
**鸟巢兰属** niao chao lan shu

Chen Xinqi (陈心启 Chen Sing-chi); Stephan W. Gale, Phillip J. Cribb

*Distomaea* Spenner; *Listera* R. Brown (1813, nom. cons.), not Adanson (1763); *Neottidium* Schlechtendal; *Nidus* Rivinus; *Pollinirhiza* Dulac.

Herbs, small, terrestrial, autotrophic or holomycotrophic. Rhizome short, with many densely crowded, tufted, fibrous or fleshy, sometimes coralloid roots. Stem erect, with several sheathing bracts at base, green, buff, or reddish brown, with or without green leaves. Leaves (when present) 2 [very rarely 3 or 4 in *Neottia ovata* (Linnaeus) Bluff & Fingerhuth], opposite or subopposite, usually borne midway along stem, sessile or subsessile, green, sometimes with white venation, ovate, deltoid-ovate, ovate-cordate, or cordate, base shallowly cordate, truncate, or broadly cuneate. Inflorescence terminal, racemose and many flowered or rarely reduced to a solitary flower; peduncle glabrous or pubescent; floral bracts persistent, usually shorter than ovary, membranous. Flowers small, resupinate or very rarely not resupinate, membranous or fleshy, green, purple, yellowish brown, or reddish; pedicel slender; ovary ellipsoid. Sepals free, similar, spreading. Petals often narrower and shorter than sepals; lip usually much larger than sepals and petals, sometimes with a pair of auricles at base, without a spur but sometimes shallowly concave at base, apex deeply 2-lobed or emarginate, or rarely unlobed; disk sometimes with a glandular pubescent longitudinal strip or a shallow glossy depression. Column sub-erect, straight or slightly arcuate, long or short, without a foot; anther inserted at rear margin of clinandrium, erect or slightly nodding; filament extremely short and inconspicuous; pollinia 2, each ± longitudinally 2-parted, granular-farinaceous, without caudicles; stigma subterminal, concave or protruding; rostellum spreading horizontally or suberect, ligulate or ovate, large. Capsule small.

About 70 species: E and N Asia, Europe, and North America, with a few species extending into tropical Asia; 35 species (23 endemic) in China. *Neottia tenuis* (Lindley) Szlachetko (Fragm. Florist. Geobot., Suppl. 3: 119. 1995; *Listera tenuis* Lindley, J. Proc. Linn. Soc., Bot. 1: 176. 1857) has been noted from Xizang (Press et al., Annot. Checkl. Fl. Pl. Nepal, 220. 2000). However, the present authors found no relevant specimens and therefore could not substantiate the occurrence of this species in China.

1a. Plants holomycotrophic, lacking green leaves.

2a. Lip entire; column (excluding anther and rostellum) less than 0.5 mm.
   3a. Floral rachis glabrous; flowers resupinate .................................................................  7. *N. acuminata*
   3b. Floral rachis villous; flowers not resupinate .................................................................  8. *N. taibaishanensis*

2b. Lip bilobed at apex; column (excluding anther and rostellum) 1.5–4 mm.
   4a. Lip distinctly concave at base; apical lobes of lip diverging at an obtuse angle to one another.
      5a. Apical lobes of lip 2.5–3 mm; sinus of lip without a short tooth between lobes ................  5. *N. papilligera*
      5b. Apical lobes of lip less than 1 mm; sinus of lip with a short tooth between lobes ........  6. *N. brevicolis*
   4b. Lip not concave at base; apical lobes of lip parallel or diverging at an acute angle to one another.
      6a. Lip with a pair of triangular auricles at base .............................................................  4. *N. tenii*
      6b. Lip without a pair of auricles at base.
         7a. Lip obovate, 6–10 mm wide .......................................................................................  3. *N. megalochila*
         7b. Lip narrowly obovate-oblong or cuneate, 1.5–4 mm wide.
            8a. Lip narrowly obovate-oblong, 6–9 × 3–4 mm .........................................................  1. *N. listeroides*
            8b. Lip cuneate, 10–12 × 1.5–2 mm ................................................................................  2. *N. camtschatea*

1b. Plants autotrophic, with 2, rarely more, green leaves.

9a. Lip with a pair of auricles near base.
   10a. Auricles strongly incurved, embracing column and overlapping one another above column ........  35. *N. japonica*
   10b. Auricles spreading outward, not embracing column.
      11a. Lip with a pair of swollen suborbicular lamellae on disk ........................................  34. *N. yunnanensis*
      11b. Lip without lamellae.
         12a. Lip apex 3-lobed ........................................................................................................  27. *N. karoana*
         12b. Lip apex 2-lobed.
            13a. Apical lobes of lip diverging widely, ca. 5 mm .....................................................  28. *N. divaricata*
            13b. Apical lobes of lip parallel, slightly incurved, strongly recurved, or diverging at an acute angle, 0.5–3 mm.
               14a. Apical lobes of lip strongly recurved and meeting underneath lip ...................  29. *N. brevicaulis*
               14b. Apical lobes of lip spreading forward or pendent, not recurved.
                  15a. Rachis 1.9–2.2 cm, 2- or 3-flowered ...............................................................  30. *N. tianschanica*
                  15b. Rachis 3–13 cm, 6–19-flowered.
                     16a. Peduncle ca. 15 cm, ca. 3 × as long as rachis ..................................................  31. *N. fangii*
                     16b. Peduncle 6–10 cm, not more than 2 × as long as rachis.
17a. Leaves borne at ca. middle of plant; rachis 3–4 cm, 6–8-flowered; pedicel glabrous; basal auricles of lip ca. 1.7 mm ........................................ 32. *N. pseudonipponica*

17b. Leaves borne below middle of plant; rachis 8–13 cm, 10–19-flowered; pedicel pubescent; basal auricles of lip ca. 0.5 mm ........................................ 33. *N. nanchuanica*

9b. Lip without a pair of auricles at base.

18a. Plants 40–50 cm tall; leaves 5–7.5 cm ................................................................. 12. *N. mucronata*

18b. Plants 4–33 cm tall; leaves 0.6–4 cm.

19a. Lip shallowly notched or emarginate at apex, sinus less than 1 mm deep.

20a. Rachis 11–13-flowered; lip 3.5–4.5 mm; column ca. 1.5 mm; leaves wider than long ...... 11. *N. taizanensis*

20b. Rachis 1–4-flowered; lip 8–10 mm; column 3–4 mm; leaves longer than wide.

21a. Leaves inserted above middle of plant, one distinctly larger than other; inflorescence 1- or 2-flowered; rachis sparsely pubescent or almost glabrous ................. 9. *N. biflora*

21b. Leaves inserted at ca. middle of plant, equal in size; inflorescence 2–5-flowered; rachis densely pubescent ................................................................. 10. *N. morrisonicola*

19b. Lip distinctly 2-lobed at apex, sinus more than 1 mm deep.

22a. Lip with a distinct claw at base ................................................................. 26. *N. oblata*

22b. Lip not clawed at base.

23a. Apical lobes of lip 5–7 mm.

24a. Apical lobes of lip linear, 0.5–0.6 mm wide, apices acuminate ............... 21. *N. kuanshanensis*

24b. Apical lobes of lip oblong-ovate, subovate, or lanceolate, 1–6 mm wide, apices obtuse-rounded or truncate.

25a. Lip with a nectary at base.

26a. Leaves 2.5–3.8 × 2.5–4 cm; apical lobes of lip minutely ciliate ............... 22. *N. chenii*

26b. Leaves 1–2 × 1.2–2.5 cm; apical lobes of lip not ciliate ............... 23. *N. formosana*

25b. Lip without a nectary at base.

