; *Liparis nigra* Seidenfaden var. *hensoaensis* (Kudô) S. S. Ying.

Herbs, terrestrial. Pseudobulbs ovoid, ca. 1 cm × 8 mm. Leaves 3 or 4, linear-lanceolate, 10–30 × 1–1.5 cm, membranous or herbaceous, base not articulate, apex acute. Inflorescence 40–60 cm; rachis 10–20 cm, 10-flowered; floral bracts triangular, 4–6 mm. Flowers green; pedicel and ovary ca. 1 cm. Dorsal sepal oblong-lanceolate, ca. 9 × 2 mm, 6-veined; lateral sepals oblong-ovate, ca. 8 × 3 mm, 5-veined. Petals linear-oblanceolate, ca. 9 × 1.3 mm, 3–5-veined; lip ovate or oblong-elliptic, adaxially with papillate projections, base cuneate, apex emarginate and mucronate. Column ca. 5 mm. Fl. Sep.

• C Taiwan.

27. *Liparis barbata* Lindley, Gen. Sp. Orchid. Pl. 27. 1830.

须唇羊耳蒜 xū chún yáng ěr suān

Diteilis wrayi (J. D. Hooker) M. A. Clements & D. L. Jones; *Leptorkis wrayi* (J. D. Hooker) Kuntze; *Liparis fimbriata* Kerr; *L. wrayi* J. D. Hooker.

Herbs, terrestrial. Stem subterete, 2–3(–10) cm, thick, fleshy, with many nodes, ± enclosed by white membranous sheaths, not articulate. Leaves often 2; petiole sheathlike, ca. 3 cm, not articulate; blade subelliptic, ca. 6.5 × 2.8 cm, membranous or herbaceous, base contracted into petiole, apex acute or obtuse. Inflorescence ca. 10 cm, usually not exceeding leaves; rachis laxly several flowered; floral bracts broadly ovate-trian-

gular, ca. 1 mm. Flowers greenish white, often with 2 red stripes on lip; pedicel and ovary 6–7 mm. Dorsal sepal broadly linear, ca. 7 × 1.3 mm, inconspicuously 3-veined, apex obtuse; lateral sepals suboblong, ca. 6.5 × 1.8 mm, inconspicuously 3-veined, apex acuminate. Petals narrowly linear, ca. 7 × 0.5 mm; lip oblong, ca. 5 × 3.5 mm, shortly fimbriate, with 2 calli near base, slightly widened toward apex, subtruncate and emarginate. Column slightly arcuate, ca. 3.5 mm. Fl. Jul. $2n = 42$.

Soil-covered rocks in forests. S Hainan, C Taiwan [India, Indonesia, Malaysia, Myanmar, Papua New Guinea, Philippines, Sri Lanka, Thailand; Pacific islands (Samoa, Vanuatu)].

28. *Liparis petiolata* (D. Don) P. F. Hunt & Summerhayes, Kew Bull. 20: 52. 1966.

柄叶羊耳蒜 bǐng yè yáng ěr suān

Acianthus petiolatus D. Don, Prodr. Fl. Nepal. 29. 1825; *Liparis angkae* Kerr; *L. nepalensis* Lindley; *L. pulchella* J. D. Hooker; *L. taronensis* S. C. Chen.

Herbs, terrestrial, with slender rhizomes. Pseudobulbs 2–4 cm apart on rhizome, ovoid, 1.5–3 × 1–1.5 cm, ± enclosed by white membranous sheaths. Leaves 2; petiole sheathlike, 5–11 cm, amplexicaul, not articulate; blade broadly ovate, 5–11 × 3.5–8 cm, membranous or herbaceous, base subtruncate or shallowly cordate, margin ± irregularly obtuse-crenate or nearly entire, apex subacuminate or shortly cuspidate. Inflorescence 10–24 cm, lower part ridged, upper part narrowly winged; rachis several to more than 10-flowered; floral bracts lanceolate, 5–6 mm. Flowers greenish white, lip tinged with purplish green; pedicel and ovary 6–8 mm. Sepals linear-lanceolate, ca. 8 × 1.8 mm, inconspicuously 3-veined, apex obtuse; lateral sepals somewhat oblique. Petals narrowly linear, 7–8 × ca. 0.4 mm, 1-veined; lip elliptic to orbicular, ca. 10 × 8–9 mm, with 2 calli near base, margin often slightly irregularly incised, apex mucronate. Column arcuate, ca. 4 mm, base thickened, apex slightly enlarged and narrowly winged. Capsule subobovoid-oblong, ca. 1.5 cm × 6–7 mm; fruiting pedicel 4–5 mm. Fl. May–Jun, fr. Sep–Oct. $2n = 30, 36$.

Forests, streamsides, humid places; 1000–2900 m. N Guangxi, Hunan, W Jiangxi, SE Xizang, S Yunnan [Bhutan, NE India, Nepal, Thailand, Vietnam].

29. *Liparis bootanensis* Griffith, Not. Pl. Asiat. 3: 278. 1851.

镰翅羊耳蒜 lián chì yáng ěr suān

Cestichis plicata (Franchet & Savatier) F. Maekawa; *Leptorkis bootanensis* (Griffith) Kuntze; *L. lancifolia* (J. D. Hooker) Kuntze; *L. plicata* (Franchet & Savatier) Kuntze; *Liparis bootanensis* var. *uchiyamae* (Schlechter) S. S. Ying; *L. lancifolia* J. D. Hooker; *L. plicata* Franchet & Savatier; *L. pterostyloides* Szlachetko; *L. ruybarrettoi* S. Y. Hu & Barretto; *L. subplicata* Tang & F. T. Wang; *L. uchiyamae* Schlechter.

Herbs, epiphytic. Pseudobulbs densely arranged, ovoid, ovoid-oblong, or narrowly ovoid-cylindric, 0.8–1.8(–3) cm × 4–8 mm. Leaf 1; petiole 1–7(–10) cm, articulate; blade narrowly oblong-oblanceolate, oblanceolate, or narrowly elliptic-oblong, (5–)8–22 cm × (5–)11–33 mm, papery, base contracted

into petiole, apex acuminate. Inflorescence 7–24 cm; peduncle somewhat compressed, both sides with very narrow wings; rachis arching or pendulous, 5–12 cm, several to 20-flowered; floral bracts narrowly lanceolate, 3–8(–13) mm. Flowers often yellowish green, sometimes slightly tinged with brown, rarely nearly white; pedicel and ovary 4–15 mm. Dorsal sepal ovate-lanceolate to oblong-lanceolate, 5.2–8 × 1.3–2.3 mm, apex subacute to obtuse; lateral sepals obliquely oblong-lanceolate to elliptic, 5–7 × 1.5–2 mm, apex obtuse. Petals narrowly linear, 5.2–8 × 0.4–1 mm; lip broadly oblong-obovate, 5–6.5 × 4–5.5 mm, apical margin entire to slightly irregular, apex emarginate to subtruncate-rounded, broadly apiculate, at base with 2 variously shaped calli, in profile appearing low, rounded, triangular to digitate. Column arcuate, 2.6–3.4 mm, apex with 2 falcate, triangular wings; anther cap ca. 1 mm. Capsule obovoid-ellipsoid, 8–10 × 5–6 mm; fruiting pedicel 8–10 mm. Fl. Aug–Oct, fr. Mar–May. $2n = 38, 42$.

Forest margins, forests or shaded trees, rocks or cliffs along valleys; 400–2300(–3100) m. N Fujian, S Guangdong, Guangxi, Guizhou, Hainan, Hunan, Jiangxi, SW Sichuan, Taiwan, SE Xizang, Yunnan [Bhutan, NE India, Indonesia, Japan, Malaysia, Myanmar, Philippines, Thailand, Vietnam].

30. *Liparis averyanoviana* Szlachetko, *Fragm. Florist. Geobot.* 38(2): 451. 1993.

狭翅羊耳蒜 xia chi yang er suan

Liparis bootanensis Griffith var. *angustissima* S. C. Chen & K. Y. Lang.

