

THE GESNERIACEAE OF TAIWAN<sup>(1)</sup>MUH-TSUEN KAO<sup>(2)</sup> and CHARLES E. DEVOL<sup>(3)</sup>

**Abstract:** This revision is an attempt to summarize our knowledge of the Gesneriaceae of Taiwan. For each genus and species a full description is given. A total of 12 genera and 15 species are enumerated, together with one new species *Lysionotus montanus* Kao.

This revision is an attempt to summarize our knowledge of the Gesneriaceae of Taiwan. For each genus and species found on Taiwan, a full description is given. There are altogether 12 genera and 15 species, besides, one species is described as new, which is *Lysionotus montanus*. This was first collected by T. Suzuki in July 15, 1931 on Kita-soten-zan (Pei-cha-tien-shan) between Taipei and Taoyuan counties on the mountains of northern Taiwan.

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). Two genera each with one species (*Didymocarpus anachoreta* (Hance) Léveillé and *Hemiboea follicularis* C. B. Clarke) are not represented by specimens in these herbaria, and therefore are not described in the present paper.

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## Key to Genera

1. Fruit berry-like ..... 2.
1. Fruit a capsule..... 3.
2. Perfect stamens 4; fruit ovoid or globose..... 10. *Rhynchotechum*
2. Perfect stamens 2; fruit cylindrical..... 5. *Cyrtandra*
3. Capsule shorter than the calyx ..... 4.
3. Capsule longer than the calyx ..... 6.
4. Inflorescence cymose ..... 12. *Whytockia*
4. Inflorescence racemose ..... 5.
5. Flowers of only one type; plant nearly glabrous ..... 9. *Rhynchoglossum*
5. Flowers of two types; plant densely pubescent ..... 11. *Titanotrichum*
6. Capsule twisted..... 2. *Boea*
6. Capsule straight or curved, not twisted..... 7.
7. Stigma bifid..... 3. *Chirita*
7. Stigma rounded, not bifid ..... 8.
8. Capsules not more than twice as long as the calyx;  
corolla actinomorphic; corolla-tube short..... 4. *Conandron*

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8. Capsule much longer than the calyx; corolla slightly zygomorphic, tubular long .....9.  
 9. Epiphytes, evergreen vines or small shrub.....10.  
 9. Terrestrial herbs.....11.  
 10. Perfect stamens 4; stems more or less creeping .....1. *Aeschynanthus*  
 10. Perfect stamens 2; stems short, not creeping .....8. *Lysionotus*  
 11. Capsules bicarpellate; stems and petioles pubescent .....6. *Didymorcarpus*  
 11. Capsules mono-carpellate; stems and petioles glabrous.....7. *Hemiboea*

**Gesneriaceae** Nees in Ann. Sci. Nat. 6, 295, (1825-Dumortier, Anal. Fam. 28 & 30; 1929)

Annual or perennial herbs, sometimes shrubs, rarely trees; leaves radical and cauline, whorled, opposite or alternate; veinlets prominent or obscure; margins entire, toothed or undulate; glabrous or pubescent; inflorescence axillary or terminal cymes, racemes, panicles or umbels; flowers perfect, rarely imperfect, usually irregular, rarely regular; calyx usually tubular, free or adnate to the ovary, lobes valvate; corolla tubular or campanulate, usually distinctly 2-lipped, 5-lobed; stamens 2 or 4, sometimes 5, often only 2 fertile; anthers usually paired, contiguous or connate; ovary superior or inferior, 1 or 2-celled; ovules many; style linear, stigma rounded, sometimes bifid; fruits usually a capsule, the capsule oblong-linear, straight, curved or twisted, elongate or often enclosed in the calyx, rarely berry-like, indehiscent or dehiscent, sometimes spirally twisted; seeds many, small.

About 100 genera, about 1,500 species in tropics except a few ranging into temperate regions, 12 genera and 15 species in Taiwan.

**1. *Aeschynanthus*** Jack, in Trans. Linn. Soc. 14: 42, 1823.

*Trichosporum* Don, in Edinb. Phil. Journ. 84, 1822.

Scandent vines, epiphytes or rock-plants; leaves usually opposite or sometimes whorled, fleshy or coriaceous, lanceolate or ovate; inflorescence axillary or in terminal heads; flowers usually showy, scarlet, yellow or green; calyx tubular, curved, shortly 2-lipped, upper lobes erect, lower 3-lobes deflexed; stamens 4, didynamous exerted; anthers connivent in pairs; ovary superior; disk cup-shaped; style slender, long; stigma small peltate; capsule cylindrical, slender, long, 2-valved; seeds many, minute, hairy at each end.

About 182 species distributed in India, Burma, Malay Peninsula, Java, Sumatra, New Guinea, Borneo, Thailand, Philippines and one species in Taiwan.

***Aeschynanthus acuminatus*** Wall. Cat. 6397, 1828.

**Plate 1.**

*Trichosporum acuminatum* O. Kuntze, Rev. Gen., 417, 1891.

Scandent epiphytic vines, glabrous; leaves opposite, with short petioles, elliptical, 6-10 cm. long, 1.5-3.5 cm. wide, margins entire, apex acuminate, attenuate at base; petioles about 5 mm. long; inflorescence in axillary pedicellate cymes, one to few flowered, curved; bracts 2, opposite, ovate; calyx 5-parted, lobes oblong, about 4 mm. long, reflexed, persistent; corolla campanulate, yellowish-white, 15-20 mm. long, upper lip 2-lobed, lobes erect, lower lip 3-lobed, slightly deflexed; stamens 5, 2 pairs longer than the corolla, filaments filiform, upper ends bearing scattered glandular hairs; anthers connate, one sterile stamen inside corolla tube, without anther, about 1 cm. long; ovary cylindrical, glabrous, about 1 cm. long; with 5-lobed basal disc;



Plate 1. *Aeschynanthus acuminatus* Wall.

1. habit; 2. flower; 3. calyx; 4. vertical section of flower; 5. stamens; 6. pistil; 7. ovary section; 8. fruits; 9. seeds; 11. glandular hairs.

Loc.: Nantou Co.; Lien-hua-chu, M. T. Kao, 7162, (TAI).

style about 7 mm. long; stigma peltate; capsule cylindrical up to 15 cm. long, 2-valved; seeds many, minute, with long white hairs at each end.

Distributed in India, Mainland China and Taiwan.

Taipei Co.: Wu-lai, *Y. Yamamoto*, s. n. V. 12, 1929; *C. C. Chuang*, 2139; *S. Suzuki*, 3232; s. n. XII. 30, 1924; s. n. II. 10, 1928; *S. Sasaki*, s. n. III. 28, 1920; Kan-kou, *T. Nakamura*, 4215; Taihyo, *S. Suzuki* 3446. Taoyuan Co.: So-ten-zan, *T. Suzuki*, 4581. Taichung Co.: Mt. Pa-shen, *S. Suzuki*, s. n. X. 22, 1929. Nantou Co.: Lien-hua-chu, *M. T. Kao*, 7162; *S. Hibino* & *S. Suzuki*, s. n. VII. 17, 1936; Ho-she, *T. Shimizu*, 11043; Sun-moon Lake, *Kudo* & *Sasaki*, 15360; *Y. Yamamoto* & *K. Mori*, s. n. XI. 3, 1932; Ching-shui-kou, *T. C. Huang*, 1942; *T. C. Huang*, *Kou* & *Kao*, 784. Chiayi Co.: Su-tzu-lu, *M. T. Kao*, 5632. Kaohsiung Co.: San-pin, *M. T. Kao*, 7468; *C. C. Chuang* & *M. T. Kao*, 3271. Pingtung Co.: Ako, *E. Matuda*, s. n. I. 3, 1918; Wu-wei, *Kawakami* & *Sasaki*, s. n. III. 1909; *S. Sasaki*, s. n. I. 5, 1925. Taitung Co.: Tzu-pun, *S. Suzuki*, 10762; Chian-chin, *T. Hosokawa*, 5217; Chin-shuei-yin, *T. Suzuki*, 8041. Hualien Co.: An-tung, *M. T. Kao*, 6138; Ching-shui, *T. Shimizu* & *M. T. Kao*, 11715. I-lan Co.: Mt. O-bi, *G. Masamune*, 3180.

## 2. *Boea* Commers. ex Lam. Encyc.I: 401, 1783.

Herbaceous or small woody plants; stem cylindric, densely covered with woolly felted hairs; leaves cauline, opposite or rosulate, petiolate, lanceolate or oblanceolate, upper surface sparsely covered with woolly hairs, under surface densely covered with woolly hairs; flowers in a terminal or axillary panicle; calyx 5-parted, tube short or absent, lobes linear or broader; corolla-tube very short, limb expanded, more or less 2-lipped, blue, white or rose; stamens 2; filaments very short; anthers broad, oblong, connivent, yellow; style longer than corolla; ovary superior; capsule cylindric or fusiform, spirally twisted; seeds minute, yellow.

About 20 species distributed in Burma, Malaya, New Guinea, Solomon Islands, Mainland China and one species in Taiwan.

*Boea swinhofii* Hance in Ann. Sc. Nat. Sér. V. (5): 231, 1866.

### Plate 2.

Small shrub-like plants; 30-60 cm. high; stems cylindric woody at base, covered with woolly felted hairs; leaves opposite, petiolate, petioles 2-5 cm. long, lanceolate or sometimes oblanceolate, 10-23 cm. long, 3-6 cm. wide, acuminate or acute at apex, rounded or acute at base; upper surface sparsely covered with scattered woolly hairs, becoming glabrous; under surface densely covered with appressed woolly hairs; lateral veins 5-10 paired, distinctly raised on lower side; margins serrate; flowers in a terminal or axillary panicle; calyx about 2 mm. long, 5-lobed, lobes linear, glabrous; corolla about 5 mm. long, limb expanded, slightly 2-lipped; stamens 2, filaments very short; anthers broad, oblong, connivent; ovary superior, style longer than corolla; capsule 2-3 cm. long, cylindric or fusiform, spirally twisted; seeds many, minute, yellow, fusiform.

Distributed in Borneo and Taiwan.

Taipei Co.: Wu-lai, *S. Sasaki*, s. n. X. 15, 1915. Taoyuan Co.: Chiau-pan-shan, *T. Suzuki*, 4556; *S. Sasaki*, s. n. VII. 5, 1914. Hsinchu Co.: Chuton, *N. Fukuyama*, 31. Taichung Co.: Mt. Pah-hsien, *T. I. Chuang* & *M. T. Kao*, 2784. Nantou Co.: Lien-hua-tsu, *S. Sasaki*, s. n. VIII. 29, 1929; Baikei to Pu-li, *Y. Kudo* & *K. Mori*, 2349, 2350; Wu-she *G. Masamune*, 2096; 2142; Ho-she, *S. Suzuki*, 1058. Chiayi Co.: Kwang-tsu-lin, *H. Morimoto*, 509. Pingtung Co.: Budai to San-ti-men, *T. Hosokawa*, 5469; Budai, *S. Suzuki*, 11289. Taitung Co.: Chinshuei, *Y. Yamamoto* & *K. Mori*, 8;



Plate 2. *Boea swinhoii* Hance

1. habit; 2. flower; 4. vertical section of flower; 5A. fertile stamens; 5B. sterile stamen; 6. pistil; 7. ovary section; 8. fruits; 9. seeds.

Loc.: Pingtung Co.; Budai to San-ti-men, S. Suzuki, 11289, (TAI).

Ku-tzu-lun, *H. Simizu*, 3798; Shou-cha to Shin-wha, *T. S. Liu & M. T. Kao*, 2782; Tama-li, H. Keng, 1382. Hualien Co.: Ta-ki-mi, *S. Suzuki*, 1535; 1475; Tai-lu-ko, *S. Suzuki*, 10409; 10507; *T. Hosokawa*, 5032; *S. Sasaki*, s. n. V. 6, 1932. I-lan Co.: Mt. Taipin, *S. Sasaki*, s. n. II. 18, 1939.

### 3. *Chirita* Hamilton in D. Don, Prodr. Fl. Nepal. 89, 1825.

Shrub-like or herbaceous plants; leaves opposite, whorled or alternate, lanceolate or ovate, pubescent; inflorescence in terminal or axillary cymes, with long peduncles, one or few flowered; bracts large to small or none, or sometimes connate in a cup; calyx wide or narrow; corolla funnel-shaped; 5-lobed, purple, blue or white; perfect stamens 2, sterile stamens 2; anthers oval, connivent; ovary cylindrical; stigma ovate or oblong, usually bifid; capsule long cylindrical.

About 100 species distributed in the Himalayas, India, Malaya, Borneo, Thailand, Vietnam, Malacca, Sumatra, Java, Mainland China, Philippines, and one species in Taiwan.

*Chirita minuteserrulata* Hayata Icon. Pl. Formos. 5: 133, 1915.

Plate 3.

*Didymocarpus minuteserrulata* (Hay.) Yamamoto, in Journ. Soc. Trop. Agric. VIII: 72, 1936.

Herbaceous plant; stems cylindrical, unbranched or sparingly branched above, glabrous or subglabrous; leaves opposite, long petiolate, membranous, sparsely covered with multicellular, white hairs on upper surface, nearly glabrous on lower surface, ovate-lanceolate, 4-11 cm. long, 2-5 cm. wide, acute or acuminate at apex, equal or unequal at base, margins minutely serrulate; cymes axillary or terminal, long pedunculate, peduncle 5-8 cm. long, glabrous; flowers 3-5, pedicels 5-10 mm. long; bracts paired, membranous, glabrous, 3-6 mm. long, ovate, margins with multicellular white hairs; pedicels glabrous, 1-2 cm. long; calyx cylindrical-campanulate, 5-cleft, lobes about 13 mm. long, glabrous, margins densely bordered with multicellular, white hairs; corolla campanulate, white, 25-28 mm. long, shallowly 5-lobed, lobes rounded, nearly alike; 2 stamens perfect, filaments swollen at base, pubescent, 8 mm. long, staminoides 2, worm-shaped 3-4 mm. long, setose at apex; ovary linear, somewhat flattened, 10 mm. long; style 15 mm. long, with glandular hairs, apex 2-lobed, lobes oblong, fruits long linear, about 7 cm. long; seeds many, minute.

Distributed in Taiwan.

Kaohsiung Co.: Liu-kuei, *Y. Yamamoto & K. Mori*, 770. Pingtung Co.: Butai to San-tei-mon, *T. Hosokawa*, 5462; Ira-sya, *S. Suzuki*, 11310. Taitung Co.: Chippongoe, *S. Sasaki*, s. n. X. 9, 1934.

