

30. LEPIDAGATHIS Willdenow, Sp. Pl. 3: 400. 1800.

鳞花草属 lin hua cao shu

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Herbs [or shrubs], perennial, with cystoliths, often anisophyllous. Leaves opposite; leaf blade margin entire or crenate-serrate. Inflorescences dense spikes or cymes condensed into globose heads, sometimes clustered; bracts and bracteoles present. Calyx 5-lobed; lobes heteromorphic; posterior lobe usually largest; lateral 2 lobes smallest; anterior 2 lobes usually connate to a greater degree than other lobes. Corolla small; tube usually expanded into a distinct throat near middle; limb 2-lipped; lower lip 3-lobed, patent, usually spotted, lobes subequal or middle one slightly larger; upper lip erect or slightly patent, entire to 2-lobed; lobes quincuncial in bud. Stamens 4, didynamous [or with one pair reduced or absent], usually included in corolla tube; filaments short; anthers 2-theous [or with one pair of anthers sometimes 1-theous]; thecae oblong, parallel or one lower and somewhat divergent, base mucous or spurred. Ovary with 2 ovules per locule; stigma subcapitate, entire or slightly 2-cleft. Capsule subellipsoid to oblong to linear-conical, lacking a stalk, to 4-seeded; retinacula present. Seeds discoid, pubescent with hygroscopic trichomes.

About 100 species: tropical to subtropical regions worldwide (mostly paleotropical); seven species (three endemic) in China.

- 1a. Inflorescences globose or ovoid heads to 1 cm; leaves sessile to subsessile; leaf blade usually less than 2 cm, base truncate to subcordate 6. *L. secunda*
- 1b. Inflorescences ± elongate and secund spikes to 5.5 cm; leaves usually petiolate; leaf blade to 14.5 cm, base cuneate to attenuate and usually decurrent onto petiole (in *L. inaequalis* abruptly truncate to rounded and decurrent onto petiole).
 - 2a. Leaf blade linear to linear-lanceolate, (4.6–)6.5–16 × as long as wide 7. *L. stenophylla*
 - 2b. Leaf blade ovate to elliptic to subcircular to obovate, 1.6–4.5(–5.6) × as long as wide (in *L. fasciculata*, sometimes only distalmost 1 or 2 nodes with leaf blade linear to linear-lanceolate and 6–9.5 × as long as wide and others ovate to elliptic and 1.7–3 × as long as wide).
 - 3a. Anterior calyx lobes connate at base for 10%–25% of their length; bracts (1 or)3(or 5)-veined.
 - 4a. Corolla pinkish; bracts broadly ovate to ovate-oblong, 2.5–4.4 mm wide; posterior calyx lobe 3-veined; distinct segments of anterior calyx lobe oblanceolate to linear, 6–6.5 mm; capsule 4.5–5 mm, pubescent distally 1. *L. fasciculata*
 - 4b. Corolla white; bracts narrowly lanceolate, 1–1.5 mm wide; posterior calyx lobe 5-veined; distinct segments of anterior calyx lobe narrowly lanceolate, 9–10 mm; capsule 6–6.5 mm, pubescent throughout 3. *L. hainanensis*
 - 3b. Anterior calyx lobes connate at base for 30%–60% of their length; bracts 1(or 3)-veined.
 - 5a. Leaf blade 1–4(–6) cm, 1.6–2 × as long as wide, base abruptly rounded to truncate and decurrent onto petiole; plants decumbent, not conspicuously woody at base 4. *L. inaequalis*
 - 5b. Leaf blade to 14.5 cm, usually more than 2 × as long as wide, base cuneate to long attenuate and decurrent onto petiole; plants not decumbent, conspicuously woody at base.
 - 6a. Calyx 5–6 mm 2. *L. formosensis*
 - 6b. Calyx 8–10 mm 5. *L. incurva*

1. *Lepidagathis fasciculata* (Retzius) Nees in Wallich, Pl. Asiat. Rar. 3: 95. 1832.

齿叶鳞花草 chi ye lin hua cao

Ruellia fasciculata Retzius, Observ. Bot. 4: 28. 1786.