Herbs, epiphytic. Pseudobulbs borne close together, ovoid-conic, to 3 × 1.2 cm, binodal. Leaf 1, erect, oblanceolate to oblong, to 19 × 2.3 cm, stout, conduplicate toward base, apex acute. Inflorescence subaxillary ca. 35-flowered; peduncle arcuate, to 10 cm, distinctly winged; rachis to 13 cm; floral bracts subulate, ca. 3 mm, apex acuminate. Flowers yellow-white, not resupinate, arcuately bent downward with lip outwardly directed; pedicel and ovary 8–9 mm. Dorsal sepal oblong to lanceolate, 3.5–5.3 × ca. 1.2 mm, 1-veined, apex obtuse; lateral sepals ovate-lanceolate, 3.5–5.2 × ca. 1.4 mm, 3-veined, apex acute. Petals linear, 3–5.1 × ca. 0.4 mm, 1-veined, apex obtuse; lip rectangular, 4.8–5.2 × 2.6–4 mm, slightly constricted near middle, usually ± notched at apex, basal auricles very small, fleshy in basal portion with a small thickening perpendicular to veins, apical margin almost entire. Column ca. 3 mm, with narrow wings. Fl. Nov.

Guangxi, Guizhou [Laos, Vietnam].

The type is from Guizhou (“Kouy-Tcheou: Houang-tre-a”).

31. *Liparis balansae* Gagnepain, *Bull. Soc. Bot. France* 79: 165. 1932.

圆唇羊耳蒜 yuan chun yang er suan

Liparis hainanensis Tang & F. T. Wang.

Herbs, epiphytic. Pseudobulbs densely arranged, nearly narrowly ovoid or ovoid, 1–1.5 cm × 4–7 mm. Leaf 1; petiole 2–4 cm; blade oblanceolate or narrowly elliptic-oblanceolate, 10–17 × 1–2.8 cm, papery, base contracted into petiole, apex

acuminate. Inflorescence 11–25 cm; peduncle compressed cylindrical, narrowly winged; rachis laxly 3–5-flowered; floral bracts narrowly lanceolate, 3–15(–20) mm. Flowers green; pedicel and ovary 1.5–1.8 cm. Dorsal sepal oblong-lanceolate, 10–11 × 2–2.9 mm, apex obtuse; lateral sepals obliquely ligulate-lanceolate to oblong-ligulate, 10–11 × 2.5–3 mm, apex subacute to obtuse. Petals linear-lanceolate, 10–13 × 0.7–1.2 mm, 1-veined, apex subacute; lip flabellate-oblanceolate or broadly obovate-orbicular, 8–12 × 10–13 mm, base contracted, with 2 calli, margin irregularly denticulate, apex rounded or subtruncate, mucronate. Column gently arcuate, 4.3–5 mm, apex with 2 straight to falcate, acute wings; anther cap ca. 2 mm. Capsule obovoid, 1–1.2 cm × 6–7 mm; fruiting pedicel 9–15 mm. Fl. Sep–Oct, fr. next spring.

On trees or rocks in forests or along valleys; 500–2200 m. Guangxi, Hainan, SW Sichuan, SE Xizang, SE Yunnan [Thailand, Vietnam].

32. *Liparis bautingensis* Tang & F. T. Wang, *Acta Phytotax. Sin.* 12: 39. 1974.

保亭羊耳蒜 bao ting yang er suan

Herbs, epiphytic. Rhizomes elongate, 2–2.5 mm in diam., with many nodes, internodes 2–8 mm, often with remaining membranous sheaths. Pseudobulbs borne 1.5–4 cm apart from each other, subcylindric or narrowly ovoid-cylindric, ca. 1.2 cm × 3–7 mm. Leaf 1; petiole 1.5–4 cm, articulate; blade elliptic, narrowly elliptic, or oblong, 6–15 × 1.6–1.8 cm, papery, base contracted into petiole, apex acuminate. Inflorescence 7–14 cm; peduncle compressed cylindrical, narrowly winged; rachis ca. 5 mm, 3- or 4-flowered; floral bracts green, lanceolate or narrowly lanceolate, 5–15 mm. Flowers green or greenish white; pedicel and ovary 1.5–2.2 cm. Dorsal sepal broadly linear or broadly linear-lanceolate, 9–10 × 1.5–2 mm, margin revolute, apex obtuse; lateral sepals sublanceolate, slightly oblique, 9–10 × ca. 2 mm. Petals filiform, 9–10 × ca. 0.5 mm; lip subflabellate-oblanceolate or broadly obovate-orbicular, 8–9 × ca. 10 mm, base with 2 very small calli united basally, apex subtruncate and usually irregularly denticulate and centrally apiculate. Column slightly arcuate, ca. 4 mm, apical half winged on both sides; wings ca. 1 mm wide, decurved and hooked. Capsule obovoid, ca. 1.4 cm × 7–9 mm; fruiting pedicel 1.2–1.8 cm. Fl. Nov–Feb, fr. Jan–Apr. $2n = 38^*$.

• Rocks in forests; below 1600 m. S Hainan.

33. *Liparis superposita* Ormerod, *Taiwania* 52: 311. 2007.

云南羊耳蒜 yun nan yang er suan

Herbs, epiphytic. Pseudobulbs borne 3–5 cm apart, arising from base of previous pseudobulb or arising from apex of pseudobulb next to inflorescence, 1-leaved, 2–2.3 cm × 5–6 mm. Leaf 1; petiole 1.7–2.7 cm; blade narrowly elliptic, 8.3–11.5 × 3–4.5 cm, apex acute to subacuminate. Inflorescence terminal, 14.1–17.2 cm, narrowly winged; peduncle 4.1–11.5 cm; rachis ca. 10 cm, laxly 4–6-flowered; floral bracts lanceolate, 5–10.5 mm, apex acute. Flowers green; pedicel and ovary ca. 21 mm, narrowly winged. Dorsal sepal oblong-ligulate, ca. 10 × 3 mm, apex subacute; lateral sepals subfalcate, obliquely oblong-ligulate, ca. 10.5 × 2.5 mm, apex subacute. Petals linear, ca. 11.5 × 1 mm, apex acute; lip suborbicular-rhombic, 10–11 × ca. 10

mm, margin of upper half minutely irregularly erose, callus consisting of a pair of separate, parallel calli obliquely elliptic in side view. Column straight, 4.8–5 mm, upper half with 2 broad-based wings each with a short triangular, subfalcate lobe basally. Fl. Nov.

- Mixed forests; 1400–1800 m. Yunnan.

This species appears to be the plant that is illustrated as *Liparis bautingensis* in FRPS (18: 79. 1999). It differs from *L. bautingensis* in having longer (2–2.3 cm as opposed to ca. 1.2 cm) pseudobulbs, much broader (3–4.5 cm as opposed to 1.6–1.8 cm) leaves, a longer (ca. 10 cm as opposed to ca. 5 cm) rachis, and a longer (4.8–5 mm as opposed to ca. 4 mm), straight (not arcuate) column.

34. *Liparis rockii* Ormerod, *Taiwania* 52: 310. 2007.

若氏羊耳蒜 ruo shi yang er suan

Herbs, lithophytic. Pseudobulbs approximate, 2.5–4 cm, ca. 1 cm in diam. at base, ca. 0.4 cm in diam. at apex, 1-leaved, ovoid-subcylindric, covered by several subacuminate sheaths, largest 3 sheaths 2.5–7 cm. Leaf petiole 1.8–3.2 cm; blade oblong-ligulate to ligulate-oblongate, 17.7–24.6 × 3.4–4.4 cm, thin, apex acute. Inflorescence terminal, 18–20.8 cm, narrowly winged; peduncle 8–8.8 cm; rachis 10–12 cm, laxly ca. 20-flowered; floral bracts lanceolate, ca. 8 mm, apex acute. Flowers orange; pedicel and ovary to 13 mm. Dorsal sepal oblong-lanceolate, ca. 9 × 2.4 mm, apex obtuse; lateral sepals oblong-lanceolate, ca. 8.7 × 2.3 mm, apex subacute. Petals linear-lanceolate, ca. 9 × 1 mm, apex acute; lip broadly obovate (flattened), 7.5–8 × 7.5–8 mm, in natural state with a subtubular basal third expanded into a transversely elliptic blade, basal margins entire becoming irregularly suberose toward apex, basally with a single callus divided into 2 narrowly conic lobes. Column arcuate, subterete, ca. 3 mm, subapically with triangular, subfalcate, subacute wings. Fl. Oct–Nov.