### 4. *Conandron* Siebold et Zuccarini Fl. Japan. Fam. Natur. in Abh. Akad. Muench. III: 729, 1843.

Rhizomes short, decumbent at base, densely covered with long yellowish-brown hairs; leaves few, radical, margins toothed; scapes with a few small bracts; cymes terminal; flowers with slender pedicels, usually purple or white, actinomorphic; calyx of 5 sepals, the segments narrowly lanceolate; corolla rotate, deeply 5-lobed, the lobes narrowly deltoid, acute; stamens 5, inserted at base of corolla, filament short, the anthers erect, oblong, borne in a tube around the style; disc absent; placentae 2-lobed, prominently intruded and raised within; the ovary imperfectly 2-locular; style linear, long, persistent; the stigma capitate; capsules lanceolate, 2-



Plate 3. *Chirita minuteserrulata* Hayata

1. habit; 3. calyx; 4. vertical section of flower; 5A. fertile stamens; 5B. sterile stamens; 6. pistil; 7. ovary section; 8. fruits; 9. seeds; 10. multicellular hairs; 12. bract; 14. stigma. Loc.: Pingtung Co.; Ira-sya, S. Suzuki, 11310, (TAI).

valved; seeds many, minute, smooth, fusiform.

Two species distributed in Vietnam, Taiwan, Ryukyu and Japan, one species in Taiwan.

**Conandron ramondioides** Sieb. & Zucc. Fl. Jap. Fam. Nat. 2: 730, 1843; Ohwi, Flora of Japan, 813, 1965. **Plate 4.**

*Conandron ramondioides* Sieb. & Zucc. var. *taiwanensis* Masamune, in Trans. Nat. Hist. Soc. Form. 29: 64, 1939.

Perennial herbs; rhizomes short, decumbent at base, densely covered with multicellular yellowish-brown hairs; leaves radical, obovate, 10–20 cm. long, 3–5 cm. wide, membranaceous, sparsely pubescent or nearly glabrous, acute at apex, lateral veins 5–6, margins mucronate-toothed, petiole winged; scapes slender 7–10 cm. long, sparsely covered with multicellular hairs, many flowered, the bracts narrowly lanceolate; sepals 5, narrowly lanceolate, 4–8 mm. long; corolla rotate, about 2 cm. across, purple or white; the lobes ovate, 10 mm. long, glabrous; the pedicels 8–15 mm. longer than the bracts, sparsely covered with multicellular hairs; stamens 5, perfect, filaments included in a tube; capsules cylindrical, 8–10 mm. long, slightly longer than the calyx, style persistent; seeds many, minute.

Distributed in Taiwan, Ryukyu and Japan.

Taipei Co.: Mt. Ra-ra T. Suzuki, 21355. Hsinchu Co.: To-shi-suei-shan, N. Fukuyama, 3554; Ma-pa-pa-shan, S. Sasaki s.n. X. 17, 1931. Miaoli Co.: Ta-fu, Kawakami, Hayata & Mori, 76; (This specimen used in drawing Pl. 4.) Kawakami & Mori, s.n. VIII. 20, 1908. Nantou Co.: Chi-tou to Chi-ti, C. C. Chuang & M. T. Kao, 7082; Chi-tou, M. T. Kao, 7737. Chiayi Co.: Mt. A-li, M. T. Kao, 7721.

Notes: Ohwi (1965:813) distinguishes *f. pilosum* (Mak.) Ohwi as having rather short pilose hairs on scapes, cymes, calyx and sometimes on the veins on the underside of the leaves. Masamune described this form as a new variety (1939:64), var. *taiwanensis* Masamune based on Kawakami, Hayata et Mori's No. 76. Judging from the specimens we have seen there seems to be a wide range in the amount of hairiness. Our specimens collected in Nantou Co. at Chi-tou are almost glabrous, the one illustrated is from Miaoli Co. and is quite hairy.

##### 5. *Cyrtandra* Forst. Char. Gen. 5. t. 3, 1776.

Usually small shrubs; leaves opposite or alternate, pubescent or glabrous; margins subentire, serrate, dentate or crenate; cymes axillary, many-flowered; bracts small or large, sometimes opposite and connate in a cup; calyx tubular, 5-lobed; corolla funnel-shaped, white, usually 2-lipped; stamens 2, adnate to corolla, anthers connate; ovary ovoid or oblong; style long; stigma globose or bilobed; fruits a brown cylindrical beaked fleshy berry; seeds minute, many.

About 350 species distributed in Polynesia, Philippines with one species in Taiwan.

***Cyrtandra umbellifera*** Merr. in Philip. Journ. Sci. 3: 435, 1908; Hatusima, Enum. Pl. Batan Isl. 49, 1966. **Plate 5.**

*Cyrtandra kotoensis* Hosokawa in Trans. Nat. Soc. Formos. 25: 412, 1935.

Small shrub, about 1.5 m. high; branches terete or five-angled, glabrous, bark raised to form narrow wings, the branchlets pubescent; leaves opposite, petiolate, oblong-elliptical, sometimes falcate, membranous, 16–30 cm. long, 5–9 cm. wide, glabrous or sparsely covered with multicellular brownish hairs on both surfaces; acuminate at apex, oblique or acute at base; margins serrate to dentate, subentire





Plate 4. *Conandron ramondioides* Sieb. & Zucc.

1. habit; 2. flower; 3. calyx; 4. vertical section of flower; 5. stamens; 6. pistil; 7. ovary section;  
8. fruit; 9. seeds; 10. multicellular hairs; 11. glandular hairs; 15. hairs.

Loc.: Miaoli Co.; Ta-fu, Kawahara, Hayata & Mori, 76, (TAI).



Plate 5. *Cyrtandra umbellifera* Merr.

1, habit; 2, flower; 3, calyx; 4, vertical section of flower; 5A, fertile stamens; 5B, sterile stamens; 6, pistil; 7, ovary section; 8, fruit; 9, seeds; 10, multicellular hairs; 11, glandular hairs.

Loc.: Taitung Co.; Orchid Island, G. Masamune, 4140, (TAI).

near base; petioles pubescent, 1-4 cm. long; inflorescence umbellate, axillary, solitary, pedunculate, peduncle slender, 1.5-3 cm. long, densely covered with ferruginous-hairs, bracteate; bracts lanceolate, pubescent, about 10 mm. long; calyx pubescent with multicellular brownish hairs, 5-lobed, subulate, acuminate, about 5 mm. long; corolla white about 10 mm. long, pubescent outside; upper 2 lobes slightly connate, larger than the 3 other lobes; stamens 2, filaments filiform; anthers connate; style elongate, with scattered glandular hairs, about 6 mm. long; fruits oval, 8 mm. long, glabrous; seeds many, minute.

Distributed in Philippines (Batanes and Babuyan Islands) and Taiwan (Orchid Island).

Taitung Co.: Orchid Island, *T. Hosokawa*, 8106, 8129; *S. Sasaki*, s. n. VII. 1926; *T. Sata*, 1702, 1703; *G. Masamune*, 4140; *T. Liu*, *H. Keng et al.* 490, 509; *C. E. Chang*, 6141; *T. C. Huang & M. T. Kao*, 5120, 5386.

#### 7. *Hemiboea* C. B. Clarke, in Hook. Icon. Pl. 18: t. 1798, 1888.

Herbaceous or woody plants; stems cylindrical or angled, glabrous, sometimes with many branches; leaves opposite, petiolate, elliptical or lanceolate; inflorescence cymose, terminal or axillary; flowers covered with a large bract; calyx short or deeply 5-parted, lobes linear or lanceolate; corolla wide, tubular, upper 2 lobes slightly smaller than the 3 others, all rounded; stamens: 2 perfect, 2 sterile; filaments linear, anthers connected; ovary free; style long or short, linear, stigma capitate or truncate; capsule long-cylindrical, sometimes recurved; seeds many, minute.

