



A revision of *Rosa transmorrisonensis* Hayata and allied species in Taiwan

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ABSTRACT: *Rosa transmorrisonensis* Hayata and allied taxa (*Rosa* section *Synstylae*) in Taiwan was extremely controversial in classification. The marked discrepancy between previous taxonomic treatments suggests that more intensive taxonomical investigation is needed. The present study revised *Rosa transmorrisonensis* Hayata and allied taxa based on extensive field observation and detailed morphological comparison. Our studies revealed that stipules, styles and terminal leaflets shape are the important and good characters for classifying Taiwanese taxa. As a result, *Rosa sambucina* var. *mushaniana* Liu & Ou and *R. luciae* var. *rosea* Li are considered to be synonymous with *R. pricei* Hayata. *Rosa multiflora* var. *formosana* Cardot is treated as a synonym of *R. transmorrisonensis* Hayata. Moreover, the identity of a puzzling taxon, *R. taiwanensis* Nakai, which had long been misidentified as *R. pricei* or misapplied the name as *R. multiflora*, *R. luciae*, or *R. kwangtungensis*, is clarified. The present study provides key to taxa, description, distribution, and illustration for each taxon.

KEY WORDS: Morphological study, *Rosa luciae*, *R. pricei*, *R. sambucina*, *R. taiwanensis*, *Synstylae*, Taxonomy.

INTRODUCTION

The genus *Rosa* L. (Rosaceae) consists of more than 200 species widely distributed from the sub-tropical to temperate regions in the Northern Hemisphere (Gu and Robertson, 2003; Wissemann, 2003). According to morphological and molecular evidence, the genus was separated into four subgenera. However, the classification below subgenus is still unresolved (Wissemann, 2003; Wissemann and Ritz, 2005; Liu *et al.*, 2015).

The earliest record of *Rosa* in Taiwan can be traced back to A. Henry in 1896, who recorded five species. In the subsequent 30 years, this genus has been studied by Matsumura and Hayata (1906), Hayata (1911, 1913, 1915, 1916), Cardot (1916), Nakai (1916), Koidzumi (1913, 1917, 1930), Boulenger (1933), Kudo and Masamune (1932), Masamune (1936, 1938), etc. and totally, 14 names had appeared in the early plant lists of Taiwan.

The first thorough revision of Taiwanese *Rosa* species was carried out by Li (1963), who recognized 7 species and 5 varieties, including one new taxon (*R. luciae* var. *rosea* Li). His treatment was approximately adopted by Liu (1972) in Trees of Taiwan and by the Flora of Taiwan (Liu and Su, 1977; Ohashi, 1993). However, in Flora of China (Gu and Robertson, 2003), only 9 taxa are recorded in Taiwan. Based on Gu and Robertson's system, the Taiwanese species separately classified into the sections *Banksianae*, *Bracteatae*, *Laevigatae*, *Pimpinellifoliae* and *Synstylae*. The former four contains only 1 member respectively and, hence, are easy to distinguish. While the section *Synstylae* contains all the other analogous species, identifying them takes far more efforts.

In Taiwan, *Rosa* sect. *Synstylae* contains *Rosa*

transmorrisonensis Hayata and allied taxa, including *R. kanzanensis* Masamune, *R. multiflora* Thunb. ex Murray var. *formosana* Cardot, *R. pricei* Hayata, *R. sambucina* Koidz., *R. sambucina* var. *pubescens* Koidz., *R. sambucina* var. *mushaniana* Y. C. Liu & C. H. Ou, *R. luciae* Fr. & Rochebr. var. *rosea* Li, *R. taiwanensis* Nakai, and *R. transmorrisonensis* Hayata. Their classification and species delimitation were extremely controversial (e. g., Ying, 1985; Liu *et al.*, 1988, 1994). The marked discrepancy between previous literatures in Taiwan suggests that most taxonomic problems exist in this section and more intensive systematic investigation is needed in these close related taxa.

Although molecular markers have been widely used to resolve numerous taxonomic and phylogenetic problems. However, previous molecular phylogenetic studies on *Rosa* (Wu *et al.*, 2000; Wissemann and Ritz, 2005; Bruneau *et al.*, 2007; Fougère-Danezan *et al.*, 2015; Liu, 2015; Jeon and Kim, 2019) show poor resolutions and low support values. Zhu *et al.* (2015) tried to reconstruct the phylogenetic relationship of the sections *Chinenses* and *Synstylae* by more extensive geographic and taxonomic sampling, including 4 Taiwanese species, *R. luciae*, *R. pricei*, *R. sambucina*, and *R. transmorrisonensis*. However, their results show very low resolution among closed species and didn't clarify the phylogenetic relationships yet because of incongruence between chloroplast and nuclear marker. Therefore, the classification of *Rosa* sect. *Synstylae* mostly relied on more detailed morphological comparison and field observation.

The present revision conducted extensive field observations and inspected specimens preserved in various herbaria.

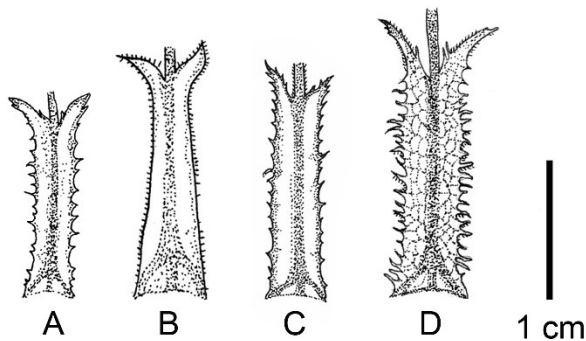


Fig. 1. Stipules of *Rosa pricei* Hayata (A), *R. sambucina* Koidz. (B), *R. taiwanensis* Nakai (C), and *R. transmorrisonensis* Hayata (D).

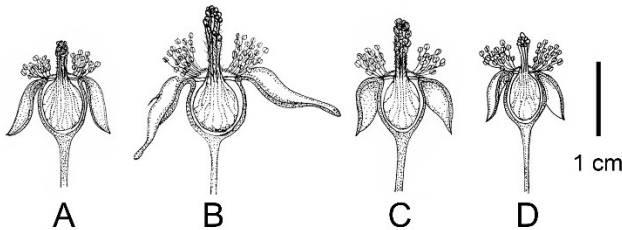


Fig. 2. Longitudinal section of the flowers of *Rosa pricei* Hayata (A), *R. sambucina* Koidz. (B), *R. taiwanensis* Nakai (C), and *R. transmorrisonensis* Hayata (D). Notice the glabrous styles in *R. transmorrisonensis* vs. pubescent ones in other 3 species.

MATERIALS AND METHODS

Materials used in our study were collected from the field throughout Taiwan. Most materials were processed as specimens and deposited in the TNU Herbarium. Besides, specimens from the following herbaria were examined: HAST, NCUF, NTUF, PPI, TAI, TAIF, and TNM. Specimens out of Taiwan herbaria were observed by digital images from the online Chinese Virtual Herbarium (CVH) database (<https://www.cvh.ac.cn>) and Digital Herbarium of Shimane University Faculty of Life and Environment Sciences (<http://tayousei.life.shimane-u.ac.jp/herbarium/index.php>). Digital images of type specimens preserved in the Herbaria HUH, K, KYO, L, P, TI, and US were examined.

TAXONOMIC TREATMENT

In previous studies, tiny characters are primarily used to differentiate the Taiwanese species include the degree of stipule adnation, styles vestiture, number of leaflets, inflorescence type, hair, and spines types. However, based on our field observation, four characters—number of leaflets, inflorescence type, hair, and spines types—often display great variations within the population. Hence, these traits are somewhat impractical. For example, *R. taiwanensis*, *R. luciae* and *R. pricei* were frequently separated by the number of leaflets (5 and 7 leaflets respectively) (Li, 1963; Liu, 1972; Liu and Su, 1977; Ohashi, 1993; Liu *et al.* 1988, 1994), but both kinds

of leaves can be found in these species. The inflorescence is also the same case; for example, *R. transmorrisonensis* and *R. multiflora* var. *formosana* are distinguished by one to five flowered cyme and thyrse respectively (Liu and Su, 1977; Ohashi, 1993; Liu *et al.* 1988, 1994). Actually, the type specimen of *R. multiflora* var. *formosana* displays its inflorescence solitary or cymous, and *R. transmorrisonensis* is occasionally found with big thyrse, especially in Hohuanshan district.

The epidermal features (glabrous, pilose, glandular, and spines) on calyx, hypanthium, and pedicel also have been used as diagnostic characteristics, such as *R. sambucina* var. *mushaniana* features their glandular hairs (Liu and Ou, 1982). However, glandular hair is not a unique feature for specific taxa. *Rosa pricei* and *R. transmorrisonensis* also have different epidermal type include glabrous, pilose, and glandular. Therefore, a single hairs feature is not suitable for separating taxa.

Based on the detailed morphological study, we found that the morphology of stipules and styles are relatively stable. Our studies show that morphology of stipules is the most reliable character for separating Taiwanese taxa. Merely according to stipule patterns, we can match an individual with its corresponding section and series, so we say that the stipule pattern is the most critical character. The members of section *Synstylae* can be subdivided into series *Brunoniaenae* and *Multiflorae* according to the types of the stipules margin (Gu and Robertson, 2003), entire in the former and irregularly serrate in the latter (Fig. 1). Style morphology provides substantial information, and the useful traits including whether style forms a column or free, and whether style is villous or not. The style of column forms the synapomorphy of *Rosa* sect. *Synstylae* which can be used to distinguish the members of this section from other taxa of Taiwan. The glabrous styles of *R. transmorrisonensis* is the most obvious and steady character being separated this species from other congeners of Taiwan (Fig. 2). Here, we recognized 4 taxa of *Rosa* sect. *Synstylae* in Taiwan.