- Rocks. Yunnan.

35. *Liparis esquirolii* Schlechter, *Repert. Spec. Nov. Regni Veg.* 12: 108. 1913.

贵州羊耳蒜 gui zhou yang er suan

Herbs, epiphytic. Pseudobulbs densely arranged, cylindrical, 1–3.5 cm × 3–5 mm. Leaf 1, oblong to ligulate, 8–12 × 1.2–1.9 cm, papery, narrowed toward base into a short petiole, articulate, apex acuminate. Inflorescence compressed cylindrical, ca. 19 cm, conspicuously exceeding leaf, narrowly winged; rachis laxly 10-flowered; floral bracts narrowly lanceolate, 6–10 mm. Flowers orange-yellow; pedicel and ovary 1–1.5 cm. Dorsal sepal ligulate, ca. 1.1 cm, apex acuminate; lateral sepals oblique. Petals narrowly linear, ca. 11 × 0.5 mm, apex subacute; lip obovate, ca. 11 × 6 mm, base cuneate, with a longitudinal ridge from base to middle. Column slightly arcuate, ca. 5 mm, upper part with narrow wings on both sides. Fl. May–Jul.

- Shaded rocks; ca. 900 m. S Guizhou.

36. *Liparis cespitosa* (Lamarck) Lindley, *Bot. Reg.* 11: ad t. 882. 1825.

丛生羊耳蒜 cong sheng yang er suan

Epidendrum cespitosum Lamarck, *Encycl.* 1: 187. 1783; *Cestichis cespitosa* (Lamarck) Ames; *Leptorkis cespitosa* (Lamarck) Kuntze; *L. pusilla* (Ridley) Kuntze; *Liparis angustifolia* (Blume) Lindley; *L. pusilla* Ridley; *Malaxis angustifolia* Blume; *M. cespitosa* (Lamarck) Thouars.

Herbs, epiphytic, small. Pseudobulbs densely arranged, ovoid or narrowly ovoid to subcylindric, 8–20(–30) × 2–6 mm. Leaf 1, oblanceolate or linear-oblongate, 5–17 × 0.5–0.8(–1.5) cm, papery, base attenuate into a petiole, articulate, apex acuminate. Inflorescence 5–16 cm; peduncle slightly compressed cylindrical, very narrowly winged; rachis (7–)10–40-flowered; floral bracts subulate, 3–5(–8) mm. Flowers green or greenish white, very small; pedicel and ovary 3–4 mm. Dorsal sepal suboblong, 1.5–1.8 × ca. 0.7 mm, 1-veined, apex obtuse; lateral sepals ovate-oblong, slightly oblique, 1.3–1.5 × 0.9–1 mm, 1-veined. Petals narrowly linear, 1.5–1.8 × ca. 0.3 mm, apex obtuse; lip nearly broadly oblong, ca. 1.8 × 1.2 mm, base with a pair of backward spreading auricles, without a conspicuous callus, margin sometimes slightly undulate, apex subtruncate and mucronate. Column slightly arcuate, 0.8–1.2 mm, apex dilated. Capsule subellipsoid, 3–4 × ca. 3 mm; fruiting pedicel 4–5 mm. Fl. Jun–Oct, fr. Oct–Nov. *2n* = 40.

On trees, rocks in forests, shaded places on cliffs; 500–2400 m. C and S Hainan, SE Xizang, S Yunnan [widely distributed in tropics of Africa and Asia, extending to Pacific islands].

37. *Liparis laurisilvatica* Fukuyama, *Rep. (Annual) Taihoku Bot. Gard.* 3: 83. 1933.

月桂羊耳蒜 yue gui yang er suan

Cestichis laurisilvatica (Fukuyama) Maekawa.

Herbs, epiphytic, 10–15 cm high. Pseudobulbs approximate, globose, somewhat obliquely complanate, 1–1.5 cm, with 1 or 2 broadly ovate, acuminate basal sheaths. Leaf 1, erect, oblanceolate-linear, ca. 10 × 1 cm, slightly leathery, base long decurrent, apex acute. Inflorescence ca. 10 cm; peduncle angular; rachis ca. 5 cm, rather laxly 10–15-flowered; floral bracts linear, ca. 1 cm, apex acute to acuminate. Flowers yellowish, ca. 8 mm in diam.; pedicel and ovary slightly recurved, ca. 5 mm. Dorsal sepal oblong, ca. 4.5 × 1.5 mm, 1-veined, margin slightly revolute, apex acute; lateral sepals spreading, slightly obliquely oblong, ca. 4.5 × 1.5 mm, 1-veined, apex acute and reflexed. Petals reflexed, narrowly linear to filiform, ca. 5 mm; lip curved at middle, oblong, ca. 4 × 2 mm, fleshy at base, distally slightly denticulate, rounded. Column ca. 2.5 mm, fleshy at base, apical wings triangular. Fl. Oct.

- Laurel forests (“silvis laurilignosis”); 900–1500 m. Taiwan.

38. *Liparis inaperta* Finet, *Bull. Soc. Bot. France* 55: 341. 1908.

长苞羊耳蒜 chang bao yang er suan

Herbs, epiphytic, small. Pseudobulbs somewhat densely arranged, ovoid, 4–7 × 3–5 mm. Leaf 1; petiole 7–15 cm, articulate; blade oblanceolate-oblong to suboblong, 2–7 × 0.6–1.3 cm, papery, apex acuminate. Inflorescence 4–8 cm; peduncle slightly compressed, very narrowly winged; rachis several

flowered; floral bracts narrowly lanceolate, 3–5(–7) mm. Flowers pale green, often tubular in early stage due to dorsal sepal and lateral sepals connivent with each other; pedicel and ovary 4–7 mm. Dorsal sepal suboblong, ca. 4.5 × 1.2 mm, apex obtuse; lateral sepals subovate-oblong, oblique, ca. 4 × 1.4 mm. Petals ± falcate, narrowly linear, 3.5–4 × ca. 0.6 mm, apex obtuse; lip suboblong, 3.5–4 × 1.5–2 mm, slightly contracted toward base, without a callus or lamella, apex subtruncate and irregularly denticulate, with a short point. Column slightly arcuate, 2.5–3 mm, upper part winged; wings subtriangular, ca. 0.8 mm wide, ± decurrent and slightly hooked. Capsule obovoid, 5–6 × 4–5 mm; fruiting pedicel 4–5 mm. Fl. Sep–Oct, fr. next May–Jun.

• Forests or rocks along valleys; 500–1100 m. N Fujian, C and N Guangxi, C and E Guizhou, Jiangxi, SW Sichuan, Zhejiang.

39. *Liparis kwangtungensis* Schlechter, Repert. Spec. Nov. Regni Veg. 19: 379. 1924.

广东羊耳蒜 *guang dong yang er suan*

Herbs, epiphytic, small. Pseudobulbs subovoid or ovoid, 5–7 × 3–5 mm. Leaf 1, subelliptic or oblong, 2–5 × 0.7–1.1 cm, papery, base contracted into a conspicuous petiole, articulate, apex acuminate. Inflorescence 3–5.5 cm; peduncle somewhat compressed, very narrowly winged; rachis 1.5–2.5 cm, several flowered; floral bracts narrowly lanceolate, 3–4 mm. Flowers greenish yellow, very small; pedicel and ovary 3–4 mm. Dorsal sepal broadly linear, 4–4.5 × 1–1.2 mm, apex obtuse; lateral sepals ca. 4 × 1 mm. Petals narrowly linear, 3.5–4 × ca. 0.5 mm; lip obovate-oblong, 4–4.5 × ca. 2 mm, base with a distinct or rarely inconspicuous callus, apex subtruncate and irregularly denticulate, centrally mucronulate. Column slightly arcuate, 2.5–3 mm, upper part winged; wings sublanceolate-triangular, ca. 0.7 mm wide, ± decurrent and slightly hooked. Capsule obovoid, 4–5 × 3–4 mm; fruiting pedicel 3–4 mm. Fl. Oct.