About 12 species distributed in the Himalayas, Vietnam, Mainland China and Taiwan, 2 species seen from Taiwan, one more reported but not seen.

#### Key to species

1. Stems herbaceous, leaves broadly elliptical, stigma capitate.....*H. bicornuta*
1. Stems woody, leaves narrowly elliptical, stigma truncate.....*H. merrillii*

***Hemiboea bicornuta*** (Hay.) Ohwi in Journ. Jap. Bot. 12: 662, 1936.

**Plate 6.**

*Chirita bicornuta* Hay. Icon. Pl. Formos. 3: 154, 1913.

Perennial herbaceous plants; about 1 m. or more high; stems glabrous, succulent, erect; leaves opposite, long petiolate; elliptical or slightly falcate, 10-20 cm. wide, acuminate at apex, oblique or attenuate at base, margins serrate at apex, subtire near base, upper surface glabrous, under surface with slightly appressed white hairs on veins; lateral veins 8-10; petioles 2-6 cm. long, pubescent or glabrous when old; flowers pedicellate, one or few paired, in a terminal or axillary pedunculate cyme, peduncles 2.5-7 cm. long; bracts dimorphic, membranaceous, outer bracts ovate-rotundate, 2.5-3 cm. long, 2-2.5 cm. wide, inner bracts ovate, 2-2.5 cm. long, 1.5-2 cm. wide; sepals 5, lanceolate or elliptical, 10 mm. long, apex acuminate, corolla white, cylindrical-campanulate, tube slightly curved, 4-4.5 cm. long, inside with dimorphic hairs, upper part of tube villous, lower part of tube covered with multicellular white hairs; upper lips 2-lobed, lower lip 3-lobed; stamens fastened on corolla tube, 2 perfect, filaments complanate, 2 cm. long, ascending, glabrous, anthers connate 3.5 mm. wide, rounded at apex; sterile filaments united at apex, 5 mm. long; ovary cylindrical, glabrous 8 mm. long; style glabrous, erect 11 mm. long, stigma capitate; capsule cylindrical, somewhat curved, 22 mm. long, 4 mm. wide, apex rostrate, base not contracted, sometimes 2-valvate, dehiscent on one side in upper



Plate 6. *Hemiboea bicornuta* (Hay.) Ohwi

1. habit, 2. flower; 3. sepal; 4. vertical section of flower; 5A. fertile stamens; 5B. sterile stamens; 6. pistil; 7. ovary section; 8. fruit; 9. seeds; 10. multicellular hairs.

Loc.: Chiayi Co.; Tosikyaku, S. Sasaki s. n. X. 10, 1919, (TAI).

suture; seeds abundant, minute.

Distributed in Taiwan.

Taipei Co.: Shiao-kwang-yin-shan, *H. Simada*, 1288; Pin-ling, *S. Suzuki*, s. n. XI. 1924; Wu-lai, *G. Masamune*, 130; Kwang-yin-shan, *N. Fukuyama* 174; Shiao-a-yu, *T. Suzuki*, 7727; Mt. La-la, *S. Sasaki*, s. n. X. 3, 1930; Chu-tzu-shan, *T. Nakamura*, 773. Taichung Co.: Mt. Pa-shen, *T. Suzuki*, 5628, 5625, 5691; *Liu, Kuo & Kao* 433; Mt. Amma, *T. S. Liu et al.*, 118; Ta-chian, *K. Mori*, s. n. X. 29, 1936. Nantou Co.: Mein-yen, *S. Sasaki*, s. n. XI. 29, 1922; Chi-tou, *C. C. Chuang*, 4019, 4072; *M. T. Kao*, 7733; Lien-hwa-chih, *Y. Yamamoto*, s. n. X. 11, 1929; *Y. Yamamoto & K. Mori*, s. n. XI. 2, 1932; Mt. Hon-hong, *M. T. Kao*, 6764; Ching-shui-kou, *Huang, Kou & Kao*, 767. Chiayi Co.: Fun-chi-fu, *C. S. Feung & M. T. Kao*, 4925; Mt. A-li, *Y. Yamamoto & N. Nakamura*, 4130; *M. T. Kao* 7710; *Tosikyaku, S. Sasaki*, s. n. X. 10, 1919; *U. Faurie*, 1461. Hualien Co.: Ton-li, *S. Suzuki*, 1591. I-lan Co.: *S. Suzuki*, s. n. VIII. 15, 1928.

**Hemiboea merrillii** Yamamoto in Journ. Soc. Trop. Agric. 8 73, 1936. Plate 7.

Herbaceous plants more or less woody near base, angled, glabrous; branches slightly decumbent at base; leaves opposite, petiolate, elliptical, 6-12 cm. long, 1-3 cm. wide, acuminate at both ends, remotely serrate, both surfaces glabrous; petioles slender, 1-2 cm. long; cymes terminal or axillary, pedunculate, peduncles about 2-4 cm. long; bracts rounded, 1.8 cm. long, and wide, glabrous, obtuse at apex; sepals 5, membranaceous, glabrous, lanceolate, 9-12 mm. long, 4 mm. wide, acuminate; corolla campanulate, somewhat curved, 5-lobed, lobes rounded, inside of corolla with dimorphic hairs, upper part of tube villous, lower part of tube covered with multicellular white hairs; perfect stamens 2, fastened on corolla tube; filaments filiform, anthers connate, 2 sterile stamens without anther united at apex; ovary cylindric, glabrous; stigma truncate; capsule cylindric and curved, 2.5 cm. long, glabrous.

Distributed in Taiwan.

Taoyuan Co.: Kappan-zan, *S. Sasaki*, s. n. X. 24, 1917.

The type of *H. merrillii* Yamamoto is deposited in the New York Botanical Garden. Our specimens collected by *S. Sasaki* from Kappanzan (Chiao-pan-shan 角板山) on October 24, 1917 had previously been identified as *Chirita minutesserrulata* Hay.

#### 8. *Lysionotus* D. Don in Edinb. New Philos. Jour. 7: 86, 1822.

Small shrubs or subshrubs; often epiphytic; stems woody; leaves ternate, or 5-7-verticillate, evergreen, entire or toothed, coriaceous or membranous; cymes terminal or axillary, bracteate, sometimes reduced to a single flower; bracts small, sometimes caducous; calyx 5-parted, lobes narrow; corolla purplish or violet, tube elongate, straight, ampliate, limb broadly bilabiate, upper lip 2-lobed; lower lip 3-lobed; fertile stamens 2, anterior, inserted above the middle on the tube, the filaments with a tooth at the apex, longer than the anthers, disc annular; style long, stigma 2, lamellate, short and broad; placentae connate on the center with the ovules borne on the incurved margins; capsules elongate-linear, 4-valvate; seeds linear, with a capillary appendage at each end.

About 21 species distributed in the Himalayas, Burma, Borneo, Vietnam, Hainan, Taiwan and Japan. 3 species in Taiwan.



Plate 7. *Hemiboea merrillii* Yamamoto

1. habit; 3. calyx; 4. vertical section of flower; 5A. fertile stamens; 5B. sterile stamen; 6. pistil;

7. ovary section; 10. multicellular hairs; 12. bract; 14. stigma.

