

## LIMNOPHILA (SCROPHULARIACEAE) IN CHINA

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*Limnophila* of the Scrophulariaceae is a tropical genus of the Old World. Of the 40 species of the genus, about 10 are found in China, all in the southern part of the country.

Species of the genus are mostly marsh or water plants. They are aromatic and have translucent dots in the leaves. The plants are usually very variable in their habit and foliage. The type of variation depends upon the environmental conditions of the habitat.

This revision of the Chinese species is based on the collections in the following herbaria:

- A Arnold Arboretum
- GH Gray Herbarium
- LA University of California at Los Angeles
- MO Missouri Botanical Garden
- NY New York Botanical Garden
- PH Philadelphia Academy of Science
- TAI National Taiwan University
- UC University of California
- US United States National Herbarium

The generosity of the curators of these herbaria in loaning specimens for study is gratefully acknowledged.

### *Limnophila* R. Brown

*Ambulia* Lam., Encyc. Meth. Bot. 1: 128. 1783. Type species:

*A. aromatica* Lam., the only original species.

*Limnophila* R. Brown, Prodr. Fl. Nov. Holl. 442. 1810. Type species:

*L. gratiolooides* R. Brown, the only original species.

This name has been made a *nomen conservandum*.

### Key to the Chinese Species

- A. Leaves all alike, all opposite, rarely 3-4 whorled, entire or simply dentate
- B. Flowers sessile or subsessile, in axillary or terminal spikes or heads, these sessile or pedunculate.

- C. Flowers in axillary pedunculate heads; leaves large, reticulate, not clasping, about 5.5 cm. long and 2.5 cm. wide, the veins pinnate.... 1. *L. rugosa*
- CC. Flowers in sessile or pedunculate, terminal and axillary spikes; leaves small, sessile, clasping, to 3.5 cm. long and 1.5 cm. wide, the veins longitudinal.....2. *L. connata*
- BB. Flowers more or less distinctly long pedicillate, solitary and axillary or in racemes.
- C. Flowers in axillary or terminal, many flowered racemes, rarely solitary; leaves all opposite or rarely 3-4-nately whorled.
- D. Plant hirsute; pedicels and calyx hirsute; capsules oblong, acute ..... 3. *L. chinensis*
- DD. Plant glabrous; pedicels and calyx glabrate; capsules oblong-orbicular .....4. *L. aromatica*
- CC. Flowers solitary, axillary; leaves all opposite.
- D. Plant glabrous; pedicels and calyx glabrous .....5. *L. chevalieri*
- DD. Plant hirsute; pedicels and calyx hirsute.....6. *L. erecta*
- AA. Leaves with the lower ones in whorls of 3-6, lobulate or pinnatisect, the upper ones whorled or opposite, entire or crenulate to serrulate.
- B. Flowers sessile or subsessile.
- C. Stems hirsute, calyx-lobes ovate, long-acuminate.... 7. *L. sessiliflora*
- CC. Stems glabrous; calyx-lobes shortly acuminate.....8. *L. heterophylla*
- BB. Flowers distinctly pedicillate, the pedicels longer than the calyx .....9. *L. indica*
- Uncertain species.....10. *L. cavalerieri*

### 1. *Limnophila rugosa* (Roth) Merrill

*Limnophila rugosa* Merrill, Interpr. Rumph. Herb. Ambion. 466. 1917, in Lingnan Sci. Jour. 6: 286. 1938; Mori in Masamune, Short Fl. Formos. 191. 1936; Li in Quart. Journ. Taiwan Mus. 3: 61. 1950.

*Herpestris rugosa* Roth, Nov. Spec. 290. 1821.

*Limnophila roxburghii* G. Don, Gen. Syst. 4: 543. 1838; Hook. f., Fl. Brit. Ind. 4: 265. 1864; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26: 186. 1890; Matsum. & Hay. in Journ. Coll. Sci. Imp. Univ. Tokyo 22: 276. 1936; Hay., Gen. Ind. Fl. Formos. 52. 1916; Nemoto, Fl. Jap. Suppl. 660. 1936.

*Stemodia menthastrum* Benth. in Wall. List No. 3930. 1831, *nomen nudum*, in Bot. Reg. 17, sub. t. 1470, 1832.

*Limnophila menthastrum* Benth. in DC. Prodr. 10: 386. 1846; Maxim, in Mel. Biol. 9: 406, 1875.

India to southern China, Mayaysia, and Polynesia, in water or swampy places. Flowers white-pruple. Flowering in August and September.