Key to taxa of *Rosa* sect. *Synstylae* of Taiwan:

1. Stipules entire at margin, often glandular pubescent; leaflets larger, 5–8 cm long, 2–4 cm wide; flowers 3.5–4.5 cm across (Ser. *Brunoniaenae*) 2. *R. sambucina*
1. Stipules irregularly serrate at margin; leaflets smaller, less than 5 cm long, 0.5–2 cm wide; flowers less than 3.5 cm across (Ser. *Multiflorae*)
2. Styles glabrous or nearly so 4. *R. transmorrisonensis*
2. Styles densely villous
3. Leaves pubescent along the rachis and midrib, leaflets usually 5–7, elliptic to oblong 3. *R. taiwanensis*
3. Leaves glabrous, leaflets usually 7–9, elliptic to ovate 1. *R. pricei*

1. *Rosa pricei* Hayata, Icon. Pl. Formos. 5: 58. 1915; Li, Woody Fl. Taiwan 299. 1963; Liu & Su in Li *et al.*, Fl. Taiwan 3: 102. 1977 *excl. syn. R. kanzanensis*; Liu *et al.*, Trees Taiwan 191. 1988; Ohashi in T. C. Huang *et al.*, Fl. Taiwan 2nd ed. 3: 117. 1993; Liu *et al.*, Trees Taiwan 2nd ed. 159. 1994; Gu & Robertson in Wu & Raven, Fl. China



9: 372. 2003; Lu *et al.*, Trees Taiwan 174. 2017; Chung, Illustr. Fl. Taiwan 4: 366. 2017.-**TYPE**: Formosa Tattaka (as Tappansha), Horisha, alt. 6000 ped. 9. Jul. (as Sept.) 1912, R. Price 798. (Holotype: TI, photo!; Isotypes: K, 2 sheets, photo!)

普萊士薔薇、太魯閣薔薇, Fig. 3

Rosa luciae Fr. & Rochebr. var. *rosea* Li, Lloydia 14: 235. 1951; *et* Woody Fl. Taiwan 298. 1963; Liu & Su in Li *et al.*, Fl. Taiwan 3: 103. 1977; Liu *et al.*, Trees Taiwan 192. 1988; Ohashi in T. C. Huang *et al.*, Fl. Taiwan 2nd ed. 3: 117. 1993; Liu *et al.*, Trees Taiwan 2nd ed. 160. 1994; Gu & Robertson in Wu & Raven, Fl. China 9: 372. 2003; Lu *et al.*, Trees Taiwan 174. 2017.-**TYPE**: Formosa. Hualien on limestone, Nov. 2, 1918, E. H. Wilson 11067 (Holotype: US, photo!) *syn. nov.*

Rosa sambucina Koidz. var. *mushaniana* Y. C. Liu & C. H. Ou, Bull. Exper. For. NCHU 4: 3, photo. 1, 1982; Liu *et al.*, Trees Taiwan 191. 1988; Liu *et al.*, Trees Taiwan 2nd ed. 159. 1994; Lu *et al.*, Trees Taiwan 174. 2017.-**TYPE**: Taiwan. Nanto, Wusha, alt. 1500 m, May 26, 1974, C. H. Ou 2488. (Holotype: NCUF!) *syn. nov.*

Rosa taiwanensis auct. non Nakai: Liu, Trees Taiwan 187. 1972; Liu *et al.*, Trees Taiwan 192. 1988; Liu *et al.*, Trees Taiwan 2nd ed. 160. 1994; Lu *et al.*, Trees Taiwan 176. 2017

Shrubs climbing, up to 2–5 m tall. **Branchlets** slender; prickles scattered, hooked, up to 6 mm long. **Leaves** pinnately compound, 3–12 cm long including petiole; stipules herbaceous, mostly adnate to petiole, free part lanceolate, pubescent, the margin irregular serrate with glands or hairs, the apex acuminate; rachis and petiole almost glabrous with few sparse prickles and short glands; leaflets 5–9, thin-chartaceous or coriaceous, ovate or elliptic, 0.5–4 cm long, 0.5–2 cm wide, the terminal one larger than the lateral ones, ovate to ovate-lanceolate, both surfaces glabrous or sparsely pubescent near the base, acute or acuminate or obtuse at apex, acute to obtuse at base, the margin simply serrate. **Flowers** few to many, in terminal corymb or raceme-like cyme, ca. 2.5–3 cm in diameter; pedicel ca. 2–2.5 cm long, pubescent or glandular; bracts narrowly ovate, small, margin glandular, the apex acuminate; hypanthium globose, glandular, pubescent or glabrous; sepals 5, reflexed, shorter than petals, ovate-elliptic, adaxially pubescent, abaxially pubescent or glandular, the margin entire or occasionally with small linear lobes, the apex acute, deciduous after fruit; petals 5, white or somewhat pinkish, obovate-triangle, 1–2 cm long, 1–1.5 cm wide, the apex emarginated; styles connate into a column, exserting, longer than stamens, densely villous. **Hip** globose, 0.6–0.8 cm in diameter, red or purplish when ripe, black when dry.

Endemic. From medium to high altitudes, throughout the central mountains.

Notes: *Rosa pricei* was published by Hayata (1915) based on W. R. Price's collections, one sheet of which in TI was considered to be the holotype by Momiyama and Ohba (1988). Other two duplicates in K are isotypes. Each of the three specimens comes with a tag numbered "798", so this suggests them to be the same collection. In the images of holotype (TI) and isotypes (K), the handwritings, "Tattaka, Horisha 9/7/12", can be read

clearly on the sheets. However, Hayata's protologue recorded the type information as "Tappansha, Holisha, ad 6000 ped. alt., Sept. 1912, leg. R. PRICE", which is apparently inconsistent with the label. After consulting the article, "Plant Collecting in Formosa" (Price, 1982, p.111), a daily account of Price's specimen-collecting journeys in Taiwan, undoubtedly, Hayata (1915) misread the "Tattaka" (near Mt. Li-Ying, Renai Township, Nantou County) as "Tappansha" (near Dabang Village, Alishan Township, Chiayi County) and "9/7/12" (July, 1912) as "Sep. 1912". Here, we correct the type information.

Rosa pricei is widely distributed from the middle to high altitudes in Taiwan. There are wide variations in leaf shapes, hair types on inflorescence, and petal colors. As a result, it is frequently misidentified and treated as different varieties.

Rosa luciae var. *rosea* was first described by Li (1951) based on the type specimen (E. H. Wilson 11067) collected from Hualien. He considered this taxon, characterized by smaller pink flowers, to be an extraordinary variety growing on limestone cliffs of the steep coast of eastern Taiwan. Since then, no more specimen was collected until our first author recollected it. The fresh materials from Hualien (type locality, L. Y. Hung 152, 153, 164, 489, 531, 536) match Li's original protologue and the image of holotype of *R. luciae* var. *rosea* exactly. Based on detailed comparison between our collections and *R. pricei*, the former's morphology undoubtedly falls within the variation of the latter. The petals' color is only slightly pink and uneven to every single one. Additionally, their distribution overlaps. As a consequence, the authors treated it as synonymy of *R. pricei*.

Based on the type specimen from Wusha (Wushe), Liu and Ou (1982) described a new variety, *R. sambucina* var. *mushaniana*, characterized by smaller 7-foliolate leaves and inflorescence with dense red glandular hairs. By checking the holotype and comparing it with *R. sambucina* and *R. pricei* (Table 1), it is found that this variety resembles *R. pricei*. Otherwise, we made an intensive field collection at Wushe where the plants with (LYH282, 286, 290, 292, 293, 297b) or without (LYH284, 288, 289, 291, 295, 296) dense red glandular-hairy inflorescence are found sympatrically. Moreover, some specimens of *R. pricei* collected from Ilan (LYH 321, 334,

Table 1. A comparison of *Rosa pricei*, *R. sambucina* var. *mushaniana* and *R. sambucina*.

Characters	<i>R. pricei</i>	<i>R. sambucina</i> var. <i>mushaniana</i> *	<i>R. sambucina</i>
Leaf length	3–12 cm	8–10 cm	10–18 cm
Leaflets number	almost 7	almost 7	almost 5
Leaflets			
length	0.5–4 cm	2–4 cm	5–9 cm
width	0.5–2 cm	1–2 cm	2–4 cm
Pedicel length	2–2.5 cm	2–2.5 cm	> 3 cm

* type specimen

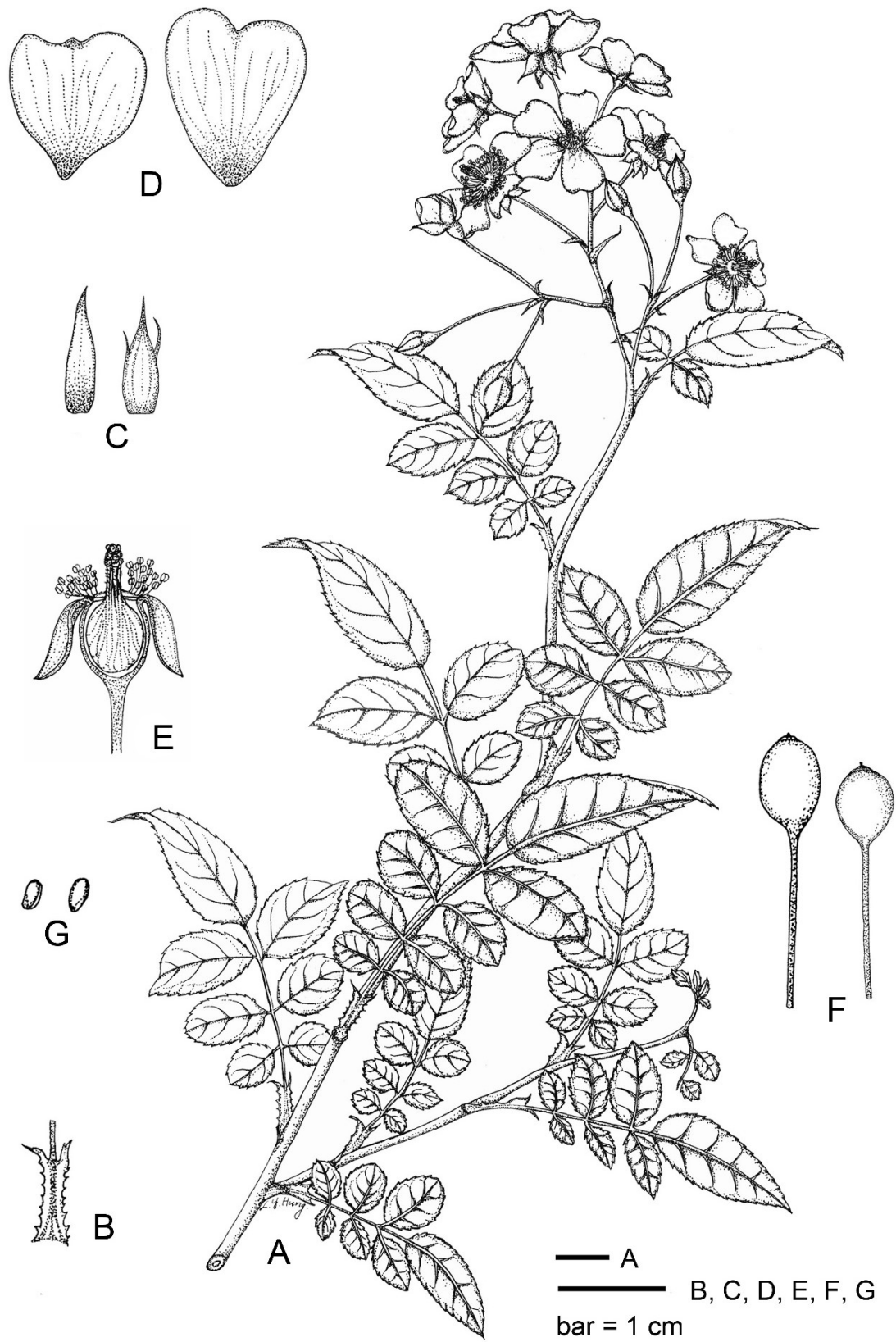


Fig. 3. Illustration of *Rosa pricei* Hayata. A: branch, B: stipule, C: sepals, D: petals, E: hypanthium, F: hips, G: seeds.