Loc.: Taoyuan Co.; Kappan-zan, S. Sasaki, s. n. X. 24, 1917, (TAI).

## Key to species

1. Leaves in whorls of 3.....2.  
 1. Leaves 5-7-verticillate at upper nodes, (lower nodes may have only 3 leaves .....*L. montanus*  
 2. Leaves narrowly elliptical about 1 cm. or less wide .....*L. pauciflorus*  
 2. Leaves broadly elliptical, usually 2 cm. or more wide.....*L. ikedae*

Comparative Characteristics of the Taiwan 3 species of *Lysionotus*

Scientific name	<i>Lysionotus montanus</i>	<i>Lysionotus ikedae</i>	<i>Lysionotus pauciflorus</i>
leaf arrangement	3-7 verticillate	ternate	3-4 verticillate
leaf petiole	pubescent	glabrous	pubescent
leaf shape	elliptical 1.5-2 cm. wide	broadly elliptical 2-4 cm. wide	narrowly elliptical 0.8-1.5 cm. wide
bract	ovate, acute, pubescent	oblanceolate, obtuse puberulent	lanceolate, obtuse pubescent
calyx	margins of sepals pubescent	glabrous	pubescent on margins and back*
corolla	glabrous	pubescent on outside of lower end of tube	glabrous
filament	curved	curved	twisted
glandular punctate dots on anthers	none	present	present

\* hairs occasionally caducous.

*Lysionotus ikedae* Hatusima in Mem. Fac. Agric. Kagoshima Univ. 7(2): 324, 1970.

## Plate 8.

Epiphytic, glabrous, small shrubs; rhizome long creeping; stems erect, somewhat irregularly curved 15-30 cm. high, branches few; leaves opposite or ternate, obovate-elliptic or broadly elliptic, 2-9 cm. long, 2-4 cm. wide, apex obtuse; margins undulate or crenate, costa prominent, lateral veins obscure; petiole 5-15 mm. long; flowers one to three in terminal or axillary cymes; peduncles long, 2-4 cm. long, bracts small, oblanceolate, slightly puberulent on outer surface, glabrous inside; calyx 5-parted, segments narrowly lanceolate, glabrous, 5-8 mm. long; corolla purplish-white, campanulate, bilabiate, covered with small multicellular hairs near the base on outside of tube, otherwise glabrous, 3.5-4.5 cm. long; stamens 4, 2 fertile filaments flat, 1.5 cm. long; anthers oval 2.2 mm. long, with glandular-punctate dots on one side; 2 sterile stamens very much reduced, 3 mm. long, without anthers; ovary tubular 1-2.6 cm. long; style about 2 mm. stigma capitate; capsules erect 5-8 cm. long; seeds minute, fusi-form, both ends bearing a fine hair.

Distributed in Taiwan (Orchid Island, Botel Tobago).

Taitung Co.: Orchid Island, T.C. Hwang & M.T. Kao, 5233; T. Hosokawa, 8131; T. Sata, 1704, 1705, 1706, 1707; S. Sasaki, s. n. VII. 1926; s. n. X. 30, 1934.



Plate 8. *Lysionotus ikedae* Hatusima

1. habit; 2. flower; 3. calyx; 4. vertical section of flower; 5A. fertile stamens; 5B. sterile stamens; 6. pistil;  
7. ovary section; 8. fruits; 9. bracts; 10. glandular hairs; 11. magnified glandular hairs; 12. bract.

Loc.: Taitung Co.; Orchid Island, T. C. Huang & M. T. Kao, 5233, (TAI).



**Lysionotus montanus** Kao sp. nov.

Plate 9.

Epiphytica, caule 30 cm. alto, foliis 3-7-verticillatis 1.5-2 cm. latis, bracteis ovatis, staminibus non appendiculatis.

Small epiphytic shrub; rhizome long creeping; stems erect up to 30 cm. high, 3 mm. thick when dry, branches few; leaves 3-7, subverticillate, petiolate, coriaceous, glabrous, elliptical, 3-7 cm. long, 1.5-2 cm. wide, apex acute, base acute or sometimes obtuse, costa prominent, ridged below, deeply grooved above, lateral veins obscure; petioles 3-7 mm. long, with minute appressed white hairs in upper groove; cymes terminal or axillary, solitary or 3-flowered, with peduncles about 2 cm. long, bracts minute, opposite, ovate, 2 mm. long, sparsely covered with white hairs outside; calyx 5-parted, lobes linear-lanceolate, 4-7 mm. long, sparsely covered with minute white hairs; corolla cylindrical-campanulate, glabrous, about 5 cm. long; stamens 4, the 2 fertile longer than the sterile, filaments filiform, about 1.6 cm. long, inserted on sides and near top of constricted region of corolla tube, anthers connivent; 2 sterile ones beak-like, without anthers, connivent, about 8 mm. long; ovary cylindrical, 3 cm. long, stigma capitate; capsules elongate, cylindrical, 8 cm. long, 2-valvate; seeds linear, 2 mm. long, with a hair-like appendage at each end.

Distributed in Taiwan.

Taipei Co.: Kita-sotenzan, *T. Suzuki*, 4713, (VII. 16, 1931) (Type in TAI).  
Taitung Co.: Chin-shuei-yin, *H. Simizu*, 3663; Sekikoko, *Y. Yamamoto & Mori*, 8131.  
Hualien Co.: Chin-shuei-shan, *T. Nakamura*, 3636; Ta-ki-mi, *S. Suzuki*, 1532. I-lan Co.: O-bi, *G. Masamune*, s. n. IV. 26, 1938.

**Lysionotus pauciflorus** Maxim. in Bull. Acad. St.-Pét. 19: 534, 1874.

Plate 10.

*Lysionotus warleyensis* Hort. ex Gard. Chron. Ser. III. 54: 125, 1913.

Epiphytic, glabrous, small shrubs; rhizome long creeping; stems erect, usually simple, sometimes with a few branches, 15-30 cm. high; leaves coriaceous, usually ternate, sometimes 4-subverticillate, elliptical or slightly wedge-shaped, 2-6 cm. long, 8-15 mm. wide, margins toothed towards apex, dark green on upper surface, whitish on lower surface, margins slightly recurved, apex acute, cuneate at base; the petioles bearing minute white hairs, 2-3 mm. long; flowers solitary or few in axillary or terminal cymes; peduncles slender up to 3 cm. long; bracts small, narrowly lanceolate, about 2 mm. long, covered with minute hairs outside, glabrous inside; calyx 5-parted, segments lanceolate, 3-4 mm. sparsely covered with white hairs; corolla purplish-white, tubular and bilabiate, 3-4 cm. long; stamens 4, 2 fertile stamens with spiral filaments, anthers with glandular-punctate dots on one side, connivent at apex; filaments of 2 sterile stamens threadlike, curved, without anthers; ovary tubular, 2 cm. long; stigma capitate; capsule cylindrical, 4-8 cm. long; seeds minute, oblong, about 1 mm. long, both ends bear a fine hair.

Distribution: South China, Taiwan and Japan (Kyushu).

