

## THE PRIMULACEAE OF TAIWAN<sup>(1)</sup>

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This is a study of the Primulaceae of Taiwan. A. Henry (1896:57) listed eight species in three genera. Matsumura and Hayata (1906:220-223) listed ten species in three genera, Hayata (1916:43) listed twelve species in five genera. Sasaki (1928:326-327) listed seven cultivated species in two genera and twelve wild species in five genera. Masamune (1936:163-164) listed seven cultivated species in two genera and fifteen wild species in five genera, finally Masamune (1954:92-93) reported fifteen species in five genera.

In the present paper we recognize thirteen species in five genera. The present work is based on the specimens deposited in the Herbarium of the Department of Botany, National Taiwan University (TAI) and the Herbarium of Taiwan Forest Research Institute (TAIF). A few species which are not represented by specimens in these herbaria, and not described in the present paper, are listed at the end of the paper. An analytical key to the genera and a key to the species as well as short descriptions for the genera and the species are given.

One new species is described, this was first collected by S. Suzuki in July 1929 on Mt. Taiping (Taiheizan) in Ilan Co. The specimen which he designated as TYPE is his collection No. 132. Suzuki suggested the name *Lysimachia taiwaniana* for this species but so far as we know he never published it. This species has been found in the mountains of four of the northern counties of Taiwan.

The authors wish to especially thank Mr. Chin-tsu Chen for making the drawings of all the species included in this paper.

**Primulaceae** Ventenat, Tabl. II, 285, 1799.

Annual, biennial and perennial herbs; stems creeping or erect; leaves radical or cauline, simple, alternate, opposite, or verticillate, rarely pinnately lobed, exstipulate; flowers in racemes, axillary, or superposed verticils, bisexual, usually actinomorphic; calyx persistent 4 to 9, usually 5-lobed; corolla rotate, salverform or infundibuliform, sometimes subcampanulate, imbricate in bud, the limb 4 to 9-lobed; stamens as many as the corolla-lobes and opposite them, inserted on the tube, staminodia alternate with the stamens, rarely present; ovary superior, glabrous or pubescent, 1-locular; ovules many, the placentation free-central; seeds small, many, the endosperm copious.

30 genera, with about 800 species mainly distributed in the North Hemisphere, a few in the Tropics and the South Hemisphere; 5 genera and 13 species in Taiwan.

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## Key to the Genera

1. Plants scapose; leaves all basal ..... 2
1. Plants with leafy aerial stems ..... 3
2. Flowers large; the corolla-tube longer than the calyx ..... 4. *Primula*
2. Flowers small; the corolla-tube shorter than the calyx ..... 2. *Androsace*
3. Basal leaves petiolate, cauline leaves sessile ..... 5. *Stimpsonia*
3. Leaves all alike ..... 4
4. Capsule circumscissile ..... 1. *Anagalis*
4. Capsule longitudinally dehiscent or indehiscent ..... 3. *Lysimachia*

1. *Anagalis* Linn. Sp. Pl. ed. 1, 148, 1753.

Annual or perennial herbs; stems erect or creeping, glabrous; leaves cauline, opposite, ternate, or sometimes all or the upper ones alternate, sessile or short petiolate, margins entire; flowers small, bisexual, axillary, pedicellate, bluish-purple to red; calyx 5-parted, the segments lanceolate or broadly linear spreading; corolla 5-parted, rotate, the lobes contorted; stamens inserted at the base of corolla lobes, the filaments filiform or subulate, hairy, the anthers obtuse; ovary glabrous; style filiform; capsules globose, dehiscence circumscissile; seeds small.

About 85 species, in Europe, Africa, Asia and temperate south America; one in Taiwan.

*Anagalis arvensis* Linn.

## Plate 1

Linnaeus Sp. Pl. ed. 1, 148, 1753; Masamune, List Vasc. Pl. Taiwan 93, 1954.

*A. femina* Miller Gard. Dict. ed. 8, no 2, 1768.

*A. coerulea* Schreber, Spicil. Fl. Lips. 5, 1771.

Annual or biennial, glabrous, whitish or glaucous herbs; stem 4-angled, many branched, prostrate at base 10-30 cm. long; leaves opposite, sessile, ovate, 10-25 mm long, 5-15 mm. wide, spreading, margins entire, acute to subobtusate at apex, rounded at base; flowers axillary, the pedicels 2-3 cm. long, calyx-segment linear-lanceolate, long-acuminate, 4-6 mm. long; corolla bluish-purple to reddish, the lobes obovate-orbicular, serrate at apex, often ciliolate; capsules globose, dehiscence circumscissile; seeds small, dark brown.

Distributed in Japan, Ryukyus, Taiwan and temperate and tropical regions.

