

ON THE TAIWAN SPECIES OF CROTALARIA

by

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The genus *Crotalaria* known as the Rattle Box Legumes is comprised of about 300 species distributed everywhere throughout tropical and subtropical regions. The group in Taiwan includes many indigenous, naturalized, and cultivated species which are used as valuable green manures.

This study is an attempt to summarize our knowledge of the species of the genus *Crotalaria* on this island. The specimens studied are deposited in the Herbarium of Department of Botany, National Taiwan University (TAI) and the Herbarium of Taiwan Forest Research Institute (TAIF).

14 species of *Crotalaria* are treated in this paper; some are native and some introduced. A description of the genus, analytical key to species, species descriptions, habitat, flowering period, general distribution, and an illustration of each species is given.

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Crotalaria LINN.

Crotalaria LINN. Sp Pl. 1: 714, 1753; DC. Prodr. 2:124, 1825; Benth. in Benth. et Hook. f. Gen. Pl. 1:479, 1862; Baker in Hook. f. Fl. Brit. Ind. 2:65, 1876; Merr. Fl. Manil. 251, 1912; Steward, Man. Yangtze Valley 192, 1958.

Annual or perennial herbs or shrubs. Leaves simple or trifoliate; stipules prominent, minute or lacking. Flowers few to many in terminal racemes or 1 to several in the axils of leaves; calyx 5-cleft or with upper two teeth connate, teeth linear or lanceolate; corolla as long as, or exceeding the calyx, usually yellow, sometimes purplish or pink; stamens 10, monadelphous, connate; anthers dimorphous, basifixied on long filaments and versatile on short filaments, alternately arranged; style strongly incurved, somewhat bearded. Pods subglobose to oblong, inflated, sessile or stalked not septate, with 2 to numerous seeds.

A large genus with about 300 species in the tropical and subtropical regions.

CHINESE NAME: Yeh Pai Ho Shu. 野百合屬.

ENGLISH NAME: *Crotalaria*, Rattle box, Rattle pod.

JAPANESE NAME: Tanukimame Zoku.

Key to species

1. Leaves simple 2
1. Leaves trifoliate 11
2. Stipules large, prominent 3
2. Stipules minute or lacking 5
3. Stems angled; stipules ovate-lunate (14) *C. verrucosa*
3. Stems cylindrical; stipules lanceolate or linear, reflexed 4
4. Flowers small 4-6 mm. long, more than 6 per raceme; pod
5-6 mm. long (1) *C. acicularis*
4. Flowers large 1.5 cm. long, always 2 to 3 in number; pod
2-3 cm. long (7) *C. ferruginea*
5. Corolla exceeding the calyx; leaves oblanceolate, more than
2 cm. wide (3) *C. assamica*
5. Corolla as long as the calyx; leaves less than 2 cm. wide .. 6
6. Leaves oblong to elliptic 7
6. Leaves linear or oblanceolate 8
7. Stems decumbent; leaves less than 1 cm. long, densely
arranged; pods subglobose 1 cm. long (12) *C. similis*
7. Stems ascending; leaves 2-3 cm. long, loosely arranged;
pods oblong 1-1.5 cm. long (5) *C. chinensis*
8. Calyx less than 1 cm. long, slightly hairy; hairs less than
1 mm. long 9
8. Calyx 1-2.5 cm. long, densely hairy, hairs 2-5 mm. long 10
9. Leaves oblanceolate, 2-2.5 cm. long; calyx 7 mm. long,
membranaceous; pods exceeding the calyx, 7-10mm. long... (2) *C. albida*
9. Leaves linear, 3-4 cm. long; calyx 5-6 mm. long, thick; pods
subglobose about 5 mm. long (9) *C. linifolia*
10. Flowers yellow; calyx 2.5 cm. long (4) *C. calycina*
10. Flowers purple blue; calyx 1 cm. long (11) *C. sessiliflora*
11. Pods 2 seeded 12
11. Pods many seeded 13
12. Terminal leaflets oblong to obovate, apex obtuse; pods 5-6
mm. long (6) *C. elliptica*
12. Terminal leaflets obtriangular, truncate or emarginate at the
apex; pods 3-4 mm. long (13) *C. trifoliastrum*
13. Terminal leaflets obovate to oblong, retuse with mucro in
notch; pods glabrate (10) *C. saltiana*
13. Terminal leaflets elliptic, obtuse apiculate; pods hairy.... (8) *C. incana*
1. ***Crotalaria acicularis* BUCH.**—HAM. in Wall. Cat. n. 5390, 1832; Baker, in Hook. f.
Fl. Brit. Ind. 2:68, 1876: Hay. Icon. Formos. 1:170, 1911; Merr. Enum. Philip.



Fig. 1 *Crotalaria acicularis* BUCH.-HAM.

Pl. 2:271, 1932; Masam. Short Fl. Formos. 96, 1936, List Vasc. Pl. Taiwan 70, 1954.

Fig. 1.

A herb, about 20-60 cm. high, clothed with hairs; leaves membranous, oblong, 1-2 cm. long, 0.5-1 cm. wide, obtuse at both ends, subsessile; stipules linear, reflexed; raceme axillary or terminal, 6-30 flowered; calyx 4-6 mm. long, cleft nearly to the base, teeth linear, acuminate, clothed with long brown hairs; corolla yellow, as long as the calyx, standard round or obovate; pods cylindrical, 5-6 mm. long, 10-12 seeded.

This species is characterized by the branches being clothed with rough, spreading hairs and with linear reflexed stipules.

CHINESE NAME: 針狀葉野百合.

JAPANESE NAME: Hime-tanukimame.

FLOWERING TIME: September to October.

HABITAT: Open grasslands and grassy slopes in southern Taiwan.

DISTRIBUTION: India, Java, Philippines, Southern China and Formosa.

SPECIMENS EXAMINED:

TAINAN HSIEN:

Nei-ying, T. Hosokawa, 3074. Chu-tou-chi, T. Hosokawa, 3071. Yen-shuei-chi, Y. Shimada 12843, 12844, 12845 (TAIF).

KAOHSIUNG HSIEN:

Chia-hsien, T. Hosokawa, Oct. 31, 1931 & 3073.

PINGTUNG HSIEN:

Kao-shu, T. Hosokawa, 3072.

2. *Crotalaria albida* Heyne in Roth. Nov. Sp. Pl. 333, 1821; DC. Prodr. 2:126, 1825; Baker, in Hook. f. Fl. Brit. Ind. 2:71, 1876; Hay. Icon. Pl. Formos. 1:170, 1911; Merr. Enum. Philip. Pl. 2:271, 1923. Masam. Short Fl. Formos. 96, 1936, List Vasc. Pl. Taiwan 70, 1954.

Fig. 2.

Crotalaria montana Roxb. Fl. Ind. 3:265, 1832.