336; *Cheng 3081*) and Kaohsiung (*Lin 423*) also own inflorescence with dense red glandular hairs. Based on the evidence above, the red glandular-hairs on inflorescence is not a stable character and we consequently treated *R. sambucina* var. *mushaniana* as a synonym for *R. pricei*.

This species is often mistaken as *R. taiwanensis*. We provide the detailed comparison between them in notes of *R. taiwanensis*.

Specimens examined: TAOYUAN: Lalashan, *Lu 5654* (TAIF). HSINCHU: Litungshan to Sankuang, *Hung LYH503* (TNU); Shangpaling, May 18, 2005, *Hung LYH269, 267* (TNU); Shangpaleng to Fufushan, Feb. 13, 2006, *Hung LYH518* (TNU). TAICHUNG: Huanshan, *Lu 19655* (TAIF); Lishan, *Chiang s. n.* (TAIF); Ssuyuan, *Cheng 3081* (TAIF, TNM); Wuling farm, *Wang 3898* (TAD). NANTOU: Aowanta, *Hsiao 1309* (PPI); Chingching farm, *Hung LYH592, 593* (TNU); Hoshe, *Chang 6667* (PPI); Kuantaohsi, *Chang 6558* (PPI); Tanta, *Chiang 138* (TAIF); 4.5–5 km in Prov. 7A, *Hung LYH282, 283, 284, 285* (TNU); 5–5.5 km in Prov. 7A, *Hung LYH286, 287, 288* (TNU); Lungchuan village, *Hung LYH289* (TNU); 6.9 km in Prov. Rd. #7A, *Hung LYH290* (TNU); 8 km in Prov. Rd. #7A, *Hung LYH291, 292, 293* (TNU); 9 km in Prov. Rd. #7A (Green Grassland), *Hung LYH295, 296* (TNU); 19.5 km in Prov. Rd. #7A, *Hung LYH297b* (TNU). KAOHSIUNG: Kuanshan, *Hung LYH361* (TNU); *Lin 423* (HAST). PINGTUNG: Wutai, *Yang 29615* (PPI). TAITUNG: Litaio, *Hung LYH541* (TNU). HUALIEN: 149 km in Prov. Rd. #8, *Hung LYH536* (TNU); Hoping logging trail, *Lin 1251* (TNM, TAIF); Juissui Forest Road, *Wang 636* (HAST); Mukuashan, *Chang 2611* (PPI); Huitouwan to Meiyuan, *Hung LYH152* (TNU); Yenhai logging trail, *Hung LYH268* (TNU); Matakan-Tienhsiang, 1930, *M. Sagawa & Y. Yamamoto s. n.* (TAD); Chiuchutung, *Hung LYH153, 164, 489, 531* (TNU). ILAN: Buta-Riyohen, *Suzuki-Tokio 7580* (TAD); Nanshan, *Hsieh 7712* (TAD); Nanshan to Ssuyuan, *Hung LYH321* (TNU, HAST); Ssuyuan, *Cheng 3081* (TAIF, TNM); Ssuyuanyakou, *Hung LYH334, 336* (TNU); Yuanyanghu, *Lu 14842* (TAIF).

2. *Rosa sambucina* Koidz., Bot. Mag. Tokyo 31: 130. 1917; Liu & Su in Li *et al.*, Fl. Taiwan 3: 102. 1977; Liu *et al.*, Trees Taiwan 191. 1988; Liu *et al.*, Trees Taiwan 2nd ed. 160. 1994; Ohashi in T. C. Huang *et al.*, Fl. Taiwan 2nd ed. 3: 118. 1993. Lu *et al.*, Trees Taiwan 175. 2017; Chung, Illustr. Fl. Taiwan 4: 364. 2017.-TYPE: Japan. Honshu. Okayama: Prov. Bitchiu, Atetsu-gun, Hiroishi. *Yoshino 28* (Lectotype: TI, designated by Momiyama & Ohba, 1988. photo!); Prov. Bitchiu, Jobo-gun, Tanase, Jun. 21, 1915, *G. Koidzumi s. n.* (Other syntype: TI, photo!)

山薔薇, Fig. 4

Rosa sambucina Koidz. var. *pubescens* Koidz., Bot. Mag. Tokyo 31: 130. 1917; Kanehira, Formos. Trees rev. ed. 280. f. 232. 1936; Li, Woody Fl. Taiwan 299. 1963; Gu & Robertson in Wu & Raven, Fl. China 9: 372. 2003. -TYPE: Formosa, Mt. Arisan, Yaoliping-Shuicheliao, Apr. 23, 1913, *B. Hayata & I. Tanaka s.n.* (Lectotype: TI, designated by Momiyama & Ohba, 1988. Photo!); Mt. Arisan, Yaoliping-Fenchiku, Mar. 27, 1914, *s. coll.* (other syntype: TI, photo!)

Rosa henryi Boulenger, Ann. Soc. Sci. Bruxelles, ser. B, 53: 143. 1933, et Bull. Jard. Bot. Brux. 9: 231. 1933; Yu & Ku in Yu, Fl. Rep. Popu. Sin. 37: 443. 1985; Gu & Robertson in Wu & Raven, Fl. China 9: 378. 2003. -TYPE: China, S. Wushan (Prov. Szechuan), Mar. 1889, *Henry A., 5773*. (Type: K, 2 sheets, photo!; HUH, 2 sheets, photo!) *syn. nov.*

Rosa rubus Levl. & Vaniot var. *pubescens* Hayata, Gen. Ind. Pl. Form. 24. 1917, *nom. nud.*

Rosa moschata auct. non Mill.: Hayata, Icon. Pl. Formos. 5: 60. 1915.

Shrubs climbing to 5–6 m tall. **Branchlets** terete, pubescent when young, glabrate when mature; prickles scattered, curved, up to 1 cm long, stout, flat, gradually tapering to broader base. **Leaves** pinnately compound, 10–18 cm long including petiole; stipules herbaceous, mostly adnate to petiole, free parts lanceolate, pubescent, the margin entire and often ciliate, the apex acuminate; rachis and petiole glabrous or pubescent, with sparse small hooked prickles; leaflets 5 or 7, herbaceous or coriaceous, oblong to oblong-obovate, 5–9 cm long, 2–4 cm wide, acuminate or acute at apex, subrounded or broadly cuneate at base, usually glabrous above, sparsely pubescent or glandular beneath along the midrib, the margin irregularly serrate. **Flowers** few to many, in terminal corymb or raceme-like cyme, 3–3.5 cm in diameter; pedicels 2–4 cm, pubescent and glandular; bracts narrowly ovate, small, margin glandular, apex acuminate; hypanthium globose or obovoid, glandular, pubescent or glabrous; sepals 5, reflexed, ovate-elliptic, adaxially pubescent, abaxially pubescent or glandular, margin entire or with a few small lobes, apex long acuminate, leaflike, deciduous after fruit; petals 5, white, obovate-triangle, 2–3 cm long, 2–3 cm wide, base broadly cuneate, apex emarginated; styles connate into a column, exserting, longer than stamens, densely villous. **Hip** subglobose, 0.8–1 cm in diameter, shiny, mostly glabrous, sometimes with a few hispid glands, reddish when ripe, black when dry.

China and Japan. Taiwan, in open slopes, roadsides; at medium altitudes throughout the island.

Notes: *Rosa sambucina* var. *pubescens* Koidz. differs from the typical variety only by the pubescence and glandular-hairy on pedicels and sepals (Koidzumi, 1917). This treatment was adopted by Gu and Robertson (2003) in Flora of China. They considered that *R. sambucina* var. *sambucina* is endemic to Japan while the variety *R. sambucina* var. *pubescens* is confined in Taiwan. However, by field observation and examining numerous specimens, we found that glabrous and pubescent plants coexist within a population. Therefore, the surface features on pedicels and sepals are not stable characters. Here, we adopt the treatment of Flora of Taiwan (Liu and Su, 1977; Ohashi, 1993), canceling this variety.