• Forests or rocks along valleys. W Fujian, E and S Guangdong.

40. *Liparis chapaensis* Gagnepain, Bull. Soc. Bot. France 79: 166. 1932.

平卧羊耳蒜 *ping wo yang er suan*

Herbs, epiphytic, small. Pseudobulbs densely arranged, ± prostrate, subovoid-oblong, 4–6(–15) × 5–10 mm. Leaf 1, narrowly elliptic to oblong, 3–5(–10) × 0.8–1.1 cm, papery or thinly leathery, base contracted into a conspicuous petiole, articulate, apex acuminate. Inflorescence 4–7 cm; peduncle compressed cylindrical, narrowly winged; rachis 2–4 cm, laxly several flowered; floral bracts narrowly lanceolate, 4–8 mm. Flowers pale yellowish green or turning orange, column white; pedicel and ovary 8–10 mm. Dorsal sepal nearly narrowly oblong-lanceolate, 4–6(–9) × 1.5–2 mm, 3-veined, margin revolute, apex acuminate; lateral sepals narrowly oblong-lanceolate, slightly oblique, 4–6 × 1.8–2.2 mm. Petals narrowly linear, ca. 4 × 0.5 mm; lip subobovate-oblong, ca. 4 × 3 mm, with a bilobed callus near base, apex subtruncate and mucronulate. Column slightly arcuate, ca. 3 mm, upper part narrowly winged. Fl. Oct.

On trees or rocks in broad-leaved evergreen forests on limestone slopes; 800–2500 m. W Guangxi, SW Guizhou, NW Yunnan [Myan-

mar, N Vietnam].

41. *Liparis pumila* Averyanov, Updated Checkl. Orchids Vietnam, 85. 2003.

中越羊耳蒜 *zhong yue yang er suan*

Herbs, epiphytic. Pseudobulbs clustered, ovoid to subglobose, 5–7 × 4–5 mm, enclosed by 3 or 4 green herbaceous sheaths. Leaf 1, ligulate to ligulate-oblong, 5–6 × 0.6–0.8 cm, base contracted, articulate, apex acute. Inflorescence 3–7 cm; peduncle 1.5–3.5 cm; rachis 1.5–3.5 cm, subclaxly 7–20-flowered; floral bracts lanceolate, 3.5–4 mm, apex acute. Flowers pale green; pedicel and ovary 2–2.5 mm. Dorsal sepal oblong, ca. 2.5 × 1 mm, 1-veined, apex obtuse; lateral sepals obliquely oblong, ca. 2.5 × 1 mm, 1-veined, apex subacute. Petals linear, ca. 2.5 × 0.25 mm, apex obtuse; lip lower half broadly obovate, upper half transversely suborbicular, ca. 3 × 2 mm, base with 2 widely separated calli, apex irregularly dentate, apiculate. Column ca. 2 mm, not winged, slightly curved apically. Fl. Jun.

Forests. Yunnan [Laos, Vietnam].

42. *Liparis fargesii* Finet, Bull. Soc. Bot. France 55: 340. 1908.

小羊耳蒜 *xiao yang er suan*

Herbs, epiphytic or lithophytic, often forming clusters. Pseudobulbs prostrate, subcylindric, 7–14 × ca. 3 mm, new pseudobulbs arising from near apex of old pseudobulb. Leaf 1; petiole 3–6 mm, articulate; blade elliptic or oblong, 1–2(–3) × 0.5–0.8 cm, papery, apex rounded or obtuse. Inflorescence 2–4 cm; peduncle compressed cylindrical, narrowly winged; rachis 1–2 cm, usually 2- or 3-flowered; floral bracts narrowly lanceolate, 1–1.8 mm. Flowers pale green; pedicel and ovary 8–9 mm. Sepals linear-lanceolate, 5–6 × 1.2–1.4 mm, 1-veined, margin often revolute, apex obtuse. Petals narrowly linear, 5–6 × ca. 0.3 mm; lip suboblong-pandurate, 4–5 × 2.5–3 mm, base slightly thickened, apex subtruncate and emarginate, sometimes apiculate in sinus. Column slightly arcuate, 3–3.5 mm, upper part with narrow wings. Capsule obovoid, 6–7 × 3–4 mm; fruiting pedicel 6–7 mm. Fl. Sep–Oct, fr. next May–Jun.

• On trees or rocks in forests or shaded places; 300–1700 m. S Gansu, Guizhou, W Hubei, Hunan, S Shaanxi, N and W Sichuan, C Yunnan.

43. *Liparis latifolia* Lindley, Gen. Sp. Orchid. Pl. 30. 1830.

宽叶羊耳蒜 *kuan ye yang er suan*

Malaxis latifolia Blume, Bijdr. 393. 1825, not Smith (1812); *Cestichis latifolia* (Lindley) Pfitzer; *Leptorkis latifolia* (Lindley) Kuntze; *Stichorkis latifolia* (Lindley) Pfitzer.

Herbs, epiphytic. Pseudobulbs somewhat densely arranged, subterete, narrowed toward apex, to 8 × 1.5–3 cm, base with reddish brown sheaths. Leaf 1, subelliptic or elliptic-oblong, ca. 20 × 5 cm, base contracted into a petiole, articulate, apex subacuminate. Inflorescence nearly as long as leaf; rachis many flowered; floral bracts small. Flowers pale yellow, lip orange-brown; pedicel and ovary ca. 1.5 cm. Sepals suboblong, ca. 8 × 3 mm, apex acute or obtuse. Petals narrowly linear, ca. 8 × 1 mm; lip subobovate-oblong, ca. 10 × 3 mm, deeply bilobed, with a bilobed basal callus; apical lobes divergent, suboblong,

4–5 × 2.5–3 mm, apex irregularly toothed. Column 3–3.5 mm, upper part with narrow wings. Fl. unknown. $2n = 42$.

S Hainan [Indonesia, Malaysia, Thailand].

44. *Liparis mannii* H. G. Reichenbach, *Flora* 55: 275. 1872.

三裂羊耳蒜 san lie yang er suan

Leptorkis mannii (H. G. Reichenbach) Kuntze.

Herbs, epiphytic. Pseudobulbs narrowly ovoid, ovoid, or suboblong, 1–2 cm × 4–7 mm. Leaf 1, narrowly oblong to narrowly oblong-oblancheolate, 7–15 × 6–12 cm, papery, base contracted into a short petiole, articulate, apex acuminate. Inflorescence 9–13 cm; peduncle somewhat compressed, very narrowly winged; rachis 3.5–7.5 cm, 10- to many flowered; floral bracts narrowly lanceolate, 1.5–2.5 mm; pedicel and ovary 1.5–2 mm. Sepals nearly narrowly ovate-elliptic, 1.5–1.8 × ca. 0.7 mm. Petals narrowly linear, 1.3–1.6 × ca. 0.2 mm; lip subovate, ca. 1.8 × 1.5 mm, 3-lobed; lateral lobes subovate, obtuse; mid-lobe suboblate or broadly rhombic-oblate, 0.6–0.8 × ca. 1 mm, base ecallose, apical margins irregularly denticulate, apex subacute. Column slightly arcuate, ca. 1.2 mm, base dilated and thick. Capsule ellipsoid or broadly obovoid-ellipsoid, 2.5–3 × 1.8–2 mm; fruiting pedicel 1.5–2 mm. Fl. Oct–Nov, fr. next Mar. $2n = 38$.