27a. Lip 3–5(–7) mm wide, without lamellae ........................................... 24. *N. pinetorum*

27b. Lip 7–13 mm wide, with 2 longitudinal lamellae ........................................... 25. *N. wardii*

23b. Apical lobes of lip 3 mm.

28a. Leaves less than 1 cm long and wide ................................................................. 13. *N. microphylla*

28b. Leaves more than 1 cm long and wide.

29a. Pedicel and ovary distinctly pubescent.

30a. Lip ca. 1.7 mm wide; apical sinus without a tooth between lobes ...... 14. *N. puberula*

30b. Lip 2.5–3 mm wide; apical sinus with a tooth between lobes ............... 15. *N. smithii*

29b. Pedicel and ovary glabrous or occasionally sparsely pubescent.

31a. Column 4–5 mm ................................................................. 16. *N. meifongensis*

31b. Column 1–3 mm.

32a. Stem longer than peduncle and rachis together, leaves borne above middle of plant; disk of lip glandular papillose-pubescent along lateral veins ........................................ 17. *N. longicaulis*

32b. Stem shorter or subequal in length to peduncle and rachis together, leaves borne at or below middle of plant; disk of lip not papilllose-pubescent.

33a. Lip to 2 mm wide; apical lobes of lip divergent, narrowly linear, ca. 0.5 mm wide.

34a. Leaves ovate to deltoid, much longer than broad ...... 18. *N. suzukii*

34b. Leaves orbicular-ovate or reniform, ca. as long as broad ................................ 19. *N. bambusetorum*

33b. Lip 3–7 mm wide; apical lobes of lip usually parallel, oblong-ovate or subovate, 1 mm or more wide.

35a. Lip purplish; disk without a longitudinal channel ...................................... 20. *N. nankomontana*

35b. Lip greenish yellow; disk with a longitudinal channel ........................................... 24. *N. pinetorum*


368. 1839.

*Listera lindleyana* (Decaisne) King & Pantling; *Neottia*
**Neottia kamtschatica (Linnaeus) Steudel.**

Plants leafless, holomycotrophic, 15–35 cm tall. Rhizome with many fleshy roots. Peduncle green, 8–20 cm, slender to robust, pubescent, with 3–5 sheaths; sheaths tubular, 1.5–3 cm, membranous; rachis 6–15 cm, pubescent, subdensely 10- to more than 20-flowered; floral bracts suboblong-lanceolate, lower ones 12–15 mm, to ca. 4 mm above, abaxially pubescent, apex acuminate or acute. Flowers resupinate, pale green or green; pedicel 6–8 mm, slender, pubescent; ovary broadly ellipsoid-fusiform, 3–8 mm, densely pubescent; sepals and petals spreading. Sepals oblong-ovate, 4–5 × 1–1.8 mm, outer surfaces sparsely pubescent, with prominent midvein, apex obtuse; lateral sepals falcate. Petals sublinear to narrowly oblong, 3.8–4.5 × 0.5 mm, glabrous, with prominent midvein; lip linear, 3.5–4.5 × 0.5 mm, glabrous, with prominent midvein; anther inclined toward rostellum, ovoid-obtuse; sinus with a short tooth between lobes. Column slightly arcuate, ca. 2.5–3 mm; anther inclined toward rostellum, ca. 0.7 mm; stigma concave, suborbicular; rostellum spreading horizontally, broadly ovate-ligulate, nearly as long as anther. Fl. Jul–Sep.


Plants leafless, holomycotrophic, 20–35 cm tall. Rhizome with many fleshy roots. Peduncle robust, 10–15 cm, glabrous or very sparsely pubescent above, with 3–5 sheaths; sheaths tubular, 2–5 cm, membranous; rachis 6–18 cm, glabrous or sometimes sparsely pubescent, subdensely to densely more than 30-flowered; floral bracts oblong-ovate, 5–7 × ca. 4 mm, lowest (2–)3–10 mm, shorter above, outer surfaces slightly pubescent at base. Flowers relatively large, resupinate, yellowish green or pale green, lip flushed white at margins; pedicel ca. 5 mm, almost glabrous; ovary obovoid, ca. 5 mm, sparsely pubescent; sepals and petals spreading. Dorsal sepal subovate or narrowly elliptic, ca. 5 × 2–3 mm, 1-veined, outer surfaces almost glabrous; lateral sepals falcate, similar to dorsal sepal, but somewhat wider. Petals linear to linear-ligulate, slightly oblique, ca. 4.5 × 1 mm, dilated toward apex, glabrous, 1-veined; lip obovate, 8.5–15 × 6–10 mm, narrowing to ca. 4 mm wide at base, apex deeply 2-lobed; lobes diverging at an acute angle to one another, broadly oblong to subsquare, 2.5–2 × 3.5 mm, margins minutely ciliate, apices truncate-rounded and slightly unulate or crenulate; disk with minute papillae. Column slightly arcuate, ca. 4 mm; anther inclined toward rostellum, ca. 0.7 mm; stigma concave, suborbicular, with slightly exerted margins; rostellum subsquare or broadly oblong-obovate, large, ca. 0.7 mm. Fl. Jul.–Aug.

- **Pinus** forests, shaded grassy slopes; 3000–3800 m. W Sichuan, NW Yunnan.


**耳唇鸟巢兰** er chun niao chao lan

Plants leafless, holomycotrophic, ca. 25 cm tall. Peduncle sparsely pubescent above, with several sheaths; rachis pubescent, sublaxly ca. 20-flowered; floral bracts lanceolate, 5–6 mm, glabrous or nearly so, apex acuminate. Flowers resupinate; pedicel and ovary 7–8 mm, sparsely pubescent. Sepals lanceolate, 3–4 mm, 1-veined, apex subacute; lateral sepals oblique, slightly falcate. Petals linear-ligulate, slightly shorter than sepals, 1-veined, apex obtuse; lip spreading forward, narrowly oblong, 7–8 × ca. 3.5 mm, with a pair of auricles at base, apex 2-lobed; lobes subparallel to one another, lanceolate, oblique, 1–1.5 mm, margins minutely ciliate, apices acute and slightly incurved; auricles triangular, projecting backward, very small, slightly thickened at base; disk with 3–5 slightly thickened veins. Column slightly arcuate, ca. 2.5 mm; anther inclined toward rostellum, elliptic, ca. 0.6 mm; stigma concave, suborbicular, with slightly exerted margins; rostellum broadly ovate,
rather large, slightly shorter than anther. Fl. unknown.

● N Yunnan.

The present authors have seen no specimens of this species. According to the original description, this species is similar to Neottia listeroides, differing only in the presence of a pair of auricles at the base of the lip.


凹唇鸟巢兰 ao chun niao chao lan

Neottia nidus-avis (Linnaeus) Richard var. manshurica Komarov; N. papilligera f. glaberrima Kitagawa.