Crotalaria formosana Matsum. in Ito et Matsum. in Journ. Coll. Sci. Univ. Tokyo. 12:395, 1899.

Crotalaria albida Heyne form. *membranacea* Hosokawa in Journ. Soc. Trop. Agr. 4:198, 1932 Var. *gracilis* Hosokawa in Journ. Soc. Trop. Agr. 4:198, 1932.

An erect herb, 15-50 cm. high, pubescent; leaves oblanceolate, upper surface glabrous, lower surface pubescent, subsesile; stipules very small; racemes axillary or terminal, 6-20 flowered, bracts small linear; calyx 6-8 mm. long, deeply cleft, teeth linear, acuminate, covered with short soft hairs; corolla yellow, exceeding the calyx; pods glabrous, cylindrical 7-10 mm. long, 6-12 seeded.

This is a very variable species. 1932, Hosokawa created one form and one variety, But after careful examination of the type specimens of these two, I think that they are very similar to the present species in the characters both of flowers and fruits,



Fig. 2 *Crotalaria albida* HEYNE.

therefore I am not using subspecific names.

CHINESE NAME: 響鈴豆.

JAPANESE NAME: Hozaki-tanukimame.

FLOWERING TIME: May to October.

HABITAT: Widely distributed in open grasslands throughout the Island.

SPECIMENS EXAMINED:

TAIPEI HSIEN:

Pei-tou, Y. Shimada, May 1913. Yang-ming-shan, T. Hosokawa 3084. Hu-kou. T. Hosokawa, Oct. 25, 1931.

NANTOU HSIEN:

Wu-she, S. Suzuki, Aug. 27, 1929. Hou-she, S. Suzuki, Oct. 14, 1935. Tung-pu, T. Suzuki, 13213.

TAICHUNG HSIEN:

Hsin-chuang, T. Kawakami et Y. Shimada, 12866 (TAIF).

CHIAYI HSIEN:

Chung-pu, K. Mori, Jan. 1, 1934. Kong-tien, S. Sasaki 12868 (TAIF).

TAINAN HSIEN:

Kuan-tze-ling, H. Morimoto, 439. Nan-ying Shan, T. Hosokawa, 3079. San-cha, H. Shimada, Aug. 10, 1940. Tainan, S. Sasaki 12873, 12874 (TAIF).

KAOHSIUNG HSIEN:

Ta-shu, Moritani, Nov. 24, 1936. Chia-sien, T. Hosokawa, 3080. Chu-chu-tang, T. Hosokawa, 3082. Chi-shan, T. Hosokawa, 3085.

PINGTUNG HSIEN;

Chao-chou, N. Fukuyama, 3820. Nan-ping She, T. Hosokawa, Nov. 17, 1931.

3. *Crotalaria assamica* BENTH. in Hook. Lond. Journ. Bot. 2: 481, 1843; Baker in Hook. f. Fl. Brit. Ind. 2:75, 1876; Merr. Enum. Philip. Pl. 2:271, 1923. Fig. 3.
Crotalaria retusa (non Linn.) Ito et Matsum. in Journ. Coll. Sci. Univ. Tokyo 12:396, 1899; Matsumura in Bot. Mag. Tokyo 16: 38, 1902; Matsum. et Hay. in Journ. Coll. Sci. Univ. Tokyo. 22:103, 1906; Hay. Icon. Pl. Formos. 1:1911; Masam. Short Fl. Formos. 96. 1936, List Vasc. Pl. Taiwan 70, 1954.

An erect, stout herb. Branches and calyx pubescent; leaves simple, oblanceolate, obtuse, cuneate at the base, 10-13 cm. long, 2-4 cm. wide, upper surface glabrous, lower surface pubescent; stipules minute; racemes terminal, 20-30 flowered; bracts setaceous, minute, 3-4 mm. long; calyx 1-1.5 cm long, upper teeth connate; corolla golden yellow, twice as long as the calyx; pods oblong, 4-5 cm. long, glabrate.

The present species has often been mistaken for *C. retusa*, but it is clearly different from the latter in having the leaves oblanceolate, obtuse apiculate and corolla golden yellow and 2 cm. long.

C. retusa is characterized by the leaves obovate, retuse and corolla yellow 1.2-1.5 cm. long.



Fig. 3 *Crotalaria assamica* BENTH.

This species may be used as green manure.

CHINESE NAME: 大豬屎青.

JAPANESE NAME: Kogane-tanukimame.

FLOWERING TIME: July to October

HABITAT: In thickets.

SPECIMENS EXAMINED:

TAOYUAN HSIEN:

Ta-chi, Y. Shimada 1532.

NANTOU HSIEN:

Nan-tou, T. Kawakami, 12890 (TAIF), 12891 (TAIF).

4. *Crotalaria calycina* SCHRANK. Pl. Rar. Monac. t. 12, 1819; DC. Prodr. 2:129, 1825;
 Baker, in Hook. f. Fl. Brit. Ind. 2:72, 1876; Hay. Icon. Pl. Formos. 1:171, 1911;
 Merr. Enum. Philip. Pl. 2:271, 1923; Masam. Short Fl. Formos. 96, 1936. List
 Vasc. Pl. Taiwan 70, 1954.

Fig. 4.

Crotalaria stricta Roxb. Fl. Ind. 3:265, 1832.

Crotalaria Roxburghiana DC. Prodr. 2:129, 1825.

An erect annual herb, about 20-80 cm. high, plants clothed with long silky hairs; leaves linear, 7-12 cm. long, 6-8 mm. wide, upper surface hairy on costa, lower surface densely clothed with silky hairs, sessile; stipules very small; racemes terminal, 2-12 flowered, calyx 2-3 cm. long, covered with long brown hairs, upper teeth oblanceolate, lower teeth lanceolate; corolla yellow shorter than the calyx; bracts foliaceous, lanceolate 10-20 mm. long; pods glabrous, about 15 mm. long, 20-30 seeded.

This species is very similar to *C. sessiliflora*, but it can be easily distinguished by its large calyx which is about 2.5 cm long and is densely clothed with long (5 mm) spreading hairs.

CHINESE NAME: 長萼野百合.

JAPANESE NAME: Gaku-tanukimame.

FLOWERING TIME: July to October.

HABITAT: Open grasslands and along river-banks.

DISTRIBUTION: Tropical Asia, Africa, Malaya, and Northern Australia.

SPECIMENS EXAMINED:

ILAN HSIEN:

Chiao-chi, C. C. Chuang 2269.

MIAOLI HSIEN:

Chu-nan, Y. Shimada, 3169. Miao-li, T. C. Huang, K3745.

TAICHUNG HSIEN:

Sha-lu, T. Kawakami et Y. Shimasa, 12914, (TAIF).

CHIAYI HSIEN:

Hou-she, S. Suzuki, 456.

KAOHSIUNG HSIEN:



Fig. 4 *Crotalaria calycina* SCHRANK.

Chi-shan, T. Hosokawa, 3092. Chia-sien, T. Hosokawa, Nov. 2 1931. Hong-shan, T. Kawakami, 12849 (TAIF).

PINGTUNG HSIEN:

Heng-chun, T. Hosokawa, 3093. O-luan-pi, T. Hosokawa, 3090. Kao-shu, T. Hosokawa, 3089. Nan-ping She, T. Hosokawa, 3091.

PENG-HU HSIEN:

Ho-liao, C. C. Tsun, Aug. 30, 1933.

5. *Crotalaria chinensis* LINN. Syst. 10:1158, 1759; DC. Prodr. 2:130, 1825; Baker in Hook, f. Fl. Brit. Ind. 2:73, 1876; Merr. Enum. Philip. Pl. 2:272, 1923; Hosokawa in Journ. Soc. Trop. Agr. 5:58, 1933; Masam. Short Fl. Formos. 96, 1936, List Vasc. Pl. Taiwan 70, 1954.

Fig. 5.

Crotalaria Kawakamii Hay. Mater. Fl. Formos. 73, 1911; Icon. Pl. Formos. 1:172, 1911.

Crotalaria akoensis Hay. Icon. Pl. Formos. 9:18, 1920.

A herb, about 15-60 cm. high, stems slender, covered with appressed hairs; leaves oblong, 2-3 cm. long, 5-7 mm. wide, acute at the apex, upper surface glabrous, lower surface pubescent; stipules absent; flowers in terminal racemes, sometimes axillary, 1-3 flowered, bracts and bracteoles small, linear, 6-8 mm. long, calyx 8-12 mm. long, densely clothed with silky hairs, corolla whitish yellow, as long as the calyx; pods glabrous, 10-15 mm. long, enclosed by the calyx; 15-20 seeded.

The present species is very similar to *C. ferruginea* in external features, but differs from the latter in lacking stipules and having pods enclosed by the calyx.

CHINESE NAME: 臺灣野百合.

JAPANESE NAME: Taiwan-tanukimame.

FLOWERING TIME: July to October.

HABITAT: Open grasslands at low altitudes.

DISTRIBUTION: Eastern India to Southern China, Malaya, Philippines and Formosa.

SPECIMENS EXAMINED:

TAICHUNG HSIEN:

Tai-chung, T. Kawakamii et. Mori 12879 (TAIF).

TAINAN HSIEN:

Chu-tou-chi, T. Hosokawa, Nov. 4, 1931. Nan-ying Shan, T. Hosokawa, Nov. 2, 1931.

PINGTUNG HSIEN:

Heng-chun, Y. Kudo & S. Suzuki, Dec. 29, 1928; H. Morimoto. 435; E. Matuda, July 10, 1915. O-luan-pi, T. Hosokawa, 3113, 3415. Shia-ma-li, E. Matuda, 12848. (TAIF).

6. *Crotalaria elliptica* ROXB. Fl. Ind. 3:279, Benth. Fl. Hongk. 75, 1861; Forb. et Hemsl. in Journ. Linn. Soc. Bot. 23:163, 1887; Hay Icon. Pl. Formos. 1:171, 1911;



Fig. 5 *Crotalaria chinensis* LINN.



Fig. 6 *Crotalaria elliptica* Roxb.

Masamune Short Fl. Formos. 96, 1936. List Vasc. Pl. Taiwan 70, 1954. Fig. 6.

A perennial herb, about 20–60 cm. high, covered with thin hairs; leaves trifoliate; terminal leaflet 15–24 mm. long, 8–13 mm. wide, oblong or obovate, obtuse or rounded at the apex, cuneate at the base, upper surface glabrous, lower surface covered with short soft hairs, lateral leaflets smaller; petiole 1–1.5 cm. long; stipules 1–2 mm. long, reflexed, racemes terminal or axillary, bracts small, less than 1 mm. long, calyx hairy, deeply 5-cleft, teeth lanceolate, 2 mm. long; pods oblong, covered with short soft hairs; 2 seeded.

This species is very near to *C. trifoliastrum* in having pods with 2 seeds, but is distinguished from it by its oblong to obovate leaflets and obtuse apex.

CHINESE NAME: 檢圓葉野百合.

JAPANESE NAME: Daien-tanukimame.

FLOWERING TIME: August to October.

HABITAT: Open grasslands in the southern part of this island.

DISTRIBUTION: Common in South China and Formosa.

SPECIMENS EXAMINED:

PINGTUNG HSIEN:

Ken-ting, T. Hosokawa, 3094, 3096. O-luan-pi, T. Hosokawa 3095; Hudikuro 12851 (TAIF).

TAITUNG HSIEN:

Tai-tung, Y. Simada, 6063.

7. ***Crotalaria ferruginea* GRAH.** in Wall. Cat. no. 5398, 1832; Baker in Hook. f. Fl. Brit. Ind. 2:68, 1876; Hay. Icon. Pl. Formos. 1:171, 1911; Merr. Enum. Philip. Pl. 2:27, 1923. Masamune Short Fl. Formos. 96, 1936, List Vasc. Pl. Taiwan 70, 1954. Fig. 7.

An erect or decumbent herb, with many branches, covered with fine silky hairs; leaves simple, oblong to lanceolate, 2–3 cm. long, 7–15 mm. wide, obtuse at the apex; stipules lanceolate, reflexed, persistent; racemes 2–3 flowered; bracts linear, persistent; calyx 1.7 cm. long, covered with brown silky hairs; corolla 1.3 cm. long, yellow, not longer than the calyx; pods oblong, 3 cm. long, 1 cm. wide, glabrous, 20–30 seeded.

This species may be used as green manure or fodder. The simple, oblong-lanceolate leaf, with prominent reflexed stipules; glabrous, oblong pods 2–3 cm. long are the outstanding features of this species.

CHINESE NAME: 野花生, 偽地藍, 荷豬草.

JAPANESE NAME: Nanban-tanukimame.

FLOWERING TIME: June to October.

HABITAT: Open grasslands at low and medium altitudes.

DISTRIBUTION: India to China, Malaya, Philippines and Formosa.