Kwangtung: White Cloud Mountain. *F. A. McClure 13029* (UC); Ying-tak, *W. T. Tsang & K. C. Wong 14193* (UC), *14805* (UC); Ta-pu District, Uung-koo Shan, *W. T. Tsang 21633* (CH, NY).

Hainan: Hainan, *C. Wang 34413* (NY); Lam-ko District. Lin Fa Shan, *W. T. Tsang 15900* (NY, UC, US); Taam-chau District, Sha Po Shan, *W. T. Tsang 16091* (NY, UC, US).

Taiwan: Dendangai, *E. Matuda 1624* (TAI); Mukaiyan, Rinryu, *Kudo & Sasaki 15689* (TAI); Taihokusyuu, Sitiseigun, *Suzuki-Tokio 20573* (TAI).

### 2. *Limnophila connata* (Hamilton) Handel-Mazzetti

*Limnophila connata* Hand.-Maz., *Symb. Sin.* 7: 837. 1936; Pennell in *Monogr. Acad. Nat. Sci. Phila.* 5: 26. 1943.

*Cybbanthera connata* Ham. in Don, *Prodr. Fl. Nepal.* 87. 1825.

*Stemodia hypericifolia* Benth., *Scroph. Ind.* 23. 1835.

*Limnophila hypericifolia* Benth. in DC. *Prodr.* 10: 386. 1846; Hook. f., *Fl. Brit. Ind.* 4: 269. 1884; Hance in *Journ. Bot.* 21: 324. 1883; Forbes & Hemsl. in *Journ. Linn. Soc. Bot.* 26: 186. 1890; Diels in *Bot. Jahrb.* 29: 567. 1900.

Wet places, in India and southern China. Flowers purplish. Flowering from May to October.

Hupei: No precise locality, *A. Henry 2354* (US).

Kiangsi: Lung-nan District, *S. K. Lau 4527* (GH, US).

Yunnan: No precise localities, *Delavay* s.n. (PH, US); *E. E. Maire 1198* (UC), *G. Forrest 25143* (NY); Szemao, *A. Henry 10147* (PH), *10147A* (NY, US); Yunpk, *S. Ten 182* (UC); Shweli-Salween divide, *G. Forrest 25145* (US).

Kwangtung: Ying Tak, *Canton Chrit. Coll.* 14808 (UC).

### 3. *Limnophila chinensis* (Osbeck) Merrill

*Limnophila chinensis* Merrill in *Amer. Journ. Bot.* 3: 581. 1916, in *Trans. Amer. Philos. Soc. II.* 24(2): 350. 1935; Merrill & Chun in *Sunyatsenia* 2: 320. 1935.

*Columnnea ? chinensis* Osb., *Dagbok Ostind. Resa* 230. 1757.

*Stemodia hirsuta* Heyne in Wall. *List No.* 3930. 1831, *nomen nudum*; Benth., *Scroph. Ind.* 24. 1835.

*Limnophila hirsuta* Benth. in DC. *Prodr.* 10: 388. 1846, *Fl. Hongk.* 248. 1861; Hook. f., *Fl. Brit. Ind.* 4: 268. 1884; Maxim. in *Mel. Biol.* 9: 406. 1875; Forbes & Hemsl. in *Journ. Linn. Soc. Bot.* 26: 186. 1890; Bonati in *Lecomte, Fl. Gen. Indo-chine* 4: 378. 1927.

Water edges and swampy places, from India to southern China southward to Malaysia and the Philippines. Flowers purplish. Flowering in October.

Yunnan: Szemao, *A. Henry* 12569 (PH, NY); Fo-hai, *C. W. Wang* 73888 (A); Che-li District, *C. W. Wang* 78252 (A), 79867 (A); Jenn-yeh District, *C. W. Wang* 80366 (A).

Kwangsi: South of Nanning, Shih Wan Tai Shan, *R. C. Ching* 8489 (NY); Sun-to District, *W. T. Tsang* 22944 (GH).

Hainan: Hainan. *C. Wang* 34718 (NY); Chang-kiang District, *S. K. Lau* 1819 (NY); Yai-chow, *F. C. How* 70430 (NY).

#### 4. *Limnophila aromatica* (Lamarck) Merrill

*Limnophila aromatica* Merrill, Interpr. Rumph. Herb. Ambion. 466. 1917, in Ling-Nan Sci. Jour. 5: 165. 1927, in Trans. Amer. Philos. Soc. II. 24(2): 349. 1935; Hand.-Maz., Symb. Sin. 7: 836. 1936; Mori in Masumune, Short Fl. Formos. 191. 1936; Li in Quart. Journ. Taiwan Mus. 3: 60. 1950.

