

# Notes on Urticaceae of Taiwan

Bing-Ling Shih<sup>1</sup>, Yuen-Po Yang<sup>1,3</sup>, Ho-Yih Liu<sup>1</sup>, and Sheng-You Lu<sup>2</sup>

<sup>1</sup>Department of Biology, National Sun Yat-Sen University, Kaohsiung, Taiwan, Republic of China

<sup>2</sup>Division of Forest Biology, Taiwan Forestry Research Institute, Taipei, Taiwan, Republic of China

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**Abstract.** Eight species of Urticaceae in Taiwan are treated. *Droguetia iners* (Forssk.) Schweinf. ssp. *urticoides* (Wight) Friis & Wilmot-Dear and the genus are reported for the first time. Descriptions and line drawings of the new species, *Elatostema platyphylloides* Shih & Yang, *E. hirtellipedunculata* Shih & Yang, and *E. hypoglauca* Shih & Yang, are presented. *Dendrocnide meyeniana* is redelimited to accommodate its forma, *subglabra* (Hayata) Chew. *Dendrocnide kotoensis* (Hayata ex Yamamoto) Shih & Yang is treated as a distinct species which has been regarded as conspecific with *Dendrocnide meyeniana* (Walp.) Chew. *Laportea bulbifera* (Sieb. & Zucc.) Weddell, although collected as early as 1925, is a new record. *Laportea interrupta* (L.) Chew, which was transferred from *Fleurya* by Chew in 1969, is listed. A key to the genera of Urticaceae of Taiwan is provided.

**Keywords:** *Dendrocnide kotoensis*; *Dendrocnide meyeniana*; *Droguetia*; *Droguetia iners* ssp. *urticoides*; *Elatostema platyphylloides*; *Elatostema hirtellipedunculata*; *Elatostema hypoglauca*; *Laportea bulbifera*; Taiwan; Urticaceae.

## Introduction

Studies of the Urticaceae of Taiwan during the past two years have led to the discovery of some new species and records, and to the taxonomic and nomenclatural modification of some species. A key to the genera of Urticaceae in Taiwan is provided, because a few genera were merged or added to the family. The key is made primarily with the characters of vegetative organs for easy identification of Taiwanese Urticaceae.

The specimens examined in this paper are deposited in the herbarium of the Department of Biology, National Sun Yat-Sen University (NSYSU), Taiwan, except for those indicated by parentheses.

## Key to Genera of Urticaceae in Taiwan

- 1. Leaves alternate, or opposite and very unequal in size.
  - 2. Plants with stinging hairs.
    - 3. Trees.....*Dendrocnide* Miq.
    - 3. Herbs.
      - 4. Prostrate to creeping herbs.....*Nanocnide* Blume
      - 4. Erect herbs, unbranched or with ascending branches.
        - 5. Plants with spinelike stinging hairs over 5 mm long.....*Girardinia* Gaudich.
        - 5. Plants with soft stinging hairs less than 5 mm long.....*Laportea* Gaudich.
  - 2. Plants without stinging hairs.
    - 6. Leaves white-hairy beneath.

- 7. Stipules connate at base, bifid .....*Boehmeria* Jacq.
- 7. Stipules free.
  - 8. Leaves linear-lanceolate to linear-oblong.....*Debregeasia* Gaudich.
  - 8. Leaves ovate, cordiform or ovate-lanceolate.
    - 9. Leaves trinerved from base; inflorescences in paniculate glomerules or in sessile-globose heads.
      - 10. Leaves thickly snow-white sericeous beneath; inflorescences in paniculate glomerules.....*Maoutia* Wedd.
      - 10. Leaves thinly gray-white puberulent beneath; inflorescences in globose heads.....*Pipturus* Wedd.
    - 9. Leaves quadrinerved from base; inflorescences in shortly pedunculate-globose heads.....*Leucosyke* Zoll. & Moritzi
- 6. Leaves transparent-hairy to glabrous beneath.
  - 11. Plants shrubby or arborescent.
    - 12. Leaves smooth.....*Oreocnide* Miq.
    - 12. Leaves scabrous.....*Pouzolzia* Gaudich.
  - 11. Plants herbaceous or somewhat woody at base.
    - 13. Stems succulent; with a much reduced leaf opposite the normal leaf, or sometimes the nanophylls completely reduced and only their stipules remaining; cystoliths (visible in dry state) linear.
      - 14. Plants epiphytic; nanophylls (minute leaves opposite normal leaves) fleshy, more than 5 mm long.....*Procris* Juss.

<sup>3</sup>Corresponding author.

14. Plants terrestrial; nanophylls membranous and less than 4 mm long if present.
15. Inflorescence bracts somewhat connate into an involucre; staminate inflorescence 1–2-flowered, or many-flowered heads.....*Elatostema* Forster & Forster f.
15. Inflorescence bracts free; staminate inflorescences many-flowered cymes.....*Pellionia* Gaudich.
13. Stems not succulent; without reduced leaves (nanophylls) or their stipules opposite normal leaves; cystoliths dot-like.....*Pouzolzia* Gaudich.
1. Leaves opposite, at least at lower part of plant.
16. Plants with stinging hairs.....*Urtica* L.
16. Plants without stinging hairs.
17. Plants almost woody throughout.
18. Inflorescence an axillary, globose, sessile head.....*Cypholophus* Wedd.
18. Inflorescence an axillary, spicate, cymose or paniculate glomerule.....*Boehmeria* Jacq.
17. Plants herbaceous, or somewhat woody at base.
19. Plants succulent; stipules 2, connate at base or close to each other at base, intrapetiolar; cystoliths linear.
20. Inflorescence a pedunculate discoid head.....*Lecanthus* Wedd.
20. Inflorescence various, but not a discoid head.....*Pilea* Lindley
19. Plants not succulent; stipules 2 or 4, free, not close to each other, lateral or intrapetiolar; cystoliths dot-like.
21. Leaves serrate.
22. Inflorescences a group of 2 or more flowers of 1 or both sexes (only one female flower in some axils), enclosed by an involucre of fused bracts; male flower with 1 stamen.....*Droguetia* Gaudich.
22. