

THE TAIWAN SPECIES OF RUBIA (RUBIACEAE)

JEW-MING CHAO*

This paper is part of the taxonomic study on the Rubiaceae plants of Taiwan. In this study 3 species are recognized, of which one new species and one synonym are listed. Description of the genus and an analytical key to species are given. All the materials used for this study are based on the specimens kept in the following herbaria:

The herbarium of National Taiwan University (TAI)

The herbarium of Taiwan Forestry Research Institute (TAIF)

The herbarium of Taiwan National University (TNU)

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Rubia (Tourn) Linn.

茜草屬 Ch'ien Ts'ao Shu

Perennial herbs sometime shrubby at the base, often scabrid hispid, prickly or glabrous, erect diffuse or climbing, branches 4-angled or subterete. Leaves 4-12 in a whorl, rarely opposite and stipulate. Flowers in axillary and terminal cymes, pedicle jointed with the ovary, calyx-tube ovoid or glabose limb 0, corolla rotate or shortly bell- or funnellform, lobes 4-5, valvate in bud, stamens 4-5, inserted on the corolla-tube, filament short, anthers globose or oblong ovary 2-celled, style 2 or 2-fid, stigma capitate, ovules 1, erect in each cell attached to the septum. Fruits fleshy globose, didymous.

About 40 species, chiefly in Eurasia, South Africa and South America, 3 species in Taiwan.

Key to species

1. Branches subterete, near glabrous, leaves membranaceous3. *R. linii* sp. nov.
1. Branches tetragonal, scabrid hispid, leaves coriaceous2.
2. Leaves cordate.....1. *R. akane*
2. Leaves lanceolate2. *R. lanceolata*

1. *Rubia akane* Nakai, Jour. Jap. Bot. **13**:779, 1937.

Rubia cordifolia Linn. var. *munjista* (non Miq.) Sasaki, List Pl. Formos. 386, 1928.

Rubia cordifolia sensu Matsum. et Hayata, Jour. Coll. Sci. Univ. Tokyo **22**:199, 1906; Hay., Journ. Coll. Sci. Univ. Tokyo **25**:116, 1908, Icon. Pl. Formos. **2**:101, 1912; Masamune, Short Fl. Formosa, 205, 1936. non Linn. 1753.

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Rubia akane Nak. var. *erecta* Masam., Trans. Nat. Hist. Soc. Formos **29**:63, 1939. syn. nov.

Rubia cordifolia Linn. var. *erecta* Masam. in Herbarium. syn. nov.

Rubia nankotaizana Masam. in Hokuriku Jour. Bot. **3**: No. 3 inner cover plate 1954. nom nud. List Vasc. Pl. Taiwan 119, 1954. syn. nov.

A perennial climbing herb, scabrid at the whole plants, branches 4-angled, leaves coriaceous 4-6 verticillate, cordate to ovate, 1.5-4 cm. long, 1.5-4 cm. broad, apex acute, base cordate or rounded, 5-nerved, petioles 1-4 cm. long. Cymes in axillary and terminal, corolla bell-form, lobes 5, stamens 5, exerted on the mouth of the corolla, anthers oblong, ovary 2-celled, styles bifid, stigma capitate. Fruits didymous or single globose, 5-7 mm. in diameter, black at maturity, 2 seeded.

Chinese name: 紅藤仔草 Hong Teng Chu Tsao

紅根仔草 Hong Keng Chu Tsao

Habitat: In broad-leaved forest throughout the island.