On trees in forests; 700–1200 m. S Yunnan [NE India, Vietnam].

45. *Liparis viridiflora* (Blume) Lindley, *Gen. Sp. Orchid. Pl.* 31. 1830.

长茎羊耳蒜 chang jing yang er suan

Malaxis viridiflora Blume, *Bijdr.* 392. 1825; *Cestichis longipes* (Lindley) Ames; *Leptorkis longipes* (Lindley) Kuntze; *L. viridiflora* (Blume) Kuntze; *Liparis longipes* Lindley; *L. pendula* Lindley; *L. pleistantha* Schlechter; *L. simondii* Gagnepain; *L. spathulata* Lindley; *Sturmia longipes* (Lindley) H. G. Reichenbach.

Herbs, epiphytic, rather tall and large. Pseudobulbs somewhat densely arranged, base often ± prostrate, attenuate from base to apex, upper part erect, usually cylindrical, rarely suboblong, (3–)7–18 cm × 3–8(–12) mm. Leaves 2; petiole 1–4 cm, articulate; blade linear-oblancheolate or linear-spatulate, 8–25 × 1.2–3 cm, papery, apex acuminate and apiculate. Inflorescence recurved, 14–30 cm; peduncle somewhat compressed, very narrowly winged, upper part with 1 or 2 sterile bracts; rachis 9–20 cm, many flowered; floral bracts narrowly lanceolate, 3–7 mm, membranous. Flowers greenish white or pale greenish yellow; pedicel and ovary 4–7 mm. Dorsal sepal subelliptic-oblong, 2–3 × 0.8–1 mm, margin revolute, apex obtuse; lateral sepals ovate-elliptic, slightly wider than dorsal sepal. Petals narrowly linear, 2–3 × ca. 0.3 mm, apex rounded; lip recurved from middle, nearly ovate-oblong, 2–3 × ca. 1.7 mm, base ecallose, margin slightly undulate, apex subacute or mucronate. Column slightly arcuate, 1.5–2 mm, base slightly enlarged, apex winged. Capsule obovoid-ellipsoid, 4–6 × 3–4 mm; fruiting pedicel 3–6 mm. Fl. Mar. $2n = 22 + 6B, 30, 38$.

On trees or rocks in forests or shaded places along valleys; 200–2300 m. Fujian, Guangdong, Guangxi, Hainan, SW Sichuan, Taiwan,

SE Xizang, Yunnan [Bangladesh, Bhutan, Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Philippines, Sri Lanka, Thailand, Vietnam; ?Pacific islands].

46. *Liparis condylobulbon* H. G. Reichenbach, *Hamburger Garten-Blumenzeitung* 18: 34. 1862.

细茎羊耳蒜 xi jing yang er suan

Cestichis condylobulbon (H. G. Reichenbach) M. A. Clements & D. L. Jones; *Leptorkis condylobulbon* (H. G. Reichenbach) Kuntze; *Liparis confusa* J. J. Smith; *L. dolichopoda* Hayata.

Herbs, epiphytic or lithophytic. Rhizomes long, ca. 2.5 mm in diam. Pseudobulbs borne 2–4 cm apart on rhizome, green, glossy, cylindrical, 6–12 cm × 5–8 mm, attenuate toward apex. Leaves 2, lanceolate or oblancheolate-linear, 10–15 × 1–1.5 cm, base contracted into a short petiole, articulate, apex obtuse or acute. Inflorescence 10–20 cm; rachis densely many flowered; floral bracts lanceolate, ca. 3 mm. Flowers pale green or nearly white; pedicel and ovary ca. 5 mm. Sepals oblong, ca. 3.5 × 1–1.5 mm, apex obtuse. Petals linear, ca. 3.5 × 0.5 mm, apex obtuse; lip obovate, ca. 3 × 2 mm, inconspicuously bilobed. Column ca. 2 mm. Fl. Sep–Nov. $2n = 30, 42$.

On dry and open rocks or tree trunks; 100–500(–1800) m. Taiwan [Indonesia, Malaysia, New Guinea, Philippines, Thailand; Pacific islands].

47. *Liparis bistrata* E. C. Parish & H. G. Reichenbach, *Trans. Linn. Soc. London* 30: 155. 1874.

折唇羊耳蒜 zhe chun yang er suan

Leptorkis bistrata (E. C. Parish & H. G. Reichenbach) Kuntze; *Liparis saltucola* Kerr.

Herbs, epiphytic or lithophytic. Pseudobulbs densely arranged, cylindrical, 9–12 cm × 5–7 mm. Leaves 2, subelliptic or elliptic-lanceolate, 6.5–9 × 2.6–3.4 cm, somewhat leathery, base contracted into a short petiole, articulate, apex acuminate. Inflorescence 18–24 cm; peduncle subterete, nearly wingless; rachis more than 20-flowered; floral bracts lanceolate, 3–4 mm. Flowers pale green; pedicel and ovary ca. 1 cm. Sepals narrowly oblong, 5–5.5 × ca. 1.5 mm, 3-veined, margin revolute, apex obtuse. Petals linear, 4.5–5 × ca. 0.5 mm, 1-veined, apex obtuse; lip deflexed above middle, suboblong, 4.5–5 × ca. 2.5 mm, with a ± bilobed basal callus, apex subtruncate or ± erose, emarginate. Column slightly arcuate, ca. 3.5 mm, base dilated and thick, upper part with narrow wings. Capsule obovoid-ellipsoid, 8–10 × 5–6 mm; fruiting pedicel 8–10 mm. Fl. Jun–Jul, fr. Aug–Sep. $2n = 32$.

On trees or rocks in forests or along roadsides; 800–1800 m. SE Xizang, S and SW Yunnan [NE India, Myanmar, N Thailand].

48. *Liparis distans* C. B. Clarke, *J. Linn. Soc., Bot.* 25: 71. 1889.

大花羊耳蒜 da hua yang er suan

Leptorkis distans (C. B. Clarke) Kuntze; *Liparis macrantha* J. D. Hooker; *L. oxyphylla* Schlechter; *L. yunnanensis* Rolfe.

Herbs, epiphytic, rather tall and large. Pseudobulbs densely arranged, subcylindric or narrowly ovoid-cylindric, (2–)3–9.5 cm × 3–10 mm. Leaves 2; petiole 2–6 cm, articulate; blade oblanceolate or linear-oblanceolate, 15–35 × 1–2.8 cm, papery, apex acuminate. Inflorescence 14–39 cm; peduncle somewhat compressed, with narrow wings 1–2 mm wide on both sides, with 2 or 3 subulate sterile bracts; rachis 8–20 cm, several to 10-flowered; floral bracts nearly subulate, 6–12 mm. Flowers yellowish green or orange; pedicel and ovary 1.4–2.2 cm. Sepals linear, (0.8–)1–1.6 × ca. 0.2 cm, margin often revolute, apex obtuse; lateral sepals often slightly shorter than dorsal sepal. Petals nearly filiform, 12–16 × 0.3–0.5 mm, apex obtuse; lip obovate to semicircular, 1–1.4 × 1–1.1 cm, base narrowed into very short claw and with a frontally grooved callus, margin somewhat irregularly denticulate, apex rounded or obtuse. Column slightly arcuate, 5–6 mm, base slightly dilated, upper part narrowly winged. Capsule narrowly obovoid-oblong, 1.5–1.8 cm × 6–7 mm; fruiting pedicel 1–1.5 cm. Fl. Oct–Feb, fr. Jun–Jul. $2n = 38$.

On trees or rocks in shaded places along valleys; 1000–2400 m. Guangxi, SW Guizhou, Hainan, S Sichuan, SE Xizang, Yunnan [India (Assam), Laos, Thailand, Vietnam].

49. *Liparis nakaharae* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 310. 1911 ["*nakaharai*"].