## Specimens examined:

Taipei Co., Taipei, S. Sasaki, s. n. III. 1917; H. Lin, s. n. III. 25, 1947; Tseng & Kao s. n. IV. 25, 1968; Tanshui, T. C. Huang, 2278; S. Sasaki, s. n. III. 20, 1924; H. Shimada, 1180, 1181; Hu-kue-chieu, S. Suzuki, 4761; Ho-pin-tau, S. Suzuki, 4862; Pei-tou, T. Nakamura, 4292; Yang-min-shan, S. Sasaki, s. n. II. 2, 1929; Su-lin, T. Tanaka, 13520; Yeh-liu, C. C. Chuang, 2096; Chin-shan, M. T. Kao, 3958; Tzu-shan-yen, T. Nonaka & K. Mori, s. n. IV. 2, 1933; Mt. Ta-tung, S. Suzuki, 10179.

Hsinchu Co., Hsin-chu, E. Matuda, 1459.

Yunlin Co., Hu-wei, M. Ashiri, 181; Y. Yamamoto, 1098.

Tainan Co., Chia-li, *H. Morimoto*.

Penghu Co., Penghu, *Y. Kudo & K. Mori, 3095*.

Ilan Co., *G. Masamune & S. Suzuki, s. n. VII. 3, 1932*.



Plate 1. *Anagallis arvensis* Linn.

2. *Androsace* Linn., Sp. P. ed. 1, 141, 1753.

Annual or perennial herbs; short stems or stems with many branches; densely leafy, pubescent; flowers solitary or more commonly umbellate on scapes, small, white or pink; calyx 5-parted, persistent, the lobes erect, incurved or spreading in fruit; corolla salver-form or funnel-shaped, the tube shorter than the calyx, constricted on the throat, the limb 5-lobed; stamens 5, included, the filaments very short, the anthers acute; style usually short; ovules few to many; capsules globose or ovoid, dehiscent, 5-valved; seeds dorsally flattened.

100 species, in Eurasia and North America, one species in Taiwan.

*Androsace umbellata* (Lour.) Merrill

Plate 2

Merrill in Philip. Journ. Sci. XV, 237, 1919; Masamune, List Vasc. Pl. Taiwan 92, 1954.



Plate 2. *Androsace umbellata* (Lour.) Merr.

*D. umbellata* Loureiro, Fl. Cochinch. 186, 1790.

*A. saxifragaeifolia* Bunge, in Mem. Sav. Etr. Acad. Sci. St. Pet. II. 127, 1833.

*A. patens* Wright ex A. Gray, Bot. Jap. 401, 1859.

Annual or biennial herbs; leaves radical, pubescent on both surfaces, spreading, ovate-rounded, 5–15 mm. in diameter, flat, margins deltoid-toothed, truncate or wedge-shaped at base petiolate; the petioles 1–3 cm. long; scapes 5–15 cm. long; the bracts ovate to lanceolate, 4–5 mm. long; the pedicels pubescent, spreading, slender, 2–4 cm. long; calyx spreading, 5-parted nearly to the base, the lobes ovate, 3–5 mm. long in anthesis, 4–7 mm. long in fruit, pubescent, acute; corolla white, 4–5 mm. across, 5-lobed; capsules ovoid-globose.

Distributed in Japan, Korea, Taiwan and Eastern Asia.

#### Specimens examined:

- Taipei Co., Mt. Kwang-yin, *G. Masamune*, 3471; Liu-chang-ti, *G. Masamune*, 3755; Men-ten, *T. Suzuki*, 6751; Tanshui, *Y. Shimada*, s. n. IV. 1, 1909; *S. Suzuki*, s. n. V. 15, 1928; *H. Shimada*, 1367; *S. Sasaki*, III. 24, 1924; Shiu-yen-ti, *S. Suzuki*, s. n. II. 23, 1929; I. 29, 1930; II. 17, 1929; *Y. Kudo & S. Suzuki*, s. n. IV. 17, 1929.  
Hsinchu Co., Hsin-chu, *Y. Simada*, 3977.  
Taitung Co., Mt. Tai-tung, *Y. Yamamoto*, s. n. III. 28, 1930.  
Hualien Co., Tarcko, *S. Suzuki*, 9639; 8836.  
I-lan Co., Lotung, *C. C. Chuang & T. M. Kao* 4082; I-lan *S. Suzuki*, 3610.

### 3. *Lysimachia* Linn., Sp. Pl. ed. 1, 146, 1753.

Glabrous or pubescent, sometimes glandular dotted herbs; stems erect or prostrate; leaves opposite, alternate, or verticillate, margins entire; flowers axillary or terminal, solitary or in racemes, corymbs, or panicles, white, yellow, or red, rarely bluish-purple; calyx 4 to 6-parted, usually 5-parted, calyx-lobes persistent; corolla funnel-form, salver-form, or broadly campanulate, 4 to 6-lobed, the tube often very short, the lobes contorted in bud; stamens inserted on the tube, sometimes with staminodia in an alternate whorl, the anthers obtuse; ovary globose or ovoid; style simple, filiform; capsules longitudinally dehiscent or indehiscent; seeds few to many, with thin testa.