SPECIMENS EXAMINED:

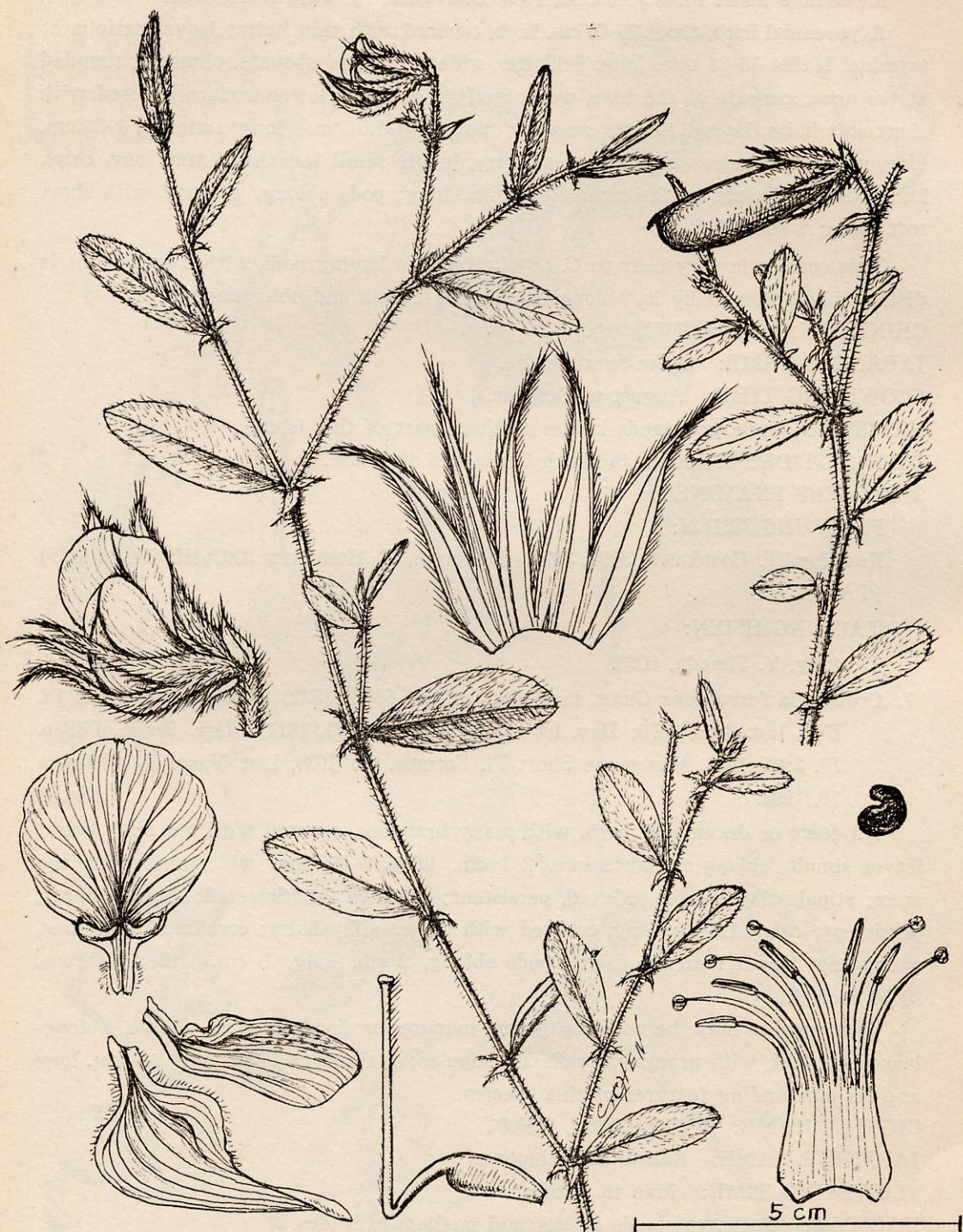


Fig 7 *Crotalaria ferruginea* GRAH.

TAIPEI HSIEN:

Kuan-yin shan, S. Suzuki, 12148, H. Shimada, Oct. 28, 1932, T. Fukuyama & S. Miura, 120. Mu-tsu shan, H. Shimizu, 388, 512. Chi-hsing shan, S. Suzuki, Nov. 2, 1928, T. Hosokawa, 3101, 3102. Pei-tou, T. Hosokawa, 3105. Yang-ming shan, T. Hosokawa, 3098, 3099, 3104, Tanaka, 2566, S. Suzuki, Nov. 2, 1928, & 12818 12816, 12817; T. Kawakami, Oct. 1912, Kamikoti, April 10, 1931; S. Sasaki 12854 (TAIF). Ying-ko, T. Hosokawa, 3107.

ILAN HSIEN:

Su-ao, S. Sasaki 12855 (TAIF).

TAOYUAN HSIEN:

Tao-yuan, G. Masamune, 692. Nan-kan, T. Hosokawa, 3103.

NANTOU HSIEN:

Wu-she, G. Masamune, 1926.

PINGTUNG HSIEN:

Tai-lu-ko, S. Suzuki, 9592, 10555, 9594. Taitung, T. Kawakami, 12858 (TAIF).

TAITUNG HSIEN:

Ta-wu shan, S. Suzuki, 7095. Ku-tzu-lung, E. Matuda, June 1917.

8. *Crotalaria incana* LINN. Sp. Pl. 716, 1753: DC. Prodr. 2:132, 1825; Baker in Hook. f. Fl. Brit. Ind. 2:83, 1876, et in Journ. Linn. Soc. Bot. 42:357, 1913; Merr. Fl. Manil. 252, 1912, Enum. Philip. Pl. 2:272, 1923; Hosokawa in Journ. Soc. Trop. Agr. 4:199, 1932 Masam. Short Fl. Formos. 96. 1936, List Vasc. Pl. Taiwan 70, 1954. Fig. 8.

An erect, branched, undershrub, about 1 m. high, clothed with grey-pubescece; leaves trifoliate, leaflets elliptic to obovate, obtuse, apiculate, 5-6 cm. long, 2.5-3 cm. wide, upper surface glabrous, lower surface pubescent; racemes terminal 5 to 20 cm. long; calyx 1 cm. long, clefts lanceolate covered with hairs; corolla yellow, 10-13 mm. long, exserted; pods deflexed, inflated, 3-4 cm. long, 1 cm. wide or less, densely hairy, 20-30 seeded.

This species is very similar to *C. saltiana*, but differing from the latter by its obtuse, apiculate leaflets and densely hairy pods.

CHINESE NAME: 恒春野百合.

JAPANESE NAME: Kosyun-tanukimame.

FLOWERING TIME: April to October.

HABITAT: In waste places in the southern part of this island.

DISTRIBUTION: A native of tropical America, and now widely distributed in the Tropics.

SPECIMENS EXAMINED:

PINGTUNG HSIEN:

Heng-chun, T. Hosokawa. Nov. 9, 1931. Shia-ma-li, T. Hosokawa, 3110; Kuei-tzu-



Fig. 8 *Crotalaria incana* LINN.

-chiao, T. Hosokawa, 3109.

9. **Crotalaria linifolia** LINN. f. Suppl. 322, 1781; DC. Prodr. 2:128, 1825; Baker in Hook. f. Fl. Brit. Ind. 2:72, 1876; Hay. Icon. Pl. Formos. 1:172, 1911; Merr. Fl. Manila 241, 1912; Enum. Philip. Pl. 2:272, 1923; Masam. Short Fl. Formos. 96, 1936, List Vasc. Pl. Taiwan 70, 1954. Fig. 9.

Crotalaria caespitosa Roxb. Fl. Ind. 3:269, 1832.

Crotalaria stenophylla Vog. in Nov. Act. Acad. Nat. Cur. 19:Supp 1.1:7, 1843.

Crotalaria linifolia Linn. f. var. *pygmaea* Yamamoto in Journ. Soc. Trop. Agr. 4:307, 1932; Masam. Short Fl. Formos. 96, 1936, List Vasc. Pl. Taiwan 70, 1954.

An erect herb, about 30–60 cm. high, densely covered with short soft hairs; leaves linear, 2–5 cm. long, 2–4 mm. wide, obtuse at the apex; exstipulate; racemes terminal or axillary; bract linear 2–3 mm. long, calyx 6–8 mm. long, deeply cleft, densely covered with hairs; corolla yellow; pods glabrous, subglobose, about 5 mm. long; 8–10 seeded.

In 1932, Yamamoto created a new variety because some plants were much branched at the base, after careful observation, I cannot find any real difference between them.

CHINESE NAME: 線葉野百合.

JAPANESE NAME: Hosoba-tanukimane.

FLOWERING TIME: May to October.

HABITAT: Open grasslands in the southern part of this island.

DISTRIBUTION: India to South China, Formosa, Philippines, Malaya and Australia.

SPECIMENS EXAMINED:

PINGTUNG HSIEN:

Keng-ting, T. Hosokawa, Nov. 12, 1931. Kao-shu, T. Hosokawa, 3114.

TAITUNG HSIEN:

Pei-nan, M. T. Kao, 3530, S. Suzuki, 5456; T. Kawakami et Mori 12883 (TAIF); S. Kobayashi 12885, (TAIF). Tai-tung, S. Kobayashi Aug. 6, 1907; S. Suzuki, 5541, Y. Yamamoto 3458, 3459. Mi-lun, S. Kobayashi, 12884 (TAIF).

HWALIEN HSIEN:

Hwa-lien, S. Suzuki, 5300.

PENGHU HSIEN (Pescadores):

Houliau, C. S. Tsun, Aug. 29, 1933. Ma-kong, Y. Horikawa July 30, 1915.

YUNLIN HSIEN:

Hu-wei, S. Suzuki, 6220, 6221, 6470, 6569, 6570, 6573; M. Asikaga, 2414, Y. Yamamoto 1084.

TAINAN HSIEN:

Tai-nan, S. Tomisumi, Aug. 3, 1938, M. Harane, Aug. 8, 1938.

10. **Crotalaria saltiana** ANDR. Bot. Rep. t. 643, 1811; Matsum. In Bot. Mag. Tokyo

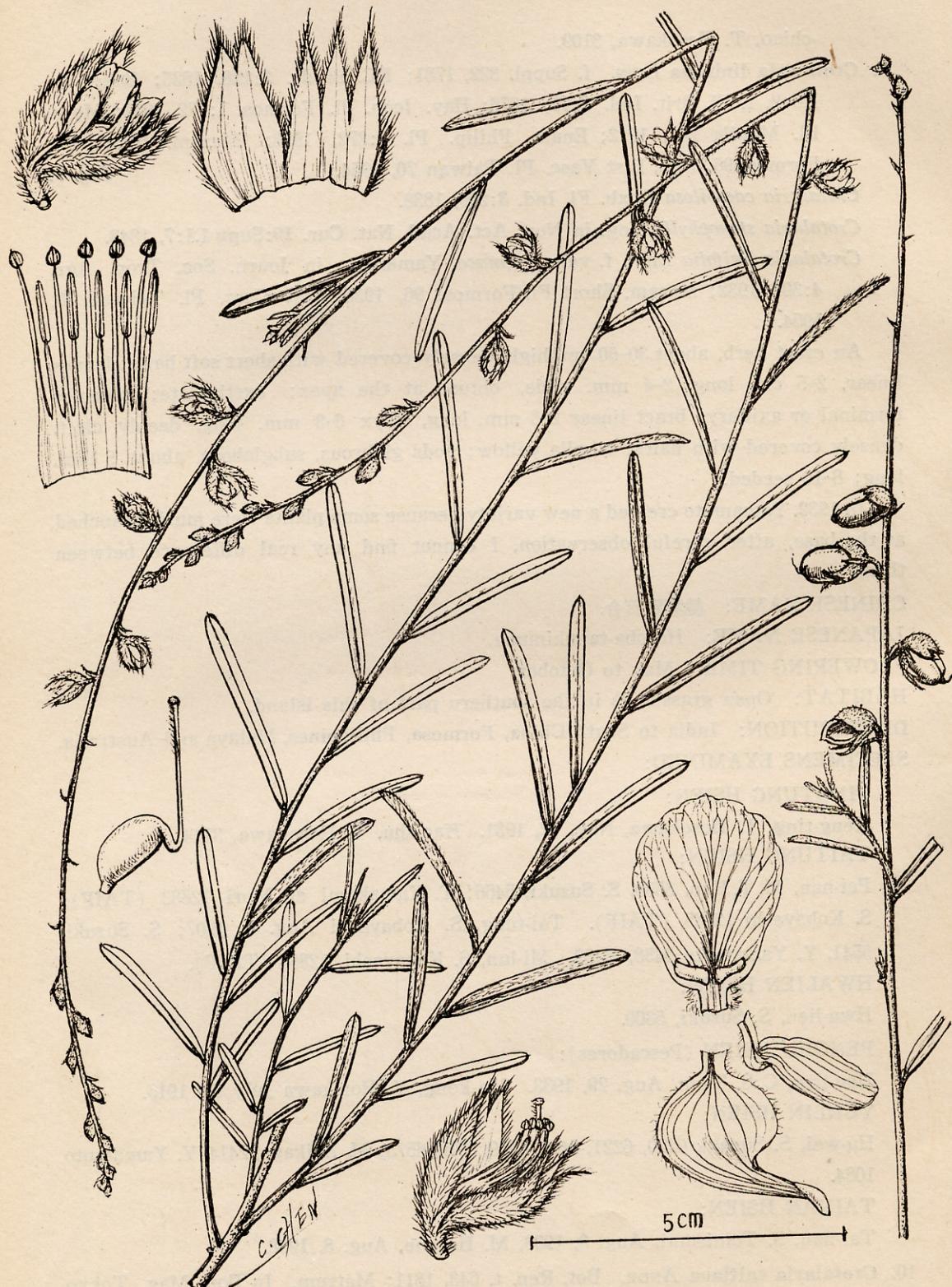


Fig. 9 *Crotalaria linifolia* LINN. f.



