

STUDY ON THE TAIWAN CUCURBITACEAE⁽¹⁾

by

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INTRODUCTION

The gourd family is distinguished by its tendril-bearing herbaceous stems, the unisexual flowers with inferior ovaries, with generally 3 parietal placentae which almost completely fill the locules and the unusual modification of the androecium.

The about 100 genera and 850 species of this family are mostly distributed in tropical regions around the world, many extending into the temperate zone. There are many species such as: cucumis 胡瓜 (*Cucumis sativus* L.), melons 香瓜 (*Cucumis melo* L.), watermelon 西瓜 (*Citrullus vulgaris* Schrad.), field pumpkin 南瓜 (*Cucurbita pepo* L.), vegetable sponge 絲瓜 (*Luffa cylindrica* (L.) Roem.) which have been cultivated for thousands of years. Some kinds are often used locally as medicinal herbs, especially 王瓜 (*Trichosanthes cucumeroides*) and 栝樓 (*Trichosanthes kirilowii*).

B. Hayata was the first scholar who made an enumeration of the Taiwan Cucurbitaceae (1906), he included *Trichosanthes* 2 species, *Gymnopetalum* 1 species, *Momordica* 1 species, *Zehneria* 2 species, *Bryonopsis* 1 species, *Mukia* 2 species, *Melothria* 1 species, *Alsomitra* 1 species and *Actinostemma* 2 species.

In 1911, 1912 and 1921, Hayata described many new species of the gourd family from Taiwan.

In 1938, Nakai revised the Japanese species of *Melothria* including the Taiwan species and he reduced the genera *Mukia* and *Zehneria* to synonyms of *Melothria*.

After 5 years, S. Kitamura and Y. Yoshida made a revision of the *Trichosanthes* and *Thladiantha* in their studies on medicinal drugs.

In 1944 Kitamura completed a survey of the gourd family from Japan including Ryukyu and Taiwan.

About 9 genera and 20 species including 2 varieties are treated in this paper.

I found several specimens in our herbarium of *Melothria indica* Lour. that had been previously wrongly identified as *M. mucronata*. This then is new record for Taiwan.

Gymnostemma simplicifolia Bl. was added to the flora of Formosa by T. Hosokawa in 1933, but from my examination of the specimens that were collected by S. Sasaki at Chin-shan in Hsinchu County in January 2, 1930, I notice that these plants not only have simple leaves but also have the three-leaflet forms, therefore I treat these plants as *G. pentaphyllum*.

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Descriptions of the genera, analytical key to species, species descriptions, general distribution of each species are given. All the specimens used for this study are deposited in the Herbarium of the Department of Botany, National Taiwan University (TAI) and in the Herbarium of Taiwan Forestry Research Institute (TAIF).

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CHARACTERISTICS OF THE CUCURBITACEAE

An annual or perennial, climbing or prostrate herb, rarely suffrutescent, stems often 5-angled; leaves alternate, usually palmately or pinnately 5-lobed or divided, tendrils spirally coiled, simple or variously forked, flowers unisexual, monoecious or dioecious, rarely bisexual, in axillary cymes or modifications of cymes, sometimes solitary, actinomorphic; staminate flowers with tubular calyx, segments 5, imbricate, or valvate, corolla free or gamopetalous, the petals or lobes 5, campanulate to rotate or salverform; stamens free or connate in variable arrangements, usually 3, rarely 1-5; pistillate flowers with a single pistil, the ovary inferior, placenta usually 3, placentation parietal, ovules many, rarely few, style single or 3-fid; fruits basically a berry with soft or hardened pericarp, often termed a pepo, dehiscent or more commonly indehiscent; seeds many, with a straight embryo having large cotyledons and without endosperm.

About 100 genera and 850 species mainly distributed in pantropical or subtropical regions.

Key to the genera

1. Leaves pedately 3-7-foliolate, rarely simple.....4. *Gymnostemma*
1. Leaves simple, often lobed or cleft2.
2. Petals fimbriate, white9. *Trichosanthes*
2. Petals or corolla not fimbriate, mostly yellow.....3.
3. Peduncle bearing a shield-shaped bract6. *Momordica*
3. Peduncle naked.....4.
4. Fruits a conical circumscissile capsule.....1. *Actinostemma*
4. Fruits ovoid or nearly globular, indehiscent5.
5. Stamens 3, anther cells straight or curved6.
5. Stamens 5, anther cells curved8.
6. Fruits ovoid acute at both ends with 10 longitudinal ribs3. *Gymnopetalum*
6. Fruits globose, round, smooth7.
7. Anthers straight, stamens inserted in the middle of the calyx-tube; leaves deltoid-ovate, truncate or hastate, entire or 3-lobed5. *Melothria*

7. Anthers curved, stamens inserted in the lower part of the calyx-tube; leaves palmately 5-lobed2. *Bryonopsis*
 8. Flowers white, less than 1 cm. in diameter; seeds winged.....7. *Neosalsomitra*
 8. Flowers yellow, 1-3 cm. in diameter; seeds wingless8. *Thladiantha*

1. *Actinostemma* Griff. Pl. Cantro. 24. t. 3, 1837.

A weak climbing herb with simple or bifid tendrils; leaves simple, petiolate, deeply cordate or hastate, dentate; flowers small, monoecious, in lax axillary panicles, pedicels jointed at the middle; calyx rotate, 5-parted, segments lanceolate-linear, margin glandular; corolla rotate, 5-parted, segments lanceolate-cordate; stamens 5, free, anther oblong, on one side, connective dilated-pappilose on the other side, panicles often staminate, with a few pistillate flowers near the base, ovary one-celled; stigma 2, reniform; ovules 2-4, anatrophous; fruits small, ovoid-conical, half-superior, covered with rough points, circumscissile above the middle; seeds 2-4, compressed, wrinkled, with denticulate margin.

About 6 or more species in Asia, one species in Taiwan.

Chinese name: 合子草屬 Ho Tzu Tsao Shu.

1. *Actinostemma lobatum* (Maxim.) Maxim. ex Fr. et Sav., Enum. Pl. Jap. 1: 175, 1875; Kitam. in Act. Phyt. et Geob. 13: 108, 1944.

Mitrosicyos lobatus Maxim. in Prim. Fl. Amur. 112, t. 7, 1859.

Mitrosicyos racemosus Maxim. in Prim. Fl. Amur. 112, in nota. 1859.

Karivia longicirrho Miq. in Ann. Mus. Bot. Lugd.-Bat. 2: 80, 1865.

Actinostemma racemosum (Maxim.) Cogn. in DC. Monogr. Phan. 3: 922, 1881.

Actinostemma japonicum Miq. in Ann. Mus. Bot. Lugd.-Bat. 3: 188, 1867.

Chinese name: 裂葉合子草 Lieh Yeh Ho Tzu Tsao (An herb with a pair-of-lobed-leaves).

Leaves simple, petiolate, narrow, triangular-hastate or triangular-cordate, dentate, acuminate or obtuse at the apex, 5-10 cm. long, 2-7 cm. wide, sometimes 3-5 lobed; panicles up to 12 cm. long; flowers small, yellowish-green, calyx segments linear-lanceolate, shorter than corolla; corolla segments ovate-oblong, 5-6 mm. long; pistillate flowers solitary at the base of inflorescence, pediceled, 1 cm. long; fruits oval, spiny tuberculate, circumscissile above the middle.

Manchuria, Korea, Japan, Mainland China and Taiwan.

Grows on bushlands along ditches.

Specimens examined:

Taipei Co.: Taipei, C. C. Chuang, 3050; S. Sasaki, Dec. 10, 1909, May 1917, July 22, 1927, (TAIF) 25190, 25191, 25192, 21561; San-chan-li, G. Masamune 2775; Yuan-shan, F. Nozumi, Aug. 20, 1940; Keelung, J. Fuji, (TAIF) 25196.