About 110 species, in temperate and tropical regions; 9 species in Taiwan.

#### Key to species

1. Flowers in terminal racemes or compound panicles.....2
1. Flowers axillary.....4
2. Bracts elliptical.....7. *L. mauritiana*
2. Bracts acicular or filiform.....3
3. Stem angled; racemes loosely flowered; pedicels long, up to 10 mm. long.....1. *L. acroadenia*
3. Stem terete; racemes densely flowered; pedicels short, less than 3 mm. long.....5. *L. fortunei*

4. Stem erect; leaves glabrous.....5  
 4. Stem prostrate at base; leaves pubescent.....6  
 5. Stem angled; fragrant when dry, pedicels short, less than 3 cm. long.....3. *L. capillipes*  
 5. Stem terete, not fragrant when dry, pedicels long, up to 6 cm. long.....2. *L. ardisioides*  
 6. Flowers with black punctate dots.....7  
 6. Flowers without black punctate dots.....8  
 7. Leaves small, 3-10 mm. long, cordate to broadly ovate.....8. *L. nigro-punctata*  
 7. Leaves large, 2 to 6 cm. long, ovate.....9. *L. taiwaniana*  
 8. Leaves about same color on both surfaces, with pellucid dots.....6. *L. japonica*  
 8. Leaves dark green above, pale below, without pellucid dots.....4. *L. formosana*

### 1. *Lysimachia acroadenia* Maxim.

Plate 3

Maxim. in Bull. Acad. Sci. St. -Pét. VII, 70, 1867; Ohwi, Fl. Jap. 718, 1965.

*L. keiskeana* Miq. Am. Mus. Lugd. -Bat. III, 120, 1867.

*L. decurrens* Forst.: Matsum. B. M. T. XIV, 71, 1900.

*L. decurrens* var. *acroadenia* Makino, Ill. Fl. Nippon 230, 1940.

Perennial herbs; with short stolons; stem erect 15-30 cm. high, sparsely branched in upper part, angled, with minutely glandular-hairs; leaves petiolate, elliptical, lanceolate to narrowly ovate, 5-10 cm. long, 1-3 cm. wide, acuminate at apex, attenuate or acuminate at base, entire, green, paler and with minute dark brown spots beneath; racemes terminal to 30 cm. long, loosely many flowered, the bracts acicular, filiform, the pedicels 1-1.5 cm. long; flowers white to pinkish, 5-6 mm. long; calyx cleft almost to base, segments lanceolate, acuminate; corolla lobes suberect, apex rounded; capsules globose, pistil persistent.

Distributed in Japan, Korea, Ryukyus, and Taiwan.

#### Specimens examined:

Taipei Co., Tzu-shan-yen, T. Nonaka & K. Mori, s. n. IV. 27, 1933; Hsin-ten, Y. Kudo et al., 249; Y. Yamamoto, s. n. IV. 29, 1929; Keelung, G. Masamune, s. n. I. 16, 1930; Simada & Odashima, s. n. V. 17, 1932; S. Sasaki, s. n. I. 19, 1912; Taipei, T. Yoshida, s. n. II. 23, 1942; Shui-yuan-ti, S. Suzuki, s. n. V. 12, 1929; Ta-li, C. C. Chuang, 2174; Mu-tzu-shan, Simada, 370.

Nantou Co., Chin-shui-ko, T. C. Huang et al., 770.

Hualien Co., Nei-taroko, E. Matuda, s. n. VIII. 8, 1918; Ching-shui, T. Shimizu & M. T. Kao 1600; Tien-hsian, C. C. Chuang & M. T. Kao, 4410.

I-lan Co., Mt. Taiping, S. Sasaki, s. n. V. 18, 1932; S. Suzuki, 3722.

### 2. *Lysimachia ardisioides* Masamune

Plate 4

Masamune, Trop. Ag. IV. 302, 1932; Masam., List Vasc. Pl. Taiwan 93, 1954.

Perennial herbs; stolons creeping; stems erect, terete, 15-50 cm. high, covered with minute glandular hairs; leaves elliptical, 4-13 cm. long, 2-4 cm. wide, acuminate at apex, cuneate at base, dark brown above, pale below, margins entire, the petioles



Plate 3. *Lysimachia acrodenia* Maxim.



Plate 4. *Lysimachia ardisioides* Masamune



5-15 mm. long; flowers axillary, peduncles 3-5 cm. long, bracts linear-lanceolate 2-4 mm. long; calyx deeply cleft, 5-lobed, the lobes ovate, acuminate, minutely glandular-ciliolate, 3 mm. long; corolla campanulate, corolla deeply 5-parted, corolla lobes ovate or lanceolate, 20 mm. long, 3-5 mm. wide acute at apex; capsules globose, ivory white, longitudinally dehiscent; seeds black.