Rosa henryi is published by Boulenger in 1933 based on the specimen no. 5773 collected by A. Henry from Sichuan (Szechuan), China. Boulenger (1933) believes that this species has mainly 5 leaflets, more or less hairy pedicels, slightly expanded ends of sepals, and hairy styles that can be distinguished from similar species. The Flora of China (Yu and Ku, 1985; Gu and Robertson, 2003) treat *R. henryi* and *R. sambucina* as different species. However, Gu and Robertson's (2003) treatment is obviously wrong because they erroneously listed *R. sambucina* in the group of stipules irregularly serrate at the margin, and accordingly separated the two. Yu and Ku (1985) mentioned that *R. henryi* and *R. sambucina* are

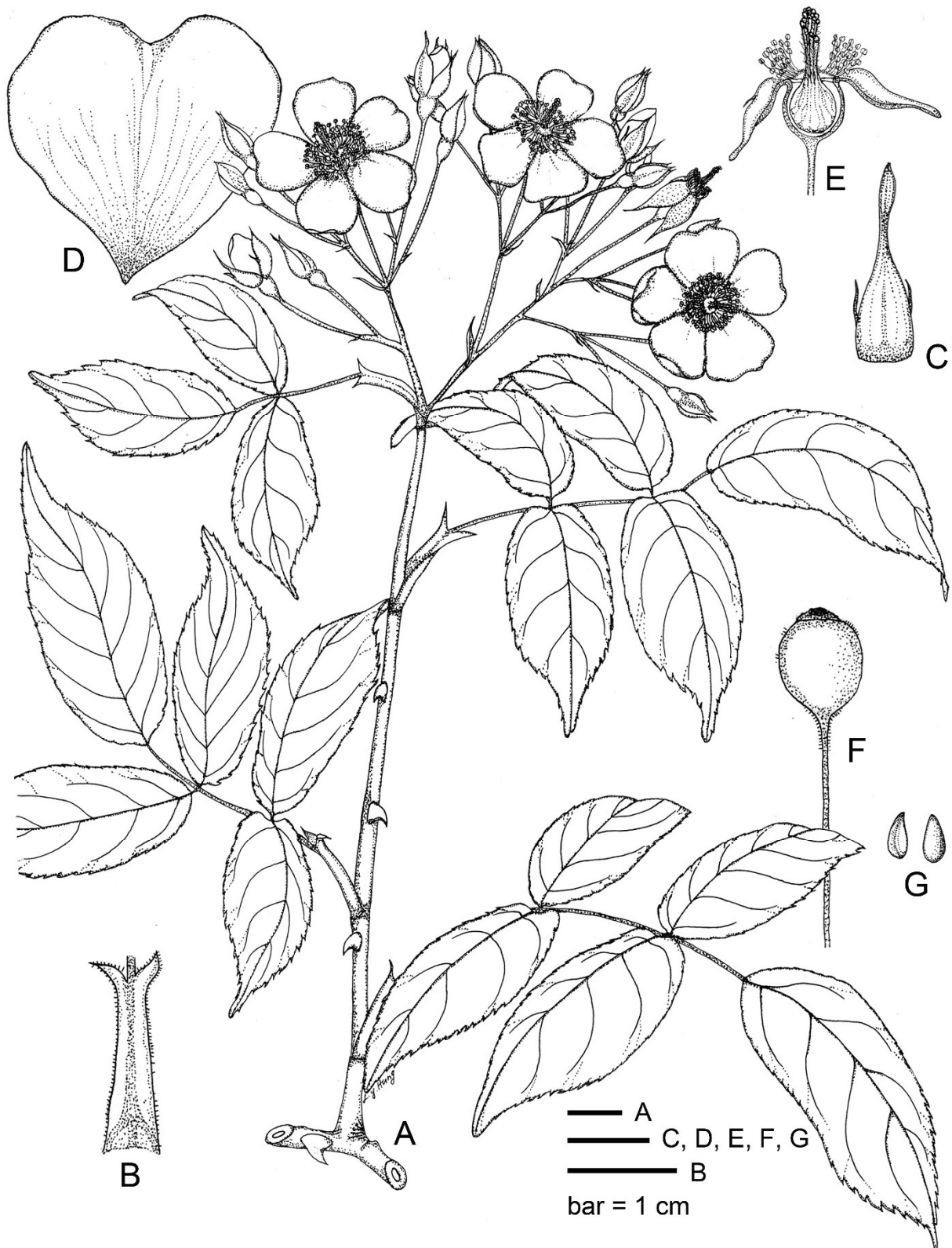


Fig. 4. Illustration of *Rosa sambucina* Koidz. A: branch, B: stipule, C: sepal, D: petal, E: hypanthium, F: hip, G: seeds.



almost similar and can be distinguished by calyx abaxially pubescent solely. They suggested that these two taxa might be synonymous very possibly.

We reviewed the photos of Henry *no. 5773* specimens from Kew. The whole stipules entire and the number of leaflets are mainly 5, the pedicel is pubescent, the sepals have glandular hairs, and the styles are hairy etc. are consistent with *R. sambucina*. The end expansion of sepals is not absolute in specimen *no. 5773*. Some sepals have but some do not; specimens collected in Taiwan also have both. Boulenger used the combination of pedicel coat and sepal pattern as the key to distinguish two species is confusing and unstable. We agree with Yu and Ku (1985) and merged *R. henryi* into the synonym of *R. sambucina*.

Specimens examined: CHINA. **Anhui:** Yuexi Co., *Liu 516* (PE); Huangshan, *Chen 1077* (IBSC). **Fujian:** Chongan Co., *Wuyi Exp2262* (PE); Liengfeng Co., 1937, *Migo s. n.* (NAS). **Guangdong:** Lianshan Co., *Ye 3758* (IBSC); Xinxing Co., *Deng 6830* (IBSC). **Guangxi:** Quan Co., *Zhong 81556* (IBK); Quanzhou Co., *Li 0499* (PE). **Guizhou:** Dashaha Co., *Liu 2031062-01* (IMC). **Hubei:** Xuanen Co., *Wang 4215* (PE); Shennongjia Naional Park, *Zhang XYQ0745* (JIU). **Hunan:** Dongkou Co., *Tan 63029*, (IBK, IBSC, PE). **Jiangsu:** Yixing Co., Longshan, *Fang 145* (PE); Yixing Co., Xinshan, *Shen 800* (NAS). **Jiangxi:** Jiuliang City, Minshan, *Tan 97361* (IBSC); Xiushui Co., Huanggang, *Miu 09282* (SZG). **Sichuan:** Tianquan Co., *Jiang 34337* (IBK); Linshui Co., *Liu 0262* (IMC). **Yunnan:** Maguan Co., *Hou & Sun 11041801* (AU). **Zhejiang:** Suichang Co., *Ge et al.*, *GBJ06908* (CSH); Anji Co., *Fang et al. 975067* (PE).

JAPAN. **Aichi:** Mikawa Prov., 1965, *Torii s. n.* (PE). **Fukui:** Ooigun, 1988, *Kawakami s. n.* (TRPM). **Fukushima:** Honshu, Tohoku Distr., 2015, *Yamashita s. n.* (FKSE). **Hyoogo:** Harima Prov., Sayoogun, *Furuse 9892* (PE); Mt. Seppiko, Himeji City, 1960, *Furuse s. n.* (KAG). **Kagoshima:** Nagamine forest road, Okujusso, *Sako 8959* (KAG); Okuchikogihara, Isa City, *Hatusima 43637* (KAG). **Kochi:** Susaki City, Aokimisaki Awa, *Miyazaki 505086* (PE). **Kyoto:** Fukotoge Ooe-cho, *Murata 38922* (PE). **Oita:** Near Nishishiyi, Innai-cho, Usa-gun, *Sato 4993* (KAG); Fukayabakei, 1956, *Arakane & Ikuno s. n.* (KAG). **Okayama:** Niimi City, Shinagase Tunnel, 1907, *Ito s. n.* (KAG). **Saga:** Taradake Tara Town, Fujitsu Distr., *Miyazaki 9805237* (PE). **Shimane:** Hikidani River, S. of Mt. Obeshi, *Noshiro et al. TWTw-21637* (PE). **Totori:** Saihaku-gun, 1985, *Masayosi s. n.* (TRPM). **Wakayama:** Hidaka-gun, 1931, *Nakajima s. n.* (PE). **Yamaguchi:** Abugun, Chomonkyo, *Saito 1368* (PE). **Yamaguchi:** Sawa-gun, 1975, *Masayosi s. n.* (TRPM).

TAIWAN. **Hsinchu:** Chingchuan to Kanwu, *Wang 733* (TAI); Hsiakelo Ancient Trail, *Wang 33* (TAIF, TNM, TNU); Litungshan, *Hung LYH264* (TNU); Talu Logging Trail (Kuanwu), *Chung 2399* (TAIF). **Miaoli:** Chiuchiushanchuan to Tapachienshan, *Ying 1888* (NTUF); Tapachienshan to Kuanwu, *Wang 2428* (TAIF). **Taichung:** Hsuehshan Forest Road 31.5 km, *Wu 1272* (HAST); Huanshan, *Chung 46* (HAST); Lishan, *Chung 1945* (TAIF); Shihkang, *Lu 25710* (TAIF); Wuling Farm, *Lin 251* (HAST); Tahsuehshan, *Hung LYH221* (TNU); Tungmaoshan, *Kao 9637* (NCUF). **Nantou:** Chuefeng to Sungkang, *Huang 3459* (TAI); Chingjing Farm, *Hung LYH595* (TNU); Chitou to Chiti (Chitou to Shanlinhsi), *Kao 7214* (TAI); Hoshe, *Hung LYH177* (TNU); Meifeng, *Ou 2927* (NCUF); Meifeng to Liyingshan, *Hung LYH596* (TNU); Shanlinhsi, *Hung LYH326* (TNU); Tunyuan, *Hung LYH542* (TNU). **Chiayi:** 84 km in Prov. Rd. #18, *Hung LYH546* (TNU); Alishan to Shanlinhsi, *Tang 516* (TAI); Fenchihu, *Chang 6071* (PPI); Tataka to Yushanchienfeng, *Yang 7833* (TAIF). **Kaohsiung:** Meilan Forest Rd. 16 km, *Liu 456* (HAST, TAIF, TNU). **Taitung:** Peitawushan (Mt. Daibu), 1918, *E. Matuda s. n.* (TAI). **Hualien:** Wuchiapengshan to Chili, *Liao 1439* (HAST, PPI, TNU). **Ilan:** Tungao, *Shih 2103* (PPI); Ssuyuan to Nanshan, *Chen 2211* (TNU).

3. *Rosa taiwanensis* Nakai, Bot. Mag. Tokyo 30: 238. 1916; Kanehira, Formos. Trees rev. ed. 280. 1936; Li, Woody Fl. Taiwan 300. 1963; Liu & Su in Li *et al.*, Fl. Taiwan 3: 103. 1977; Gu & Robertson in Wu & Raven, Fl. China 9: 372. 2003; -**TYPE:** Formosa. Tantasha, Apr. 1909, *U. Mori. s. n.* (Lectotype: TI, designated by Momiyama & Ohba, 1988. Photo!); Taiwan: Byolitsu, Mar. 1896, *Y. Tashiro 5* (Other syntype: TI, photo!); Taiwan: Pachina. May 12, 1896, *Numani & Ueno 44* (Other syntype: TI, photo!)

臺灣薔薇、小金櫻, Fig. 5

Rosa transmorrisonensis Hayata var. *taiwanensis* (Nakai) Ying, Quart. J. Chinese Forest. 8(3): 100. 1975; et Tech. Bull. Exp. Forest. Nat. Taiwan Univ. 160: 45. 1985; et Col. Illustr. Fl. Taiwan 515, f. 239. 1991.