Plants leafless, holomycotrophic, 27–34 cm tall. Rhizome with many stout, fleshy roots. Peduncle to ca. 25 cm, pubescent, with several sheaths; sheaths tubular, to 4.5 cm, membranous; rachis 10–15 cm, glabrous or pubescent, densely many-flowered, though usually with 1–3 more widely spaced flowers at base; floral bracts subulate, 5–6 mm. Flowers resupinate, beige to flesh-colored; pedicel ca. 5 mm, usually glabrous; ovary fusiform, 4–5 mm, glabrous or pubescent. Sepals obovate-spatulate, ca. 3.5 × 1.8 mm, 1-veined, apex obtuse or subtruncate. Petals suboblong, ca. 3.5 × 1.5 mm, 1-veined, apex obtuse; lip variable in shape, usually ovate, ovate-lanceolate, or suborbicular, ca. 1.2 mm wide. Petals narrowly lanceolate, 2–3.5 × ca. 0.5 mm; lip variable in shape, usually ovate, ovate-lanceolate, or suborbicular, 2–3.5 × 1–2 mm, margin slightly incurved, 1- or 3-veined, apex acuminate or obtuse, subrotund. Column extremely short, usually less than 0.5 mm, shorter than rostellum and anther; anther erect, subelliptic, ca. 1 mm; stigma erect, transversely obovate, incurved on both sides, embracing rostellum; rostellum similar to dorsal sepal, ca. 1 mm wide. Flowers small, not more than 3 mm in diam., usually in clusters of 3 or more; floral bracts oblong-ovate, 3–4 mm, glabrous, apex obtuse. Flowers small, resupinate, yellowish brown; pedicel 3–4 mm, glabrous; ovary elliptic, 2.5–3 mm, glabrous. Dorsal sepal narrowly lanceolate, 3–5 × ca. 0.8 mm, glabrous, 1-veined, apex long acuminate; lateral sepals similar to dorsal sepal, ca. 1 mm wide. Petals narrowly lanceolate, 2–3.5 × ca. 0.5 mm; lip variable in shape, usually ovate, ovate-lanceolate, or suborbicular, 2–3.5 × 1–2 mm, margin slightly incurved, 1- or 3-veined, apex acuminate or obtuse, subrotund. Column extremely short, usually less than 0.5 mm, shorter than rostellum and anther; anther erect, subelliptic, ca. 1 mm; stigma erect, transversely obovate, incurved on both sides, embracing rostellum; rostellum erect, subrotund, to ca. 1 mm. Capsule ellipsoid, ca. 6 × 3–4 mm. Fl. Jun–Aug. 2n = 36.

Forests. C Heilongjiang, S Jilin [Japan, Korea, Russia (Far East, Siberia)].


太白山鸟巢兰 tai bai shan niao chao lan

Plants leafless, holomycotrophic, 12–40 cm tall. Rhizome with many fleshy roots. Peduncle to 20–40 cm, pubescent, with 3 or 4 sheaths; sheaths tubular, to 4 cm, membranous; rachis 4–12 cm, villous, densely 20–40-flowered, flowers usually in clusters of 3 or more; floral bracts obovate, 2.5–3.5 mm, apex mucronate. Flowers small, not resupinate, gray-black, lip with a gray-white margin; pedicel 3–4 mm, glabrous; ovary obovate, ca. 3 mm, subglabrous. Dorsal sepal linear-lanceolate, ca. 5 × 0.5–0.6 mm, glabrous, 1-veined, apex acuminate; lateral sepals similar to but slightly longer than dorsal sepal, oblique. Petals narrowly lanceolate, ca. 3 × 0.5 mm, glabrous, apex acuminate; lip obovate to suborbicular, ca. 3 × 2.2 mm, 3- or 4-veined, apex mucronate, subrotund. Column very short, less than 0.5 mm, shorter than rostellum and anther; anther erect.

● Mixed Abies fargesii and Betula utilis forests; ca. 2900 m. Shaanxi.


二花对叶兰 er hua dai ye lan

Listera biflora Schlechter, Acta Horti Gothob. 1: 143. 1924.
Plants autotrophic, 10–13 cm tall. Rhizome with a few elongate, filiform roots. Stem cylindric, slender, with 1 sheath toward base. Leaves 2, opposite, borne above middle of plant, subsessile, unequal in size (one distinctly larger than other), larger one broadly ovate, 1.2–1.8 × 0.8–1.4 cm, smaller one narrowly ovate, 1–1.5 × 0.5–7 mm, both with bases rounded and apices acute. Peduncle 2–2.5 cm, pubescent, lacking sterile bracts; rachis very short, sparsely pubescent or almost glabrous, 1- or 2-flowered; floral bracts ovate-lanceolate, 3–5 × ca. 0.8 mm, shorter than pedicel, apex acute. Flowers resupinate, green; pedicel 4–6 mm, nearly glabrous; ovary 4–5 mm, glabrous; sepals and petals not spreading widely. Dorsal sepal ovate-elliptic, 6–7 × 1.2–1.8 cm, outer surface carinate, 6–7 × 1.2–1.8 mm, outer surface carinate, apex obtuse-rounded; lateral sepals linear-lanceolate, ca. 7 × 1 mm, outer surface carinate, apex acute. Petals linear, ca. 6.5 × 1 mm, apex obtuse or acute; lip spreading forward, cuneate, 8–10 × 4–5.5 mm, apex truncate-rounded and shallowly notched, usually with a minute tooth in notch; disk with a groove at base, midvein slightly truncate-rounded and shallowly notched, usually with a minute acute; lip spreading forward, cuneate, 8–10 × 4–5 mm, base cuneate and narrowing to ca. 0.5 mm wide, 3-veined, apex emarginate. Column ca. 1.5 mm. Fl. Jul.

- Forests; ca. 1800 m. N Taiwan.


浅裂对叶兰 qian lie dui ye lan

*Listera morrisonicola* Hayata, Icon. Pl. Formosan. 2: 140. 1912; *L. taiwania* S. S. Ying; *Neottia taiwania* (S. S. Ying) Szlachetko; *Ophrys morrisonicola* (Hayata) Makino.

Plants autotrophic, 4–20 cm tall. Rhizome with a few elongate, filiform roots. Stem cylindric, slender. Leaves 2, opposite, borne at ca. middle of plant, sessile, ovate or ovate-oblanceolate, 1.5–2 × 1.2–1.8 cm, base rounded, apex acute. Peduncle 2–5 cm, pubescent; rachis 2–6 cm, pubescent, subdensely 2–5-flowered; floral bracts ovate-lanceolate, 6–7 × ca. 3 mm, with 3 inconspicuous veins, apex obtuse. Flowers resupinate, light green, with lip tinged yellowish green at margins, 15–20 mm in diam.; pedicel 4–5 mm; ovary ca. 3.5 mm. Sepals not spreading widely, similar, ovate-lanceolate, 7–8 × 2–2.5 mm, 1-veined, apex acute. Petals linear-lanceolate, 6–7 × 1–1.5 mm, 1-veined, apex acute; lip pendulous or spreading forward, broadly cuneate, 9.5–10 × 5–6.5 mm, with 3 inconspicuous veins, base concave and slightly channeled, margin recurved, apex truncate and shallowly notched or emarginate. Column ca. 3 mm; anther erect, narrow, ca. 1 mm. Capsule obovoid, ca. 8 × 4 mm, with 3 conspicuous ridges. Fl. Jun–Jul.

- Coniferous forests, shaded and damp meadows; 2500–3800 m.


小花对叶兰 xiao hua dui ye lan


Plants autotrophic, 11–16 cm tall. Rhizome with a few filiform roots. Stem slender, usually with 1 sheath toward base. Leaves 2, opposite, borne at ca. middle of plant, subsessile, deltoid or ovate-suborbicular, ca. 2 × 2.5 cm, base cuneate or triangular-cuneate, apex acute. Peduncle 2–4 cm, pubescent, with 1–4 sterile bracts; rachis 2.5–5 cm, subdensely 11–13-flowered; floral bracts ovate-lanceolate, 3 × 1–1.5 mm, 1-veined, apex acute. Flowers small, resupinate; pedicel and ovary erect, 6–9 mm, glabrous. Dorsal sepal narrowly ovate, ca. 2 × 0.7 mm, glabrous, 1-veined, apex acute or subacute; lateral sepals oblong, falcate, ca. 2.5 × 1 mm, glabrous, apex subacute. Petals linear or spatulate-linear, ca. 2.3 × 0.3 mm, glabrous, 1-veined, apex subacute; lip erect, spatulate, 3.5–4.5 × ca. 1.3 mm, base cuneate and narrowing to ca. 0.5 mm wide, 3-veined, apex emarginate. Column ca. 1.5 mm. Fl. Jul.