Hsinchu Co.: Wai-tai-ping, S. Sasaki, Dec. 7, 1930.

Chiayi Co.: Shuan-tou, H. Morimoto June 11, 1942.

2. *Bryonopsis* Arn. in Hook. Journ. Bot. 3: 274, 1841.

A climbing herb with bifid tendrils; leaves petiolate, palmately 5-lobed; flowers small, yellowish, monoecious, staminate and pistillate clusters in the same axils; staminate flowers calyx-tube widely campanulate, 5-toothed, corolla 5-parted, stamens 3, inserted low down in the calyx-tube, anthers free; pistillate flowers: staminoides 3, ovary ovoid, style slender, trifid at the top, placenta 3, ovule few; fruit a berry, spherical, indehiscent; seeds oblong or ovoid, compressed.

About 2 species distributed in Africa, India, Malaya, Australia, one species in Taiwan.

Chinese name: 琉球馬廐兒屬 *Ryu Kyu Ma Pa Erh Shu*.

1. *Bryonopsis lacinosa* (L.) Naud. in Ann. Sc. Nat. 4 Ser. 12: 141, 1859; Kitam. in Act. Phyt. et Geob. 13: 109, 1944.

Bryonia lacinosa L. Sp. Pl. ed. 1, 1013, 1753.

Chinese name: 琉球馬廐兒 *Ryu Kyu Ma Pa Erh*.

Leaves simple, cordate, deeply palmately 5-lobed, lobes usually linear-lanceolate, sometimes ovate or ovate-lanceolate, acuminate at the apex, margin serrulate, upper surface scabrid, 10-15 cm. long, 10-15 cm. wide; flowers monoecious, yellow, staminate and pistillate flowers clustered in the same axils; calyx and corolla campanulate, stamens 3, ovary 3-placenta, style 3; fruits globose, 2 cm. in diameter, green with white vertical stripes.

Africa, India, Malaya, Mainland China, Ryukyu and Taiwan.

Specimens examined:

Taipei Co.: Mt. Ta-tun, *Y. Shimada* Dec. 13, 1914, *A. T. Hsieh* (TAIF) 21376; Sui-yuan-ti, *S. Sasaki*, Oct. 2, 1927, *S. Suzuki*, April 18, 1929, 12381; Pei-tou, *S. Sasaki*, Nov. 13, 1924; Chu-shan-yuan, *T. Nonaka* & *K. Mori*, May 14, 1933, *H. C. Lee*, 2029; Yuan-shan, *Y. Shimada* (TAIF) 25211.

Nantou Co.: Nantou, *T. Kawakami* (TAIF) 25212.

Pingtung Co.: Pingtung, *E. Matuda*, Sept. 1, 1915; Mu-tan, *Y. Kudo* & *Mori* 2407; Heng-chun, *J. L. Wang*, Dec. 8, 1943; *T. Kawakami*, (TAIF) 25213; O-luan-pi, *S. Sasaki* (TAIF) 25216; Ken-ting, *S. Sasaki* (TAIF) 25124.

Botel Tobago: Ya-yu, *T. S. Liu* et al. Aug. 3, 1954; *K. Mori* (TAIF) 25219.

3. *Gymnopetalum* Arn. in Hook. Journ. Bot. 3: 278, 1841.

A twining herb, with simple tendril; leaves petiolate, cordate, 5-angular, nearly entire or deeply lobed; flowers white, large, monoecious; staminate solitary, peduncled, calyx-tube long, contracted near the mouth, segments 5, lanceolate, petals 5, stamens 3, anthers connate, elongate; pistillate calyx and corolla as same as in the staminate, ovary oblong, style long, stigmas 3, placenta 3; fruits ovate-oblong, 10 ridged, pubescent; seeds many, ellipsoid, compressed, margins nearly smooth.

About 9 species distributed in India, Malaya, one species in Taiwan.

Chinese name. 裸瓣瓜屬 Lo Pan Kua Shu.

1. *Gymnopetalum cochinchinensis* (Lour.) Kurz. in Journ. Asiat. Soc. Beng. **50**: 57, 1871; Kitamura in Act. Phyt. et Geob. **13**: 109, 1944.

Bryonia cochinchinensis Lour. Fl. Cochinch. 595, 1790.

Gymnopetalum chinense (Lour.) Merr. in Philip. Journ. Sci. **15**: 256, 1919.

Evonymus chinensis Lour. Fl. Cochinch. **1**: 194, 1793.

Scotanthus tubiflora Naud. in Ann. Sci. Nat. **16**: 173, t. 3. 1862.

Chinese name: 裸瓣瓜 Lo Pan Kua.

Leaves simple, cordate sometimes narrowly 3-lobed, both surfaces covered with short hairs, 4-8 cm. long, 4-6 cm. wide; flowers large, white, monoecious, staminate flowers in raceme, pistillate flowers solitary; bracts ovate-oblong, acuminate, calyx-tube 6-10 cm. long, covered with silky hairs, 5-cleft, segments lanceolate, corolla 5-lobed white, ovate; berry ovate-oblong, 3-5 cm. long, 2-3 cm. wide, with 10 vertical ridges, red when mature.

India, Malaya, Vietnam, Philippines, South China and Taiwan.

Specimens examined.

Hsinchu Co.: Hsin-chu, Y. Shimada (TAIF) 25236.

Ilan Co.: I-lan, T. Tanaka, (TAIF) 25235.

Nantou Co.: Neng-kao, S. Sasaki, Dec. 4, 1932; Nantou, S. Sasaki, (TAIF) 25237.

Chiayi Co.: Hou-ta-pu, S. Sasaki, Dec. 15, 1930; Chiayi, S. Sasaki Sept. 1917; Y. Shimada, (TAIF) 25238.

Tainan Co.: Kuan-tien, H. Morimoto, Nov. 3, 1942, Tai-nan, S. Sasaki (TAIF) 25239.

Kaohsiung Co.: Kuan-hsing, C. C. Chuang, 4733.

Pingtung Co.: Ping-tung, E. Matuda, May 1917, (TAIF) 25240; Nei-men, E. Matuda, Nov. 26, 1916.

4. *Gymnostemma* Bl. Bijdr. 23, 1825.

A climbing herb, with simple or bifid tendrils; leaves simple or palmately parted, leaflets 3-5, membranous, ovate-lanceolate, margins serrate; flowers small, greenish or white, dioecious, in axillary panicles, staminate flowers calyx 5-cleft; corolla deeply 5-cleft, rotate, segments lanceolate; stamens 5, filaments connate below, anther 2-celled, straight; pistillate flowers calyx and corolla as same as the staminate; ovary spherical, 2-3 celled, style 2-3, united at the base; fruits globose, indehiscent; seeds verrucose, 1-3.

5 species in Southern and Eastern Asia, one species in Taiwan.

Chinese name: 絞股藍屬 Chiao Ku Lan Shu (Tangled blue stem).

1. *Gymnostemma pentaphylla* (Thunb.) Makino in Tokyo Bot. Mag. **16**: 179, 1902; Kitam. in Act. Phyt. et Geob. **13**: 109, 1944.

Vitis pentaphylla Thunb. Fl. Jap. 105, 1784.

Cissus pentaphylla (Thunb.) Willd. Sp. Pl. **1**: 659, 1797.

Gymnostemma pedata Bl. Bijdr. 23, 1825.

Gymnostemma pedata var. *trifoliata* Hay. Icon. Pl. Formos. 10: 5, 1921.

Gymnostemma pentaphylla var. *trifoliatu* (Hay.) Sasaki, List Pl. Formos. 393, 1928.

Gymnostemma simplicifolia Bl. Bijdr. 23, 1825.

Chinese name: 絞股藍 Chiao Ku Lan, 金絲五爪龍, 五爪粉藤, 龍鬚藤.