Rosa multiflora auct. non Thunb.: Matsumura & Hayata, J. Coll. Sci. Imp. Univ. Tokyo (Enum. Pl. Formos.) 22: 128. 1906; Koidz., J. Coll. Sci. Univ. Tokyo 34(2): 230. 1913.

Rosa luciae auct. non Fr. & Roehbr.: Matsumura & Hayata, J. Coll. Sci. Imp. Univ. Tokyo (Enum. Pl. Formos.) 22: 128. 1906; Koidz., J. Coll. Sci. Univ. Tokyo 34(2): 232. 1913. *pro parte.*; Liu & Su in Li *et al.*, Fl. Taiwan 3: 101. 1977; Ying, Col. Illustr. Fl. Taiwan 1: 508, f. 237. 1991; Liu *et al.*, Trees Taiwan 190. 1988; Ohashi in T. C. Huang *et al.*, Fl. Taiwan 2nd ed. 3: 115. 1993; Liu *et al.*, Trees Taiwan 2nd ed. 159. 1994; Gu & Robertson in Wu & Raven, Fl. China 9: 373. 2003. *pro parte.*

Rosa luciae Fr. & Roehbr. var. *formosana* auct. non Cardot: Li, Woody Fl. Taiwan 298. 1963; Liu, Trees Taiwan 186. 1972 *excl. syn. R. luciae* var. *rosea*.

Rosa kwangtungensis auct. non T.T.Yu & H.T.Tsai: Chung, Illustr. Fl. Taiwan 4: 365. 2017.

Shrubs climbing, with long repent branches. **Branchlets** terete, puberulous when young; prickles scattered, curved, to 6 mm, stout, flat, gradually tapering to broad base. **Leaves** 3–12 cm including petiole; stipules herbaceous, mostly adnate to petiole, free parts lanceolate, pubescent, the margin irregularly serrate to fimbriate with glands, the apex shortly acuminate; leaflets 5–7(–9), herbaceous or little chartaceous, pale-green abaxially, green adaxially, elliptic to elliptic-oblong, 0.5–5 cm long, 0.5–2 cm wide, the base broadly cuneate or subrounded, the apex acute to obtuse, the margin serrate to fimbriate, abaxially subglabrous; rachis and prominent midvein pubescent, sometimes with sparse short prickles or glands. **Flowers** few to many, 1.5–3 cm in diameter, in terminal corymb or raceme-like cyme; pedicel 1–3 cm, densely pubescent or glandular or subglabrous; bracts small, 1–1.5 cm, narrowly ovate, margin glandular or pubescent, apex acuminate; hypanthium globose, glandular, pubescent or glabrous; sepals 5, reflexed, deciduous, ovate-elliptic, both surfaces pubescent or subglabrous, abaxially intermixed with glandular hairs, the margin entire, the apex acuminate; petals 5, white, obovate, obovate-triangular, 1–2 cm long, 1–1.5 cm wide, the base broadly cuneate, the apex emarginate or rounded-obtuse; styles connate into column, exerting, slightly longer than stamens, densely villous. **Hip** globose, 6–8 mm in diameter, reddish to blackish when ripe, black when dry.

Taiwan. In shrubs, slopes, river sides, roadsides; at low to medium altitudes.

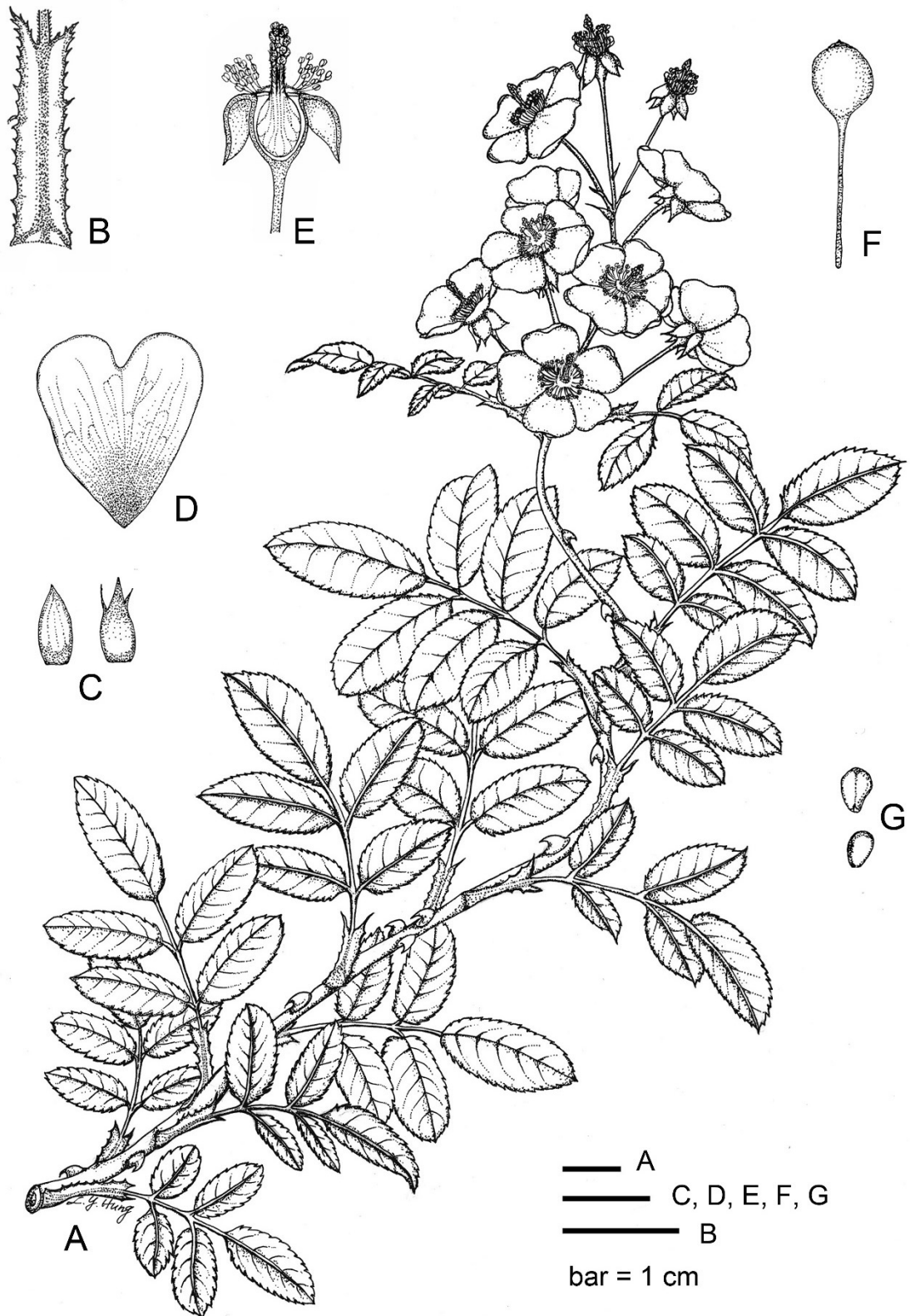


Fig. 5. Illustration of *Rosa taiwanensis* Nakai. A: branch, B: stipule, C: sepals, D: petal, E: hypanthium, F: hip, G: seeds.

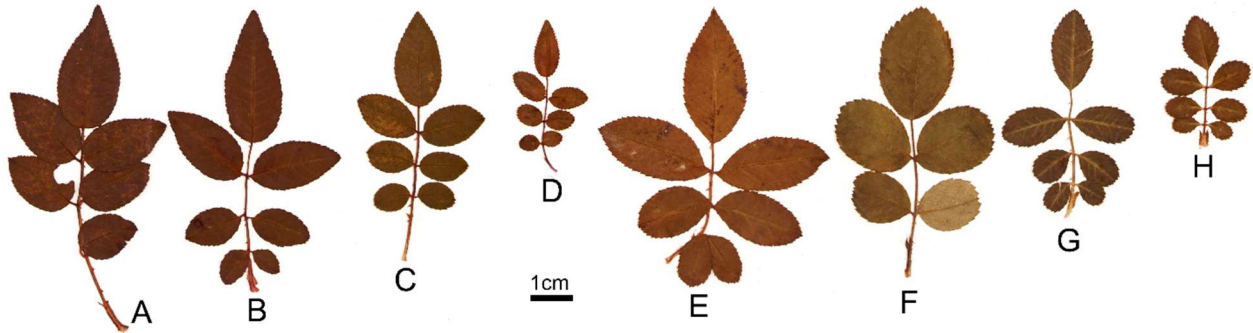


Fig. 6. Representative leaves of *R. pricei* and *R. taiwanensis*. Notice the terminal leaflets of *R. pricei* (A-D) are ovate to ovate-lanceolate while those of *R. taiwanensis* (E-H) are elliptic to elliptic-oblong. Materials from the first author's specimen LYH289, LYH282, LYH593, LYH268, LYH528, LYH586, LYH537, and LYH582 (from A to H).