- Forests; 3000–3900 m. NW Sichuan (Songpan).


小柱对叶兰 xiao ye dui ye lan


Plants autotrophic, 40–50 cm tall. Rhizome with many elongate, filiform roots. Stem 15–22 cm, somewhat stout, with 1 or 2 sheaths toward base. Leaves 2, opposite, borne at ca. middle of plant, sessile, broadly ovate to suborbiculate, 5–7.5 × 4.4–7.9 cm, base broadly cuneate or subacute, apex acute. Peduncle 6–15 cm, pubescent, with 2 or 3 sterile bracts 3–5 mm; rachis 15–17.5 cm, laxly 12–17-flowered; floral bracts ovate-lanceolate, 3–5 mm, 1-veined, apex acuminate. Flowers resupinate, green; pedicel 4.5–7 mm, pubescent; ovary fusiform, 3.5–5 mm, pubescent; sepals and petals spreading widely. Dorsal sepal elliptic or ovate-lanceolate, 4–5 × ca. 1.2 mm, 1-veined, apex obtuse; lateral sepals ovate, oblique, ca. 5 × 1.5 mm, apex obtuse. Petals linear or spatulate-linear, ca. 5 × 0.6 mm, apex obtuse-rounded; lip pendulous or spreading forward, subobovate-cuneate, 8–10 × 6–7 mm, narrowing to ca. 2 mm wide at base, apex deeply 2-lobed; lobes divergent, suboblong, 3.5–4 × 2–3 mm, margins minutely papillose-ciliate; sinus with small tooth between lobes; disk with a distinct thickened central ridge extending from base of lip and continuous with tooth in sinus. Column 1–1.5 mm; anther inclined toward rostellum; rostellum large. Fl. Jul–Aug.

Shaded places in forests; ca. 2400 m. SW Sichuan, Yunnan [Bhutan, India, Japan, Nepal].


小叶对叶兰 xiao ye dui ye lan


Plants autotrophic, 5–11 cm tall. Rhizome with a very few elongate, filiform roots. Stem 0.6–2 cm, slender. Leaves 2, opposite, borne below middle of plant, sessile, orbicular-ovate, 0.6–0.8 × 0.7–0.9 cm, minutely glandular hairy on both surfaces, base broadly truncate, apex obtuse-acute. Peduncle 2.6–6 cm, glabrous, sometimes with 1 sterile bract; rachis 1.6–3 cm, sparsely pubescent, laxly 3- or 4-flowered; floral bracts sub-
ovate or ovate-lanceolate, 3–4 × ca. 2 mm, apex acute. Flowers resupinate, greenish white; pedicel arcuate, 1.5–2 mm, slender, glabrous; ovary ca. as long as pedicel, glabrous; sepals and petals not spreading. Dorsal sepal oblong-ovate, ca. 3.5 × 1.5 mm, 1-veined, apex obtuse; lateral sepals lanceolate-ovate, slightly oblique, similar in size to dorsal sepal, outer surface carinate. Petals oblong-ovate, slightly shorter and narrower than dorsal sepal; lip spreading forward, obovate-cuneate, 5–5.5 × ca. 3.5 mm, apex deeply 2-lobed; lobes broadly oblong, ca. 1.4 × 1.6 mm, 3-veined, apices obtuse; sinus with small tooth between lobes; disk with an indistinct ridge extending from base of lip and continuous with tooth in sinus. Column suberect, 1.5–2 mm, 3-veined, apices obtuse; sinus with small tooth between lobes; lip spreading forward, obovate-cuneate, 5–5.5 × ca. 3 mm. Capsule erect, ellipsoid, ca. 3 × 2 mm. Fl. Oct. 2n = 40 + 0–2B*.

- Grassy slopes; ca. 2500 m. NW Yunnan.


对叶兰 dui ye lan

Plants autotrophic, 8–20 cm tall. Rhizome with very few elongate, filiform roots. Stem cylindric, slender, usually with 1 or 2 membranous sheaths toward base. Leaves 2, opposite, borne at ca. middle of plant, subsessile, cordate, broadly ovate, or broadly ovate-triangular, 1.5–2.5 × 1.5–2.2 cm, base broadly cuneate or subcordate, margin slightly crisped, apex acute or obtuse. Peduncle 2–7 cm, pubescent; rachis 2.5–7 cm, pubescent, laxly 4–7-flowered; floral bracts lanceolate, 1.5–3.5 mm, glabrous, apex acute. Flowers very small, resupinate, green; pedicel 3–4 mm, pubescent; ovary ca. 6 mm, pubescent; sepals and petals not spreading widely. Dorsal sepal ovate-lanceolate, 1.8–2.4 × 0.8–1 mm, 1-veined, apex subacute; lateral sepals ovate-lanceolate, oblique, 1.5–2.2 × ca. 0.6 mm, apex acute. Petals linear, 1.2–2.2 × ca. 0.5 mm, 1-veined, apex acute; lip narrowly obovate-cuneate or oblong-cuneate, 6–8 × ca. 1.7 mm, margin slightly papillate-ciliate, apex deeply 2-lobed; lobes divergent or nearly parallel, oblong, 1.8–2.5 × 0.8–1 mm; disk with a thickened midvein. Column slightly arcuate, 1.5–2.5 mm; anther inclined toward rostellum; rostellum narrowly ovate, large, but shorter than anther. Capsule obovoid, ca. 6 × 3.5 mm. Fl. Jul–Sep, fr. Sep–Oct.

Damp places in dense forests, deep shade of coniferous forests; 1400–2600 m. Chongqing, S Gansu, NW Hebei, Heilongjiang, S Jilin, Liaoning, Nei Mongol, Qinghai, N Shanxi, NW Sichuan [Japan, Korea, Russia (Far East)].

14a. Neottia puberula var. puberula

对叶兰(原变种) dui ye lan (yuan bian zhen)


Leaves uniformly green. Apical lobes of lip straight. 

Damp places in dense forests; 1400–2600 m. C Gansu, Guizhou, NW Hebei, Heilongjiang, S Jilin, Liaoning, Nei Mongol, Qinghai, N Shanxi, NW Sichuan [Japan, Korea, Russia (Far East)].


花叶对叶兰 hua ye dui ye lan


Leaves green, white, or grayish white along midvein and longitudinal lateral veins. Apical lobes of lip slightly incurved toward apex.

- Deep shade of coniferous forests; 2000–2200 m. Chongqing, S Gansu, NW Sichuan.


川西对叶兰 chuan xi dui ye lan

Listera smithii Schlechter, Acta Horti Gothob. 1: 144. 1924.

Plants autotrophic, 9–12 cm tall. Rhizome with several elongate, filiform roots. Stem slender, with 2 sheaths toward base. Leaves 2, opposite, borne above middle of plant, sessile, green, ovate or ovate-obilicate, 1.3–1.7 × 1.2–1.6 cm, base rounded or broadly cuneate, apex obtuse or subacute. Peduncle pubescent, rachis 1.5–4 cm, pubescent, laxly 2–5-flowered; floral bracts ovate-lanceolate, ca. 4 mm. Flowers small, resupinate, green with paler sepals and petals and a whitish margin to lip; pedicel ca. 3 mm, pubescent; ovary ca. 2 mm, sparsely pubescent. Dorsal sepal narrowly elliptic, ca. 3 × 1.2 mm, 1-veined, apex obtuse; lateral sepals ovate-lanceolate, falcate, ca. 3 × 1.5 mm. Petals linear-ligulate, oblique, ca. 2.8 × 0.4 mm, apex obtuse; lip spreading forward, obovate, ca. 8 × 2.5–3 mm, margin minutely papillose-ciliate, apex deeply 2-lobed; lobes almost parallel, linear-lanceolate, oblique, ca. 2.7 mm; sinus with a triangular tooth between lobes; anther inclined toward rostellum; rostellum broadly ovate, large. Fl. Jul.