Specimens examined:

Taipei Hsien: Shenkeng, *Kawakami* & *Mori* 24706 (TAIF)

Hsinchu Hsien: Tsaoshan, *Shimada* 24705 (TAIF)

Changhwa Hsien: Pakwasha, *Shimada* 6181B (TAI)

Nantou Hsien: Sekinhekiko, *S. Suzuki*, Dec. 16, 1922 (TAI); Shueipiken, *Kawakami* & *Sasaki*, May 3, 1908 (TAI), *Sasaki* 24710 (TAIF); Shaulaipin, *Sasaki*, Nov. 20, 1921 (TAI), *Sasaki* 24708 (TAIF); Puli, *S. Suzuki*, 6452 (TAI); Hoshei, *Huang* 2211 (TAI), *Yamamoto* Nov. 10, 1938 (TAI); Nantou, *Shimada*, 24909 (TAIF)

Chiayi Hsien: Chiayi, *Kawakami* 24716 (TAIF); Yushan, *Mori* 24713 (TAIF).

Hwalien Hsien: Tungmen, *S. Suzuki*, 1272 (TAI); Nengkaoshan, *Kao*, 5744 (TAI), Hwalien, *Shimada*, 24718 (TAIF)

Ilan Hsien: Piyanan, *Matuda*, 1728 (TAI); Nanhutashan, *S. Suzuki* July 19, 1937 (TAI); *Masamune* & *Mori* July 15, 1931 (type of *Rubia nankotaizana*—TAI), *Masamune*, *Fukuyama*, & *Nakamura* 3118 (TAI).

Taitung Hsien: Taitung, *Yamamoto*, & *Mori* 306 (TAI).

Distribution: China, Japan, Korea.

Note: This species is very closely related to *R. cordifolia* Linn. but differs by the fruits black at maturity.

2. *Rubia lanceolata* Hay., Jour. Coll. Sci. Univ. Tokyo **25**:117, 1908; Masam., Short Fl. Formos. 205, 1936; List Vasc. Pl. Taiwan 119, 1954.

Rubia cordifolia Linn. var. *stenophylla* sensu Hay., Jour. Coll. Sci. Univ. Tokyo **30**:147, 1911, Icon. Pl. Formos. **2**:101, 1912. non Franch.

A perennial climbing herb, scabrid hispid at the whole plants, branches 4-angled, leaves coriaceous 4 verticillate, lanceolate, 3-10 cm. long, 0.5-1 cm. broad, apex acute to acuminate. base cordate, 3 nerved, petioles 1-10 cm. long. Flowers panicle-cymes, in axillary and terminal, corolla bell-form, lobes 5, ovate-lanceolate with caudate apex, stamens 5, exerted on the mouth of the corolla, anthers oblong, ovary 2-celled, styles 2, stigma capitate. Fruits didymous, globose 5-7 mm. in diameter, black at maturity. Seeds 2.

Chinese name: 金劍草 Chin Chien Tsao

Habitat: Under the forests from the altitude 1,500-3,000 m. throughout the island.

Specimens examined:

Nantou Hsien: Yushan, *Sasaki*, Oct. 26, 1909 (TAI), *Kawakami & Mori* 24725 (TAIF);

Wushie, *Masamune, Mori & Nakamura* 2277 (TAI); Hoshie, *Suzuki* 53 (TAI);

Shunshan, *Yu & Kao* Dec. 16, 1954 (TAI).

Chiayi Hsien: Alishan, *Jan & Kao*, July 13, 1957 (TAI).

Taitung Hsien: Taitung, *Yamamoto & Mori* 396 (TAI); Tzueifun, *Hosokawa* 5216 (TAI).

Ilan Hsien: Piyanan, *S. Suzuki* 5043 (TAI); Taipinshan, *Fujita* May 1930 (TNU).

Distribution: Endemic.

Note: This species is characterized by the lanceolate leaves.

3. *Rubia linii* sp. nov.