*Ambulia aromatica* Lam., Ency. Meth. Bot. 1: 128. 1783.

*Antirrhnum aquatica* Lour., Fl. Cochinch. 1: 384. 1790.

*Limnophila gratissima* Blume, Bijdr. 750. 1826; Hook. f., Fl. Brit. Ind. 4: 268. 1884; Forbes & Hemsl. in Jour. Linn. Soc. Bot. 26: 185. 1890; Matsum. & Hay. in Journ. Coll. Sci. Imp. Univ. Tokyo 22: 276. 1906 (Enum. Pl. Formos.); Hay., Gen. Ind. Fl. Formos. 52. 1916; Nemoto. Fl. Jap. Suppl. 659. 1936.

*Limnophila punctata* Blume, Bijdr. 759. 1826; Benth. in DC. Prodr. 10: 388. 1846; Fl. Hongk. 248. 1861; Hook. f., Fl. Brit. Ind. 4: 268. 1884; Maxim. in Mel. Biol. 9: 406. 1875

Marshes and moist places, from India, southern China, Japan, and Malaysia to northern Australia. Flowers purplish blue. Flowering in September and October.

Yunnan: Jenn-yeh District, *C. W. Wang* 78996 (A); Che-li District, *C. W. Wang* 79864 (A).

Kwangtung: Hongkong, *Otto Kuntze* 3452 (NY), *S. Ford* s. n. (PH, MO, NY); Canton and vicinity, *C. O. Levine* 1846 (MO, US); Ying Tak, *W. T. Tsang* & *K. C. Wong* 79864 (UC).

Hainan: Hainan, *H. Y. Liang* 64667 (NY), 66303 (NY), 66393 (NY), 66397 (NY); Yaichow, *H. Y. Liang* 62920 (PH, NY); *F. C. How* & *N. K. Chun* 70004 (NY); Ching-mei District, *C. I. Lei* 983 (NY).

Fukien: Foochow, *F. P. Metcalf* & *S. G. Tang* 5077 (MO, UC), *Tang Chung Chang* & *Ma Shan En* 2923 (UC).

Taiwan: Taihoku, *S. Suzuki* 3179 (TAI), 7784 (TAI), *A. Y. Nakamura* 4065 (TAI); Taihoku, Hokuto, *Nobuo Murakami* 181 (TAI); *Suzuki-Tokio* 20574 (TAI),

21436 (TAI), *Sasaki s.n.*; Sintikusyn, Toyen, *Suzuki-Tokio* 5825 (TAI); Kosyun, *Suzuki-Tokio* 6171 (TAI).

#### 5. *Limnophila chevalieri* Bonati

*Limnophila chevalieri* Bonati in Lecomte, Fl. Gen. Indo-chine 4: 376. f. 42, 43. 1927; Merrill in Lingnan Sci. Journ. 9: 43. 1930.

Stream sides, Indo-China and Hainan. Flowers bluish. Flowering in April.

Hainan: Taam-chau District, Lin Fa Mountain, *W. T. Tsang* 16786 (GH, NY, UC, US).

#### 6. *Limnophila erecta* Benth

*Limnophila erecta* Benth. in DC. Prodr. 10: 388. 1846; Hook. f., Fl. Brit. Ind. 4: 267. 1884; Maxim. in Mel. Biol. 9: 406. 1875; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26: 185. 1890.

*Stemodia gratioloides* Benth., Scroph. Ind. 25. 1835.

Eastern India, Burma and Southern China.

The species was recorded from Kwangtung, but I have seen no specimen. It appears to be very close to *L. chevalieri* Bonati.

#### 7. *Limnophila sessiliflora* (Vahl) Blume

*Limnophila sessiliflora* Blume, Bidjr. 750. 1826; Benth. in DC. Prodr. 10: 389. 1846; Hook. f., Fl. Brit. Ind. 4: 270. 1884; Maxim. in Mél. Biol. 9: 407. 1875; Franch., Pl. David. 2: 223. 1888; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26: 186. 1890; Diels in Bot. Jahrb. 29: 567. 1900; Hand.-Maz., Symb. Sin. 7: 837. 1936.

*Hottonia sessiliflora* Vahl, Symb. 2: 36. 1791.