An annual climbing herb, glabrous, with simple tendrils; leaves palmately compound, leaflets 5, 3 or simple, terminal leaflet lanceolate, acuminate at the apex, 5-10 cm. long, 1.5-4 cm. wide, serrate; flowers small, greenish, dioecious, in axillary panicles, calyx campanulate, 5-cleft, segments triangular, acute, corolla rotate, 5-cleft, segments lanceolate, stamens 5, filaments connate at the base; ovary globose, style 3; berry globose, 6-10 mm. long, indehiscent, purplish-black at maturity.

Southern Asia, Japan, Korea, China, India, Philippines, Malaya and Taiwan.

Specimens examined:

Taipei Co.: San-sia, S. Suzuki, 5918.

Ilan Co.: Nan-Shan, S. Suzuki, July 3, 1930; Mt. Tai-ping, S. Suzuki, 4036, 6136.

Hsinchu Co.: Chu-tung, S. Sasaki, Jan. 21, 1930; Wu-tzu-shan, T. Kawakami, (TAIF) 25248.

Nantou Co.: Neng-kao, S. Sasaki, Aug. 23, 1929; Ho-she, S. Suzuki 277; Chi-tou, C. C. Chuang 4031.

Chiayi Co.: Mt. Morrison, S. Sasaki, Oct. 14, 1906, Oct. 7, 1909; T. Kawakami (TAIF) 25242, 25243; Mt. A-li, Y. Yamamoto et K. Mori, Nov. 6, 1932; Y. Yamamoto et T. Nakamura, 6139.

Kaohsiung Co.: Chi-shan, T. Suzuki, 20841, T. Hosokawa, Jan. 3, 1931; Mt. Wu-wei, E. Matsuda (TAIF) 25251.

Pingtung Co.: Ping-tung, E. Matuda, Jan. 1, 1917.

Taitung Co.: Wu-shan, S. Suzuki, 10973, T. Hosokawa, 5369.

Hwalien Co.: Tong-Neng-Kao, S. Suzuki, 2012.

5. *Melthria* Linn. Gen. Pl. ed. 5, 21, no. 48, 1754.

A slender climbing herb, with simple or bifid tendrils; leaves petiolate, deltoid-ovate, truncate or hastate, entire or deeply 3-lobed, often punctate, flowers small, whitish-yellow, monoecious or dioecious; staminate flowers in racemes or corymbs rarely solitary, calyx-tube short, campanulate, or 5-toothed, corolla deeply 5-parted, stamens 3, inserted in the middle of the calyx-tube, anthers free, one-celled; pistillate flowers solitary or clustered, with long pedicels, corolla rotate, deeply 5-parted, ovary contracted beneath the corolla, globose; stigma mostly 3, ovules many; fruits small, ovoid or nearly globose, glabrous or warty, indehiscent, berry-like; seeds many, small, oblong or ovate, much compressed.

About 85 species in warm countries, 5 species in Taiwan.

Chinese name: 馬陵兒屬 Ma Pa Erh Shu.

Key to the species

1. Both surfaces of leaves densely covered with hairs, leaves palmately 5-cleft, staminate flowers clustered4. *M. maderaspatana*
1. Both surfaces of leaves glabrous or nearly so, leaves cordate, triangular, hastate, staminate flowers in racemes or corymbs, seeds smooth.....2.
2. Staminate flowers in racemes, anthers sessile; fruits with long pedicels, seeds without margin1. *M. formosana*
2. Staminate flowers in corymbs, anthers on long filaments; fruits with short pedicels; seeds with distinct margins or without margins.....3.
3. Fruits oblong, red, 4-5 cm. long; leaves coriaceous usually deeply 3-lobed, seeds 6 mm. long, without margin.....2. *M. heterophylla*
3. Fruits globose, black, 1-3 cm. long; leaves membranaceous, cordate, seeds with distinct margins.....4.
4. Flowers monoecious.....3. *M. indica*
4. Flowers dioecious.....5. *M. mucronata*

1. *Melothria formosana* Hay. in Journ. Coll. Sci. Tokyo Imp. Univ. **30**: 120, 1911.

Melothria mucronata (non Cogn.) Yamamoto in Journ. Trop. Agr. **8**: 143, 1936.

Chinese name: 臺灣馬陵兒.

An annual climbing herb; leaves membranaceous, triangular-cordate, 3-6 cm. long, 4-8 cm. wide, upper surface scabrous; flowers small, whitish yellow, monoecious, staminate flowers in axillary raceme, calyx-teeth short, linear; corolla deeply 5-cleft, segments triangular-ovate, obtuse; anthers sessile; fruits globose with long stalks, glabrous, 8-10 mm. in diameter, whitish-gray at maturity; seeds 5-6 mm. long, without margins.

Endemic in Taiwan.

Specimens examined:

Taipei Co.: Wan-tan, *H. Shimizu*, 2180; *T. Soma*, (TAIF) 25258.

Hsinchu Co.: Wai-tai-ping, *S. Sasaki*, Dec. 7, 1930.

Pingtung Co.: Ping-tung, *E. Matuda*, 1778; Heng-chun, *S. Sasaki*, (TAIF) 31382.

2. *Melothria heterophylla* (Lour.) Cogn. in DC., Monogr. Phan. **3**: 618, 1881; Kitam. in Act. Phyt. et Geob. **13**: 111, 1944.

Solena heterophylla Lour. Fl. Cochinch. **2**: 514, 1790.

Zehneria umbellata (Klein.) Thwaites Enum. Pl. Zeyl. 125, 1864.

Chinese name: 埔瓜, 變葉馬陵兒.

A perennial climber, with many tubers; tendrils simple; leaves coriaceous, cordate or hastate usually deeply 3-lobed, lobes ovate, oblong and linear, acute or obtuse at the apex, 5-10 cm. long, 5-6 cm. wide; flowers small, whitish yellow, monoecious, staminate flowers long-pedicellate in racemes or corymbs, calyx and corolla 5-cleft, segments triangular, pistillate flowers solitary; berry oblong, 4-5 cm. long, red at maturity; seeds without margins 6 mm. long.

India, Malaya, Vietnam, Mainland China and Taiwan.

Specimens examined:

Taipei Co.: Suei-yuan-ti, *S. Suzuki*, May 10, 1929; *H. Shimizu* 190; Sung-ken, *H. Shimizu*, 297; Chu-shan-yuan, *T. Nonaka* et *K. Mori*, May 14, 1933; *Y. Shimada*, May 20, 1912; Tsan-hsu-shan, *T. Fukuyama*, 1409; Mt. Ta-tun, *Y. Shimada* (TAIF) 25260; Shih-lin, *S. Sasaki*, (TAIF) 25262; *G. Masamune* 1422; Chu-tze-hu, *G. Masamune*, 571; Pei-tou, *S. Sasaki*, Oct. 25, 1914; *Y. Shimada* (TAIF) 25261; Shan-hsia, *H. Umetani*, Aug. 26, 1928; Taipei, *S. Sasaki*, July 3, 1929.

Taoyuan Co.: Chio-pan-shan, *T. Suzuki*, July 13, 1931.

Hsinchu Co.: Chu-tung, *H. Shimizu*, Oct. 27, 1934.

Nantou Co.: Sun-moon Lake, *Y. Kudo* et *S. Sasaki*, 15199; Shu-shan, *S. Suzuki*, Jan. 28, 1922; Ho-she, *Y. Yamamoto*, Nov. 10, 1938; Pu-li, *B. Hayata* et *S. Sasaki*, (TAIF) 25271; Nantou, *T. Kawakami*, (TAIF) 25268; *K. Mori*, (TAIF) 25270.

Tainan Co.: Kuan-tien, *H. Morimoto*, May 1, 1941; Kuan-tze-lin, *S. Sasaki* (TAIF) 25274.