This species is similar to *Lysimachia sikokiana*, but in this species the stems are without wings and are not fragrant when dry.

**Distributed in Taiwan.**

**Specimens examined:**

Taipei Co., Mt. Tzu-tzu, *T. Nakamura*, 759; Ruggyahu, *T. Suzuki*, 15975; Mt. Siau-kwan-in, *H. Simada*, 1198; A-yu, *M. T. Kao*, 30004; Rahao and Rimogan, *Y. Kudo*, 707; Wu-lai, *T. Soma*, s. n. V. 6, 1916; *S. Sasaki*, s. n. V. 12, 1929; s. n. IV. 25, 1918; s. n. VII. 25, 1919; *Y. Yamamoto* V. 12, 1929; *Y. Kudo*, 514; *E. Matuda*, 274; *C. C. Chuang* 2137, 2303; *T. Tanaka*, 13561; Mt. Kabo, *N. Fukuyama*, 19244; Se-ting, *H. Simada*, 1325; Kan-kou, *Lin & Shen*, IV. 24, 1933.

Hsinchu Co., Mt. Lu-chuan-ta-shan, *N. Fukuyama*, 3447; Mt. So-ten, *T. Suzuki*, 4683.

Chiayi Co., Mt. Ali, *Y. Hashioka*, s. n. VII. 1, 1933; *T. Nakamura*, 4119; Mt. Morrison, *S. Suzuki*, 13139.

Pingtung Co., Palwan, *E. Matuda*, s. n. VI. 1917; Kuaruru, *E. Matuda*, s. n. J. 1, 1917.

Taitung Co., Ta-li-li-ku, *S. Sasaki*, s. n. V. 1924; Wu-shan, *T. Hosokawa*, 5354.

Chen-kon, *Y. Yamamoto*, 2291; 1006; 1003; Mt. Ta-wu, *M. T. Kao*, 6110; Shin-suei-yin, *Y. Yamamoto*, s. n. VI. 2, 1927.

Hualien Co., Mt. Chin-shui, *T. Nakamura*, 3629; Tanshui, *T. Suzuki*, 17730; Chon-yanchian-shan, *N. Fukuyama & T. Suzuki*, 16202; Mt. Mu-kwa, *M. T. Kao*, 4182; Pian-pin, *S. Suzuki*, 1818; Taroko, *S. Sasaki*, s. n. VII. 12, 1933.

I-lan Co., Mt. Nan-hu-ta-shan, *G. Masamune*, 3086; Si-ki-kun, *S. Suzuki*, 958; Mt. Tai-ping, *S. Suzuki*, s. n. VIII. 15, 1928; Szu-yuan, *C. C. Chuang*, 2472; Mt. Bon-bon, *M. T. Kao*, 5951.

**3. *Lysimachia capillipes* Hemsl.**

**Plate 5**

Hemsl. in Journ. Linn. Soc. XXVI, p. 48, 1889; Masam., List Vasc. Pl. Taiwan 92, 1954.

*L. fragrans* Hayata Mat. Fl. Formos. p. 175, 1911.

Fragrant when dry, glabrous, perennial herbs; stolons short; stems usually tufted, 4-angled, erect, 30-60 cm. long, with many branches on the upper parts; leaves alternate, membranous, ovate-elliptical, 1-8 cm. long, 6-25 mm. wide, acute or acuminate at apex, attenuate at base, margins entire or slightly undulate; petioles 5-10 mm. long; flowers axillary, with long pedicels, 2-3 cm. long; calyx cleft nearly to base, calyx-lobes ovate to lanceolate, acuminate, 3-4 mm. long; corolla rotate, 5-lobed, the lobes acute, 4 mm. long; ovary glabrous, capsules globose, longitudinally dehiscent, green turning brownish; seeds many, brown to black.

**Distributed in Taiwan and Southern China.**

**Specimens examined:**

Taipei Co., Yin-ho-tong, *M. T. Kao*, 6273; Shui-yuan-ti, *S. Suzuki*, s. n. V. 21, 1929; Tan-corei, *T. Suzuki*, 7373.

Hsinchu Co., Nan-chuang, Y. Simada, 1509.

Taichung Co., Son-lin, S. Suzuki, s. n. X, 1930; Mt. Tugitaka, G. Masamune, 1257.

Nantou Co., Wu-she, G. Masamune et al., 2261.

Taitung Co., Kotobuki, Y. Yamamoto & K. Mori, 181; 265; Mt. Taitung, Y. Yamamoto, 1001; 1002; Chian-tung, S. Suzuki, 10844.



Plate 5. *Lysimachia capillipes* Hemsl.