Herbae minute aculeolate, caulibus elongatis subteretis vel 4-gonis. Folia 4-natim verticillata longe petiolata, petiolis lamina in longitudine 1-2-plo longioribus minute uncinato-aculeolatis, laminis ovato-lanceolatis vel ovatis, apice acuminatis, basi rotundatis vel leviter cordatis, 2-5 cm. longis 0.7-2.5 cm. latis, supra glabra, subtus ad nervos et margines uncinato-asperis, trinervis. Flores minuti in cymas paniculatas, 5-10 cm. longas, axillares et terminales dispositi, bracteis lanceolatis 3-8 mm. longis, 4-natim verticillatis, pedicellis gracilibus 1-1.5 mm. longis, calycis tubus obovoideus 0.3 mm. longus, apice truncatus, corolla campanulata 0.1-1 mm. longa, limbo 4 lobo, lobis valvatis ovato-lanceolatis, apices acuminato-caudatis, stamina 4, lobis corollae alterna fere libera, filamentis brevissime 0.1 mm. longis antheris oblongis obtusis forso connectivo, ovarium 2-locular loculis 1-ovulatis, stylus 2, 0.1 mm. longi. Semina 2.

A perennial scandent or climbing herb, branches subterete, thin scabrid or subglabrous. Leaves membranaceous, 4 verticillate, ovate-lanceolate or ovate, 2-5 cm. long, 0.7-2.5 cm. broad, apex acuminate, base rounded or cordate, upper surface glabrous, under surface along the nervis and margin thin scabrid, trinerved, petioles scabrid, 2-5 cm. long. Flowers panicle cymes, axillary and terminal, bracts lanceolate, 3-8 cm. long, 4 verticillate, pedicellis 1-1.5 mm. long, calyx-tube obovate, 0.3 mm. long, apex truncate, corolla campanulate, 0.8-1 mm. long, 4-lobed, lobes valvate in bud, ovate-lanceolate, apex acuminate-caudate stamens 4, alternated with corolla lobes, filaments short, 0.1 mm. long, anthers oblong, dorsal connected, 2-celled, ovary 2-celled, 1-ovule in each cell, styles 2, 0.1 mm long, stigma capitate. Fruits didymous, 4 mm. long, 7 mm. in diameter, black at maturity, 2-seeded.

Chinese name: Lin Shih Chien Ts'ao 林氏茜草

Habitat: Under the forests from the altitude 1,000-3,000 m. throughout the island.

Specimens examined:

Taoyuan Hsien: Tachi, *T. Suzuki & T. Nakamura* st 18254 (TAI).

Miaoli Hsien: Chialishan, *Sasaki*, Jan. 1915 (TAI), 24707 (TAIF).