Kaohsiung Co.: Kaohsiung, *S. Sasaki*, March 17, 1910; Chia-sien, *C. C. Chuang*, 4736.

Pingtung Co.: Tsao-chou, *S. Sasaki*, Mar. 20, 1931; Kao-shih-fu, *B. Hayata* et *S. Sasaki*, (TAIF) 25278.

Taitung Co.: Ta-wu, *E. Matuda*, May 23, 1918; *T. S. Liu* et al. Aug. 10, 1955.

Hwalien Co.: Hwalien, *Y. Shimada* (TAIF) 25279.

3. *Melothria indica* Lour. Fl. Cochinch. 35, 1790; Steward, Man. Vasc. Pl. Yangtze Valley 383, 1958.

Chinese name: 老鼠冬瓜 Lao Chu Tung Kwa (Rat Melon).

A slender vine with simple tendrils; leaves scabrous, triangular-ovate, acuminate, base hastate-cordate, margins subentire, 3-8 cm. long; flowers monoecious, staminate and pistillate solitary or few in the same axil, pedicels slender 1-2.5 cm. long; fruits ovoid or ellipsoid, pointed, about 2 cm. long.

Widely distributed in Philippines, India and Malaya. This a new record for Taiwan. Specimens had previously been wrongly identified as *M. mucronata*.

Specimens examined:

Nantou Co.: Suei-she, *S. Sasaki*, Sept. 12, 1929; Sun-moon Lake *Y. Kudo* et *S. Sasaki*, Sept. 20, 1929.

4. *Melothria maderaspatana* (L.) Cogn. in DC., Monogr. Phan. 3: 623, 1881; Kitam. in Act. Phyt. et Geob. 13: 110, 1944.

Cucumis maderaspatanus L. Sp. Pl. ed. 1: 1012, 1753.

Bryonia altaeoides Seringe in DC. Prodr. 3: 306, 1828.

Melothria altaeoides (Seringe) Nakai in Journ. Jap. Bot. 14: 127, 1938.

Melothria leisperma Matsum. (non Cogn.) Ind. Pl. Jap. 2: pt. 2, 610, 1912.

Mukia scabrella (L. f.) Arn. in Hook. Journ. Bot. 3: 276, 1841.

Chinese name: 倒吊金鐘 Tao Tiao Tin Chung, 天花.

A climbing herb; leaves cordate or slightly triangular, entire, palmately 5-cleft, both surfaces densely villose; flowers small, yellow; staminate flowers clustered; calyx teeth acute; corolla segments ovate-oblong, pistillate flowers solitary; anthers sessile; fruits berry, globose, 7-12 mm. in diameter, red; seeds concave.

Widely distributed in Africa, India, Malaya, Australia, Philippines, Vietnam, Southern China, Taiwan and Ryukyu.

Specimens examined:

Taipei Co.: Mt. Yang-ming, S. Sasaki, (TAIF) 25287, 25288; Mt. Ta-tun, Y. Shimada (TAIF) 25289; Pei-tou, H. Shimada, 359; Keelung-tao, G. Masamune et al. 120; An-kou, T. Suzuki, 5814; Mt. Men-tien, S. Sasaki, Oct. 31, 1924, Nov. 1913; Ching-shan, S. Sasaki, (TAIF) 25286.

Ilan Co.: Kuei-shan, K. Mori, April 27, 1938.

Hsinchu Co.: Hsin-chu, Y. Shimada (TAIF) 25292.

Hwalien Co.: Tai-lu-ko, T. Hosokawa, Aug. 12, 1932; Tong-men, S. Suzuki, 1333;

Tong-li, S. Sasaki, Aug. 20, 1929; Hwa-lien, Y. Shimada (TAIF) 25300.

Taichung Co.: Pa-hsien-shan, S. Suzuki, Oct. 24, 1929.

Nantou Co.: Tun-yuan, S. Suzuki, Aug. 3, 1926; Pu-li, S. Suzuki, 6454; T. Ito (TAIF) 25294; Nan-tou, K. Mori, (TAIF) 25293.

Tainan Co.: Kuan-tze-lin, H. Morimoto, Oct. 16, 1942.

Pingtung Co.: Tsuan-fan-shu, T. Hukuyama, 677; Feng-chun, Y. Kudo et K. Mori, 2888; Ping-tung, S. Sasaki, Mar. 24, 1910; Hsia-liu-chiu, T. Hosokawa, 1984; Hsia-ma-li, T. Suzuki, 4760; O-luan-pi, T. Suzuki, 6052.

Taitung Co.: Taitung, S. Sasaki, July 1906; Botel Tobago, T. S. Liu et al. Aug. 1, 1954; Pi-nan, G. Nakahara, (TAIF) 25284.

5. *Melothria mucronata* Cogn. in DC., Monogr. Phan. 3: 608, 1881; Kitam. in Act. Phyt. et Geob. 13: 111, 1944.

Zehneria kelungensis Hay. Icon. Pl. 10: 13, fig. 7-8, 1921.

Melothria kelungensis (Hay.) Hay. Icon. Pl. Formos. 10: 15, 1921.

Melothria odorata (non Hook. et Thom.) Henry List Pl. Formos. 46, 1896.

Chinese name: 黑果馬陵兒, 山刺瓜.

A climbing herb, herb, with simple tendrils; leaves 3-5 cm. long, 4-5 cm. wide, membranous, broadly ovate or ovate-cordate, acute or acuminate at the apex, margins entire or serrate, upper surface scabrous; flowers small white, dioecious, staminate flowers in axillary corymbs or short racemes; calyx short, reflexed, narrowly triangular; corolla segments ovate-oblong, slightly acute; pistillate flowers solitary; berry globose, 8-10 mm. long, black at maturity; seeds 3-4 mm. long, with distinct margins.

This species distributed in India, Malaya, Philippines and Taiwan.

Specimens examined:

Taipei Co.: Tan-suei, S. Sasaki (TAIF) 25311; Luan-luan, T. Kawakami, (TAIF)

25306; Chin-shan, S. Sasaki (TAIF) 25308; Kuei-shan, H. Shimada, 1272; Keelung, T. Suzuki, 6710; T. Kawakami June 27, 1913; Suei-yuan-ti, H. Shimizu, 358; H. Suzuki, April 18, 1926; T. Tanaka, 17744; Ta-tun-shan, H. Shimada, April 23, 1933; S. Suzuki, 10188; Wu-lai, S. Sasaki, (TAIF) 25314; Chi-hsin-shan, G. Masamune, 2795; Yang-ming-shan, C. C. Chuang, 2794; S. Sasaki (TAIF) 31405; Chu-san-yuan, C. C. Chuang, 3987.

Ilan Co.: Tu-chan, S. Suzuki, 1164; Lo-tung, S. Suzuki, 3636.

Hwalien Co.: Tien-hsiang, T. Shimizu et M. T. Kao; Tong-li, S. Suzuki, 1615; Tai-lu-ko, S. Suzuki, 6668.

Nantou Co.: Chi-tou, C. C. Chuang, 2859, 4001, 4021, 4035, 4044; Ching-shui-kou, T. C. Huang, 851; Ho-she, S. Suzuki, 294, 354; S. Sasaki, (TAIF) 25322; B. Hayata, (TAIF) 25323.

Chiayi Co.: A-li Shan, R. Kanehira et S. Sasaki, Feb. 1913.

Kaohsiung Co.: San-ping, C. C. Chuang, 3274; Kao-hsiung, S. Sasaki (TAIF) 25324.

Pingtung Co.: Ping-tung, E. Matuda, 763; Pai-wan, E. Matuda, Nov. 7, 1916; Tsuan-fan-shu, J. L. Wang; O-luan-pi, S. Sasaki, (TAIF) 25328.