Rice fields, swamps and ponds, from India, Ceylon, and Malaysia to Southern China and Japan. Flowers bluish to purplish. Flowering in September.

Kiangsi: Kien-nan District, *S. K. Lau* 4256 (PH, GH).

Hupeh: No precise locality, *A. Henry* 4302 (US); Wuchang, *H. H. Chung* 9150 (NY), 9160 (NY).

Kweichow: Suicheng, *Y. Tsiang* 9441 (NY).

Yunnan: No precise locality. *E. E. Maire* 620 (LA); Fo-hai, *C. W. Wang* 74866 (A); Che-li District, *C. W. Wang* 78255 (A); Jenn-yeh District, *C. W. Wang* 80390 (A), 81246 (A); Luh-shuen District, *C. W. Wang* 80892 (A), 80916 (A, TAI).

#### 8. *Limnophila heterophylla* Benth.

*Limnophila heterophylla* Benth., Scroph. Ind. 25. 1835, in DC. Prodr. 10: 390.

1846; Hook. f., Fl. Brit. Ind. 4: 270. 1884; Hance in Journ. Bot. 16: 231. 1878; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26: 186. 1890.

Stream sides, India to Malaysia, Southern China and Japan, Flowering in July.

Kwangtung: Ying Tak, *Canton Christ. Coll.* 14932 (UC); Yeung-chun, *C. Wang* 2017 (TAI), 2018 (TAI); Canton, *T. Hosokawa* 10344 (TAI).

Fukien: Foochow, *Tang Chung Chan & Ma Shan En* 2918 (UC); Dionglloh, *Chen Ping En* 2565 (UC).

About this species, Hooker (l.c.) said: "The much larger size, glabrous stem, abundant multifid leaves, frequent presence of upper opposite and alternate small entire floral leaves, and the shortly scuminate calyx-lobes distinguish this from *L. sessiliflora*, but there are a good many specimens which in a dried state may be referred to either".

### 9. *Limnophila indica* Druce

*Limnophila indica* Druce in Bot. Exch. Club Brit. Isles Rep. 3: 420. 1914; Merrill, in Philipp. Journ. Sci. 9: 140. 1914; Yamamoto in Journ. Soc. Trop. Agr. 4: 560. 1934; Nemoto, Fl. Jap. Suppl. 660. 1936; Mori, in Masamune, Short Fl. Formos. 1936; Li in Quart. Journ. Taiwan Mus. 3: 61. 1950.

*Hottonia indica* L., Syst. ed. 10. 909. 1759.

*Limnophila gratioloides* R. Brown, Prodr. Fl. Nov. Holl. 442. 1810; Forbes & Hemsl. in Journ. Soc. Linn. Bot. 26: 186. 1890.

*Ambutia stipitata* Hay., Ic. Pl. Formos. 9: 76. 1920.

"*Limnophila sessiliflora*" sensu Formbes & Hemsl. in Journ. Linn. Soc. Bot. 26: 186. 1890; Henry, List Pl. Formos. 67. 1896; Matsum. & Hay., in Journ. Coll. Sci. Imp. Univ. Tokyo 22: 277. 1906 (Enum. Pl. Formos.): Sasaki, List Pl. Formos. 367. 1928; Makino & Nemoto, Fl. Jap. ed. 2. 1060. 1931; *non* Blume.

India, Hainan, Southern China, to Malaysia and tropical Africa.

Taiwan: Sintiku-syu, Toyen, *Suzuki-Tokio* 21418 (TAI); Takaraduka-Syokubutuen, *Isikawa-Einosuke s.n.* (TAI).

This species is similar to *L. sessiliflora* (Vahl) Blume. Before Yamamoto many authors referred the Taiwan plant to this species. It differs from *L. sessiliflora* (Vahl) Blume, which occurs from India to the mainland of Southern China and Japan, in that it possesses flowers which are pedicillate.

### 10. *Limnophila cavalierieri* Vaniot

*Limnophila cavalierieri* Vaniot in Bull. Int. Acad. Geogr. Bot. 15: 85. 1905.

Kweichow. No specimen seen. Without access to type material, I have been unable to determine the status of this species.

## 中國之菊藻屬(參玄科)——摘要

李惠林

菊藻 (Limnophila) 主產東半球之熱帶。中國約有十種，占全屬四分之一，分佈於南方各省生水中或沼澤地帶。各種形態，每因環境之影響而發生變異。本文訂正中國各種之分類及分佈。