Herbs to 40 cm tall, erect to spreading, isophyllous to anisophyllous. Stems 4-angled to 4-angled and sulcate, pubescent or glabrate. Petiole 1.5–3.5 cm; leaf blade ovate to elliptic (distalmost 1 or 2 nodes with leaves sometimes linear to linear-lanceolate), 1.3–12.5 × 0.7–5(–7) cm, 1.7–3 (6–9.5 in distalmost linear leaves when present) × as long as wide, both surfaces pubescent but trichomes sometimes sparse or restricted to midvein, secondary veins 4 or 8 or more on each side of midvein, base attenuate and decurrent onto petiole, margin entire to crenate-serrate, apex acuminate. Spikes elongate, 2–4 cm; bracts broadly ovate to ovate-oblong, 7–10 × 2.5–4.4 mm, abaxially pubescent, 1- or 3-veined, veins prominent, margin

ciliate with gland-tipped and non-glandular trichomes, apex aristate; bracteoles ovate-elliptic, abaxially pubescent, margin ciliate with glandular and non-glandular trichomes. Calyx ca. 8 mm, pubescent with gland-tipped and non-glandular trichomes; posterior lobe narrowly elliptic to oblong-lanceolate, ca. 8 × 1.5–1.7 mm, 3-veined; lateral lobes lanceolate, ca. 6.5 mm; anterior lobes connate at base for 17%–25% of their length, distinct segments oblanceolate to linear and 6–6.5 mm. Corolla pinkish, 0.8–1.5 cm, outside pubescent; lower lip 2.5–4 mm, lobes ca. 1 × 0.7–1 mm. Capsule 4.5–5 mm, distally pubescent. Seeds subcircular in outline, 0.8–1.2 mm in diam. Fl. Nov–Mar, fr. Jan–May. 2n = 20.

Thickets, roadsides, streamsides. Hainan, Yunnan [Bangladesh, Laos, Malaysia, Myanmar, N Thailand].

2. *Lepidagathis formosensis* C. B. Clarke ex Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 213. 1911.

台湾鳞花草 tai wan lin hua cao

Herbs to 45(–90) cm tall, suffruticose, erect, isophyllous to conspicuously anisophyllous. Stems 4-angled and sulcate, glabrous or slightly pubescent. Petiole 0.5–2 cm; leaf blade ovate to narrowly elliptic to broadly elliptic to obovate, 2.5–14.5 × (0.8–)1–6 cm, 2–3.8(–5.6) × as long as wide, abaxially sparsely pubescent along veins, adaxially glabrous, secondary veins 4–7 on each side of midvein, base long attenuate and decurrent onto petiole, margin entire to sinuate, apex acuminate. Spikes elongate, 1–5 cm, secund; bracts ovate to lanceolate, 3.5–5 × 1–2 mm, 1(or 3)-veined, abaxially and marginally pubescent with non-glandular and sometimes gland-tipped trichomes, apex aristate; bracteoles similar to bracts or narrower. Calyx 5–6 mm, pubescent with non-glandular and sometimes gland-tipped trichomes; posterior lobe ovate to oblong-lanceolate, 5–5.9 × 1.2–1.8 mm, 3-veined; lateral lobes lanceolate to oblong-lanceolate, 4.5–5.8 × 0.7–0.9 mm; anterior lobes connate at base for 50%–60% of their length, distinct segments lanceolate-subulate and 2.5–3 mm. Corolla white with purple markings on limb, 6.5–9 mm, outside pubescent; lower lip 2.3–3.1 mm, lobes 1–2 × 1–2 mm. Capsule 5–7 mm, distally pubescent. Seeds subcircular to broadly ovate in outline, 1.3–1.8 mm in diam. Fl. Sep–May, fr. Jan–Apr.

• Secondary evergreen broad-leaved forests, along streams, ditches, slopes; 100–2300 m. Guangdong, Taiwan.

Lepidagathis formosensis is similar to *L. incurva*, if it is indeed distinct. On most plants from Taiwan the bracts and calyx are pubescent with only non-glandular trichomes. On some, however (e.g., *B. Bartholomew* & *D. E. Boufford 6193* at CAS), conspicuous gland-tipped trichomes are present on these structures. In other respects, such plants agree with non-glandular specimens of *L. formosensis*.

3. *Lepidagathis hainanensis* H. S. Lo, Fl. Hainan. 3: 598. 1974.