Taitung Co.: Wu-shan, T. Hosokawa, 5296.

6. *Momordica* Linn. Sp. Pl. ed. 1. 1009, 1753.

A climbing herb with simple or bifid tendrils; leaves simple, cordate, petiolate; flowers yellow or white, monoecious or dioecious; staminate flowers solitary, in panicles or racemes; calyx campanulate, 5-cleft; corolla rotate 5-cleft, cleft nearly to the base; stamens 5, filaments short, anthers free; pistillate flowers solitary, ovary 3 placenta, stigma 3; fruits oblong or nearly spherical, small or large, often spiny-tuberculate, rugose, indehiscent, but occasionally dehiscent at maturity.

About 35-40 species in tropical Asia and Africa, two species in Taiwan.

Chinese name: 苦瓜屬 Ku Kua Shu (Bitter Squash).

Key to the species

1. Leaves deeply 5-7 cleft, 3-5 cm. long, margins denticulate; fruits 2-3 cm. long, yellow1. *M. charantia*
1. Leaves 3-5 cleft; 6-13 cm. long, margins warty glandular; fruits 12-15 cm. long, red.....2. *M. cochinchinensis*

1. *Momordica charantia* Linn. Sp. Pl. ed. 1. 1009, 1753; Steward Man. Vasc. Pl. Yangtze Valley 383, 1958.

Chinese name: 苦瓜 Ku Kua.

An annual climber, stems covered with hairs, with simple tendril; leaves reniform orbicular, palmately deeply 5-7 cleft, lobes ovate; 3-5 cm. long, 3-4 cm. wide; flowers yellow, monoecious, long pedicellate, solitary in axils of leaves; calyx campanulate, 5-cleft, segments ovate, obtuse; corolla rotate, deeply 5-cleft; staminate flowers

stamens 3, pistillate stigma 3 cleft; fruits oblong 2-3 cm. long, verrucose, yellow when mature.

This species is distributed in tropical and subtropical regions.

Specimens examined:

Taipei Co.: Bamboo-lake, *T. Nakamura*, 4016.

Nantou Co.: Ho-she, *M. T. Kao*, 2979.

Taichung Co.: Sha-lu, *T. Kawakami* et *Y. Shimada*, 4179.

Chiayi Co.: Chia-yi, *H. Morimoto*, 466.

Tainan Co.: Tainan, *S. Sasaki*, May 13, 1931.

2. *Momordica cochinchinensis* (Lour.) Spreng., Syst. Veg. 3: 14, 1826; Kitam. in Act. Phyt. et Geob. 13: 112, 1944.

Muricia cochinchinensis Lour. Fl. Cochinch. 596, 1790.

Momordica mixta Roxb. Fl. Ind. 3: 709, 1832.

Chinese name: 木鼈子 *Mu Pie Tze*.

A perennial climber, with simple tendrils and tuberous roots; leaves broadly cordate, deeply palmately 3-5 cleft with warty glands on the margin, 6-13 cm. long, 5-10 cm. wide; flowers pale yellow covered with purplish spots; staminate flowers with long pedicels, large bracts at base; pistillate with short pedicels; fruits oblong, 12-15 cm. long, red.

India, Malaya, Vietnam, Philippines, Southern China and Taiwan.

Specimens examined:

Taipei Co.: Chi-chu, *C. C. Chuang*, 3096; Ho-liao, *S. Suzuki*, 5885; Nei-hu, *H. Simizu*, Dec. 15, 1934; Hsin-tien, *H. Simizu*, 2938; 2245; Shen-keng, *H. Simizu*, 391; Chushan-yuan, *C. C. Chuang*, 3996.

Ilan Co.: Lo-tong, *S. Hirazukai* (TAIF) 25339.

Miaoli Co.: Miao-li, *K. Mori*, (TAIF) 25340.

Nantou Co.: Sun-moon Lake, *S. Sasaki*, Sept. 21, 1929; Lien-hwa-chi, *S. Hibino* et *S. Suzuki*, July 17, 1936.

Pingtung Co.: Ping-tung, *E. Matuda*, Sept. 20, 1915; Su-bon-she, *E. Matuda*, 848.

7. *Neoalsomitra* Hutch. in Ann. Bot. n. s., 6: 97, 1942.

Alsomitra Roem. Syn. Fam. 2: 117, 1846.

A large climber; tendrils simple or bifid; leaves palmately compound; flowers small, dioecious, white, in panicles with filiform branches; staminate flowers: calyx rotate, 5 parted, segments oblong, acute; corolla rotate 5-parted, segments obtuse; stamens 5, filaments short, anthers small, oblong, straight, 1-celled, without staminoides; pistillate flowers: calyx and corolla as in staminate flowers, in racemes, corolla 9 mm. long, with short hairs on the back; ovary elongate clavate, 1-celled, densely hairy, style 3, conical with semilunate stigmas, ovules many, parietal placenta; fruits capsule, large, cylindrical, truncate, 3-valved at the apex; seeds many, flattened, wings thin.

14 species in the world, mainly in Malaya, Australia, and one species in Taiwan.
Chinese name: 新穿山龍屬 Hsin Tsuan Shan Long Shu.

1. *Nealsomitra integrifoliola* (Cogn.) Hutch. in Ann. Bot. n. s., 6: 97, 1942; Jacobs in Blumea 7: 622, 1954.

Alsomitra integrifoliola Hay. in Journ. Coll. Sci. Imp. Univ. Tokyo 30: 121, 1911; Kitam. in Act. Phyt. et Geob. 13: 108, 1944.

Alsomitra tonkinensis Gagnep. in Bull. Mus. Paris 327, 1918.

Gynostemma integrifolia Cogn. in DC., Monogr. Phan. 3: 916. 1881.

Gynostemma elongatum Merr. in Philip. Journ. Sci. 3: 267, 1908.

Hemsleya elongata (Merr.) Cogn. in Engler, Pflanzen. 4, 275, 1: 26, 1916.

Chinese name: 新穿山龍 Hsin Tsuan Shan Long.

A climbing shrub with bifid tendrils, glabrous; leaves palmately compound, leaflets 5, oblong or lanceolate, acute at the apex, entire, 6-9 cm. long, 2-4 cm. wide; flowers small, yellowish white, dioecious; staminate flowers in panicles, calyx oblong-lanceolate, filaments short, anthers small; pistillate flowers in racemes, corolla 9 mm. in diameter; ovary clavate, 1-celled, fruits long tubular, 5 cm. long, 1.5 cm. wide, truncate at the apex, dehiscent in 3-valves; seeds lobed, bearing a single membranous wing. Specimens examined:

Taipei Co.: Rai-she, S. Sasaki, Oct. 29, 1935.

Taichung Co.: Mei-yuan, S. Sasaki, Dec. 15, 1924.

Nantou Co.: Ching-shui-kou, T. C. Huang, 1886; Pu-li, S. Sasaki, Nov. 15, 1911; Nan-tou.

T. Ito, (TAIF) 25198; R. Kanehira et Sasaki, (TAIF) 25199.

Chiayi Co.: Chia-yi, S. Sasaki, (TAIF) 25201, 25202.

Kaohsiung Co.: Chung-hsin-long, S. Sasaki, Sept. 25, 1933; Shan-ping, C. C. Chuang, 3172.

Pingtung Co.: Shan-ti-men, S. Suzuki, Sept. 1, 1932; Kao-shih-fo, Y. Kudo et S. Suzuki, Jan. 1, 1928; Pingtung, S. Sasaki (TAIF) 25203.

Taitung Co.: Pa-ron-wei, S. Sasaki, Oct. 1907; Kobayashi (TAIF) 25205.

8. *Thladiantha* Bunge Enum. Pl. Chin. Bor. 29, 1834.