Taipei Co.: Kankei to Kore, *S. Suzuki*, 5884; Kyanrawa, *T. Suzuki*, 7048; Sankyaku, *S. Suzuki*, 5915; Tonroku, *T. Suzuki*, 18975. Miaoli Co.: Taiko, *S. Sasaki*, s. n. VIII. 1, 1908. Hsinchu Co.: Lu-chan-ta-shan, *N. Fukuyama*, 3374. Taichung Co.: Son-lin, *S. Sasaki*, s. n. X. 10, 1930; Mt. Pa-shien, *T. I. Chuang*, *C. C. Kou & M. T. Kao*, 2769; *T. Suzuki*, 5657; *S. Suzuki*, 2889; Mt. Am-ma, *T. S. Liu et al.* s. n. X. 20, 1957. Nantou Co.: Lien-hwa-chu, *S. Hibino & S. Suzuki*, s. n. VII. 17, 1936; *T. Seki*, 8; Nei-kao, *E. Matuda*, 1665; Wu-she, *G. Masamune*, *K. Mori & T. Nakamura*, 2396. Chiayi Co.: Fun-chi-fu, *C. S. Feung & M. T. Kao*, 4937; Mt. A-li, *S. Sasaki*, s. n. XII. 7, 1933. Pingtung Co.: Aderu, *S. Suzuki*, 11169; Kuwaruru, *E. Matuda*, 1664. Taitung Co.: Hsien-kan, *Y. Yamamoto*, 1169; Wu-shan, *T. Hosokawa*, 5345;



Plate 9. *Lysionotus montanus* Kao sp. nov.

1. habit; 3. calyx; 4. vertical section of flower; 5A. fertile stamens; 5B. sterile stamens; 6. pistil; 7. ovary section; 8. fruit; 9. seeds; 12. bracts.

Loc.: Taipei Co.; Kita-soten-zan, T. Suzuki, 4713, (Type in TAI).



Plate 10. *Lysionotus pauciflorus*<sup>8</sup> Maxim.

1. habit; 3. calyx; 4. vertical section of flower; 5A. fertile stamens; 5B. sterile stamens; 6. pistil; 7. ovary section; 8. fruit; 9. seeds; 12. bracts.

Loc.: Hualien Co.; Feng-shan, Liu, Chen & Kao, 5. (TAI).

Yizumo, Y. Yamamoto, 361, 500; Tipon-goe, S. Suzuki, 10972. Hualien Co.: Ton-  
nei-kao, S. Suzuki, 2126; S. Sasaki, s. n. VIII. 22, 1929; Muh-kwa-shan, T. Nakamura,  
4607; Feng-shan, Liu, Chen & Kao, 5, 113; Tau-sai, T. Suzuki, 17670. I-lan Co.: Mt.  
Taiping, C. C. Chuang, J. M. Chao & M. T. Kao, 4693; S. Suzuki, 557, 862; Nan-fu-ta-  
shan, S. Suzuki, s. n. VII. 22, 1922, Sei-bo-shan, T. Nakamura, 4736.

### 9. *Rhynchoglossum* Blume, Bijdr. 741, 1826.

Pubescent or nearly glabrous herbs; leaves alternate, ovate, membranous, very  
unequal-sided at base, margins entire or somewhat sinuate; inflorescence in elongated,  
slender, many flowered racemes; bracts minute, linear or absent; calyx 5-lobed,  
campanulate; corolla blue, tube cylindrical, upper lip 2-lobed, lower lip entire or 3-  
lobed, and longer than upper lip; stamens fastened on corolla tube, perfect stamens  
2; anthers connate, staminodes 2; ovary ovoid; style long; stigma capitate; capsule  
ovoid, included in the calyx, membranaceous; seeds minute, many.

About 8 species distributed in India, Malaya and Philippines, one species in  
Taiwan.

*Rhynchoglossum hologlossum* Hayata Icon. Pl. Formos. 5: 131, 1915. **Plate 11.**

Annual herbaceous plants; stems cylindrical, unbranched or sparsely branched  
above, puberulous or glabrous, 40-50 cm. tall; leaves alternate, petiolate, obliquely  
ovate, 3-11 cm. long, 2-4 cm. wide, acuminate at apex, very unequal-sided at base,  
membranous, sparsely covered with minute hairs, margins entire with minute hairs,  
lateral veins prominent on lower surface; petiole 2-20 mm. long; inflorescence in a  
terminal and axillary raceme, elongate, slender, many flowered, covered with minute  
hairs; bracts minute, linear, hirsute, 1-2 mm. long, pedicellate, pedicels 3-4 mm. long,  
hirsute; calyx campanulate, 4-5 mm. long, with minute glandular hairs on outer  
surface (especially evident in buds) 5-lobed, lobes lanceolate; corolla blue, tube  
cylindric, about 12 mm. long, upper lip 2-lobed, lobes reflexed, lower lip rounded,  
obovate, margin entire; perfect stamens 2, attached to corolla tube, filaments filiform,  
glabrous, anthers connate, sterile stamens 2, small, without anthers; ovary ovoid,  
2-3 mm. long, slightly pubescent or glabrous; with 2 glands at base; style 7-8 mm.  
long, glabrous; stigma capitate, persistent; capsule ovoid, 4 mm. long, included in  
the calyx; seeds minute, elliptical, many.

Distributed in Taiwan.

Taichung Co.: Hakusanko, S. Sasaki, s. n. IX. 9, 1917; Kasagisan, E. Matuda,  
2666; Pah-sien-shan, S. Suzuki, s. n. X. 22, 1929; An-ma-shan, T. S. Liu et al., 132.  
Nantou Co.: Ho-she, S. Suzuki, 106, 352; Shui-li to Nei-fun-pu, T. Suzuki, 13195; Wu-  
she, S. Suzuki, 2785; Mei-yuan, S. Sasaki, s. n. X. 8, 2935; S. Suzuki, s. n. VII. 20,  
2536; Chi-tou, M. T. Kao, 7730. Chiayi Co.: Fun-chi-fu, C. S. Feng & M. T. Mao,  
4942; Kuan-tsu-lin, Kawakami & Mori, 1777; Morimoto, 510, Mt. A-li, S. Sasaki, s. n.  
X. 1928. Pingtung Co.: Bankinsing, A. Henry, 1085.

### 10. *Rhynchotechum* Blume, Bijdr. 775, 1825.

Perennial herbs or subshrubs, pubescent; stems erect, simple or few branched  
at base; leaves opposite or alternate; cymes axillary, simple or branched; peduncu-  
late, many flowered, flowers small, white; calyx 5-parted, lobes narrowly lanceolate;  
corolla campanulate, deeply 5-lobed, lobes equal; stamens 4, inserted on base of  
corolla, short; staminodes small or absent; style erect, stigma entire; ovary round;



Plate 11. *Rhynchoglossum hologlossum* Hayata

1. habit; 2. flower; 3. calyx; 4. vertical section of flower; 5A. fertile stamens; 5B. sterile stamens; 6. pistil; 7. ovary section; 8. fruit; 9. seeds; 14. stigma.

Loc.: Chiayi Co.; Mt. A-II, S. Susaki, s. n. X. 1928, (TAI).

fruits berry-like, ovoid to subglobose; seeds minute, ovoid, many.

About 12 species in India, Himalayas, Philippines, Mainland China, Taiwan, Ryukyus and Japan. Two species in Taiwan.

#### Key to species

1. Leaves alternate, serrate, oblanceolate obovate-oblong ..... *R. discolor*  
 1. Leaves opposite, entire, broadly elliptical or rhomboidal..... *R. formosanum*

*Rhynchosyche discolor* (Maxim.) Burt in Notes Roy. Bot. Gard. Edinb. **24**: 37, 1962; Hatusima, Kagoshima Univ. **Plate 12**.