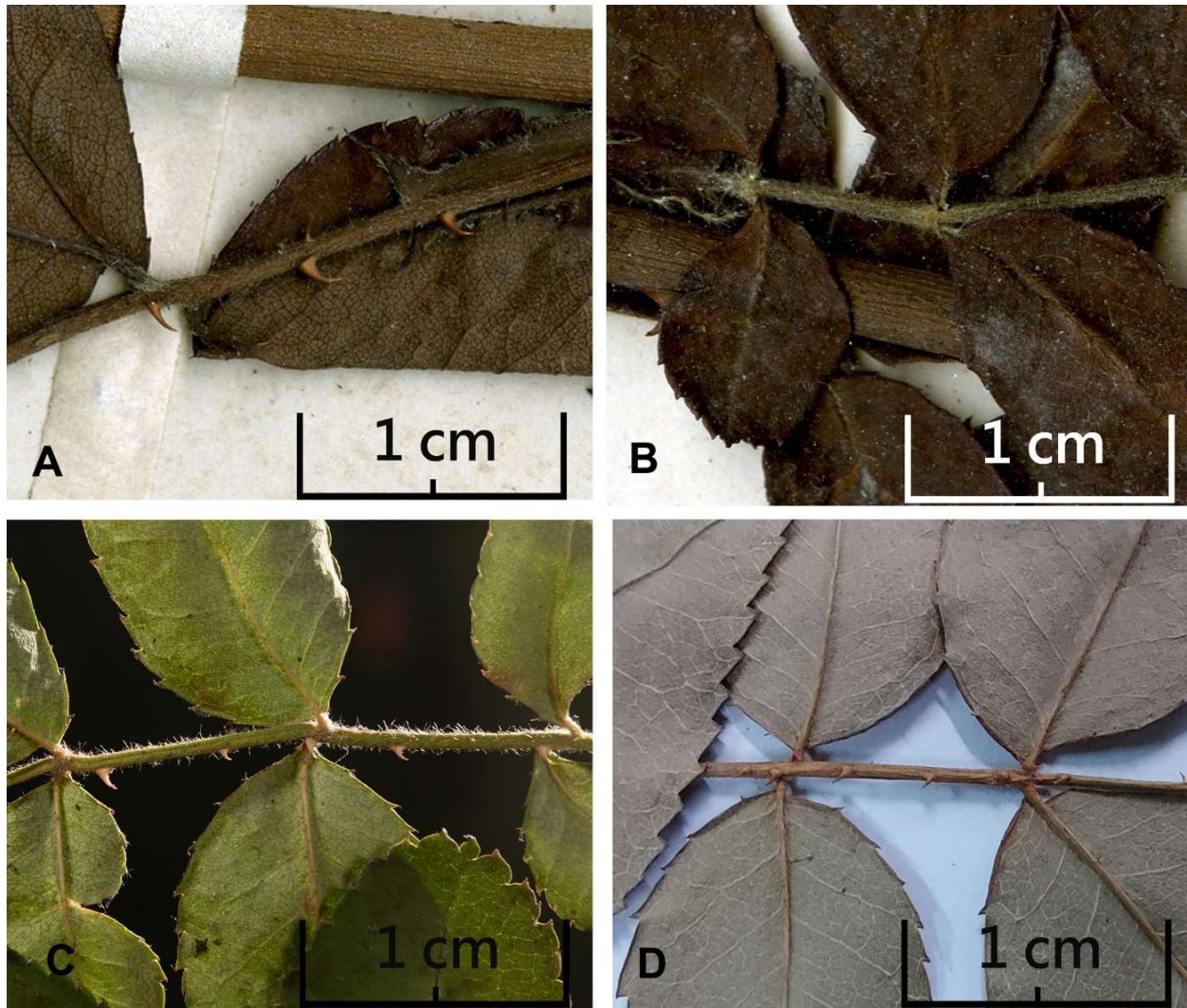


Fig. 7. Comparison of vestiture along rachis between *R. taiwanensis* (A-C) and *R. pricei* (D). A. from lectotype of *R. taiwanensis* (Formosa. Tantasha, Apr. 1909, *U. Mori* s. n.); B. from syntype of *R. taiwanensis* (Taiwan: Byolitsu, *Y. Tashiro* 5); C. from fresh leaf of *R. taiwanensis* (Taiwan: Tainan, Baihe, LYH631); D. from *R. pricei* (Taiwan: Nantou, Provincial Rd #14, LYH293)

Notes: *Rosa taiwanensis* Nakai was an extremely puzzling taxon in the past. Local taxonomists did not precisely describe its difference with related species until

we check high-resolution digital images of the lectotype and other syntypes from TI, in which the trichomes on leaf surface can be clear observed. Most specimens of this

**Table 2.** A comparison of *Rosa pricei* and *R. taiwanensis*

Characters	<i>R. pricei</i>	<i>R. taiwanensis</i>
Terminal leaflet shape	ovate to ovate-lanceolate	elliptic to elliptic-oblong
Texture	thin-coriaceous to coriaceous	herbaceous
Abaxial surface	greenish	pale green
Leaves pubescence	glabrous, or sparsely pubescent on the base of leaflet	pubescent along rachis and prominent midvein
Distribution altitude	medium to high	low to medium

species in Taiwan herbaria were misidentified as *R. pricei* because both species belong to the same series *Multiflorae* (Yu and Gu, 1985), they share almost identical floral morphology and can be distinguished only by leaf characters (Table 2, Fig. 6). The leaves of *R. taiwanensis* are pubescent along the rachis and midrib while those of *R. pricei* are glabrous (Fig. 7).

This species was also misidentified as *R. kwangtungensis* (Chung, 2017). Indeed, it is greatly similar to *R. kwangtungensis*. After we checked the isotype of *R. kwangtungensis* and other specimens deposited in IBSC and Taiwan herbaria, we find it is different from *R. taiwanensis* because of abaxially pubescent leaflets and densely pubescent prominent midvein. *Rosa pubinervis*, a new species but without formal publication raised by Hung (2006), is also synonymous with this taxon.

Rosa taiwanensis was once widely distributed in western Taiwan during the Japanese occupation (1895–1945 A.D.) according to the original publication and herbarium specimens. However, most early habitats have disappeared as a result of severe land developments. At present, only few populations are spotted in lowlands in Hsinchu, Miaoli, and Taichung. The important population found in Dadushan-tableland (Taichung) is under severe human disturbance. According to the criteria of IUCN red list (Editorial Committee of the Red List of Vascular Plants of Taiwan, 2017), we propose that this species should be in the vulnerable (VU) category.

Specimens examined: **TAIPEI:** Kantou, 1922, *Sasaki s. n.* (TAI); Neihu (Naiko), *Shimizu 4731* (TAI); Kuanyinshan, *Fukuyama 172* (TAI); Taihoku, 1931, *Sasaki s. n.* (TAI). **HSINCHU:** Chutung, *Lu 9425* (TNU); Sintiku, *Simada 854a* (HAST), *854, 854c* (TAI); *Shimada 5705* (TAIF); Sintikusyu, *Simada 850a* (HAST); Wuchihshan, 1914, *T. Ito s. n.* (TAIF). **MIAOLI:** Miaoli, 1957, *Liu s. n.* (TAI); Hsihu, *Hung LYH582* (TNU); Hsihu Public Cemetery #1 (Prov. Rd. #128), *Peng 21434* (HAST); Hoenshan, *Huang 12680* (TAI); Sanchahe, 1909, *Kawakami & Sasaki s. n.* (TAIF); Tunglo to Wumeikeng (Prov. Rd. #128), *Peng 13946* (HAST); Wanli, *Kao 10329* (TAI); Zhuolan, 1909, *Kawakami & Sasaki s. n.* (TAIF). **TAICHUNG:** Dadushan-tableland, *Hung LYH586* (TNU); Fengyuan, *Hung LYH537* (TNU); Mt. Tudu, *Lu 20056* (TAIF, HAST); Nanliao, *Chen 1257* (TAIF); Mt. Hassen, 1932, *Sasaki s. n.* (TAI); Shihkang, *Hung LYH528, 529* (TNU); Takeng, *Hung LYH533* (TNU). **YUNLIN:** Touliu, 1936, *Shihing s. n.* (TAI). **CHIAYI:** Chiayi, 1910, *Kawakami s. n.* (TAI); Chuchiso, *Kao 10680* (TAI). **TAINAN:** Baihe, *Yen 7708* (HAST); same loc., Feb 17, 2022, *Hung LYH631* (TNU); Chukao, Exper. St., 1936, *Mori s. n.* (TAI); Wushantou, 1943, *Mori s. n.* (TAI). **HUALIEN:** Gwaii-taroko, Kwarenko, 1919,

Kanehira & Sasaki s. n. (TAIF); Shihkungtsai Trail, *P. F. Lu 18177* (TAIF); Suhua Ancient Trail, *Chung 10084* (TAIF); Taroko, 1919, *Kanehira & Sasaki s. n.* (TAIF).

4. *Rosa transmorrisonensis* Hayata, Icon. Pl. Formos. 3: 97. 1913; Li, Woody Fl. Taiwan 300. 1963; Liu & Chen, Illustr. Ligneous Pl. Taiwan 1: 460. 1970; Liu & Su in Li *et al.*, Fl. Taiwan 3: 103. *pl.* 493. 1977; Liu *et al.*, Trees Taiwan 192. 1988; Ying, Col. Illustr. Fl. Taiwan 1: 514, 1991; Ohashi in T. C. Huang *et al.*, Fl. Taiwan 2nd ed. 3: 119. 1993; Liu *et al.*, Trees Taiwan 2nd ed. 160. 1994; Gu & Robertson in Wu & Raven, Fl. China 9: 372. 2003; Chung, Illustr. Fl. Taiwan 4: 368. 2017. **-TYPE:** Formosa, Mt. Morrison, *U. Mori s. n.* (Holotype: TI, photo!)

高山薔薇, Fig. 8

Rosa multiflora Thunb. ex Murray var. *formosana* Cardot in Lecomte, Not. Syst. 3: 263. 1916; Li, Woody Fl. Taiwan 299. 1963; Liu & Su in Li *et al.*, Fl. Taiwan 3: 101, 1977; Liu *et al.*, Trees Taiwan 191. 1988; Ying, Col. Illustr. Fl. Taiwan 1: 508. 1991; Liu *et al.*, Trees Taiwan 2nd ed. 159. 1994; Ohashi in T. C. Huang *et al.*, Fl. Taiwan 2nd ed. 3: 117. 1993. **-TYPE:** Formosa, Arisan, alt. ca. 2500 m, Jun. 1914, *Faurie 73* (Holotype: KYO, photo!) **syn. nov.**

Rosa formosana (Cardot) Koidz., Symb. Orient.-Asiat. 55. 1930.

Rosa calva Boul. var. *formosana* (Cardot) Boulenger, Bull. Jard. Bot. Bruxell. 9: 271. 1933.

Rosa kanzanensis Masamune, Trans. Nat. Hist. Soc. Form. 26: 55. 1936; Masamune, List Vasc. Pl. Taiwan 68. 1954. **-TYPE:** Formosa, Jakaosyu, Mt. Kanzan, alt. ca. 3200 m, *N. Fukuyama s. n.* Jul. 12, 1935. (Holotype: TAI!) **syn. nov.**

Rosa luzoniensis Merr., Philip. J. Sci. Bot. 17: 259. 1921. **-TYPE:** The Philippines, Luzon, Panai, Jul. 1907, *BS & E. A. Mearns s. n.* (Paratype: L, photo!)