A perennial climbing herb with tuberous roots and simple tendrils; leaves simple, ovate, entire or rarely 3-lobed, deeply cordate; flowers large or small, dioecious, yellow, peduncled; staminate flowers in racemes or solitary, calyx-lobe short, rotate or campanulate; corolla campanulate, 5-parted, segments elliptical, revolute, 1-3 scales at the base; stamens 5; anthers one-celled; pistillate solitary, calyx and corolla the same as the staminate, without scales, staminoides 5, long, ovary oblong, style deeply trifid, placenta 3; fruits ellipsoid, nearly glabrous, indehiscent, with vertical ribs; seeds many, smooth compressed.

About 24 species in eastern Asia, 3 species in Taiwan.

Chinese name: 青牛膽屬 Ching Niu Tan Shu.

Key to the species

1. Staminate flowers with bracts; leaves 3-lobed.....3. *T. taiwaniana*
1. Staminate flowers without bracts; leaves ovate-cordate, margins denticulate (veins ending in clavate tips)2.
2. Stems glabrous; leaves nearly glabrous; margins crenate; calyx slightly pubescent2. *T. punctata*
2. Stems villose; leaves densely covered with brown hairs, margins dentate; calyx villose.....1. *T. nudiflora*

1. ***Thladiantha nudiflora*** Hemsl. in Journ. Linn. Soc. **23**: 316, t. 8, 1888; Kitam. in Act. Phyt. et Geob. **13**: 113, 1944.

Thladiantha formosana Hay. Fl. Mon. Formos. 100, t. 11, 1908; Icon. Pl. Formos. **2**: 35, 1912.

Chinese name: 山瓜 Shan-Kua, 青牛膽.

A climbing herb, densely villose; leaves ovate-cordate, acute at the apex, 9-15 cm. long, 5-8 cm. wide, upper surface scabrous, lower surface densely covered with brown hairs; margins irregular, denticulate; flowers small, yellow, staminate flowers in racemes, calyx-tubes short, segments lanceolate, 5 mm. long, corolla ovate-lanceolate 10-15 mm. long; fruits globose, 3-4 cm. long, red at maturity.

This species is distributed in Mainland China and Taiwan.

Specimens examined:

Ilan Co.: Wu-tai, *T. Suzuki*, 7567; Su-chi, *S. Suzuki*, 4947; - Mt. Li-tung, *E. Matuda*, July 29, 1918; Nan-shan, *S. Sasaki*, (TAIF) 25345.

Taoyuan Co.: Tao-yuan, *S. Sasaki*, June 1918; Dec. 10, 1917.

Hsinchu Co.: Hsin-chu, *S. Suzuki*, 4951; Ching-chuan, *S. Sasaki*, Jan. 2, 1930.

Taichung Co.: Mt. Pa-sien, *T. I. Chuang* et al. 2600; Kuei-tze-tou, *T. Ito*, Oct. 1917.

Nantou Co.: Tun-yuan, *S. Suzuki*, 2743; Wu-she, *S. Sasaki*, July 28, 1922; *Y. Saito*, Sept. 12, 1925; *T. Kawakami*, (TAIF) 25349; Ho-she, *S. Suzuki*, Oct. 11, 1935; *M. T. Kao*, Dec. 16, 1954; Lien-hwa-chi, *Y. Kudo* et *K. Mori*, July 9, 1930; *K. Mori*, Oct. 28, 1936; Pu-li, *T. Kawakami* (TAIF) 25350.

Chiayi Co.: A-li-shan, *T. Kawakami*, (TAIF) 25352.

Hwalien Co.: Tai-lu-ko, *T. Hosokawa*, 5079; 5085; *S. Suzuki*, 10573, Tong-li, *S. Sasaki*, Aug. 21, 1929; East Neng-kao, *S. Suzuki*, 2010.

Taitung Co.: Tsan-pan, *Y. Yamamoto* et *K. Mori*, 232, 301.

2. ***Thladiantha punctata*** Hay. Mater. Fl. Formos. 119, 1911; Icon. Pl. Formos. **1**: t. 37, 1911; Kitam. in Act. Phyt. et Geob. **13**: 113, 1944.

Chinese name: 斑點青牛膽.

An annual climber; stems nearly glabrous; leaves ovate-cordate, acuminate at the apex; 4-15 cm. long, margins denticulate, upper surface densely verrucose; flowers small, yellow, staminate flowers solitary in racemes, calyx-tube 2-3 mm. long; corolla

1-3 cm. long, punctate, deeply 5-cleft, without bracts; fruits globose, about 5 cm. long.

Endemic to Taiwan.

Specimens examined:

Type: T. Kawakami et Mori (TAIF) 1420, Mt. Wu-tzu, Hsinchu Co. July 2, 1906.

Ilan Co.: Tun-chang, S. Suzuki, 4154, 3719.

Taoyuan Co.: Chiao-pan-shan, T. Suzuki, July 13, 1931; Y. Shimada et K. Mori, Mar. 15, 1910; S. Sasaki, May 1929; Mar. 25, 1910.

Nantou Co.: Lien-hwa-chi, Y. Yamamoto, Oct. 11, 1929; Wu-she, G. Masamune, 2240; T. Kawakami (TAIF) 25358; Pu-li, Y. Shimada, (TAIF) 25359.

Chiayi Co.: Mt. A-li, S. Sasaki, (TAIF) 25361.

3. *Thladiantha taiwaniana* Hay. Mater. Fl. Formos. 119, 1911; Icon. Pl. Formos. 2. 36, 1912; Kitam. in Act. Phyt. et Geob. 13. 113, 1944.

Chinese name. 臺灣青牛膽.

A climbing herb, covered with short hairs; leaves ovate-cordate, 3-lobed, margins irregularly dentate; upper surface hirsute, 5-10 cm. long; staminate flowers in axillary racemes, bracts obovate 7-10 mm. long; corolla 5, oblong; fruits globose 2.5 cm. in diameter, covered with thin hairs.

Endemic to Taiwan.

Specimens examined:

Type locality. Kuei-tze-tou Taichung County.

Kaohsiung Co.. Niao-sung, S. Sasaki, July 23, 1933.

9. *Trichosanthes* Linn. Gen. Pl. ed. 5, 439, 1754.

Climbing herbs; sometimes with tuberous roots; tendrils mostly 1-5 branched; leaves entire or 3-5 lobed; flowers white, monoecious or dioecious; staminate flowers in racemes, or solitary; calyx long, tubular, campanulate 5-lobed; corolla rotate or cup-shaped, long, fimbriate; anthers connate, curved S-shaped; stamens 3; filament short; pistillate flowers solitary, ovary oblong, 1-celled, with many ovules, 3-5 placentas; fruits fleshy, smooth, oblong or globose; seeds many, compressed, ellipsoidal or somewhat rectangular and with a central thickened band.

About 50 species, from India and Japan to Australia, 5 species and 2 varieties in Taiwan.

Chinese name. 括縷屬 Kua Lü Shu.