Hualien Co., Lion-chian, S. Sasaki, s. n. VIII. 20, 1929; Nei-taroko, S. Sasaki, s. n. VIII. 8, 1918; E. Matuda, s. n. VIII. 8, 1918; Sakahen, S. Suzuki, 1763; Mt. Chin-suei, T. Nakamura, 3630; Su-li to Shan-fon, G. Masamune & K. Mori, s. n. VII. 3, 1938; Tairoko-ta-shan, T. Suzuki, 9293.  
I-lan Co., Si-ki-kun, S. Suzuki, 95; Nan-hu-ta-shan, S. Suzuki, s. n. VII. 20, 1937; Si-ki-kun to Piyanan, T. Hosokawa, 2417; S. Suzuki 4977.

4. *Lysimachia formosana* Honda

Plate 6

Honda B. M. T. XLIV, 668, 1930; Masamune, List Vasc. Pl. Taiwan 92, 1954.

Perennial pubescent herbs; stems ascending, decumbent at base; leaves opposite, ovate to rhomboid-ovate, 2-3 cm. long, 1-1.5 cm. wide, upper surface dark green, under



Plate 6. *Lysimachia formosana* Honda

surface pale, without pellucid dots, obtuse or acute at apex, attenuate at base, margins entire, the petioles 10 mm. long; flowers axillary, the pedicels, 5-10 mm. long, pubescent; sepals 5, lanceolate, acuminate, 7-12 mm. long, pubescent; corolla deeply 5-parted, the lobes obovate, 8 mm. long, 5-6 mm. wide, rounded at apex, margins denticulate; capsules brown, globose, pubescent, shorter than calyx, longitudinally dehiscent.

This species is very similar to *Lysimachia japonica*, but the leaves are without pellucid dots.

**Distributed in Taiwan.**

**Specimens examined:**

- Taipei Co., Seh-men, *T. I. Chuang & M. T. Kao*, 3343; Tanshui, *H. Simada*, 1188; Keelung, *S. Sasaki*, s. n. IV, 30, 1911; Fu-kuei-chao, *T. Suzuki*, 8321.  
 Taoyuan Co., Chuang-le, *T. Kawakami & Y. Simada*, s. n. III, 28, 1911.  
 Hsinchu Co., Chii-tan-mon-shan, *T. I. Chuang*, 1559; Shlan-shan, *Y. Simada*, 3993; Hsinchu, *Onuma*, 2.

**5. *Lysimachia fortunei* Maxim.**

**Plate 7**

Maxim. in Bull. Acad. st.-Pét. XII, 68, 1868; Masamune, List Vasc. Pl. Taiwan 92, 1954.

*L. barystachys* Klatt in Abh. Naturw. Ver. Hamburg IV-4, 11, t. 1, 1866.

*L. fortunei* var. *pubescens* Pampanini in Nuov. Giorn. Bot. Ital. n. s. XVIII, 132, 1912.

*L. chikungensis* Bailey in Gent. Herb. I, 40, 1920.

*L. fortunei* f. *suboppositifolia* Honda in B. M. T. LIII, 100, 1939.

Perennial herbs; stolons creeping; stems terete, with minute black spots, 30-50 cm. high, sparsely branched above; leaves alternate, elliptical, 4-7 cm. long, 1-2 cm. wide, apex acute or obtuse, entire, sessile or with short petioles; racemes terminal, densely many-flowered, 10-20 cm. long, glabrous or minutely glandular hairy, the pedicels short, 3 mm. long, the bracts acicular, 3-5 mm. long; flowers white, 5-6 mm. across; calyx-segments ovate-oblong, acute, margins minutely ciliate; corolla lobes oblong, rounded, 3-5 mm. long; capsules globose, 2-2.5 mm. in diameter.

**Distributed in Japan, Korea, Ryukyus, Mainland China, Taiwan and Indochina.**

**Specimens examined:**

- Taipei Co., Sen-zyo-zan, *T. Nakamura*, 2353; Keelung, *S. Sasaki*, s. n. IV, 1911; Kuang-yin-shan, *T. C. Huang*, 2353; *S. Miura & N. Fukuyama*, 66; Kan-kou, *Lin & Shen*, s. n. V, 27, 1933; *Y. Simada*, s. n. X, 17, 1914.  
 Taoyuan Co., Tao-yuan, *Y. Simada*, s. n. X, 17, 1914; *S. Sasaki*, s. n. X, 17, 1914; s. n. VI, 5, 1923; *S. Suzuki*, 4638.  
 Hsinchu Co., Lin-chang-li, *T. Kawakami*, 5964.  
 Nantou Co., Sun-Moon Lake, *Y. Kudo & S. Sasaki*, 15399.  
 I-lan Co., Mt. Taiping, *S. Suzuki*, s. n. VIII, 18, 1925.

**6. *Lysimachia japonica* Thunberg**

**Plate 8**

Thunberg, Fl. Jap. 83, 1784; Masamune List Vasc. Pl. Taiwan 92, 1954.