凹唇羊耳蒜 ao chun yang er suan

Cestichis kawakamii (Hayata) Maekawa; *C. nakaharae* (Hayata) Kudô; *C. nokoensis* (Fukuyama) Maekawa; *C. taiwaniana* (Hayata) Nakai; *Liparis kawakamii* Hayata; *L. plicata* Franchet & Savatier var. *kawakamii* (Hayata) S. S. Ying; *L. nokoensis* Fukuyama; *L. taiwaniana* Hayata.

Herbs, epiphytic. Leaves 2; petiole ca. 10 cm, articulate; blade oblanceolate, 18–35 (including petiole) × 1.7–2 cm, apex acuminate. Peduncle ca. 18 cm; rachis 8–15 cm, laxly flowered; floral bracts lanceolate, 7–10 mm. Flowers 1–2 cm in diam. Sepals spreading, reflexed-recurved, oblong-linear to linear, 9–10 × 1–1.8 mm, apex obtuse. Petals reflexed, linear, 9–12 × ca. 0.5 mm, margin convolute; lip cuneate-obovate to lyrate, ca. 8 mm, 5.5–7 mm wide above, ca. 2.5 mm wide at base, with a dorsally grooved basal callus, apical margin sometimes unequally denticulate. Column 5–6 mm. Fl. Jan.

• Taiwan.

50. *Liparis stricklandiana* H. G. Reichenbach, Gard. Chron., n.s., 13: 232. 1880.

扇唇羊耳蒜 shan chun yang er suan

Leptorkis dolabella (J. D. Hooker) Kuntze; *L. stricklandiana* (H. G. Reichenbach) Kuntze; *Liparis chloroxantha* Hance; *L. dolabella* J. D. Hooker; *L. malleiformis* W. W. Smith; *L. stricklandiana* var. *longibracteata* S. C. Chen.

Herbs, epiphytic, rather tall and large. Pseudobulbs densely arranged, suboblong, 2–3.5 cm × 6–15 mm. Leaves 2; petiole 4–17 cm, articulate; blade oblanceolate or linear-oblanceolate, 16–46 × 1.7–3.5 cm, papery, apex acuminate. Inflorescence 16–45 cm; peduncle compressed cylindric, both sides

with wings 1–2 mm wide, upper portion with 1 or 2 subulate sterile bracts; rachis 8–22 cm, more than 10-flowered; floral bracts subulate, 5–10(–12) mm. Flowers greenish yellow; pedicel and ovary 7–11 mm. Sepals narrowly obovate or oblong to oblong-obovate, 4–4.5 × 1.5–1.8 mm, margin revolute, apex obtuse; lateral sepals often slightly wider than dorsal sepal. Petals nearly filiform, 4–4.5 × ca. 0.5 mm, slightly widened toward apex; lip flabellate, 4–4.5 × 5–6 mm, with an oblate basal callus, apical margin irregularly serrulate, apex subtruncate and mucronate; callus running forward becoming a broad, short and stout midvein. Column suberect or slightly arcuate, 3–3.5 mm, slender, base slightly dilated, apex with narrow wings. Capsule obovoid-ellipsoid, 7–8 × ca. 5 mm; fruiting pedicel 3–5 mm. Fl. Oct–Jan, fr. Apr–May. $2n = 76$.

On trees in forests, shaded cliffs along valleys; 1000–2400 m. S Guangdong, Guangxi, Guizhou, Hainan, SE Xizang, NW to SE Yunnan [Bhutan, NE India, N Vietnam].

51. *Liparis latilabris* Rolfe, J. Linn. Soc., Bot. 36: 6. 1903.

阔唇羊耳蒜 kuo chun yang er suan

Herbs, epiphytic or lithophytic, rather tall and large. Pseudobulbs densely arranged, narrowly ovoid or narrowly ovoid-cylindric, 2–2.5 cm × 7–10 mm. Leaves 2; petiole (2.5–)4–11 cm, articulate; blade oblanceolate or linear-oblanceolate, 13–29 × 1.3–3 cm, papery, apex acuminate. Inflorescence 20–35 cm; peduncle often ± narrowly winged, with a sterile bract; rachis 10- to many flowered; floral bracts narrowly lanceolate, 5–8 mm. Flowers yellowish green or yellow tinged with brown; pedicel and ovary 6–8 mm. Sepals oblong, ca. 7 × 2 mm, veins inconspicuous, apex obtuse. Petals narrowly linear or subfiliform, ca. 7 × 0.5 mm, apex obtuse; lip oblate or subreniform, 6–7 × 8–10 mm, adaxially with glandular hairs, with 2 small calli near base, middle part with a thick longitudinal lamella ca. 2 mm, margin irregularly toothed, apex rounded. Column suberect or slightly arcuate, 2–2.5 mm, nearly wingless. Capsule obovoid-ellipsoid, 6–7 × 4–5 mm; fruiting pedicel 3–5(–8) mm. Fl. Nov–Feb, fr. Sep–Oct.

On trees in forests, rocks along valleys; 1200–1800 m. C and SE Yunnan [N Vietnam].

52. *Liparis elliptica* Wight, Icon. Pl. Ind. Orient. 5: 17, t. 1735. 1852.

扁球羊耳蒜 bian qiu yang er suan

Cestichis platybolba (Hayata) Kudô; *Leptorkis elliptica* (Wight) Kuntze; *Liparis hookeri* Ridley; *L. platybolba* Hayata; *L. wightii* H. G. Reichenbach.

Herbs, epiphytic. Pseudobulbs densely arranged, oblong or ellipsoid, compressed, 1–3 cm × 6–15 mm. Leaves 2, narrowly elliptic or narrowly oblong, 4–12 × 1.2–2.8 cm, papery, base contracted into a short petiole, articulate, apex acute to shortly acuminate. Inflorescence arching or pendulous, 7–17 cm; peduncle somewhat compressed, sometimes with a few sterile bracts; rachis 4–8 cm, several to many flowered; floral bracts lanceolate, 1.5–3 mm, membranous. Flowers pale yellowish green; pedicel and ovary ca. 4.5 mm. Sepals oblong-lanceolate, 4–5 × 1.5–1.8 mm, apex obtuse. Petals narrowly linear or nearly filiform, 3.5–4.5 × ca. 0.5 mm; lip orbicular or nearly

ovate-orbicular, 4–5 mm, ecallose, margin ± crisped especially toward apex, appearing 3-lobed due to auriculate-folded margins at or above middle, apex long acuminate or shortly caudate. Column 1.5–2 mm, wingless. Capsule narrowly obovoid, 5–6 × 2–2.5 mm; fruiting pedicel ca. 2 mm. Fl. Nov–Feb, fr. May.

On trees in forests; 200–1600 m. S Sichuan, Taiwan, SE Xizang, S and W Yunnan [India, Indonesia, Myanmar, Nepal, Philippines, Sri Lanka, Thailand, Vietnam; Pacific islands].

53. *Liparis somae* Hayata, Icon. Pl. Formosan. 4: 33. 1914 [“*somai*”].

台湾羊耳蒜 tai wan yang er suan

Liparis sikkimensis Lucksom & S. Kumar.

Herbs, epiphytic. Pseudobulbs ovoid or clavate, ± compressed, 2.5–5.5 × 1–2 cm, longitudinally ridged. Leaves 2; petiole 2–3 cm, articulate; blade oblanceolate, ca. 13 × 2 cm, apex acute. Inflorescence erect, 10–20 cm; peduncle slightly compressed, narrowly winged; rachis densely 30- or more flowered; floral bracts lanceolate, 5–10 mm. Flowers yellowish or whitish, column white; pedicel and ovary 7–9 mm. Dorsal sepal lanceolate, ca. 3 × 1 mm, apex obtuse or acute; lateral sepals obliquely ovate, ca. 3 × 1.5 mm. Petals linear, ca. 2.5 × 0.5 mm; lip ovate, ca. 3 × 2 mm, obscurely 3-lobed; lateral lobes erect; mid-lobe slightly thickened near base, apical margin slightly crisped-denticulate, apex acute. Column ca. 1.5 mm. Fl. Jan.