- Forests; ca. 3900 m. NW Sichuan.


梅峰对叶兰 mei feng dui ye lan


Plants autotrophic, 12–25 cm tall. Rhizome with a few clustered, filiform roots. Stem slender, ridged. Leaves 2, opposite, borne at or above middle of plant, sessile, broadly ovate to ovate-deltoid, 1.5–2.5 × 1.8–3.2 cm, base truncate-subcordate, apex acute. Peduncle 3–6 cm, pubescent, with 1–3 ovate-lanceolate sterile bracts 3–5 mm; rachis 3–6 cm, pubescent, laxly 2–7-flowered; floral bracts ovate-lanceolate, 3–4.5 × ca. 2 mm, apex acute. Flowers resupinate, light green, lip tinged pale yel-
lowish green along margin; pedicel and ovary arcuate, 6–8 mm, glabrous or sometimes sparsely pubescent at base; sepals and petals spreading. Dorsal sepal lanceolate, 3–4.5 × ca. 1.3 mm, apex acute; lateral sepal lanceolate, falcate, 3.5–5.5 × 1.5–2 mm, apex acute. Petals linear-lanceolate, 3–5 × 0.7–1.1 mm, apex acuminate; lip spreading forward, cuneate-rectangular or broadly oblong, 6–10 × 3–7.5 mm, apex obstone-rounded and shallowly 2-lobed; lobes ovate-oblong, 1.5–2 × 1.5–2.5 mm; disk with a longitudinal groove at base that extends into a thickened keel running almost to apical sinus, margins ciliate. Column distinctly arcuate above middle, 4–5 mm; anther inclined toward rostellum, ca. 1 mm; rostellum large, ca. 0.8 mm. Fl. Jun–Jul.

● Abies and Tsuga forests; 2200–3300 m. C Taiwan.


毛脉对叶兰 mao mai dui ye lan


Plants autotrophic, 12–15 cm tall. Rhizome with a few filiform roots. Stem 8–10 cm, slender, with 1 sheath at base. Leaves 2, opposite, borne above middle of plant, subsectile, broadly ovate-cordate, ca. 2.5 × 3 mm, base shallowly cordate, apex acute or obtuse. Peduncle ca. 1.5 cm, pubescent, with 1 sterile bract 4–6 mm; rachis 3–4 cm, pubescent, laxly to subdensely 5–6-flowered; floral bracts ovate-lanceolate, ca. 3 mm, apex acuminate. Flowers resupinate, yellowish green; pedicel 4–5 mm, almost glabrous; ovary 2–3 mm, glabrous. Dorsal sepal oblong-ovate, ca. 4 × 1.7 mm, 1-veined, apex obtuse; lateral sepals lanceolate, falcate, ca. 4.5 × 1.5 mm, slightly thickened, apex obtuse. Petals linear-lanceolate, ca. 3.5 × 1 mm, 1-veined, apex obtuse; lip suboblong or obovate-oblong, ca. 12 × 7 mm, margin ciliate, apex deeply 2-lobed; lobes nearly parallel or slightly divergent, broadly ovate, ca. 3 mm, apex obtuse; disk glandular-papillose-pubescent along lateral veins, midvein thickened. Column arcuate above middle, ca. 2.7 mm; anther inclined toward rostellum; rostellum large. Fl. Jul. 2n = 46.

*Pinus wallichiana* forests; ca. 2800 m. S Xizang [Bhutan, NE India].

P. Ormerod (pers. comm.) notes that a comparison of type material of this species and *Listera yueana* (here treated as a synonym of *Neottia pinetorum*) led him to find them conspecific, and he believes what is called *N. longicaulis* here and *L. longicaulis* in FRPS is in fact a different species (see Ormerod, Taiwania 48: 91. 2003).


无毛对叶兰 wu mao dui ye lan

*Listera suzukii* Masamune, Trop. Hort. 3: 42. 1933; *L. deltoidea* Fukuyama; *L. uraiensis* S. S. Ying; *Neottia deltoidea* (Fukuyama) Szlachetko; *N. uraiensis* (S. S. Ying) Szlachetko.

Plants autotrophic, 8–30 cm tall. Rhizome with very few elongate, filiform roots. Stem ridged, 3.5–12 cm, with a sheath near base. Leaves 2, opposite, borne at or below middle of plant, sessile, ovate to deltoid, 2–4 × 1–3 cm, base truncate-rounded, apex acute. Peduncle green or purple, 2.5–10 cm, pubescent; rachis 2.5–9 cm, glabrous, laxly 10– to more than 20-flowered; floral bracts ovate-triangular, 1–2 × 1–1.5 mm, apex acute. Flowers resupinate, pale greenish brown; pedicel and ovary 5–6 mm, glabrous; sepals and petals not spreading. Dorsal sepal ovate, ca. 2.5 × 1.5 mm, 1-veined, apex acute; lateral sepal rhombic to broadly ovate, oblique, ca. 2.5 × 2 mm, apex acute. Petals oblong-ovate, falcate, ca. 2 × 0.8 mm, 1-veined, apex acute; lip narrowly cuneate or obovate-cuneate, 4–8 × 1.5–2 mm, apex deeply 2-lobed; lobes divergent, narrowly linear, 2.5–4 × ca. 0.5 mm, apices acuminate; sinus with a short tooth between lobes; disk with a thickened midvein. Column ca. 1 mm; rostellum spreading forward, ovate, very large. Fl. Jan–Apr.

● Bamboo forests; 3200–3400 m. W Yunnan.


台湾对叶兰 tai wan dui ye lan


Plants autotrophic, 12–20 cm tall. Stem cylindrical, 4–7 cm, slender. Leaves 2, opposite, borne at ca. or below middle of plant, sessile, broadly ovate, 1.8–2 × 1.5–2.5 cm, base truncate, apex acute. Peduncle 3–6 cm, pubescent, with 3 sterile bracts; rachis 5–8 cm, pubescent, laxly 5–8-flowered; floral bracts lanceolate, ca. 3 mm, apex acute. Flowers resupinate, greenish, lip purplish; pedicel and ovary 7–9 mm, glabrous. Sepals elliptic or ovate, ca. 3 × 1 mm, 1-veined, apex obtuse; lateral sepals oblique. Petals linear, ca. 3 × 0.5 mm, apex obtuse; lip subcuneate, ca. 6 × 1.5–2 mm, base attenuate, apex deeply 2-lobed; lobes divergent, narrowly linear, 2–2.5 × ca. 0.5 mm, margins minutely papillose-ciliate, apices obtuse; sinus with a short tooth between lobes. Column slightly arcuate, ca. 2 mm. Fl. Jul.
fleshy at center, apex deeply 2-lobed; lobes parallel, subovate, 2–3 × ca. 1 mm, apices obtuse. Column erect, arcuate above middle, 2.5–3 mm. Fl. Jul.

- Coniferous forests; 2600–3200 m. C and N Taiwan.