Pubescent perennial herbs; stems creeping, distal ends ascending; leaves with



Plate 7. *Lysimachia fortunei* Maxim.

pellucid dots, opposite, ovate to nearly reniform, 1-3 cm. long, 10-15 mm. wide, rounded or acute at apex, rounded or cuneate at base, the petioles 4-8 mm. long; flowers axillary, yellow, 5-7 mm. across; the pedicels 3-8 mm. long, pubescent; sepals 5, linear-lanceolate, pubescent; corolla-lobes obovate 5-7 mm. long; without black dots

on corolla lobes but with minute pellucid dots; capsules brown, globose, pubescent, shorter than calyx, longitudinally dehiscent; seeds black.

**Distributed** in Japan, Ryukyus, Mainland China, Taiwan and Malaysia.

**Specimens examined:**

Taipei Co., Taipei, Y. Yamamoto & S. Suzuki, s. n. V. 1929; Kwang-yin-shan, N. Fukuyama & S. Miura, 201; Nan-kan, G. Masamune, 2780; Shui-yuan-ti, S. Sasaki, s. n. IV. 16, 1929; s. n. IV. 16, 1929; s. n. II. 17, 1929; Tan-shui, S. Sasaki, s. n. III. 24, 1924; Keelung, T. Kawakami, s. n. V. 1916; Pi-tan, H. Shimizu, 2121; Tu-tan, T. Suzuki, 8346.

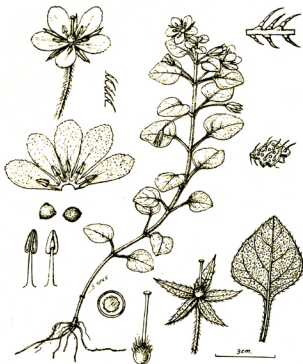


Plate 8. *Lysimachia japonica* Thunb.

7. *Lysimachia mauritiana* Lamarck

Plate 9

Lamarck, Encycl. Meth. III, 572, 1789; Masamune, List Vasc. Pl. Taiwan 93, 1954.  
*L. lineariloba* Hooker et Arnott, Bot. Beschey Voy. 268, 1841.



Plate 9. *Lysimachia mauritiana* Lam.

Biennial glabrous herbs; stolons stout, short; stems solitary, or tufted, erect, 10-40 cm. high; stout, terete, often with short branches above, covered with minutely glandular hairs, leaves slightly fleshy, sessile or subsessile, obovate or spatulate, 2-7 cm. long, 1-2 cm. wide, obtuse to acute at apex, attenuate at base, with black glands, margins entire; racemes erect, terminal, often compound-paniculate, many flowered, 4-12 cm. long, pedicels 5-25 mm. long, about as long as the leaf-like bracts; flowers white to pinkish, 10-12 mm. across; calyx-segments oblong, obtuse, minutely toothed at apex; corolla lobes narrowly obovate; capsules brown globose, 4-6 mm. in diameter, stigma persistent.

**Distributed** in Japan, Korea, Ryukyus, Mainland China, Taiwan, Pacific Islands and India.

**Specimens examined:**

- Taipei Co., Fu-kuei-chiao, *G. Masamune*, 722; *S. Suzuki*, 4760; Chin-shan, *M. T. Kao*, 3958; Keelung Island, *G. Masamune*, 97; 98; *Y. Yamamoto*, 148, 149, 150, 151; *S. Sasaki*, s. n. [V. 27, 1910, s. n. V. 20, 1924; *T. Kawakami* & *S. Sasaki* s. n. IV, 26, 1910; Ho-pin-tzu, *H. Simoda*, 1211; *G. Masamune*, 1805; Keelung, *Kawasumi* & *Sasaki*, s. n. IV, 27, 1910; *S. Sasaki*, s. n. IV, 27, 1910; *S. Sasaki*, s. n. V, 16, 1908.  
 Penghu Co., Peng-hu, *C. Tseng*, VIII, 12, 1933.  
 Taitung Co., Orchid Island, *T. Sata*, 1587, 1588; *T. Hosokawa*, 9878, 8152 *T. I. Chuang* & *C. C. Hsu*, 2281; *T. S. Liu et al.*, 205; Green Island, *T. Soma*, 1461; *Y. Kudo* & *K. Mori*, 363.  
 I-lan Co., Kuei-shan Island, *G. Masamune* & *S. Suzuki*, s. n. VII, 3, 1932.

8. *Lysimachia nigro-punctata* Masamune

Plate 10

Masamune Trop. Ag. IV, 191, 1932; Masamune, List Vasc. Pl. Taiwan 93, 1954.

Prostrate herbs; stolons rooting at nodes, 5-20 cm. long, pubescent; basal leaves, opposite, sometimes the upper ones alternate, with short petioles, about 2-4 mm. long, broadly ovate to cordate, acute at apex, cordate or rotundate at base, 3-10 mm. long, 3-7 mm. wide, pubescent on both surfaces, veinlets prominent on under surface, margins entire; flowers axillary, with short pedicels, 3-5 mm. long; sepals 5, lanceolate, acuminate at apex, about 5 mm. long, 2 mm. wide, pubescent, with black punctate dots, glabrous within, corolla segments with black-punctate dots, rotundate-obovate; stamens 5, adnate to the corolla tube, filiform about 4 mm. long; capsules brown, globose, pubescent, shorter than calyx, longitudinally dehiscent.