**V.** (3). 49, 1966.

*Isanthera discolor* Maxim., in Bull. Acad. Pétersb. **19**: 538, 1874.

Small shrubs, rhizome long creeping; stems 30–45 cm. high, sparsely branched above, cylindrical, gray, densely covered with yellowish-brown long-woolly hairs while young, becoming glabrous with age; leaves alternate petiolate, herbaceous, oblanceolate or obovate, slightly falcate, 10–25 cm. long, 3–8 cm. wide, acute at apex, attenuate at base, margins mucronate-toothed, pale brown above, glandular-punctate beneath, with yellowish-brown long-woolly hairs while young, persistent on the veins; petioles 2–7 cm. long; cymes axillary, solitary, long peduncled, many flowered, dense and in head-like glomerules; bracts lanceolate, about 5 mm. long; calyx 5-parted, segments linear, about 5 mm. long; corolla white, campanulate, deeply 5-lobed, the lobes equal, rounded, glabrous, about 3.5 mm. long; stamens 4, inserted at base of corolla; staminodes small; ovary ovoid, style about 1.5 mm. long; stigma globose; fruits a berry, rounded, white; seeds minute, many.

Distributed in Philippines, Taiwan, Ryukyus and Japan.

Taipei Co.: Sotenzan, *T. Suzuki*, 4554; Senjozan, *G. Masamune*, 1382; Taihyo, *G. Masamune*, s. n. XII. 30, 1929; Yang-min-shan, *S. Sasaki*, s. n. XII. 29, 1935; *T. I. Chuang & M. T. Kao*, 1676; Kuan-in-shan, *N. Fukuyama & Miwura*, 126; Taipei, *S. Sasaki*, s. n. I. 8, 1928; Wu-lai, *S. Sasaki*, s. n. X. 15, 1925; Kan-kou, *S. Sasaki*, s. n. X. 17, 1932; Ta-ken, *H. Shimizu*, 477. Hsinchu Co.: Yi-shan, *S. Sasaki*, s. n. I. 20, 1930; Kipeizan to Tonnohu, *S. Uchida*, s. n. XII. 21, 1927. Nantou Co.: Sun-moon Lake, *Kudo & Sasaki*, 15354; *S. Sasaki*, s. n. IX. 12, 1929; Suisya, *S. Sasaki*, s. n. IX. 12, 1929; Mai-mau-shan, *Kawahami & Mori*, s. n. VII. 22, 1907; Chi-tou, *C. S. Feung & M. T. Kao*, 322; *I. M. Liu & M. T. Kao*, 3045; Wu-she, *G. Masamune, Mori & Nakamura*, 2392. Chiayi Co.: Mt. A-li, *M. T. Kao*, 5637. Pingtung Co.: Kuaruru, *E. Matuda*, 1663; Kuskus, *Y. Kudo & S. Suzuki*, 15989; Daijurin, *Y. Kudo & K. Mori*, 2809; Kutzulun-shan, *T. I. Chuang & M. T. Kao*, 1137; Ta-wu, *S. Suzuki*, 7066. Taitung Co.: Oiwake, *S. Suzuki*, 10718; Mt. Taitung, *Y. Yamamoto* 1168, 1189. Hualien Co.: Kirisato to Sakahen, *S. Sasaki*, s. n. VIII. 19, 1929; Sakahen, *S. Suzuki*, 1706; Yu-li, *Y. Yamamoto*, 8437. I-lan Co.: Mt. Taiping, *S. Suzuki*, s. n. VIII. 15, 1928; Mt. O-bi, *G. Masamune*, s. n. IV. 23, 1938; Mt. Bon-bon, *M. T. Kao*, 5960.

*Rhynchosyche formosanum* Hatusima in Journ. Jap. Bot. **15**: 132, 1939.

Small herbs, about 15 cm. tall; stem simple, pubescent; leaves opposite, petiolate, obovate or broadly elliptical 9–15 cm. long, 5–7 cm. wide, acute at apex, cuneate at base, margins entire, both surfaces densely covered with woolly hairs; petioles about 15 mm. long; cymes axillary, long pedunculate, peduncles about 3 cm. long, densely covered with woolly hairs; bracts 2, opposite, linear about 3 mm. long; calyx 5-lobed, lobes narrowly triangular, pubescent, 3–4 mm. long; fruits ovoid.

Distributed in Taiwan.



Plate 12. *Rhynchotechum discolor* (Maxim.) Burt

1. habit; 2. flower; 3. calyx; 4. vertical section of flower; 5. stamens; 6. pistil; 7. ovary section;  
8. fruit; 9. seeds; 12. bract.

Loc.: Nantou Co.: Chi-tou, I. M. Liu & M. T. Kao, 3045, (TAI).

Taipei Co.: Buzangun, S. Sasaki, s. n. VIII. 12, 1930.

Type of *R. formosanum* Hatusima is deposited in the Herbarium of the University of Kyusyu. Our specimen collected by S. Sasaki from Buzangun (Kankou 乾溝) on Aug. 12, 1930 was previously identified as *Conandron ramondioides* Sieb. & Zucc.

11. **Titanotrichum** Solereder, in Deutsch. Bot. Ges. 27: 393, 1909.

*Matsumuria* Hemsl., in Kew Bull. 360, 1909.

Perennial pubescent herb; stems cylindric or 4-angled, densely covered with multicellular brown hairs; leaves usually opposite with one leaf much larger than the other; (terminal leaves sometimes alternate) petiolate, elliptical, or sometimes slightly falcate, margins toothed toward apex, entire near base, scabrous, herbaceous, both surfaces covered with multicellular whitish-hairs, acuminate or acute at apex, acute or oblique at base; inflorescence in terminal racemes, often ending in spikes or panicles; flowers dimorphic, bracteate, bracts linear-elliptical; perfect flowers large; calyx 5-parted, lobes rounded, nearly equal, stamens 4, filaments filiform inserted on corolla tube at base; anthers ovate connivent; ovary ovoid, covered with glandular hairs; style long, persistent; stigma enlarged; capsule ovoid 4-valvate; seeds small; sterile flowers very small, in long terminal spikes, panicles, or in short clusters, calyx 5-parted, lobes linear-lanceolate.

Only one species distributed in Taiwan.

**Titanotrichum oldhami** (Hemsl.) Solereder in Ber. Deutsch. Bot. Ges. 27: 400, 1909.

Plate 13.

*Rehmannia oldhami* Hemsl., in Journ. Linn. Soc. 26: 194, 1889.

*Matsumuria oldhami* (Hemsl.) Hemsl., in Kew Bull. 361, 1909.

Perennial pubescent herbs; 25-50 cm. tall; stems cylindric or 4-angled, densely covered with multicellular brown hairs; leaves opposite, sometimes rarely alternate, usually with one small leaf and one large leaf (the small leaf is about 1/2 size of the large leaf), elliptical, slightly falcate, 12-21 cm. long, 6-8 cm. wide, apex acuminate or acute, acute or oblique at base, scabrous, herbaceous, both surface covered with multicellular whitish-hairs; petioles 2-6 cm. long; inflorescence of perfect flowers in long terminal racemes; of sterile flowers in spikes or panicles, peduncle covered with multicellular whitish-hairs; flowers dimorphic, bracteate, bracts elliptical or narrowly lanceolate; perfect flowers large, calyx 5-parted, lobes narrowly lanceolate, about 1 cm. long, covered with multicellular hairs; corolla cylindric-campanulate, yellow, 5-lobed; stamens 4, filaments filiform inserted on base of corolla tube; anthers connivent; ovary ovoid, about 4 mm. long, covered with glandular hairs; style long, 2.5 cm. long; stigma enlarged; capsule ovoid, beaked, shorter than calyx, 4-valvate; seeds small, black, many; sterile flowers in long slender spike, panicles or dense clusters, small, calyx 5-parted, lobes linear-lanceolate.