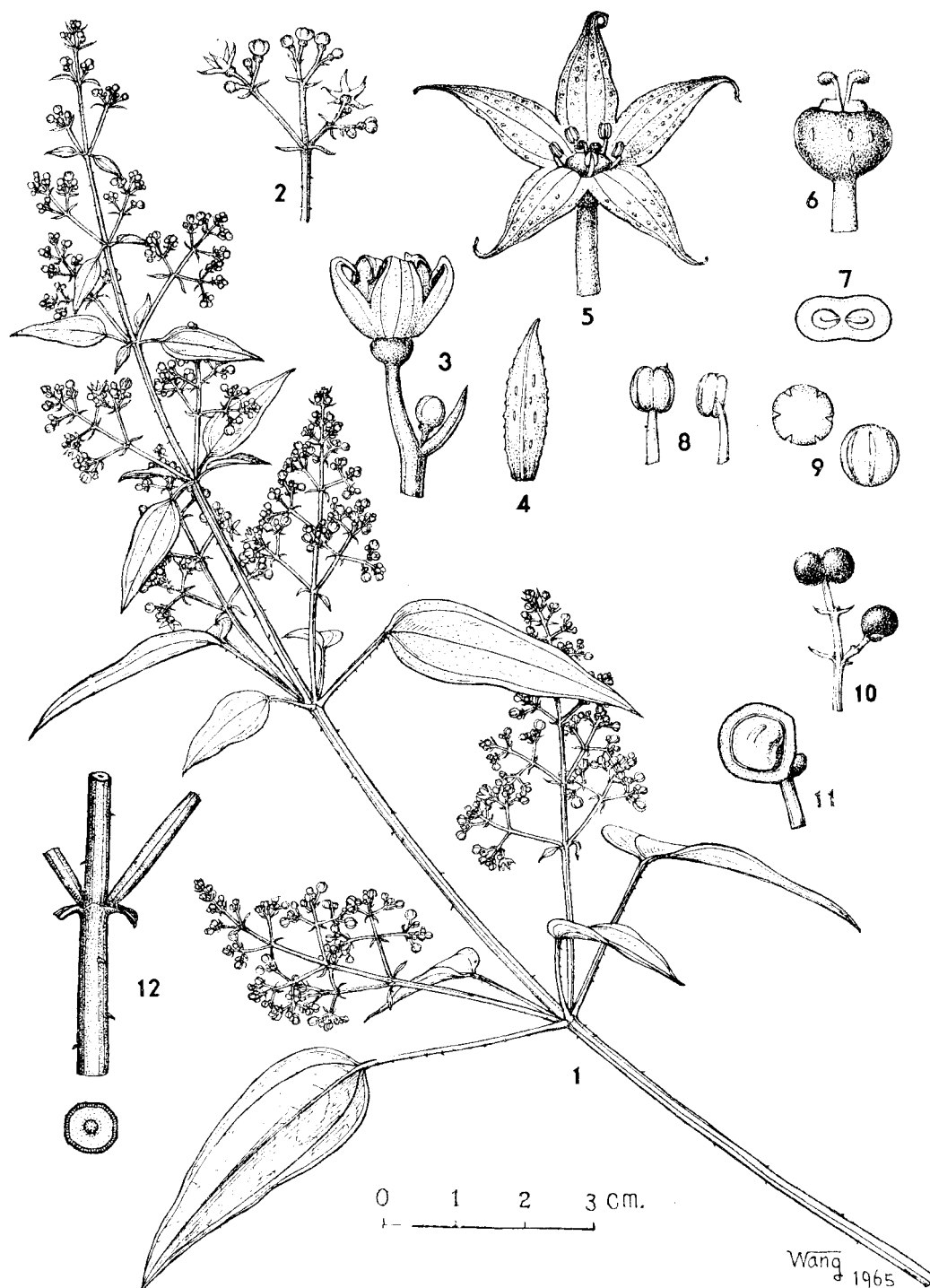


Plate 1. *Rubia linii* sp. nov.

1. Flowering branch 2. Part of inflorescence 3. Flower buds 4. Bract 5. Flower 6. Pistal
7. Ovary (c. s.) 8. Stamens 9. Pollens 10. Fruits 11. Fruit (l.s.) 12. Branche and its cross section

Nantou Hsien: Luantashan, *Kawakami & Mori* 24624 (TAIF); Chingshueikou, *Huang, Kou & Kao* 1029 (TAI)

Taichung Hsien: Anmashan, *Liu et al* 125 (TAI).

Chiayi Hsien: Alishan, *Chuang & Kao* July 13, 1959 (TAI), *Kao* 4870 (TAI) 4933 (TAI), *Chao* 92 (Type—TNU, TAI); Yushan, *Kawakami & Mori* 24714 (TAIF)

Taitung Hsien: Chippon-goe S. *Sasaki*, Oct. 10, 1934 (Lectotype—TAI)

Ilan Hsien: Taipingshan, S. *Suzuki*, Aug. 12, 1928 (TAI); *Chuang, Kao & Chao* 4710 (Lectotype—TAI).

Distribution: Endemic.