Rosa multiflora auct. non Thunb.: Gu & Robertson in Wu & Raven, Fl. China 9: 380. 2003. *pro parte.*

Shrubs climbing or scandent, dwarf to 3 m tall. **Branchlets** glabrous or with some glands on young branches; prickles paired or scattered, flat, up to 7 mm long. **Leaves** pinnately compound, 4–10 cm long including petiole; stipules membranous, mostly adnate to petiole, free parts lanceolate, 1–2 cm long, both surfaces subglabrous or sparsely pubescent, margin filiform-dissected with glands or hairs; rachis and petiole pubescent, glandular-pubescent, sparsely prickly; leaflets 5–9, herbaceous or a little chartaceous, elliptic or oblong, the terminal one largest, 0.8–3.5 cm long, 0.5–2 cm wide, subglabrous above, sometimes sparsely glandular or pubescent along midrib, the margin acutely simply serrate with sparse glands; the leaflet apex rounded-obtuse, acute, or truncate; the leaflet base obtuse or broadly cuneate. **Flowers** few to many, solitary, paired or >3 in cyme to compound-cyme, 1.8–2.5 cm in diameter; bracts broadly ovate, filiform-dissected, glandular or pubescent, the apex acuminate; pedicel 1.5 cm, glandular-pubescent or glabrous; hypanthium subglobose to urceolate, glabrous or glandular; sepals 5, ovate-elliptic, adaxially densely pubescent, abaxially pubescent, glandular-pubescent or glabrous, the apex acuminate; petals 5, white, obovate-triangle, about 1–2 cm long, 1–1.5 cm wide, emarginated at apex; styles connate into column, equal to or a little longer than stamens, styles nearly glabrous. **Hip** subglobose,

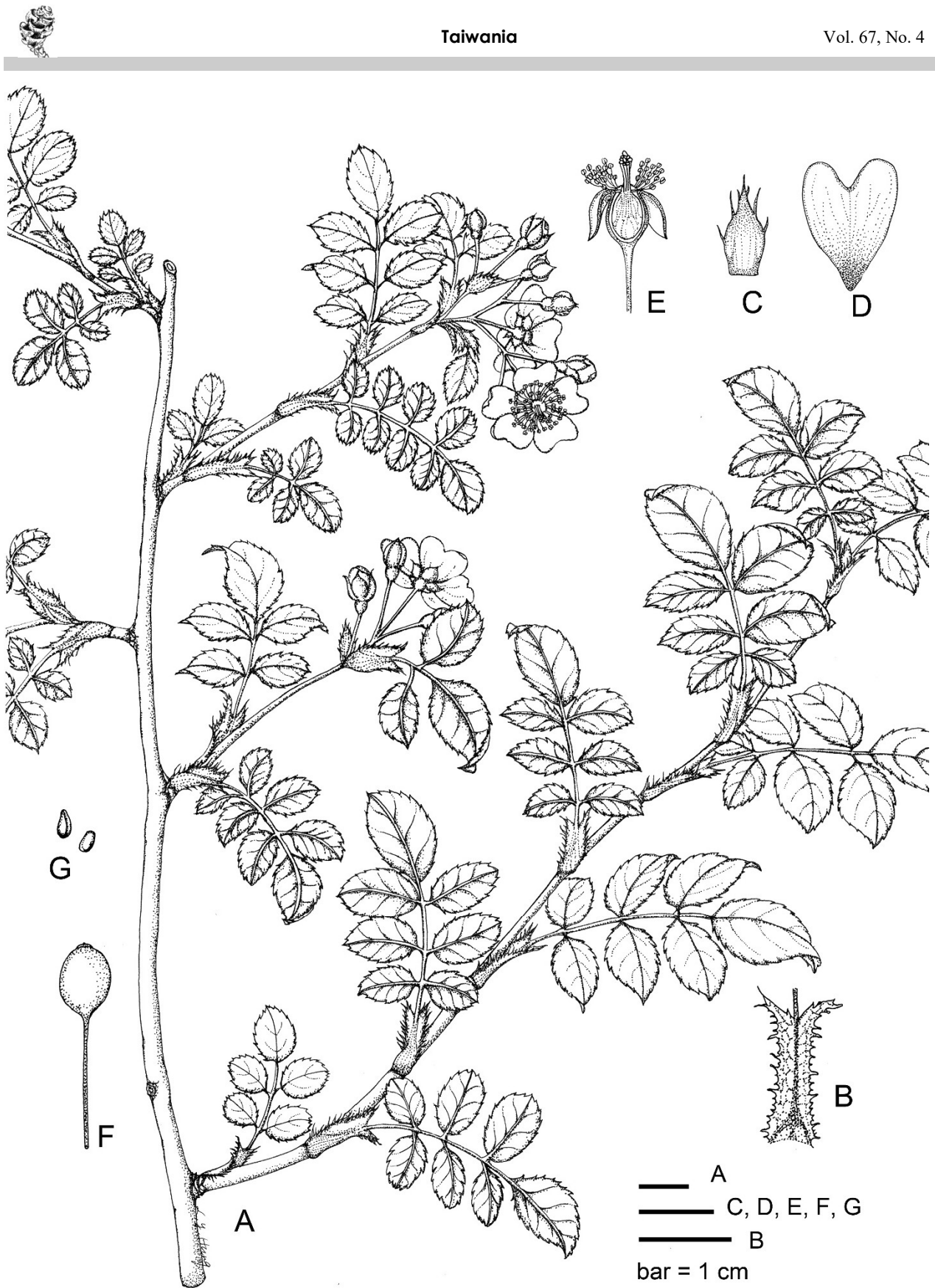


Fig. 8. Illustration of *Rosa transmorrisonensis* Hayata. A: branch, B: stipule, C: sepal, D: petal, E: hypanthium, F: hip, G: seeds.

**Table 3.** A comparison of *Rosa transmorrisonensis*, *R. kanzanensis* and *R. pricei*.

Characters	<i>R. transmorrisonensis</i>	<i>R. kanzanensis</i> (type specimen)	<i>R. pricei</i>
Styles	glabrous	not available (flower in bud)	pubescent
Inflorescence	solitary or cyme	most solitary	cyme or thyrse
Pediceal length	1–2 cm	1–2 cm	2–2.5 cm
Stipules	membranous, margin filiform-dissected	membranous, margin filiform-dissected	herbaceous, margin irregular serrate
Leaf texture	herbaceous	herbaceous	thin-coriaceous or coriaceous

6–8 mm in diameter, sometimes with a few glands, reddish when ripe, shiny, black when dry.

The Philippines. Taiwan, in shrubs, slopes, roadsides; at high altitudes throughout the central mountains.

Notes: *Rosa transmorrisonensis* is easy to diagnose by glabrous styles and filiform-dissected ciliate stipules margin. It was described to have very small leaflet and solitary flower in the original publication (Hayata, 1913). However, based on our field observation and specimen examination, its inflorescence types can be solitary, paired or cymous, and its leaf length ranges from ca. 4 to 10 cm.

Rosa multiflora var. *formosana* was described based on a specimen from Arisan (Cardot, 1916). Upcoming taxonomists, for example Li (1963), Liu (1972), and Liu and Su (1977), used the inflorescence type as the main feature to distinguish *R. multiflora* var. *formosana* from *R. transmorrisonensis*. According to the holotype photo of *R. multiflora* var. *formosana*, the solitary or cymous inflorescence and other characters fall in the variation range of *R. transmorrisonensis*. As above, we treated it to be synonymous with *R. transmorrisonensis*.

Rosa kanzanensis was initially collected from Mt. Kanzan at altitude of 3,200m (Masamune, 1936). It was treated as a synonym of *R. pricei* by Liu and Su (1977). After examining the holotype at TAI and carefully comparing it with both *R. transmorrisonensis* and *R. pricei* (Table 3), we draw the conclusion that *R. kanzanensis* is identical with *R. transmorrisonensis* rather than *R. pricei*. Here we treated it as a synonym of *R. transmorrisonensis*.

Rosa transmorrisonensis is widely distributed in high mountains above the altitude 2,300 m throughout Taiwan. Its altitudinal distribution is partially overlapping with *R. pricei*. At medium altitudes, particularly along with the Provincial Highway #8 over 2000 m, there are some individuals with corymb inflorescence but glabrous style, a combination intermediate between *R. transmorrisonensis* and *R. pricei* (LYH475). Interspecific hybridization between two species is suggested, so we encourage further study to confirm this hypothesis.

Specimens examined: HSINCHU: Kuanwu, 1990, *C. H. Ou s. n.* (TNM). MIAOLI: Leshan to Kuanwu, *Wang 4664* (TNU, TAI); Taian 230 Forest Rd. 12 km, *Wang 1119* (TAIF, PPI, TNM); Tapachienshan, *Wang 2400* (TAIF, TNM). TAICHUNG: Chingshan to Tchi, *Wang 2746* (TNM); Hsiaoshueshan, *Liu 285* (NTUF); Hsuehshan, *Kuo 364* (TAIF, TNU); Pilushan, 1990, *Lin s. n.* (TNM); Tahsuehshan, *Chang 3906* (PPI). NANTOU: Chichaihu, *Wu 1432* (PPI); 19 km in Prov. Rd. #7A, *Hung LYH297a* (TNU); Hsinjenkang, *Liu 1257* (HAST); Hohuanshan, *Peng 8288* (HAST); Iuanfeng, *Wang 2* (TNM); Patungkuang to Kuankao, *Huang 5281* (TAI); Tienchih to Yunhai, *Liu*

1014 (NTUF); Tungpu to Shenmutsun, *Yang 27425* (PPI); Wushe, *Chuang 419* (PPI). CHIAYI: Alishan, 1928, *Sasaki s. n.* (TAI); Chushan station to Alishan foot path, *Kawasaki 970* (HAST); Tatachia, *Hung LYH544* (TNU); Yushan, *Fukuyama 15153* (TAI); 86 km in Prov. Rd. #18, *Hung LYH484, 485* (TNU). KAOHSIUNG: Hsiangyang, *Hung LYH540* (TNU); Kuanshan, *Liou 413* (PPI, TAIF, TNU); Kuanshanlingshan, *Hung LYH362* (TNU); Takuanshan, *Chen 784* (TNU). PINGTUNG: Tawutzu, *Huang 985* (HAST); Yakou, *Chang 3907* (PPI). TAITUNG: Hsiangyangshan, *Chiu 2925* (TNM). HUALIEN: Chingshuishan, *Leu 1777* (HAST, TNM); Tayuling, *H. L. Chiang 751* (TAIF); Kuankao, *Hung LYH486* (TNU). ILAN: Nanhutashan, *Wang 3669* (TAI); 710 log road, *Chang 4357* (TAIF); Taipingshan, *Huang 4978* (TAI).