This species is very similar to *Lysimachia japonica*, but the calyx and corolla-segments have black punctate dots.

**Distributed** in Taiwan.

**Specimens examined:**

- Hualien Co., Higinashinoko, Nokogee, *Y. Kudo* & *K. Mori* 34, Type: (TA1) *S. Sasaki*, s. n. VIII, 23, 1929; *S. Suzuki*, 2056.

9. *Lysimachia taiwaniana* Suzuki in Sched. ex Kao sp. nov.

Plate 11

Herbae pubescentes, stoloniferae ad nodos radicans, 10-30 cm. longa, albo vel fulvo-pubescentes, pubescens 1 mm. longis. Folia opposita, ovata, 2-6 cm. longa, 1-2





Plate 10. *Lysimachia nigro-punctata* Masam.

cm. lata, apice acuta, basi obtusa vel cuneata, multicellato-pubescentes et nigro-punctatis utroque obtekti, margine integra, petiolis 10-15 mm. longis. Flores axillares, breviter pedicellata, pedicellis circa 2-4 mm. longis, sepala 5, lanceolata, longe acuminata, 7-10 mm. longa, multicellato-pubescentes, corolla 5-fida, petala nigro-punctatis, obovata circa 10 mm. longa, capsula globosa, quam calyces breviora.

Pubescent herbs; stolons creeping, rooting at the nodes, 10-30 cm. long, covered with multicellate white or brown hairs, the hairs 1 mm. long; leaves opposite, ovate, 2-6 cm. long, 1-2 cm. wide, acute at apex, obtuse or cuneate at base, covered with multicellular hairs and with black punctate dots on both surfaces, margins entire, petioles 10-15 mm. long; flowers axillary, with short pedicels 2-4 mm. long, sepals 5, lanceolate, long acuminate, 7-10 mm. long, covered with multicellate hairs; corolla 5-lobed, corolla-segments with black-punctate dots, obovate, 10 mm. long; capsules globose, shorter than calyx.

This new species has leaves and corolla segments with black-punctate dots. *L. japonica* is similar in having black dots on the leaves, but lacks the black dots on the corolla. *L. nigro-punctata* has black dots on the flowers but not on the leaves.

**Distributed in Taiwan.**

**Specimens examined:**

Taipei Co., Sankan to Kyanrawa, T. Suzuki, 7001.

Hsinchu Co., Lu-tsung-ta-shan, N. Fukuyama, 3467; Kita-sotenzu, T. Suzuki, 4684.

Hualien Co., Mt. Mu-kwa, T. Nakamura, 4596.

I-lan Co., Mt. Tal-ping, S. Suzuki, 132, Type in TAL.



Plate 11. *Lysimachia taiwaniana* Suzuki ex Kao

#### 4. *Primula* Linn., Sp. Pl. ed. 1, 142, 1753.

Perennial herbs; stolons short; leaves often basal, rarely densely clustered on a short stem, reniform-orbicular, ovate-orbicular or obovate-spathulate; subsessile to long-petiolate, margins entire or palmately lobed, often toothed; flowers in terminal umbels on the scapes, rarely solitary, white or rose-purple, rarely yellow, the bracts small, without bracteoles; calyx tubular to infundibuliform, 5-lobed; corolla salverform or campanulate, often with appendages on the throat, the limb 5-lobed, imbricate in bud, entire or serrulate; stamens inserted on the tube, the filaments very short, the anthers obtuse; ovary globose or ovoid; style simple, slender; capsules globose to cylindrical, 5-valved; seeds many.

About 300 species mostly in the north temperate regions, one in the high mountains of Taiwan.

#### *Primula miyabeana* Ito et Kawakami

Plate 12

Ito et Kawakami, in Coll. Bot. Pap. Miyabe 1, 1911; Masamune, List Vasc. Pl. Taiwan 92, 1954.

Perennial tufted herbs; stolons stout; leaves radical, glabrous membranous, spatulate, 12–24 cm. long, 3–5 cm. wide, obtuse at apex, gradually narrowed below to a petiole-like base, midrib and lateral veins prominent on both surface, veinlets anastomosing, margins with short deltoid teeth, or serrulate; scapes terete 20–45 cm. long, glabrous; the flowers whorled at intervals on indeterminate umbels, the bracts linear, 10–20 mm. long, the pedicels 2–4 cm. long, calyx cup shaped, 5–10 mm. long; corolla purple, lobes crenate at apex, 15–20 mm. long; capsules globose, styles long and persistent.

This species is very similar to *Primula japonica*, but the corolla lobes of this species are crenate at the apex, while in *P. japonica* they are entire.