Distributed in Taiwan.

Taipei Co.: Yang-min-shan, S. Suzuki, s. n. XI. 8, 1928; S. Sasaki, s. n. IX. 5, 1933; Morimoto, 476; Pei-tou, I. Simozawa, s. n. VII. 13, 1933; Do, 890; T. Hosokawa, s. n. VII. 29, 1930; H. Simada, 746; Taihyo, S. Suzuki, 3452; G. Masamune, 395; Sankyaku to Suigen, S. Suzuki, 5948; Wu-lai, S. Sasaki, s. n. X. 16, 1932; Liu, Liu, Chen & Kao, 30086; A-yu, T. Suzuki, 7749; Tsu-tzu-hu, E. Matuda, 1670; Omine-toge, G. Masamune, 2743. Taoyuan Co.: Chikutokaku, S. Sasaki, s. n. XI. 24, 1935; Kapanzan, S. Sasaki, s. n. XI. 11, 1915. Hsinchu Co.: Hsinchu, S. Sasaki, s. n. XII. 15, 1922. Taichung Co.: Pa-sen-shan, S. Suzuki, s. n. X. 22, 1929; H. Keng, s. n. XI.





Plate 13. *Titanotrichum oldhami* (Hemsl.) Solereder

1. habit; 2. inflorescence; 3. calyx; 4. vertical section of flower; 5. stamens; 6. pistil; 7. ovary section; 8. fruit; 9. seeds; 10. multicellular hairs; 11. glandular hairs; 12. bract; 13. staminate flowers.  
 Loc.: Taipei Co.; Pei-tou, H. Simada, 746, (TAI).

3, 1950; Bakurasu, *S. Sasaki*, s. n. VII. 28, 1923. Chiayi Co.: Mt. Morrison, *S. Sasaki*, s. n. VIII. 1935. Taitung Co.: Yoyota, *Y. Yamamoto & K. Mori*, 94; Zuli, *G. Masamune & K. Mori*, s. n. VII. 3, 1938; Oiwake, *S. Suzuki*, 10719; Kusuhara, *T. Suzuki*, 19456; Miharashi, *T. Hosokawa*, 5259. Hualien Co.: Do-mon, *T. Nakamura*, 4828; Tien-hsian, *C. C. Chuang & M. T. Kao*, 4411; Ta-tu-mi, *S. Suzuki*, 1512, 1607, 1735; *S. Sasaki*, s. n. VIII. 20, 1929; Taroko, *S. Suzuki*, 10408; *Liu, Chen & Kao*, 25; *T. Shimizu & M. T. Kao*, 10451. I-lan Co.: Kuei-shan-tau, *G. Masamune & S. Suzuki*, s. n. VII. 3, 1932; Habun, *N. Fukuyama*, 4468; Kobayashi, *S. Sasaki*, s. n. IX. 6, 1925.

12. *Whytockia* W. W. Smith, in *Trans. Bot. Soc. Edin.* 27: 338, 1818.  
*Oshimella* Masamune & Suzuki, in *Jour. Soc. Trop. Agr.* 6: 571, 1934.

Perennial, succulent herbs; pubescent throughout; rhizome creeping, bearing roots at nodes; stems erect, decumbent at base; leaves opposite, with one large leaf and one small leaf at each node, sessile or shortly petiolate, membranaceous, both surfaces villous, margins irregularly serrate, apex acute unequal at base; helicoid cymes axillary or terminal, without bracts; flowers few to many, long pedicellate; calyx 5-parted, corolla tubular and bilabiate, upper lip 2-lobes, slightly reflexed, lower lip 3-lobed, longer than the upper lip; stamens 4, attached to corolla base, filaments with sericeous hairs above, anthers connate; ovary globose, glabrous, stigma capitate; capsule ovoid, 2-valvate; seeds minute, many.

One species in Mainland China (Yunnan) and one species in Taiwan.

*Whytockia sasakii* (Hay.) B. L. Burt in *Kew Bull.* 33, 1941.

*Rhynchoglossum sasakii* Hay. *Icon. Pl. Formos.* 6: 34, 1916.

*Oshimella formosana* Masam. & Suzuki, in *Trop. Agr.* 6: 571, 1934.

*Oshimella sasakii* (Hay.) Masam. et Suzuki, in *Jour. Soc. Trop. Agr.* 6: 571, 1934.

Perennial, succulent, pubescent herbs; rhizome creeping, bearing roots at nodes; stems erect about 35 cm. tall, often decumbent at base; leaves opposite, with one large and one small leaf at each node, sessile or with petiole, large leaves 6-8 cm. 2-4.5 cm. wide, small leaves 1-2 cm. long, 0.5-1 cm. wide, membranaceous, oblique at base, both surfaces villous, margins irregularly serrulate, apex acute; helicoid cymes axillary or terminal, without bracts, long pedicellate; pedicels about 3 cm. long, covered with multicellular hairs; few to many flowered; calyx 5-parted, lobes ovate-lanceolate, 3 mm. long; corolla white, tubular and bilabiate, outside glabrous, inside with glandular hairs, upper lip 2-lobed, lobes slightly reflexed, lower lip 3-lobed, longer than the upper lip; stamens 4, attached to corolla base 4.5-5 mm. long, filaments with sericeous hairs on upper parts; anthers connate; ovary globose, glabrous; style short about 2.5 mm. long; stigma capitate; capsule ovoid, 2-valvate, seeds minute, many.

Distributed in Taiwan.

Taipei Co.: Wu-lai, *E. Matuda*, 239; *S. Suzuki*, s. n. XI. 10, 1928. Nantou Co.: Mt. Hon-hong, *M. T. Kao*, 6761; Mt. Noko, *S. Sasaki*, s. n. VIII. 1928; s. n. VIII. 23, 1929; Chi-tou, *M. T. Kao*, 7738. Hualien Co.: Sou-lan-shan, *C. C. Chuang & M. T. Kao*, 7078; Mt. Muh-kwa, *M. T. Kao*, 4211; *T. Nakamura*, 4443; Sakahen, *Y. Kudo & K. Mori*, 1983. I-lan Co.: Mt. Bonbon, *M. T. Kao*, 5971; Mt. Taiping, *S. Sasaki*, s. n. VIII. 16, 1925; *S. Suzuki*, s. n. VII. 28, 1929; *Y. Yamamoto*, s. n. IX. 1, 1925.

The type of *Rhynchoglossum sasakii* Hay., is in the Herbarium of the University of Tokyo. We are thankful to Dr. T. Yamazaki for sending us a photo of the type specimen.

Plate 14.



Plate 14. *Whytockia sasakii* (Hay.) Burt

1. habit; 2. flower; 3. calyx; 4. vertical section of flower; 5. stamens; 6. pistil; 7. ovary section;  
8. fruit; 9. seeds; 10. multicellular hairs; 11. glandular hairs.

Loc.: Taipei Co.; U-lai, S. Suzuki, s. n. XI 10, 1928, (TAI).

The type specimen of *Oshimella formosana* is in our own herbarium (TAI). We agree with Dr. Burt that *O. formosana* and *O. sasakii* are identical and should not have been reported as separate species.

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