Key to the species

1. Calyx-segments entire2.
1. Calyx-segments denticulate or slightly cleft7.
2. Bracts slender, small, not foliaceous.....3.
2. Bracts 1-2.5 cm. long, large, broadly obovate, foliaceous.....6.
3. Leaves deeply palmately 5-7 lobed1. *T. bracteata*

3. Leaves entire or lobed, with a prominent deeply lobed cordate base4.
 4. Leaf margins irregularly crenate or 3 lobed5.
 4. Leaf margins entire with remote teeth.....3. *T. cucumeroides* var. *formosana*
 5. Leaves and lobes acute or obtuse at apex.....2. *T. cucumeroides*
 5. Leaf bases cordate and deeply lobed, apex rounded
4. *T. cucumeroides* var. *stenocarpa*
 6. Base of calyx-tube with long hairs, leaves entire, ovate-cordate..5. *T. homophylla*
 6. Base of calyx-tube scarcely hairy, leaves usually deeply palmately divided.....
6. *T. kirilowii*
 7. Bract margins undulate, tendrils 4-5-fid; leaves nearly as broad as long, with
 5-7 shallow lobes, acuminate at apex, base deeply cordate....7. *T. quinquangulata*
 7. Bract margins variably cleft, tendrils 2-3-fid; leaves cordate, deeply palmately
 5-9 lobed.....1. *T. bracteata*
 1. **Trichosanthes bracteata** Voigt Hort. Suburb. Calc. 58, 1845; Kitam. in Act. Phyt.
 et Geob. 13: 115, 1944.
Modecca bracteata Lam. Encycl. Meth. Bot. 4: 210, 1797.
Trichosanthes palmata Roxb. Fl. Ind. 3: 704, 1832.
Trichosanthes schizostroma Hay. Icon. Pl. Formos. 10: 13, 1921.
Trichosanthes laceribracteata Hay. Mater. Fl. Formos. 117, 1911.
Trichosanthes koshunensis Hay. Icon. Pl. Formos. 10: 10, 1921.
Trichosanthes multiloba Hay. (non Miq.) Enum. Pl. Formos. 157, 1906.
Trichosanthes shikokiana Makino in Tokyo Bot. Mag. 6: 54, 1892.
Trichosanthes punctata Hay. Icon. Pl. Formos. 10: 13, 1921.

Chinese name: 苞葉栝樓.

A scandent vine with bifid tendrils; leaves petiolate, very variable in shape, 10-15 cm. long, as broad as long, apex acute obtuse often 3-5 lobed, base broadly cordate, margins with veins ending in distinct teeth, racemes axillary, flowers bracteate, bracts large, embracing the floral buds, broadly ovate, acute; margins fimbriate; staminate flowers shortly pedicellate, calyx tubuliform, 3 cm. long; corolla lacerate 13 mm. long; fruits oblong-globose about 7 cm. long, red at maturity.

Distributed in India, Malaya, Philippines, Southern China, Japan and Taiwan.

Specimens examined:

Taipei Co.: Wan-tan, H. Shimizu, 2907, 2462; Yang-ming-shan, C. C. Chuang, 3925.

Taoyuan Co.: Chia-pan-shan, T. Soma (TAIF) 25387. (Type of *T. schizostroma*)

Ilan Co.: Mt. Bonbon, M. T. Kao, 5958; Nan-shan, S. Sasaki, Sept. 4, 1925; Shuh-chi, S. Suzuki, 4990; Mt. Tai-ping, S. Suzuki, Aug. 15, 1928.

Nantou Co.: Wu-she, S. Sasaki, July 28, 1922; Lien-hwa-chi, S. Hibino et S. Suzuki, July 21, 1936.

Pingtung Co.: Sou-ka, C. C. Chuang, 3496.

Hwaiien Co.: Hwa-lien, Y. Shimada (TAIF) 25378.

Taitung Co.: Pi-nan, *Kobayashi* (TAIF) 25379. (Type of *T. laceribracteata*).

2. *Trichosanthes cucumeroides* Maxim., ex Fr. et Sav. Enum. Pl. Jap. 1: 172, 1875.

Platygonia kaempferi Naud. in Ann. Sc. Nat. Ser. 5: 5, 33 t. 5, 1866.

Trichosanthes hainansis Hay. Icon. Pl. Formos. 10: 8, 1921.

Trichosanthes cucumeroides Maxim. var. *globosa* Honda in Tokyo Bot. Mag. 54: 468, 1940.

Chinese name: 王瓜, 師古草, 野冬瓜, 鴨旦袋.

A twining pubescent herb, hairs trigose, with simple tendrils; leaves variable in shape, deeply cordate, palmately 3-5 lobed; flowers dioecious, staminate flowers 2 or 3, or in racemes, bracts small, pistillate flowers solitary; calyx tubular, 5 cleft, linear-lanceolate; corolla white, 5-cleft, segments ovate-lanceolate; stamens 3; berry oblong or globose, 5-7 cm. long; seeds of this species and 2 the following varieties are somewhat rectangular and have a broad band across in center.

Distributed in Japan, Mainland China and Taiwan.

Specimens examined:

Ilan Co.: Mt. Tai-pin S. *Suzuki*, Aug. 15, 1928.

Taipei Co.: Yang-ming-shan, *Y. Shimada* (TAIF) 25363; San-chia, *T. Soma*, Feb. 1912; Mt. Ta-tung S. *Sasaki*, Jun. 1928; Pi-tan, *H. Shimizu*, Nov. 21, 1936; Kan-kou, *S. Sasaki*, Nov. 1932; San-chan-li, *J. M. Chao* et *S. Huang*, Dec. 2, 1964.

Hsinchu Co.: Chin-shan, *S. Sasaki*, Jan. 2, 1929.

Nantou Co.: Pa-hsien-shan, *S. Suzuki*, Oct. 22, 1929; Sun-moon Lake, *Y. Kudo* et *S. Sasaki*, 15361.

3. *Trichosanthes cucumeroides* Maxim. var. *formosana* (Hay.) Kitam. in Journ. Jap. Bot. 19: 38, 1943; in Act. Phyt. et Geob. 13: 116, 1944.

Trichosanthes formosana Hay. Icon. Pl. Formos. 10: 7, 1921.

Chinese name: 臺灣括樓.

A climbing herb, covered with hairs; leaves membranaceous, triangular-cordate, acuminate, entire or dentate or denticulate; staminate flowers axillary, bracts oblanceolate; calyx-tube long tubular, 5-cleft linear; corolla 5, lanceolate, margins fimbriate, fruits globose.

Endemic to Taiwan.

Specimens examined:

Taipei Co.: Pi-tan, *H. Shimizu*, 3190; Wu-lai, *E. Matuda*, July 25, 1918; Shih-lin, *Y. Shimada* (TAIF) 25365; Yang-ming-shan, *Y. Shimada* (TAIF) 25364.

4. *Trichosanthes cucumeroides* Maxim. var. *stenocarpa* Honda in Tokyo Bot. Mag. 54: 223, 1940.

Trichosanthes matsudai Hay. Icon. Pl. Formos. 10: 10, 1921.

Chinese name: 狹果括樓.

A climbing herb, densely covered with hairs; leaves membranaceous triangular and deeply cordate, 3 lobed; fruits oblong, glabrous, 7-9 cm. long, 2.5-4 cm. wide.

Japan and Taiwan.

Specimens examined:

Taipei Co.: Yang-ming Shan, C. C. Chuang, 3924; Y. Shimada (TAIF) 25380.

Ilan Co.: Nan-shan, S. Sasaki, Sept. 4, 1925.

Taichung Co.: Ta-chu-shan, T. S. Liu, et al. Oct. 24, 1957; Pa-hsien-shan, S. Sasaki, Dec. 31, 1932; Dec. 1928.

Nantou Co.: Sun-moon Lake, Y. Kudo et S. Sasaki, 15612; Lien-hwa-chi, Y. Yamamoto, Oct. 15, 1929; Suei-she, S. Sasaki, Sept. 12, 1929.

Kaohsiung Co.: Chia-hsien E. Matuda, (TAIF) 25384. (Type of *T. matsudai*)

5. *Trichosanthes homophylla* Hay. Icon. Pl. Formos. 10: 8. f. 4-5, 1921; Kitam. in Act. Phyt. et Geob. 13: 116, 1944.

Trichosanthes mushaensis Hay. Icon. Pl. Formos. 10: 11, f. 6, 1921.

Chinese name: 芋葉括樓.

A climbing herb, stems angled; with trifid tendrils; leaves petiolate, oblong-cordate, acute, 10-15 cm. long, 5-8 cm. wide, upper surface scabrous, flowers in axillary racemes, white, bracts obovate; calyx-tube, 5-cleft, linear, corolla 5, obovate; fruits oblong, 10 cm. long; seeds elliptical, much like a watermelon seed.