海南鳞花草 hai nan lin hua cao

Herbs to 30 cm tall, erect, anisophyllous. Stems 4-angled, subglabrous to slightly pubescent. Petiole (0–)0.5–1.5 cm; leaf blade ovate to elliptic, 1–12 × 0.5–3.5 cm, 1.8–3.5 × as long as wide, abaxial surface sparsely and inconspicuously puberulent especially along midvein, adaxial surface glabrous, secondary veins 4–6 on each side of midvein, base narrowly cuneate and decurrent onto petiole, margin entire to irregularly subsinuate, apex obtuse to rounded to acute. Spikes elongate, 2–6 cm, secund; bracts narrowly lanceolate, 8–10 × 1–1.5 mm, abaxially and marginally pubescent with gland-tipped and non-glandular trichomes, 3(or 5)-veined, apex aristate; bracteoles similar to bracts. Calyx 0.9–1.2 cm, pubescent with gland-tipped and non-glandular trichomes; posterior lobe lanceolate, 8.5–11 × 1.5–2 mm, 5-veined; lateral lobes lanceolate-subulate, ca. 7 × 1 mm; anterior lobes connate at base for ca. 10% of their length, distinct segments narrowly lanceolate and 9–10 mm. Corolla white, 9–10 mm, outside pubescent; lower lip not seen. Capsule 6–6.5 mm, pubescent throughout. Seeds not seen. Fl. Feb–Apr, fr. Feb–Apr.

• Forests. Guangxi, Hainan.

4. *Lepidagathis inaequalis* C. B. Clarke ex Elmer, Leaflet

Philipp. Bot. 5: 1695. 1913.

卵叶鳞花草 luan ye lin hua cao

Herbs 10–20 cm tall, decumbent, not conspicuously woody, isophyllous. Stems 4-angled, sulcate, glabrous or 2-fariously pubescent. Petiole 3–15 mm; leaf blade broadly ovate to subcircular, 1–4(–6) × 0.65–2.5(–3) cm, 1.6–2 × as long as wide, sparsely pubescent especially along midvein, secondary veins 3–5 on each side of midvein, base abruptly rounded to truncate and decurrent onto petiole, margin entire or shallowly sinuate, apex acute to acuminate. Spikes elongate, 1.2–2 cm, secund; bracts lanceolate, 3–5 × 1–1.4 mm, abaxially and marginally pubescent with gland-tipped trichomes (glands sometimes restricted to distal portion of margin), 1(or 3)-veined, apex aristate; bracteoles similar to bracts or smaller. Calyx ca. 6 mm, pubescent with gland-tipped and non-glandular trichomes; posterior lobe oblong-lanceolate, ca. 6.2 × 1.1 mm, 3-veined; lateral lobes lanceolate, ca. 5.8 × 0.7 mm; anterior lobes connate at base for ca. 50% of their length, distinct segments lanceolate and ca. 3.2 mm. Corolla white, ca. 8 mm, outside pubescent; lower lip ca. 3 mm, lobes ca. 2 × 2 mm. Capsule ca. 5 mm, distally pubescent. Seeds not seen. Fl. and fr. Sep.

Evergreen broad-leaved forests, shaded roadsides; below 100 m. Taiwan [Japan, Philippines].

Corollas of *Lepidagathis inaequalis* have been reported as 4–5 mm and glabrous outside (e.g., C. F. Hsieh & T. C. Huang, Fl. Taiwan, ed. 2, 4: 671. 1998). Those of *Kao 704* (CAS) are ca. 8 mm and pubescent outside.

Lepidagathis inaequalis is similar to *L. formosensis*, if they are indeed distinct. Some plants from Taiwan with glandular bracts and calyces (e.g., *Hsieh 787* at CAS) appear somewhat intermediate between them in leaf shape. Plants treated as *L. inaequalis* have glandular bracts and calyces, decumbent stems, and usually smaller leaf blades that are broadly ovate to subcircular and abruptly constricted basally (truncate to rounded). In *L. formosensis*, bracts and calyces are often non-glandular, stems are erect, and leaf blades are usually larger, ovate to elliptic to obovate, and gradually attenuate-tapered at the base. Among the limited specimens studied, those of *L. inaequalis* are isophyllous, whereas most of those of *L. formosensis* are anisophyllous.

5. *Lepidagathis incurva* Buchanan-Hamilton ex D. Don, Prodr. Fl. Nepal. 119. 1825.

鳞花草 lin hua cao

Lepidagathis hyalina Nees.