Plants autotrophic, 12–14 cm tall. Rhizome with a few elongate, filiform roots. Stem 5–7 cm, slender. Leaves 2, opposite, borne at ca. middle of plant, subfusiform, ovoid, ovate-suborbicular, ca. 1.5 × 1.8–2 cm, membranous, base broadly truncate, apex acute. Peduncle pubescent, with 2 sterile bracts; rachis 3–4 cm, pubescent, laxly 3–7-flowered; floral bracts ovate-lanceolate, ca. 3.5 mm, apex acute. Flowers resupinate, greenish; pedicel and ovary ca. 8 mm, glabrous; sepals and petals spreading widely. Dorsal sepal ovate-lanceolate, ca. 3.3 × 1 mm, base slightly contracted, apex acute; lateral sepals falcate, ca. 3.5 × 1.2 mm, base broadly cuneate, apex acute. Petals linear-lanceolate, ca. 3.3 × 0.5 mm, apex obtuse; lip ovate-lanceolate, ca. 14 × 2.5 mm, apex deeply 2-lobed; lobes divergent, linear, 6.5–7 × 0.5–0.6 mm, apices acuminatus; disk with a longitudinal keel. Column arcuate toward apex, 2.5–3 mm; rostellum ca. 0.9 mm. Fl. Aug.

- Forests; 2600–2700 m. S Taiwan.

22. Neottia chenii S. W. Gale & P. J. Cribb, nom. nov.


Plants autotrophic, 13–23 cm tall. Stem slender, usually with 1 sheath toward base. Leaves 2, opposite, borne near or above middle of plant, broadly ovate or ovate-cordate, 2.5–3.8 × 2.5–4 cm, apex subacute. Peduncle pubescent, with 1 or 2 sterile bracts 8–10 mm; rachis 3.5–6.5 cm, pubescent, 3–6-flowered; floral bracts ovate-lanceolate, 6–7 mm. Flowers resupinate, greenish yellow; pedicel and ovary 11–12 mm, nearly glabrous; sepals and petals spreading widely to reflexed. Dorsal sepal subelliptic, ca. 6.5 × 2.2 mm, apex subacute; lateral sepals elliptic-lanceolate, oblique, ca. 6.5 × 2 mm, apex subacute. Petals linear, ca. 6.5 × 1 mm; lip spreading forward, subovate-oblong, 15–16 × 7–10 mm, slightly narrowing to ca. 5 mm wide at base, apex deeply 2-lobed; lobes subovate-oblong, 5–6 mm, margins minutely ciliate, apices truncate; disk with a V-shaped nectary at base. Column slightly arcuate, 6–7 mm. Fl. Jun–Jul.

- Forests; 2200–2800 m. S Gansu, W Sichuan.

The specific epithet honors the first co-author of the present treatment of Neottia.


長唇對葉兰 chang chun dui ye lan

Plants autotrophic, 10–20 cm tall. Rhizome with a few elongate, filiform roots. Stem 4–15 cm, slender, with 1 sheath toward base, 7–14 cm to height of leaves. Leaves 2, opposite, sessile, broadly ovate or ovate-suborbicular, 1–2 × 1.2–2.5 cm, base subcordate, apex truncate-rounded and sometimes mucronate. Peduncle 3–5 cm, pubescent; rachis 2–5 cm, pubescent, laxly 2–6-flowered; floral bracts ovate-cuspidate, 2–5 × 2–4 mm, 1-veined, apex acuminatus. Flowers resupinate, yellowish green; pedicel and ovary 8–9.5 mm; sepals and petals spreading. Dorsal sepal narrowly ovate-lanceolate, 4.5–5 × 1–2 mm, 1-veined, base slightly contracted, apex acute; lateral sepals ovate-lanceolate, falcate, 4.5–5.5 × 1.8–2.8 mm, 1-veined. Petals linear, 3.4–4.5 × 0.7–1 mm, 1-veined, apex acute; lip spreading forward, suborbicular, 11–20 × 5.5–8.5 mm, apex truncate and deeply 2-lobed; lobes slightly divergent, ovate-oblong, ca. 6 × 2.5–4.5 mm, apices rounded; disk with a longitudinal groove and a nectary near base. Column green, distinctly arcuate above middle, 4–5 mm; anther erect, ovoid-lanceolate, ca. 0.9 mm. Fl. Jun–Aug.

- Forests; 2200–3300 m. Taiwan.


西藏对叶兰 xi zang dui ye lan


Plants autotrophic, 6–33 cm tall. Rhizome with a few elongate, filiform roots. Stem 4–15 cm, slender, with 1 sheath toward base. Leaves 2, opposite, borne at ca. middle of plant, sessile, broadly ovate or ovate-cordate, 1–3.5 × 1–4 cm, base shallowly cordate to nearly broadly truncate, apex acute. Peduncle pubescent; rachis 3–12 cm, pubescent, laxly 2–14-flowered; floral bracts ovate-lanceolate or ovate, 3–6 mm, apex acuminate. Flowers resupinate, greenish yellow; pedicel and ovary 11–12 mm, nearly glabrous; ovary 3.4–4.5 mm, glabrous; sepals and petals not spreading widely. Dorsal sepal narrowly elliptic or nearly oblong, 3.4 × 1–1.5 mm, 1-veined, apex obtuse; lateral sepals narrowly elliptic, falcate, 3.4 × 1.2–1.5 mm, apex acute or obtuse. Petals linear, 3.4 × 0.5–1 mm, apex subacute; lip pendulous, variable in shape, ovate-cuspidate, oblong-cuspidate, sublinear-cuspidate, or oblanceolate, 7–13 × 3–5(–7) mm, apex deeply 2-lobed; lobes parallel or occasionally divergent, oblong-obovate, 2.5–5 × 1–2 mm, margins slightly papillate, apices obtuse-rounded; sinus sometimes with a short tooth between lobes; disk with a longitudinal channel extending from base of lip almost to sinus. Column slightly arcuate above middle, 2–2.5 mm; anther inclined toward rostellum; rostellum large, ca. as long as anther. Fl. Jun–Aug. 2n = 40.

Plants autotrophic, 15–25 cm tall. Rhizome with a few elongate, filiform roots. Stem cylindric, slender, with 1 membranous sheath toward base. Leaves 2, opposite, borne above middle of plant, subsessile, broadly ovate or ovate-cordate, 2.5–4 × 2.5–4.2 cm, base broadly cuneate or shallowly cordate, margin slightly crisped or sometimes irregularly dentilicate, apex subacute or mucronate. Peduncle 3.5–5 cm, pubescent, with 1 or 2 sterile, ovate bracts to ca. 8 mm; rachis 3–7 cm, pubescent, laxly 7-flowered; floral bracts ovate-lanceolate, 5–7 mm, apex acute to acuminate. Flowers rather large, spreading widely. Dorsal sepal narrowly elliptic, ca. 5 × 2 mm, 3- or 4-veined, apex obtuse; lateral sepals elliptic-lanceolate, 6–7 × ca. 2.2 mm, 1-veined, apex subacute; lateral sepals elliptic-lanceolate, oblique, 6–7 × ca. 2 mm, apex acute. Petals linear, 6–7 × ca. 1 mm, apex acuminate; lip suborbicular, 2–2.5 × 0.5–1.7 mm, 3-veined, with a pair of suborbicular auricles near base, apex 3-lobed; lobes triangular, middle lobe exceeding lateral lobes. Column erect, 0.8–1 mm; anther inclined toward rostellum; rostellum short. Fl. Sep.

- Chongqing.


卡氏叶兰 ka shi dui ye lan


Plants autotrophic, 6–13 cm tall. Stem with 1 oblong sheath toward base. Leaves 2, opposite, borne below middle of plant, sessile, cuneate or ovate, 0.5–1.1 × 0.4–0.9 cm, apex obtuse to subacute. Peduncle 5–10 cm, minutely pubescent; rachis 3–5 cm, pubescent, laxly 4–10-flowered; floral bracts narrowly ovate, concave, ca. 1 mm, apex acute. Flowers resupinate, pale green; pedicel and ovary 2–5 mm, glabrous. Sepals and petals subequal, elliptic, 2.3–3.3 × 1.5–1.5 mm, apex subacute, 1-veined; lip deflexed, rectangular, 2.25 × 0.5–1.7 mm, 3-veined, with a pair of suborbicular auricles near base, apex 3-lobed; lobes triangular, middle lobe exceeding lateral lobes. Column erect, 0.8–1 mm; anther inclined toward rostellum; rostellum short. Fl. Sep.