Fig. 10 *Crotalaria saltiana* ANDR.

16:39, 1902; Baker in Journ. Linn. Soc. Bot. 13:309, 1913; Merr. Enum. Philip. Pl. 2:273, 1923; Masamune, Short Fl. Formos. 96, 1936, List Vasc. Pl. Taiwan 70, 1954. Fig. 10.

Crotalaria striata DC. Prodr. 2:131, 1825; Baker in Hook. f. Fl. Brit. Ind. 2:84, 1876; Hay. Icon. Pl. Formos. 1:173, 1911.

An erect shrub, 50-70 cm. high, stems stout, puberulent, marked with slender longitudinal grooves; leaves trifoliate, leaflets obovate, obovate-oblong, obtuse, often emarginate, apiculate, 3-5 cm. long, 2-4 cm. wide: stipules minute, setaceous deciduous: racemes terminal, 20-40 cm. long, 20-30 flowered; calyx 7 mm. long, sparsely covered with silky hairs, teeth lanceolate; corolla exserted 1.2 cm. long, yellow with red stripes: pods deflexed, oblong, cylindrical 4 cm. long; 20-30 seeded.

This species is usually cultivated and used for green manure. It can be easily identified by its obovate, emarginate apiculate leaflets and oblong deflexed pods.

CHINESE NAME: 黃野百合，豬屎豆.

JAPANESE NAME: Ohmituba-tanukimame or Kibanhagi.

FLOWERING TIME: June to October.

HABITAT: Common in fields, road sides, and waste places throughout the island.

DISTRIBUTION: Tropical Asia, Africa and America.

SPECIMENS EXAMINED:

TAIPEI HSIEN:

Shui-yun-ti, S. Suzuki, May 12, 1929; H. Simizu, Nov. 20, 1934 Wu-lai, S. Suzuki, Nov. 15, 1927.

ILAN HSIEN:

Wu-fong-chi, C. S. Feung & M. T. Kao, 5035.

CHANGHWA HSIEN:

Erh-shuei, Y. Shimada, 12894 (TAIF).

CHIAYI HSIEN:

Pu-tzu C. C. Chuang, 2250.

TAINAN HSIEN:

Ma-tou, H. Morimoto, Oct. 17, 1914. Yen-shuei, Y. Shimada 12896 (TAIF).

KAOHSIUNG HSIEN:

Kao-hsiung, Y. Shimada, Aug. 1910: Y. Shimada, 12898 (TAIF).

PINGTUNG HSIEN:

Nan-ping She, T. Hosokawa, 3116. Hsiao-liu-chiu, T. Hosokawa, 3115, 2818.

TAITUNG HSIEN:

Ta-wu, Y. Kudo, 2622, S. Sasaki 12901, 12902 (TAIF).

11. *Crotalaria sessiliflora* LINN. Sp. Pl. ed. 2:1004, 1753; DC. Prodr. 2:129, 1825:

Baker in Hook. f. Fl. Brit. Ind. 2:73, 1876: Forb. et Hemsl. in Journ. Linn. Soc Bot. 23:152, 1887; Merr. Enum. Philip. Pl. 2:273, 1923. Masam. Short Fl.

Fig. 11 *Crotalaria sessiliflora* LINN.

Formos. 97, 1936, List Vasc. Pl. Taiwan 70, 1954.

Fig. 11.

Crotalaria brevipes Champ. in Hook. Lond. Journ. Bot. 4:44, 1852.

Crotalaria eriantha Sieb. et Zucc. Fl. Jap. Fam. Nat. 1:121, 1845.

Crotalaria Oldhami Miq. in Ann. Mus. Bot. Lugd. Bat. 3:42, 1867.

An erect herb, 20-100 cm. high, covered with appressed hairs; leaves linear or lanceolate, acute at both ends, 4-10 cm. long, 0.5-1 cm. wide; stipules minute, setaceous: racemes terminal or axillary, 2-20 flowered; bracts linear, bracteoles at the upper parts of pedicel; calyx 10-15 mm. long, densely clothed with brown yellow hairs; corolla purplish-blue, as long as the calyx; pods glabrous, sessile, as long as the calyx, 10-15 sceded.

A very widely distributed species. Differing from *C. calycina*, by its headlike racemes, purple-blue flowers and with its calyx. 1 cm. long.

CHINESE NAME: 野百合.

JAPANESE NAME: Tanukimame.

FLOWERING TIME: May to October.

HABITAT: Open grasslands.

DISTRIBUTION: From India to Malaya, Philippines, Taiwan and Japan.

SPECIMENS EXAMINED:

TAIPEI HSIEN:

Yang-ming shan, T. Hosokawa, 311, Y. Yamamoto, 3121. Ying-ko, T. Hosokawa, Oct. 25, 1931. Nan-kan, T. Hosokawa 3119.

HSINCHU HSIEN:

Hsin-chu, Shimada, 3120, 4484, K. Lawada, Maio, 1931. Chu-nan, Y. Shimada. 7170.

TAOYUAN HSIEN:

Tao-yuan, S. Sasaki 12908 (TAIF).

TAINAN HSIEN;

Tainan, Y. Shimada 12916 (TAIF). Chu-tou-chi, T. Hosokawa, 3123.

PINGTUNG HSIEN:

Hengchun, E. Matuda, 433. Hsia-ma-li, T. Hosokawa, Nov. 14, 1931.

HWALIEN HSIEN:

Hwa-lien, Sato, Aug. 1931.

TAITUNG HSIEN:

Tai-tung, S. Kobayashi, 12918 (TAIF).

12. *Crotalaria similis* HEMSL. In Kew, Journ. Bot. 4:44, 1852; Ann. Bot. 9:152, 1895;

Henry, List Pl. Formos. 30, 1896; Matsum. et Hay. Enum. Pl. Formos. 103, 1906; Hay. Icon. Pl. Formos. 1:173, 1911; Masam. Short Fl. Formos. 97, 1936, List Vasc. Pl. Taiwan 70, 1954.

Fig. 12.