On tree trunks in broad-leaved evergreen forests; 500–1000 m. E and S Taiwan [India (Sikkim)].

54. *Liparis grossa* H. G. Reichenbach, Gard. Chron., n.s., 19: 110. 1883.

恒春羊耳蒜 heng chun yang er suan

Leptorkis grossa (H. G. Reichenbach) Kuntze; *Liparis rizalensis* Ames; *L. tateishii* Kudô.

Herbs, epiphytic. Pseudobulbs densely arranged, globose-ovoid, slightly compressed, 2.5–4.5 × 2–3 cm, glabrous. Leaves 2, elliptic-oblong, 6–12 × 2–3 cm, leathery, slightly fleshy, base slightly contracted, without distinct petiole, articulate, apex obtuse or rounded. Inflorescence 10–20 cm; peduncle subterete, without distinct wings; rachis more than 10-flowered; floral bracts sublinear-lanceolate, to 9 mm. Flowers orange or pale orange-red; pedicel and ovary ca. 1 cm. Sepals elliptic-oblong, 4.5–5.5 × ca. 2.5 mm, obtuse. Petals narrowly linear or nearly filiform, 4.5–5.5 × ca. 0.7 mm, 1-veined; lip reflexed, suboblong, 6–7 × 3–5 mm, slightly contracted toward base, with 2 inconspicuous calli near base, apex deeply 2-lobed; lobes suboblong, 1.5–2 × ca. 1.5 mm, apical margin often irregularly incised. Column green, slightly arcuate, ca. 4 mm. Fl. Oct–Nov.

On tree trunks or large branches at margins of broad-leaved forests; below 500 m. E and S Taiwan [Myanmar, Philippines].

55. *Liparis fissilabris* Tang & F. T. Wang, Acta Phytotax. Sin. 12: 37. 1974.

裂唇羊耳蒜 lie chun yang er suan

Herbs, epiphytic or lithophytic. Pseudobulbs densely arranged, ovoid to ovoid-oblong, 1.5–3.5 × 1–1.8 cm. Leaves 2,

oblanceolate-oblong, ligulate-oblong, or narrowly elliptic-oblong, 6–19 × 1.8–3.2 cm, papery, base attenuate into a petiole, articulate, apex acuminate or acute. Inflorescence 12–18 cm; peduncle nearly wingless, with several white sterile bracts; rachis laxly 10–30-flowered; floral bracts white, linear-lanceolate, 3–5 mm, membranous. Flowers green, lip red; pedicel and ovary 5–10 mm. Sepals suboblong, 3.5–4 × ca. 1.3 mm, 3-veined, apex obtuse. Petals filiform, 3.5–4 mm, 1-veined; lip nearly spatulate-oblong, 4–5 × ca. 1.7 mm, with a folded gap on either side of margins below middle, ± ciliate, with 2 longitudinal lamellae from base to middle, 2-lobed, sinus mucronulate; lobes ovate or oblong, ca. 1.2 × 1 mm, outer margin ± ciliate, apex irregularly incised. Column suberect or apex slightly arching, 2–2.5 mm, dilated at base, with narrow wings toward apex. Capsule obovoid-ellipsoid, 7–8 × 4–5 mm; fruiting pedicel 7–8 mm. Fl. Nov, fr. Jan–Feb.

• Forests, trees or rocks along valleys; ca. 500 m. SE Hainan.

56. *Liparis luteola* Lindley, Gen. Sp. Orchid. Pl. 32. 1830.

黄花羊耳蒜 huang hua yang er suan

Leptorkis luteola (Lindley) Kuntze.

Herbs, epiphytic or lithophytic. Pseudobulbs somewhat densely arranged, subovoid, 6–7 × 4–5 mm. Leaves 2; petiole 1–1.5 cm, articulate; blade linear or linear-oblanceolate, (4–)6–14 × 0.4–0.9 cm, papery, apex acuminate. Inflorescence 6–16 cm; peduncle somewhat compressed, narrowly winged, sometimes with 1 sterile bract; rachis 3–6 cm, several to 10-flowered; floral bracts lanceolate, 3–4(–6) mm. Flowers whitish green or yellowish green; pedicel and ovary 9–14 mm. Sepals lanceolate-linear or linear, ca. 4 × 1 mm, midvein slightly raised abaxially, apex obtuse; lateral sepals to 1.5 mm wide. Petals filiform, ca. 4 × 0.3 mm; lip oblong-obovate, ca. 3.5 × 2.8 mm, with a thick longitudinal ridge near base, with a bilobed callus in front of ridge, apex emarginate and sinus apiculate. Column slightly arcuate, ca. 2.5 mm, slender, upper part winged. Capsule obovoid, 7–9 × 3–4 mm; fruiting pedicel 6–9 mm. Fl. and fr. Dec–Feb. $2n = 38$.

On trees or rocks in forests. N, E, and W Hainan [India, Myanmar, N Thailand, Vietnam].

57. *Liparis sparsiflora* Averyanov, Updated Checkl. Orchids Vietnam, 87. 2003.

疏花羊耳蒜 shu hua yang er suan

Herbs, epiphytic. Pseudobulbs ovoid to subglobose, 8–12 × 8–12 mm, partially enclosed by 2 or 3 whitish papery sheaths. Leaves 1 or 2, ligulate-oblanceolate, 4–9 × 0.9–1.6 cm, base contracted, apex acute. Inflorescence 8–12 cm; peduncle 4–6 cm, winged; rachis flexuous, 2–6 cm, laxly 4–8-flowered; floral bracts broadly ovate, to 7 mm, apex acuminate. Flowers white with green tint to pale greenish, lip with deep green median stripe; pedicel and ovary 6–8 mm. Dorsal sepal oblong, 5–5.5 × ca. 1.5 mm, apex obtuse; lateral sepals oblong, 5–5.5 × ca. 2 mm, apex obtuse. Petals linear, 5–6 × 0.5–0.7 mm, apex obtuse; lip strongly recurved at middle, oblong-rectangular, 6–7 × 2.5–3 mm, deeply channeled lengthwise, base with 2 conic paired calli, apex truncate with slightly irregular margin. Column arcu-

ate, 4.5–5 mm, not or very narrowly winged at apex. Fl. Oct.

Montane forests; ca. 1200 m. Hainan [Vietnam].

58. *Liparis perpusilla* J. D. Hooker, Hooker's Icon. Pl. 19: ad t. 1856b. 1889.

狭叶羊耳蒜 xia ye yang er suan

Leptorkis perpusilla (J. D. Hooker) Kuntze; *Liparis togashii* Tuyama & H. Hara; *Platystyliparis perpusilla* (J. D. Hooker) Margońska.

Herbs, epiphytic. Pseudobulbs tufted, ovoid or oblong, 2–3 cm × 1–2 mm. Leaves 4 or 5, linear, 10–15 × 1–2 mm, apex acute. Inflorescence erect, 2–4 cm; rachis 5–10-flowered; floral bracts ovate-lanceolate, 2–3 mm. Flowers yellow; pedicel and ovary 3–4 mm. Dorsal sepal suboblong, 1.1–1.3 × 0.4–0.5 mm, 1-veined, apex obtuse; lateral sepals elliptic-oblong, 1–1.2 × 0.6–0.7 mm, 1-veined, apex obtuse. Petals linear or narrowly lanceolate, 1–1.1 × 0.1–0.2 mm, apex obtuse; lip ± reflexed, suborbicular, ca. 1.1 × 0.9 mm, basal margins crisped, apex obtuse-rounded, sometimes slightly mucronate; disk with a U-shaped callus near base and 2 divergent calli at base of U-shaped callus. Column ca. 1 mm, with 2 wings on ventral sides. Fl. Jul. $2n = 30$.

On tree trunks in forests; ca. 2800 m. SW Yunnan (Weixi) [Bhutan, India (Sikkim), Nepal].

59. *Liparis delicatula* J. D. Hooker, Hooker's Icon. Pl. 19: ad t. 1889. 1889.