- Forests; 2800–3100 m. W Yunnan [NE India (Sikkim)].


叉唇对叶兰 cha chun dui ye lan


Plants autotrophic, 15–24 cm tall. Stem slender, with 2 or 3 tubular sheaths near base. Leaves 2, opposite, borne at ca. middle of plant, subsessile, broadly ovate-cordate, 2–3 × 1.7–3.1 cm, base shallowly cordate to subtruncate, apex subacute. Peduncle 3–8 cm, pubescent, with 2–5 sterile bracts 4–5 mm; rachis 3–7 cm, pubescent, densely 8–14-flowered; floral bracts linear-lanceolate, 6–8 mm, 1-veined, apex acute. Flowers erect, resupinate, pale yellow or pale green; pedicel 2.5–4 mm, slender, glabrous; ovary fusiform, 1.8–3 mm, glabrous; sepal and petals spreading. Dorsal sepal oblong-lanceolate, ca. 2.2 × 0.9 mm, 1-veined, apex obtuse; lateral sepals oblong-lanceolate, oblique, ca. 3.5 × 1.5 mm, apex acute. Petals slightly incurved, linear-lanceolate, ca. 2.8 × 1 mm, 1-veined, apex obtuse; lip erect or spreading forward, ovate-flabellate, 3–4 × ca. 8 mm, with a pair of triangular auricles near base, apex deeply 2-lobed; lobes diverging widely, oblong or oblong-lanceolate, ca. 5 × 2 mm, 3- or 4-veined, apices obtuse; sinus with a tooth between lobes. Column suberect, 1.5–2 mm; anther inclined toward rostellum; rostellum ascending, ovate, slightly shorter than anther. Fl. Jul.–Aug.

*Tsuga* forests; 3000–3500 m. SE Xizang [NE India].


Plants autotrophic, ca. 23 cm tall. Rhizome with several clustered roots. Stem with 1 sheath toward base. Leaves 2, opposite, borne at ca. middle of plant, subcordate, ca. 2.8 × 3–3.5 cm, base slightly cordate, apex subacute; bractlike leaflets ovate-lanceolate, 5–6 mm, turning into floral bracts farther up stem. Peduncle pubescent, with 3 sterile bracts 5–6 mm; rachis ca. 6.5 cm, pubescent, laxly 7-flowered; floral bracts ovate-lanceolate, ca. 5 mm. Flowers large, resupinate; pedicel ca. 4 mm, pubescent; ovary clavate, ca. 4 mm, almost glabrous; sepal and petals spreading widely. Dorsal sepal narrowly elliptic, ca. 5 × 2 mm, 1-veined, apex obtuse; lateral sepals elliptic-lanceolate, oblique, ca. 6.5 × 2.5 mm, apex subacuminate. Petals linear, nearly as long as lateral sepals, ca. 0.7 mm wide; lip suborbicular or oblate, ca. 13 × 12 mm, base abruptly contracted into a claw ca. 2 × 1.5 mm, margin minutely papillose-ciliate, apex deep 2-lobed; lobes parallel but somewhat overlapping toward apex, broadly ovate, ca. 4.5 × 6 mm, apices rounded; disk with midvein thickened and deep brown. Column slightly arcuate, ca. 5.5 mm; rostellum protruding, large. Fl. unknown.

*Tsuga* forests; 3000–3500 m. SE Xizang [NE India].

Dense forests, *Picea* and *Abies* forests; 2200–3600 m. N Fujian, S and SE Xizang, W Yunnan [Bhutan, NE India, Nepal].

Plants autotrophic, 20-30 cm tall. Rhizome with filiform roots. Stem short, with 1 or 2 membranous sheaths. Leaves 2, opposite, borne below middle of plant and almost prostrate on ground, sessile, coriaceous to subcoriaceous, 0.5–1.5 × 0.5–1.5 cm, apex acute. Peduncle 6–8 cm, pubescent, with 1 or 2 sterile bracts; racis 1–7 cm, subdensely 3–8-flowered, pubescent; floral bracts rhombic. Flowers resupinate, secund, uniformely green; pedicel and ovary 4–8 mm. Dorsal sepal elliptic, ca. 4 × 1 mm; lateral sepals ovate, oblique, ca. 4 × 1.2 mm, apex acuminate. Petals narrowly elliptic, ca. 3.5 × 1 mm; lip spreading forward, cuneate, ca. 6 × 4 mm, with a pair of triangular auricles near base, apex deeply bilobed; lobes strongly recurved and meeting underneath lip, ca. 2 × 1.3 mm. Column ca. 1.5 mm. Fl. Aug.

Dense bamboo forests, grasslands; ca. 3300 m. NW Yunnan [NE India (Sikkim)].


Plants autotrophic, 3–4 cm tall. Rhizome with a few elongate roots. Stem slender, with 2 or 3 tubular sheaths at base. Leaves 2, opposite, borne at ca. middle of plant, broadly ovate to ovate, 0.9–1.5 × 0.8–1.4 cm, base broadly cuneate to subtruncate, apex subacute to obtuse-acute. Peduncle pubescent; racis 1.9–2.2 cm, pubescent, 2- or 3-flowered; floral bracts lanceolate, 1.5–3 mm, almost glabrous, acuminate. Flowers resupinate, green, lip tinged whitish green along apical margins; pedicel and ovary 2–3 mm, puberulent on ribs. Dorsal sepal narrowly elliptic-ovate, 2–2.5 × 1–1.1 mm, 1-veined, apex obtuse; lateral sepals narrowly ovate, oblique, 2.5–3 × 1–1.2 mm, 1-veined. Petals suboblong, 2.5–3 × 0.5–0.6 mm, apex obtuse; lip subulate, 3.5–4.5 × 2–2.5 mm, with a pair of small auricles at base, apex shallowly 2-lobed; lobes diverging at an acute angle, subcoriaceous or broadly ovate, ca. 0.5 mm; disk with a fleshy callus near base. Column less than 1 mm; rostellum small. Fl. Jun.

- Open wet places in *Picea* forests; 2100–2200 m. C Xinjiang (N Tian Shan, Urimqi).


Plants autotrophic, to 29 cm tall. Rhizome with a few elongate, filiform roots. Stem slender, with 1 or 2 sheaths near base. Leaves 2, opposite, borne below middle of plant, subsessile, broadly ovate or broadly ovate-cordate, 3.2–6 × 3–6 cm, base broadly cuneate or nearly shallowly cordate, apex obtuse or acute. Peduncle 6–10 cm, pubescent, with 3 sterile bracts 4–6 mm; racis 8–13 cm, pubescent, laxly 10–19-flowered; floral bracts ovate-lanceolate, 3.5–4.5 mm, apex acuminate. Flowers spreading, resupinate; pedicel and ovary 4–8 mm. Dorsal sepal linear-oblancoate, 3.2–3.5 × 0.7–1 mm, 1-veined, base narrowed, apex slightly obtuse; lateral sepals linear-oblong, 3.5–3.7 × ca. 0.7 mm, 1-veined, apex slightly obtuse. Petals linear-oblong, 3.5–4.5 × 0.8–1 mm, 1-veined, apex obtuse; lip subobovate or obtangular, 5–6 mm, narrowly clawed at base, dilated apical portion obcordate, apex deeply 2-lobed; lobes diverging at an acute angle, oblong, oblique, ca. 2.5 × 4 mm, margins entire or minutely denticulate; sinus with a tooth between lobes; claw with a pair of oblancoate auricles ca. 1.7 mm at base. Column erect, ca. 2.5 mm; anther ca. 0.7 mm; rostellum broadly ovate. Fl. unknown.