Note: The present new species is named in honor of Prof. Wei-fan Lin, (former director of Taiwan Forestry Research Institute) for his extensive contribution to Botany. The leaves of this species are much thinner than those of the other two species. It is characterized by having subterete subglabrous branches instead of tetragonal scabrid hispid branches. Regarding the transverse section of the branches, the sclerenchyma of this species are equal in thickness under the epidemis but the sclerenchyma of the other two species are only in the corner. (see plate 2)

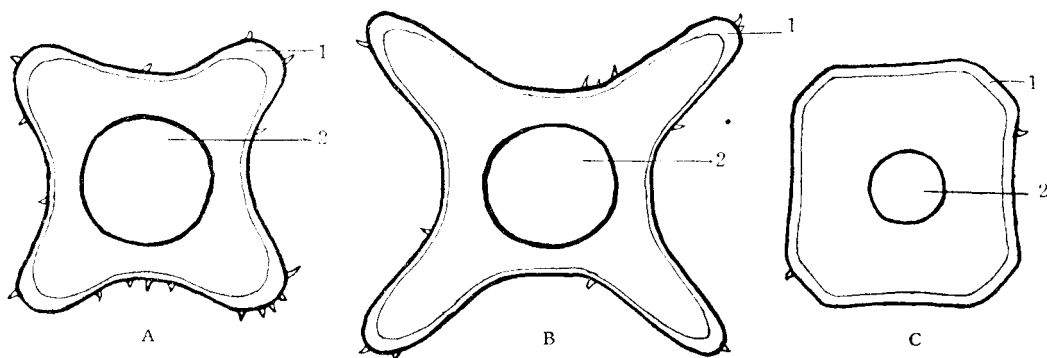


Plate 2. Diagram of cross section of branches

1. Sclerenchyma 2. Stele

A. *Rubia akane* B. *Rubia lanceolata* C. *Rubia lini*

臺灣之茜草屬植物

趙 哲 明

中 文 摘 要

本文爲筆者數年來研究茜草科植物心得之一部份，全屬共三種，其中林氏茜草 (*Rubia lini* Chao) 爲新記載者，其種名爲紀念筆者 恩師林渭訪教授 (前臺灣省林業試驗所所長)，多年來在植物學教學及研究工作之貢獻，此新種之特徵爲莖及小枝成方圓形，乾縮時有凹溝，平滑或偶具有

稀疏之短鈎刺，其橫斷面在表皮下具有相等厚度之厚角組織（其他兩種之厚角組織大部集中於角隅處），中柱之比例較他兩種為小，葉膜質，遠較另兩種為薄，其形狀則介乎另兩種之間，為卵形至卵狀披針形，雌蕊具有兩根花柱。文中所根據之材料皆存於師範大學，臺灣大學及林業試驗所之標本館內。

LITERATURE CITED

- CHAO, J. M., 1963. The Rubiaceae of Taiwan (Unpublished)
 HAYATA, B., 1908. Flora Montana Formosae. Jour. Coll. Sci. Univ. Tokyo **25**(19):116-117.
 ———, 1911. Materials for a Flora of Formosae. Journ. Coll. Sci. Univ. Tokyo **30**:147.
 ———, 1912. Icones Plantarum Formosanarum. **2**:101.
 HOOKER, J. D., 1882. Flora of British India, **3**:202-204.
 MASAMUNE, G., 1936. Short Flora of Formosa. Taihoku.
 ———, 1939. Beiträge zur Kenntnis der Flora von SüdJapan Trans. Nat. His. Soc. Formos. **29**:63.
 ———, 1954. Hokuriku Jour. Bot. (no title in this paper). **3**(3), in inner cover.
 ———, 1954. A List of Vascular Plants of Taiwan. (Mimeographed List)
 MATSUMURA, J. and HAYATA, B., 1906. Enumeratio Plantarum Formosanarum. Journ. Coll. Sci. Univ. Tokyo **22**:199.
 NAKAI, T., 1937. Japanese Species of *Rubia*. Jour. Jap. Bot. **13**:779-783.
 OHWI, J., 1961. Flora of Japan. Tokyo.
 SASAKI, S., 1928. List of Plants of Formosa. Taihoku.

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