A small decumbent herb, about 5-20 cm. high, densely clothed with silky hairs; leaves simple, subsessile, ovate to elliptic, 3-8 mm. long, 2-4 mm. wide, acute at

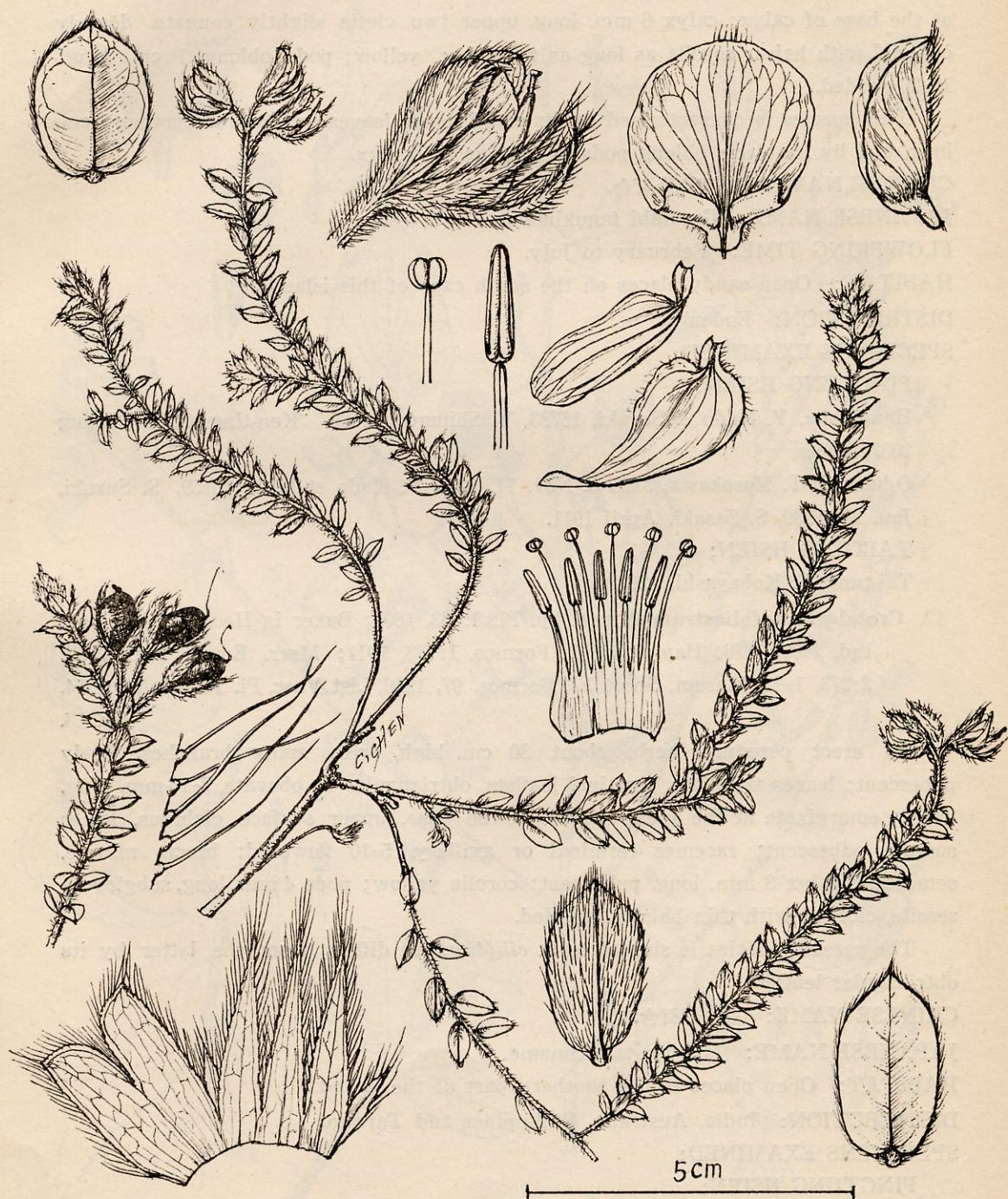


Fig. 12 *Crotalaria similis* HEMSL.

the apex; stipules absent; racemes terminal, 3-5 flowered, or solitary; 2 bracteoles at the base of calyx; calyx 6 mm. long, upper two clefts slightly connate, densely covered with hairs; corolla as long as the calyx, yellow; pods oblong 1 cm. long; 10-20 seeded.

This species is characterized by its small dense leaves which are less than 1 cm. long, and by its black, oblong pods as long as the calyx.

CHINESE NAME: 雙鑑鼻野百合.

JAPANESE NAME: Garambi tanukimame.

FLOWERING TIME: February to July.

HABITAT: Open sandy places on the south cape of this island.

DISTRIBUTION: Endemic.

SPECIMENS EXAMINED:

PINGTUNG HSIEN:

Heng-chun, Y. Kudo & Suzuki, 15733, Y. Shimada, 4485. Ken-ting C. C. Chuang 2037, 2189.

O-luan-pi, T. Hosokawa, 3125 & Nov. 11. 1031, Y. Kudo et Mori 16159, S. Suzuki, Jan. 22, 1930, S. Sasaki, April 1911.

TAITUNG HSIEN:

Tai-tung, S. Kobayashi, 12929.

13. *Crotalaria trifoliastrum* WILLD. Sp. Pl. 3:983, 1806; Baker in Hook. f. Fl. Brit. Ind. 2:82, 1876; Hay. Icon. Pl. Formos. 1:173, 1911; Merr. Enum. Philip. Pl. 2:273, 1923. Masam. Short Fl. Formos. 97, 1936, List Vasc. Pl. Taiwan 70, 1954.

Fig. 13.

An erect perennial herb, about 30 cm. high, with many branches, finely pubescent; leaves trifoliate, terminal leaflets, obtiangular or obovate, 7-10 mm. long, deeply emarginate at the apex, cuneate at the base, upper surface glabrous, lower surface pubescent; racemes terminal or axillary, 5-10 flowered; bracts minute, setaceous; calyx 3 mm. long, pubescent; corolla yellow; pods 4 mm. long, subglobose sessile, clothed with thin hairs; 2-seeded.

The present species is similar to *C. elliptica*, but differs from the latter by its obtiangular leaflets.

CHINESE NAME: 三葉野百合.

JAPANESE NAME: Mitsuba-tanukimame.

HABITAT: Open places in the southern part of the island.

DISTRIBUTION: India, Australia, Philippines and Taiwan.

SPECIMENS EXAMINED:

PINGTUNG HSIEN:

O-luan-pi, T. Hosokawa, 3126.

TAITUNG HSIEN:

Pei-nan, M. T. Kao 3558.



Fig. 13 *Crotalaria trifoliastrum* WILLD.

14. **Crotalaria verrucosa** LINN. Sp. Pl. ed. 1:715, 1753; DC. Prodr. 2:125, 1825; Baker in Hook. f. Fl. Brit. Ind. 2:77, 1876; Forb. et. Hemsl. in Journ. Linn. Soc. Bot. 23:153, 1887; Hay. Icon. Pl. Formos. 1:173, 1911; Merr. Fl. Manil. 251, 1912; Enum. Philip. Pl. 2:274, 1923; Masam. Short Fl. Formos. 97, 1936, List Vasc. Pl. Taiwan 70, 1954.

Fig. 14.

Crotalaria angulosa Lam. Encyc. 2:197, 1786.

Crotalaria acuminata G. Don. Gard. Dict. 2:134, 1832.