- Forests. C Taiwan.


Plants autotrophic, ca. 20 cm tall. Stem slender, with tubular sheaths at base. Leaves 2, opposite, borne at ca. middle of plant, ovate-suborbicular or nearly reniform-suborbicular, 2.2–2.5 × 3–3.5 cm, base subcordate, apex rounded and with caudate tip. Peduncle ca. 6 cm, pubescent; rachis 3–4 cm, pubescent, laxly 6–8-flowered; floral bracts ovate-lanceolate, 1–3 mm, apex subacute. Flowers spreading, resupinate; pedicel and ovary 6–8 mm, glabrous. Dorsal sepal linear-oblancoate, 3.2–3.5 × 0.7–1 mm, 1-veined, base narrowed, apex slightly obtuse; lateral sepals linear-oblong, 3.5–3.7 × ca. 0.7 mm, 1-veined, apex slightly obtuse. Petals linear-oblong, 3.5–4.5 × 0.8–1 mm, 1-veined, apex obtuse; lip subobovate or obtangular, 5–6 mm, narrowly clawed at base, dilated apical portion obcordate, apex deeply 2-lobed; lobes diverging at an acute angle, oblong, oblique, ca. 2.5 × 4 mm, margins entire or minutely denticulate; sinus with a tooth between lobes; claw with a pair of oblancoate auricles ca. 1.7 mm at base. Column erect, ca. 2.5 mm; anther ca. 0.7 mm; rostellum broadly ovate. Fl. unknown.

- Forests. C Taiwan.


Plants autotrophic, 3–4 cm tall. Rhizome with a few elongate, filiform roots. Stem slender, with 1 tubular sheath more than 2 cm toward base. Leaves 2, opposite, borne below middle of plant, submersile, ovate-orbicular, 2.4–2.8 × 2.8–3 cm, adaxially minutely puberulent, base cuneate-subcordate, apex acute-rounded. Peduncle ca. 15 cm, pubescent; rachis ca. 4.5 cm, pubescent, 11-flowered; floral bracts subovate-oblong, 1.5–2.5 × ca. 0.8 mm, sparsely pubescent on both surfaces. Flowers erect or spreading, resupinate; pedicel 3.5–4.5 mm, pubescent; ovary ca. 2 mm, sparsely pubescent or glabrescent; sepals and petals spreading. Sepals ovate-oblong, ca. 2 × 0.8 mm, 1-veined, apex obtuse; lateral sepals shortly oblique. Petals similar to dorsal sepal but slightly narrower; lip spreading forward to suberect, spatulate-obovate, ca. 5 × 3 mm, contracted below middle into a claw, dilated apical portion fan-shaped, ca. 2 × 3 mm, apex deeply 2-lobed; lobes diverging at an acute angle, subquadrate, ca. 2 mm, apices truncate; sinus with a small tooth between lobes; claw ca. 2.8 × 0.8 mm, with a pair of broadly ovate-deltoid auricles ca. 0.8 mm at base. Column ca. 2 mm. Fl. Jul.

- Forests; 800–1000 m. NW Sichuan.
2.8–3 × ca. 1 mm, 1-veined, apex obtuse; lateral sepals ovate-oblong, oblique, ca. 3 × 1.5 mm. Petals sublinear or narrowly oblong, ca. 2.6 × 0.8 mm, 1-veined; lip subovate, 7–9 × 3.5–6.5 mm, narrowing at base into a claw, apex deeply 2-lobed; lobes parallel or slightly incurved and overlapping toward apex, subovate-oblong, 2.5–3 × 1.5–2.2 mm, margins ciliate, apices obtuse; sinus with a short tooth between lobes; claw 0.7–1.3 mm wide, with a pair of subovate or subsquare auricles ca. 0.5 mm near base. Column suberect, ca. 2 mm; anther inclined toward rostellum; rostellum broadly ovate, large, nearly as long as anther but wider. Fl. Jul.

FORESTS or forest margins; 2000–2100 m. Chongqing.


云南对叶兰 yun nan dui ye lan


Plants autotrophic, 37–47.5 cm tall. Rhizome with a few roots. Stem with 1 tubular sheath at base. Leaves 2, opposite, borne below middle of plant, sessile, ovate, 5.5–6 × 4.4–5 cm, base slightly cordate, apex acute or mucronate. Peduncle pubescent, with 1 sterile bract 3–8 mm; rachis 14–16 cm, pubescent, laxly 24–35-flowered; floral bracts lanceolate, nearly as long as pedicel. Flowers resupinate, green; pedicel ca. 4 mm, sparsely pubescent; ovary fusiform, ca. 3 mm, glabrous; sepals and petals spreading. Dorsal sepal narrowly ovate-elliptic, 2.5–3 × ca. 1 mm, 1-veined, apex obtuse; lateral sepals ovate, oblique, 2.5–3 × ca. 1.3 mm, 1-veined. Petals suboblong, 2.5–2.8 × 0.5–0.6 mm, apex rounded; lip narrowly obovate-cuneate, 6–7 × 2.5–5 mm, with a pair of auricles near base, apex deeply 2-lobed; lobes diverging at an acute angle, narrowly lanceolate, 3–4 mm, margins minutely ciliate, apices acuminate; disk with a pair of somewhat fleshy calli at base and a pair of swollen, suborbicular lamellae midway along length of lip; auricles ovate-oblong, ca. 1.3 × 0.6 mm. Column ca. 1 mm; rostellum ovate, slightly shorter than anther. Fl. Aug.

Mixed forests; ca. 2300 m. SE Yunnan.


日本对叶兰 ri ben dui ye lan

Listera japonica Blume, Coll. Orchid. 115. 1859; Diphyllyum japonicum (Blume) Kuntze; L. shaoi S. S. Ying; L. shikokiana Makino; Neottia shaoi (S. S. Ying) Szlachetko; Ophrys japonica (Blume) Makino; O. shikokiana (Makino) Makino.

Plants autotrophic, 10–18 cm tall. Rhizome with very few elongate, filiform roots. Stem 6–8 cm tall, slender, ridged, with 1 or 2 tubular sheaths at base, purple or pale green. Leaves 2, opposite, borne slightly below middle of plant, sessile, ovate-triangular, 1–1.8 × 1–1.6 cm, base cordate or truncate, apex acute. Peduncle 3–5 cm, pubescent; rachis 3–5 cm, pubescent, laxly 3–8-flowered; floral bracts broadly ovate, very small, 1–2 mm, acute. Flowers resupinate, purplish green, lip deep purple; pedicel elongate, 9–12 mm, slender, glabrous or slightly pubescent toward base; ovary 1–3 mm, glabrous; sepals and petals reflexed. Dorsal sepal obovate-elliptic, 1.8–2.5 × 0.8–1 mm, apex acute or obtuse; lateral sepals ovate, oblique, 2–2.5 × 0.7–1.1 mm, apex obtuse. Petals lanceolate or lanceolate-linear, 1.8–2.5 × ca. 0.5 mm, apex obtuse; lip narrowly cuneate, ca. 6 mm, with a pair of auricles at base, apex deeply 2-lobed; lobes diverging at an acute angle, linear, ca. 4 mm, apex obtuse or acute; sinus with a triangular tooth between lobes; auricles
strongly incurved, embracing column and overlapping one another above column, slender. Column less than 1 mm. Fl. May–Jul.

Forests; 1400–3000 m. C and N Taiwan [S Japan (Ryukyu Islands)].