小巧羊耳蒜 xiao qiao yang er suan

Leptorkis delicatula (J. D. Hooker) Kuntze; *Platystyliparis delicatula* (J. D. Hooker) Margońska.

Herbs, epiphytic, very small, nearly in clusters. Pseudobulbs densely arranged, oblong or cylindrical-fusiform, 5–9 × 3–5 mm. Leaves 2 (or 3), spatulate-oblong to oblong-lanceolate, 1.2–3.5 (–4.5) × 0.5–1.1 cm, papery, base contracted into a short petiole, articulate, apex acute and apiculate. Inflorescence 4–10 cm, upper part sometimes narrowly winged, with a few sterile bracts; rachis 2–5 cm, several to 10-flowered; floral bracts ovate-lanceolate, 2–3 mm. Flowers white; pedicel and ovary 3–4 mm. Dorsal sepal ovate-oblong, 2.5–3 × 1.5–1.8 mm, abaxially carinate, apex obtuse; lateral sepals ovate or ovate-elliptic, slightly oblique, ca. 2 mm wide. Petals narrowly linear-lanceolate, 2.5–3 × ca. 0.5 mm; lip broadly elliptic or orbicular, ca. 2.5 mm, conspicuously folded and twisted on both sides below middle, apical half strongly reflexed, base with an orbicular, auriculate, callus-shaped fold on either side, with a concave callus in center near base, apex subtruncate or rounded, shortly caudate. Column erect, ca. 2.2 mm, with 2 wings on upper ventral surface, and 2 wings on both lower sides. Capsule trigonous-obovoid, ca. 4 × 2.5 mm; fruiting pedicel ca. 2 mm. Fl. and fr. Dec–Feb.

On trees in forests or along valleys; 500–2900 m. S Hainan, SE Xizang, S and W Yunnan [NE India, N Laos, Vietnam].

60. *Liparis platyrachis* J. D. Hooker, Hooker's Icon. Pl. 19: ad t. 1890. 1889.

小花羊耳蒜 xiao hua yang er suan

Leptorkis platyrachis (J. D. Hooker) Kuntze; *Platystyliparis platyrachis* (J. D. Hooker) Margońska.

Herbs, epiphytic. Pseudobulbs densely arranged, subterete, attenuate toward apex, somewhat compressed, ca. 1 cm, near apex with 3–5 spaced leaves. Leaf blade linear-lanceolate, 1.5–3 × 0.4–0.6 cm, base contracted into a short petiole, articulate, apex acuminate or acute. Scape ± arching, to 8 cm, ± narrowly winged; raceme 10–20-flowered; floral bracts subulate, conspicuously shorter than pedicel and ovary. Flowers white. Sepals elliptic, ovate-elliptic, or oblong, 2–3 mm, apex acute; lateral sepals somewhat oblique. Petals linear, nearly as long as sepals; lip subsquare, conspicuously shorter than sepals, below middle conspicuously folded and twisted, appearing like 2 lateral auricles, near base with 4 calli, distal 2 larger, apex rounded and emarginate, or sometimes apiculate. Column erect, upper part with a pair of small triangular wings and lower part with a pair of lateral wings. Fl. Sep.

1000–1500 m. W Yunnan [India (Sikkim), Nepal].

61. *Liparis assamica* King & Pantling, Ann. Roy. Bot. Gard. Calcutta 8: 36. 1898.

扁茎羊耳蒜 bian jing yang er suan

Herbs, epiphytic. Pseudobulbs densely arranged, ovoid-fusiform, slightly compressed, 1.5–2.5 cm × 6–10 mm, upper part with 3 or 4 spaced leaves. Leaf blade narrowly oblong-obovate, 3.5–6 × 0.5–1 cm, base contracted into a short petiole, articulate, apical half slightly crisped-margined, apex acuminate. Scape 10–13 cm, nearly wingless, with many sterile bracts 4–6 mm; raceme 5–7 cm, more than 10-flowered; floral bracts lanceolate, 2–3 mm. Flowers orange; pedicel and ovary 3–4 mm. Dorsal sepal narrowly ovate-oblong, 4.8–5.8 × ca. 1.6 mm, 1-veined, abaxially carinate, apex obtuse; lateral sepals oblong-ovate, 4.5–5.5 × 2–2.3 mm, abaxially somewhat carinate. Petals narrowly linear, 5–5.5 × ca. 0.7 mm, apex ± emarginate and sinus apiculate; lip broadly obovate-oblong, ca. 4 × 2.7 mm, near base abruptly contracted and with 2 callus-shaped and thickened folds, base inconspicuously with 2 suborbicular lobes on both sides, centrally with 1 thickened, concave callus, apex truncate and emarginate. Column erect, ca. 2 mm, ventrally with a pair of broad wings, lower part with a second pair of arcuate wings on both sides. Fl. Nov.

On tree branches in forests; 800–2100 m. S and W Yunnan [India].

62. *Liparis resupinata* Ridley, J. Linn. Soc., Bot. 22: 290. 1886.

蕊丝羊耳蒜 rui si yang er suan

Leptorkis resupinata (Ridley) Kuntze; *Platystyliparis resupinata* (Ridley) Margońska.

Herbs, epiphytic. Pseudobulbs densely arranged, subcylindrical or ± spindle-shaped, 1.8–5 cm × 3–6 mm, above middle usually with 3 or 4 remote leaves. Leaf blade narrowly oblong or nearly linear-lanceolate, 3–8 × 0.5–1.2 cm, papery, base slightly contracted, articulate, subsessile, margin slightly serrate, apex acuminate. Scape arching or pendant, 7–18 cm, nearly wingless, with several sterile bracts 5–9 mm; raceme 5–14 cm,

10–50-flowered; floral bracts lanceolate, 3–5 mm. Flowers pale green or greenish yellow; pedicel and ovary 5–7 mm. Dorsal sepal oblong or elliptic-oblong, ca. 4×1.8 mm, 1-veined, abaxially carinate, apex obtuse or acute; lateral sepals not carinate. Petals narrowly linear, ca. 3.5×0.3 mm, apex obtuse; lip broadly elliptic-oblong or broadly ovate-oblong, 2.5–3 mm,

both sides strongly contracted and with 2 lateral splits below middle, forming epichile and hypochile, apex obtuse; epichile auriculate and sagittate at base; hypochile with suborbicular lobes on both sides, centrally with 1 bilobed callus. Column erect, ca. 2.8 mm, with 2 suborbicular wings on both sides, each with 1 pendulous filiform appendage. Capsule obovoid-oblong, ca. $5 \times 2\text{--}3$ mm; fruiting pedicel ca. 4 mm. Fl. and fr. Oct–Dec. $2n = 28, 56$.

On trees in dense forests or in broad-leaved forests along valleys; 1300–2500 m. SE Xizang, W to SE Yunnan [Bhutan, India, Nepal].

63. *Liparis seidenfadeniana* Szlachetko, Novon 3: 303. 1993.

管花羊耳蒜 guan hua yang er suan

Herbs, epiphytic. Pseudobulbs cylindrical, ca. 10×2 mm, with 1 leaf at apex. Leaf blade obovate, $7\text{--}10(\text{--}25) \times 5\text{--}8$ mm, apex obtuse. Scape ca. 1.5 cm; raceme 1- or 2(or 3)-flowered; floral bracts ovate-triangular, ca. 3 mm, membranous; pedicel and ovary 3–4 mm. Flowers small, tubular. Dorsal sepal oblong-ovate, ca. 4.5×1.5 mm, margin ca. $2/3$ connate to lateral sepals; lateral sepals oblong-lanceolate, ca. 4.5×1.3 mm, separate from each other. Petals linear, ca. as long as sepals, ca. 0.5 mm wide; lip suboblong, ca. $4.5 \times 2.5\text{--}2.8$ mm, fleshy, base \pm with small auricles, margin and midvein thickened, apex emarginate. Column slightly arcuate, wingless. Fl. unknown.

• Guizhou, Sichuan.

This species needs to be critically compared with *Liparis fargesii*, as both have a very similar lip.