An erect, stout herb, somewhat pubescent or nearly glabrous, about 40-80 cm. high, branches 4-angled; leaves simple broadly elliptical, apex apiculate, base acute 5-12 cm. long, 2-5 cm. wide, with prominent veins; stipules foliaceous, ovate-lunate; racemes terminal, 10-20 flowered, bracts linear, minute; calyx 1 cm. long, finely pubescent; corolla twice as long as the calyx, purple; pods oblong, 2.5-3.5 cm long, finely pubescent; 10-12 seeded.

The present species can be easily identified by its broad elliptical leaves, 4-angled branches, and large ovate-lunate stipules. It is cultivated for green manure.

CHINESE NAME: 大葉野百合.

JAPANESE NAME: Ohba-tanukimame.

HABITAT: Open grasslands

DISTRIBUTION: Tropical Asia, Africa and America.

SPECIMENS EXAMINED:

HSINCHU HSIEN:

Hsin-pu, Y. Simada, Dec. 26, 1909.

NANTOU HSIEN:

Neng-kao, N. Ueyama, Dec. 20, 1931. Pu-li, S. Sasaki 12931 (TAIF).

CHIAYI HSIEN:

Chung-pu, S. Sasaki, 12935 (TAIF).

TAINAN HSIEN:

Chi-shan, T. Hosokawa, Oct. 30, 1931.

PINGTUNG HSIEN:

Tsao-chou, E. Matuda, April 4, 1915, S. Nakazawa, May 1920. Keng-ting, T. Hosokawa, 3131. Hsiao-liu-chiu, T. Hosokawa, 2805, 2804. Heng-chun, S. Sasaki. 12939 (TAIF), 12940 (TAIF).

TAITUNG HSIEN:

Ta-ma-wu-chu, K. Sawada, April 30, 1909. Pa-lang-wei, S. Kobayashi 12941 (TAIF).

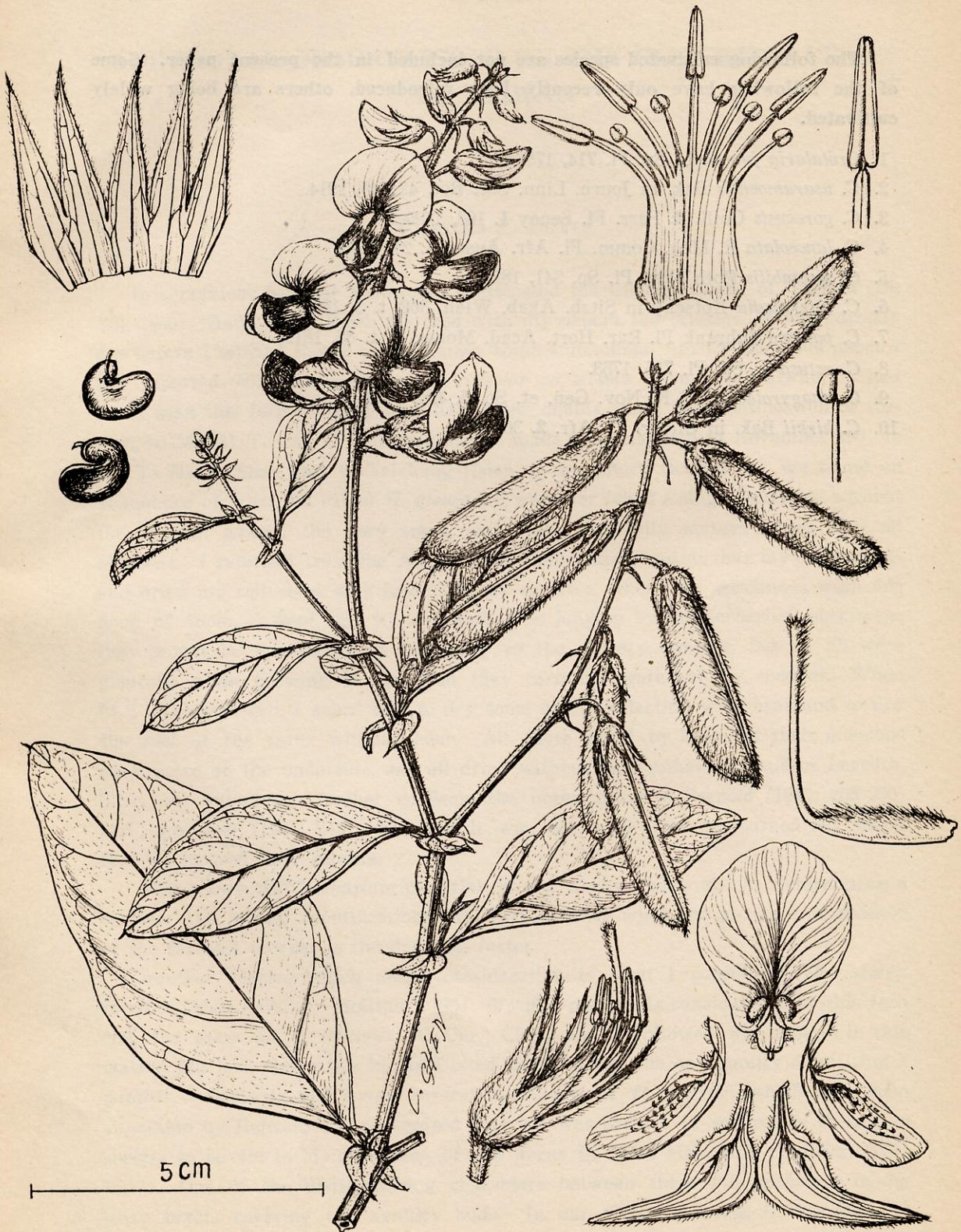


Fig. 14 *Crotalaria verrucosa* LINN.

The following cultivated species are not included in the present paper. Some of the following have only recently been introduced, others are being widely cultivated.

1. *Crotalaria juncea* L. Sp. Pl. 714, 1753.
2. *C. usaramoensis* Bak. in Journ. Linn. Soc. Bot. 42:346, 1914.
3. *C. goreensis* Guill. & Perr. Fl. Seney 1. 165, 1830-33.
4. *C. lanceolata* E. Mey. Comm. Pl. Afr. Austr. 1. 24, 1835.
5. *C. spectabilis* Roth Nov. Pl. Sp. 341, 1821.
6. *C. intermedia* Kotschy in Sitzb. Akad. Wien, 362, t. 3, 1864.
7. *C. paulina* Schrank Pl. Rar. Hort. Acad. Monac. 2. t. 88, 1819.
8. *C. retusa* L. Sp. Pl. 715, 1753.
9. *C. anagyroides* H. B. K. Nov. Gen. et. Sp. 6. 404, 1823.
10. *C. kirkii* Bak. in Oliver. Fl. Afr. 2. 36, 1871.