Excluded species

Rosa luciae Fr. & Rochebr. ex Crepin, Bull. Soc. Bot. Belg. 10: 324. 1871. **-TYPE:** Nippon (Japan), Yokoska (Yokosuka), 1866-1871, *Savatieur 373* (Lectotype: P, designated by Ohba, 2000. Photo!)

光葉薔薇

The name *R. luciae* has ever been frequently documented in the lists or floras of Taiwan. However, its identity was uncertain because the type specimen, collected at Yokohama in Japan and saved in B Herbarium is not seen until Ohba (2000) selected lectotype. In accordance with the original publication and digital images of type specimens, we found only one specimen collected from Matsu (Fuchien Province) (*T. C. Hsu 149*) exactly corresponds with *R. luciae*. All the other specimens in the major herbaria of Taiwan identified as this name are actually *R. bracteata* or *R. taiwanensis*. Hence, this species is excluded from the Taiwan flora.

Both *R. taiwanensis* and *R. luciae* belong to section *Synstylae*, and they shared almost the same morphology. However, the leaflet of *R. taiwanensis* is elliptic to oblong (vs. orbicular to obovate in *R. luciae*), the base is broadly cuneate or subrounded (vs. acute) and the apex is elliptic (vs. more orbicular). The stipules of *R. taiwanensis* are herbaceous, the rachis are pubescent, and the prominent midvein are pubescent, while those of *R. luciae* are more membranous and glabrous or nearly so in rachis and prominent midvein.

Specimens examined: FUCHIEN, Lienchiang County: Matsu Island, Tsaiyu Reservoir, *Hsu 149* (TAIF).

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LITERATURE CITED

- Boulenger, G.A.** 1933. Revision Des Roses D'Asie de la Ection des Synstylae. Bulletin du Jardin botanique de l'État a Bruxelles **9(4)**: 203–279 (Dec., 1933).
- Bruneau, A., J.R. Starr, and S. Joly** 2007. Phylogenetic relationships in the genus *Rosa*: new evidence from chloroplast DNA sequences and an appraisal of current knowledge. *Syst. Bot.* **32(2)**: 366–378.
- Cardot, J.** 1916. Rosaceae Nouvelles D'Extreme-Orient. *Lecomt. Not. Syst.* **3**: 263–271.
- Chung, S.-W.** 2017. *Rosa* (Rosaceae). Illustrated Flora of Taiwan Vol. 4. pp. 363–368. Owl Publishing House Co., Ltd. Taipei.
- Editorial Committee of the Red List of Taiwan Plants** 2017. The Red List of Vascular Plants of Taiwan. Endemic Species Research Institute, Forestry Bureau, Council of Agriculture, Executive Yuan and Taiwan Society of Plant Systematics.
- Fougère-Danezan, M., S. Joly, A. Bruneau, X.-F. Gao, and L.-B. Zhang** 2015. Phylogeny and biogeography of wild roses with specific attention to polyploids. *Ann. Bot.* **115(2)**: 275–291.
- Gu, C. and K.R. Robertson** 2003. *Rosa* (Rosaceae). In: Wu Z.-Y., Raven P.H., Hong D (eds.), *Flora of China*. Vol. **9**. Beijing, China: Science Press and St. Louis, USA: Missouri Botanical Garden. pp. 339–382.
- Hayata, B.** 1911. Materials for a Flora of Formosa. *J. Coll. Sci. Imp. Univ. Tokyo.* **30(1)**: 97–98.
- Hayata, B.** 1913. *Icones Plantarum Formosanarum nec non et Contributiones ad Floram Formosanam*. Vol. **3**. Bureau Prod. Industr., Govt. Formosa, Taihoku (Taipei). pp. 97–98.
- Hayata, B.** 1915. *Icones Plantarum Formosanarum nec non et Contributiones ad Floram Formosanam*. Vol. **5**. Bureau Prod. Industr., Govt. Formosa, Taihoku (Taipei). pp. 58–60.
- Hayata, B.** 1916. Rosaceae. In *General Index to the Flora of Formosa*. (Supplement to *Icones Plantarum Formosanarum* Vol. 6). Bureau Prod. Industr., Govt. Formosa, Taihoku (Taipei). p. 24.
- Henry, A.** 1896. A list of plants from Formosa with some preliminary remarks on the geography, nature of the flora and economic botany of the island. *Trans. Asiat. Soc. Jap.* **24(Suppl)**: 40.
- Hung, L.-Y.** 2006. A Taxonomic Study of *Rosa* L. in Taiwan [M. S. thesis]. Department of Life Science, National Taiwan Normal University.
- Jeon, J.-H. and S.-C. Kim** 2019. Comparative analysis of the complete chloroplast genome sequences of three closely related East-Asian wild roses (*Rosa* sect. *Synstylae*; Rosaceae). *Genes*, **10(1)**: 23.
- Koidzumi, G.** 1913. *Conspectus Rosacearum Japonicarum*. *J. Coll. Sci. Imp. Univ. Tokyo.* **34(2)**: 227.
- Koidzumi, G.** 1917. *Contributiones ad Floram Asiae Orientalis*. *Bot. Mag. Tokyo.* **31**: 130.
- Koidzumi, G.** 1930. *Florae Symbolae Orientali-Asiaticae*. Kyoto. Japan. p. 55.
- Kudo, Y. and G. Masamune** 1932. *Genera Plantarum Formosanarum I. Saururaceae-Rosaceae*. *Ann. Rep. Taihoku Bot. Gard.* **2**: 135.
- Li, H.-L.** 1951. Taxonomic notes on the Rosaceae of Formosa. *Lloydia* **14(4)**: 235–236.
- Li, H.-L.** 1963. *Rosa*. In *Woody Flora of Taiwan*. Livingston Pub. Co. pp. 294–301.
- Liu, C., G. Wang, H. Wang, T. Xia, S. Zhang, Q. Wang and Y. Fang** 2015. Phylogenetic relationships in the genus *Rosa* revisited based on *rpl16*, *trnL-F*, and *atpB-rbcL* sequences. *HortScience* **50(11)**: 1618–1624.
- Liu, T.-S. and H.-J. Su** 1977. *Rosa*. In Li, H. L. *et al.* (eds.), *Flora of Taiwan*. Vol. **3**. Epoch. Publ. Co. Taipei. pp. 96–104.
- Liu, Y.-C.** 1972. *Rosa*. In *Trees of Taiwan*. College of Agriculture, National Chung-Hsing University. Taichung, Taiwan. pp. 184–188.
- Liu, Y.-C. and C.-H. Ou** 1982. Contributions to the Dicotyledonous Plants of Taiwan (VII). *Bull. Exp. For. NCHU* **4**: 1–16.
- Liu, Y.-C., F.-Y. Lu, and C.-H. Ou** 1988. *Rosa*. In *Trees of Taiwan*. College of Agriculture, National Chung-Hsing University. Taichung, Taiwan. pp. 189–192.
- Liu, Y.-C., F.-Y. Lu, and C.-H. Ou** 1994. *Rosa*. In *Trees of Taiwan*. (Updated reprint). College of Agriculture, National Chung-Hsing University. Taichung, Taiwan. pp. 157–160.
- Masamune, G.** 1936. *Beitrage zur Kenntnis der Flora von Sudojapan VI*. *Trans. Nat. Hist. Soc. Formosa* **26**: 55.
- Masamune, G.** 1938. Miscellaneous Notes on the Flora of Eastern Asia (VI). *Trans. Nat. Hist. Soc. Formosa* **28**: 435.
- Matsumura, J. and B. Hayata** 1906. *Enumeratio Plantarum Fomosanarum*. *J. Coll. Sci. Imp. Univ. Tokyo.* **22**: 126–128.
- Momiyama, Y. and H. Ohba** 1988. *Catalogue of the type specimens preserved in the herbarium, Department of Botany, the University Museum, the University of Tokyo*. Part **3**. *Rosa and Rubus* (Roaceae). The University Museum, The University of Tokyo, Material Reports No.16.
- Nakai, T.** 1916. *Praecursores ad Floram Sylvaticam Coreanam VII* (Rosaceae). *Bot. Mag. Tokyo.* **30**: 217–242.
- Ohashi, H.** 1993. *Rosa*. In Huang, T.-C. *et al.* (eds.), *Flora of Taiwan*, 2nd ed. **2**: 111–119. Editorial Committee, Dept. Bot., NTU, Taipei, Taiwan.
- Ohba, H.** 2000. The type and identity of *R. luciae* Rochebr. & Fr. *ex Crep.* and the varieties described by Franchet and Savaiter. *J. Jap. Bot.* **75**: 148–163.
- Price, W. R.** 1982. *Plant Collecting In Formosa*. The Chinese Forestry Association. Taipei, Taiwan (R.O.C).
- Wissemann, V.** 2003. Classification Conventional Taxonomy (Wild Roses). In Roberts, A. V. (ed.), *Encyclopedia of Rose Science*. Vol. **1**. London, UK: Elsevier Ltd. pp. 111–116.
- Wissemann, V. and C. M. Ritz** 2005. The genus *Rosa* (Rosoideae, Rosaceae) revisited: molecular analysis of nrITS-1 and *atpB-rbcL* intergenic spacer (IGS) versus conventional taxonomy. *Bot. J. Linn. Soc.* **147(3)**: 275–290.
- Wu, S., Y. Ueda, H. He, S. Nishihara, and S. Matsumoto** 2000. Phylogenetic analysis of Japanese *Rosa* species using *matK* sequences. *Breed. Sci.* **50(4)**: 275–281.
- Ying, S.-S.** 1985. A revision of the family Rosaceae in Taiwan. *Tech. Bull. Exp. For. NTU* **160**: 42–46.
- Yu, T.-T. and T.-C. Ku** 1985. *Rosa* subgen. *Rosa* sect. *Synstylae* ser. *Multiflorae*. In Yu T.-T. (ed.), *Florae Republicae Popularis Sinicae*. Tomus **37**. Beijing, China: Science Press. pp. 360–455.
- Zhu, Z.-M., X.-F. Gao, and M. Fougère-Danezan** 2015. Phylogeny of *Rosa* sections *Chinenses* and *Synstylae* (Rosaceae) based on chloroplast and nuclear markers. *Mol. Phyl. Evol.* **87**: 50–64.