Endemic to Taiwan.

Specimens examined:

Listed as type by Hayata: Chio-pan-shan, T. Soma (TAIF) 25370, Y. Shimada (TAIF) 25371; Nan-tou, Kawakami et Mori (TAIF) 25372; Tai-tung, Kobayashi, (TAIF) 25375.

Taipei Co.: Ai-yi, T. Suzuki, 18391; Mohen, S. Suzuki, 6110; Shu-lin, Y. Shimada, Dec. 13, 1914; S. Sasaki, Dec. 13, 1914.

Ilan Co.: Tai-ping Shan, S. Suzuki, Aug. 1, 1928; Ta-yen Shan, M. T. Kao, 3180.

Taoyuan Co.: Chiao-pan, S. Sasaki, June 1916.

Nantou Co.: Wu-she, S. Sasaki, July 28, 1922; B. Hayata, (TAIF) 25391 (Type of *T. mushaensis*); Chi-tou, C. C. Chuang, 4075, 4076.

Kaohsiung Co.: Shan-ping, C. C. Chuang, 3201.

Hwalien Co.: Tai-lu-ko, S. Sasaki, May 31, 1933; E. Matsuda (TAIF) 25374.

Taitung Co.: Ta-li-ku, S. Sasaki, Feb. 25, 1925; Ching-shuei, Y. Yamamoto et K. Mori, July 30, 1937.

6. *Trichosanthes kirilowii* Maxim. Prim. Fl. Amur. 482, 1859; Kitam. in Act. Phyt. et Geob. 13: 115, 1944.

Chinese name: 括樓.

A climbing herb; with 2-5-fid tendrils; roots long and thickened; leaves variable in shape, deeply 5-7-lobed, slightly longer than broad, cordate at the base; margins with remote teeth; staminate flowers in axils, 10-20 cm. long, bracts obovate or ovate 2-2.5 cm. long, pedicels 4.5 cm. long; fruits ovate, 9-10 cm. long.

Korea, Mainland China, Japan and Taiwan.

Specimens examined:

Taipei Co.: Mt. Ta-tun *T. C. Huang*, 2410; Wu-lai, *T. S. Liu*, 30081; Wu-liao, *T. Hosokawa*, 820.

Ilan Co.: Mt. Tai-ping *C. C. Chuang, J. M. Chao & M. T. Kao*, 4781.

Hwalien Co.: Pan-pen, *S. Suzuki*, 1679.

7. *Trichosanthes quinquangulata* A. Gray Un. St. Expl. Exped. **1**: 645, 1854; Kitam. in Act. Phyt. et Geob. **13**: 115, 1944.

Chinese name: 蘭嶼栝樓.

A strong twining herb, nearly glabrous, with 4-fid tendrils; leaves broadly cordate, 10 cm. long, as wide as long; cordate at the base, acute at the apex, margins 5-angled; staminate flowers in axillary racemes, about 20 cm. long, flowers at the apex of axis, bracts conspicuous, very large, nearly entire, 3 cm. long.

Philippines, Malaya and Taiwan (Botel Tobago).

Specimen examined:

Botel Tobago, *T. Mori*, April 15, 1907; *G. Masamune*, 3875; *S. Sasaki*, 380585; *G. Nakahara* (TAIF) 25396; *R. Kanshira* et *S. Sasaki*, (TAIF) 25394.

Lu Tao, *T. Kawakami* (TAIF) 25393.

Excluded species

Trichosanthes okamotoi Kitamura in Journ. Jap. Bot. **19**: 40, 1943.

Dr. Kitamura reported this species as growing on Taiwan but no specimens are available for examination at present.

LITERATURE CITED

- (1) BAILEY, L. H.: Manual of Cultivated Plants Rev. Ed. 1958.
- (2) BENTHAM, G. and HOOKER, J. D.: Genera Plantarum 1862.
- (3) CLARKE, C. B.: In Hooker, J. D., The Flora of British India **2**: 604-635, 1879.
- (4) COGNIAUX, A.: Cucurbitaceae in DC. Monogr. Phan. **3**: 325-1008, 1881.
- (5) _____: Cucurbitaceae Fevilleae et Melothrieae, in Engler's Das Pflanzenreich **66**: 1-277, 1916.
- (6) _____ and HARMS, H.: Cucurbitaceae, Cucurbiteae—Cucumerieae in Engler's Das Pflanzenreich **88**: 1-246, 1924.
- (7) ENGLER, A. and PRANTL, A.: Die Natürlichen Pflanzenfamilien **4**: 5, 1-39, 1894.
- (8) FORBES, F. B. and HEMSLEY, W. B.: An enumeration of all the plants known from China proper, Formosa, Hainan, Corea, the Luchu Archipelago, and the Island of Hongkong, together with their distribution and synonymy in Jour. Linn. Soc. Bot. **23**: 312-321, 1888.
- (9) HAYATA, B.: Enumeratio Plantarum Formosanum 1906.
- (10) _____: Materials for A Flora of Formosa 1911.
- (11) _____: Icones Plantarum Formosarum **2**: 30-42, 1912; **10**: 5-16, 1921.
- (12) HEIMLICK, L. F.: The development and Anatomy of the staminate flower on the Cucumber in Amer. Journ. Bot. **14**: 227-237, 1927.
- (13) HOSOKAWA, T.: Revisio ad Floram Formosanom (II) in Trans. Nat. Hist. Soc. Formos. **23**: 91-93, 1933.
- (14) HUTCHINSON, J.: The Families of Flowering Plants Sec. Ed. 242-245, 1959.
- (15) ITO, T.: 臺灣植物圖說 (Illustrations of Formosan Plants) 707-722, 1927.
- (16) JACOBS, M.: Notes on some Malaysian Cucurbitaceae in Blumea **7**: 617-622, f. 1-3, 1954.

- (17) JUDSON, J. E.: The morphology and vascular anatomy of the pistillate flower of the Cucumber in Amer. Journ. Bot. **16**: 69-86, 1929.
- (18) KITAMURA, S. and YOSHIDA, Y.: Trichosanthes et Thladianthae Japonicae in Jour. Jap. Bot. **19**: 20-45, f. 1-8, 1943.
- (19) KITAMURA, S.: Synopsis Cucurbitacearum Japonicarum in Act. Phyt. et Geob. **13**: 106-117, 1944.
- (20) _____ and Hori, M.: Colored Illustrations of Herbaceous Plants of Japan (Sympetalae) 97-99, 1961.
- (21) LAWRENCE, H. M.: Taxonomy of Vascular Plants 1955.
- (22) LINNAEUS, C.: Species Plantarum ed. 1. 1753.
- (23) MASAMUNE G.: Short Flora of Formosa 1936.
- (24) _____: A List of Vascular Plants of Taiwan 1954.
- (25) MERRILL, E. D.: Enumeration of Philippines Plants **3**: 578-586, 1923.
- (26) _____: A Flora of Manila, 1912.
- (27) NAKAI, T.: On the Japanese Species of Melothria in Journ. Jap. Bot. **14**: 122-131, 1938.
- (28) OHWI, J.: Flora of Japan 1956.
- (29) SERINGO, N. C.: Cucurbitaceae in DC. Prodr. **3**: 297-320, 1828.
- (30) STEWARD, A. N.: Manual of Vascular Plants of the Lower Yangtze Valley China 379-383, 1958.
- (31) YAMAMOTO, Y.: Observations ad Floram Formosanam XIII. in Journ. Soc. Trop. Agr. **8**: 142-147, 1936.
- (32) WHITAKER, J. W.: Cytological and Phylogenetic Studies in Cucurbitaceae in Bot. Gaz. **94**: 780-790, 1933.