Distributed in Taiwan.

#### Specimens examined:

- Hsinchu Co., Ta-pa-chian-shan, H. Simoda, 626; N. Fukuyama, s. n. VII. 26, 1932; T. Hosokawa, 2445.  
 Taichung Co., Hsueh-shan, S. Suzuki, 5334; K. Mori, s. n. X. 25, 1936; G. Masamune, 1237.  
 Nantou Co., Chi-lai-chu-shan-pei-feng, S. Sasaki, s. n. VIII. 24, 1929; s. n. VII. 10, 1921; s. n. III. 6, 1918; s. n. VIII. 24, 1929; Chi-lai-chu-shan, Y. Simoda, s. n. III. 6, 1918; Nen-kno-shan, Y. Kudo & K. Mori, 95; T. Nakamura, 5045; S. Sasaki, s. n. X. 10, 1918; s. n. V. 11, 1919; s. n. VIII. 5, 1919; S. Suzuki, 2136.  
 Chiayi Co., Yu-shan, S. Sasaki, s. n. X. 23, 1918; s. n. IX. 1, 1924; s. n. VIII. 1935; S. Suzuki, 13340.  
 Kaohsiung Co., Kuan-shan, N. Fukuyama, 4472; S. Sasaki, s. n. X. 19, 1933; Mt. Ta-wu, G. Masamune, 1500; E. Matsuda, 89.  
 I-lan Co., Nan-hu-ta-shan, T. Suzuki et al., 17626; 17800; 17496; 15059; G. Masamune & K. Mori, VII. 14, 1931; S. Suzuki, VII. 17, 1973; M. T. Kao, 5240.

#### 5. *Stimpeonia* C. Wright ex A. Gray, Bot. Jap. in

Mem. Amer. Acad. Sci. n. s. VI, 401, 1859.

Glabrous or pubescent herbs, rarely suffrutescent; leaves radical and cauline,



Plate 12. *Primula miyabeana* Ito et Kawakami

alternate, linear to ovate, margins entire or obtusely toothed; flowers small, white, in terminal racemes or corymbs, the pedicels often bracteate near the middle; calyx-tube adnate to the lower part of ovary, the limb persistent, 5-lobed; corolla subcampanulate, with a short tube, the limb 5-lobed; stamens 5, inserted on the tube, alternate with the staminodes, the filament, short, the anthers obtuse to acuminate; ovary globose, the style short; ovules many, capsules ovoid-globose, 5-valved longitudinally dehiscent; seeds minute.



Plate 13. *Stimpsonia chamaedryoides* C. Wright

About 10 species, most in the South Hemisphere, a few in the North Hemisphere, one in Taiwan.

**Stimpsonia chamaedryoides** C. Wright

Plate 13

C. Wright ex A. Gray, Bot. Jap. 401, 1859; Masamune, List Vasc. Pl. Taiwan 92, 1954.

Annual or biennial, pubescent herbs; stem erect, about 15 cm. high; radical and the few lower cauline leaves elliptic to broadly ovate, 1-2 cm. long, 7-12 mm. wide, rounded at base, margins toothed, the petioles 1-2 cm. long; upper leaves sessile, ovate-orbicular, margins toothed, with reddish-brown spots on both surfaces; flowers axillary, 4-5 mm. across, white, short-pedicellate; calyx 2-3 mm. long, 5-parted, glandular hairy, the lobes lanceolate, acute at apex; corolla-tube 3 mm. long; capsules globose, with many small seeds.

Distributed in Southern Japan, Ryukyus, Mainland China and Taiwan.

**Specimens examined:**

- Taipei Co., Mt. Ta-tun, S. Sasaki, s. n. IV. 27, 1931; S. Suzuki, 10240; Mt. Seven-star C. C. Chuang, 2773; Hsiau-kwang-yin-shan, H. Simada, 960; Chu-tzu-hu, S. Suzuki, 4394; T. Suzuki, 21343; Wu-tzu-shan, T. Suzuki, 4059.  
Taoyuan Co., Pin-tin-ta-hu, H. Simada, 1148; Tao-yuan, S. Sasaki, s. n. III. 14, 1939.

**Species previously reported from Taiwan of which  
we have seen no specimens.**

- Lysimachia congestiflora* Hemsl. in Journ. Linn. Soc. XXVI, 50, 1889; Masamune, List Vasc. Pl. Taiwan 92, 1954.  
*Lysimachia leucantha* Miquel, Ann. Mus. Lugd.-Bot. III, 121, 1868; Masamune, List Vasc. Pl. Taiwan 93, 1954.  
*Lysimachia simulans* Hemsl. in Linn. Soc. Jour. XXVI, 57, 1889; Masamune, List Vasc. Pl. Taiwan 93, 1954.  
*Primula japonica* A. Gray, in Mem. Am. Acad. N. Ser. VI. 400, 1859; Masamune, Short Fl. Formosa 164, 1936.

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