Herbs 30–100 cm tall, base often conspicuously woody, often ± anisophyllous. Stems 4-angled, sulcate, pubescent or soon glabrescent. Petiole 0.5–3.5 cm; leaf blade ovate to elliptic to narrowly elliptic, 2.5–11 × 1–4.5 cm, 1.7–4.5 × as long as wide, both surfaces pubescent but soon glabrescent with few trichomes or sparsely pubescent along veins, secondary veins (4–)7–9 on each side of midvein, base cuneate and conspicuously decurrent onto petiole, margin entire and slightly sinuate, apex acute to shortly acuminate. Spikes elongate, (0.5–)1–3.8 cm, secund; bracts oblong-lanceolate, 6–10 × 1.5–2 mm, abaxially and marginally pubescent with gland-tipped (sometimes absent) and non-glandular trichomes, 1-veined, apex long acu-

minate; bracteoles similar to bracts except usually smaller. Calyx 8–10 mm, pubescent with gland-tipped (sometimes absent) and non-glandular trichomes or glabrescent; posterior lobe oblong-lanceolate, 8–9 × 1.5–1.7 mm, 3-veined; lateral lobes lanceolate, 6–7.5 × 0.7–0.8 mm; anterior lobes connate at base for 30%–55% of their length, distinct segments lanceolate and 4.8–6 mm. Corolla white streaked with purple, 8–10 mm, outside sparsely pubescent; lower lip 2.5–3 mm, lobes 1.5–3 × 1.3–1.8 mm. Stamens not seen. Ovary not seen; style not seen; stigma not seen. Capsule 5–6 mm, distally pubescent. Seeds subcircular in outline, 1.5–1.8 mm in diam. Fl. and fr. Oct–Mar. $2n = 20, 44, 84$.

Grasslands, thickets, roadsides, hedgerows, streambanks; 100–2200 m. Guangdong, Guangxi, Hainan, Yunnan [Bangladesh, India, Myanmar, Thailand, Vietnam].

This species is used medicinally.

6. *Lepidagathis secunda* Nees in A. Candolle, Prodr. 11: 259. 1847.

小琉球鳞花草 xiao liu qiu lin hua cao

Ruellia secunda Blanco, Fl. Filip. 495. 1837, not Vahl (1794).

Herbs to 30 cm tall, erect or spreading. Stems 4-angled, subglabrous. Leaves sessile to subsessile; leaf blade ovate to ovate-lanceolate, 1.5–2 × 0.7–1 cm, both surfaces pubescent, base truncate to subcordate, margin entire, apex acute to shortly acuminate. Spikes globose to ovoid, to 1 cm; bracts oblong-lanceolate. Corolla to 6 mm, outside pubescent. Stamens included in corolla tube; thecae ca. 1 mm, pilose at tip. Ovary oblong; style sparingly hirsute. Capsule ca. 4 mm. Seeds subcircular in outline.

Taiwan [Philippines].

No specimens of *Lepidagathis secunda* have been seen, and published descriptions are inadequate to evaluate the status of either this species or its occurrence in Taiwan. Information above is based entirely on that provided by C. F. Hsieh and T. C. Huang (Fl. Taiwan, ed. 2, 4: 673. 1998).

7. *Lepidagathis stenophylla* C. B. Clarke ex Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 214. 1911.

柳叶鳞花草 liu ye lin hua cao

Herbs to 40 cm tall, suffrutescent, often ± anisophyllous. Stems 4-angled to 4-angled and sulcate, subglabrous or evenly to ± bifariously pubescent. Petiole (1–)5–12 mm; leaf blade linear to linear-lanceolate, 3.5–11 × 0.3–1.9 cm, (4.6–)6.5–16 × as long as wide, both surfaces subglabrous or pubescent, secondary veins 4 or 5 on each side of midvein, base narrowed and decurrent onto petiole, margin shallowly sinuate, apex acute to acuminate. Spikes elongate, 1.3–3.8 cm, secund; bracts lanceolate to lanceolate-ovate, ca. 5 × 1–1.5 mm, abaxially and marginally pubescent with non-glandular trichomes, 1-veined, apex aristate; bracteoles similar to bracts except usually smaller and narrower. Calyx 5.5–8.2 mm, pubescent with non-glandular trichomes; posterior lobe ovate to oblong-lanceolate, 5–7.5 × 1.1–1.3 mm, 3-veined; lateral lobes lanceolate, 4.5–5.7 × 0.7–

0.8 mm; anterior lobes connate at base for 20%–55% of their length, distinct segments narrowly lanceolate and 3–6 mm. Corolla white, ca. 5 mm, outside pubescent; lower lip 2–2.3 mm, lobes 1.5–1.6 × 0.6–0.8 mm. Capsule 4.5–5.5 mm, pubescent ± throughout or only distally. Seeds subcircular in outline, 1–1.8 mm in diam. Fl. and fr. Dec.

- Forest trails; 200–400 m. Hong Kong, Taiwan.

Fl. China 19: 469–472. 2011.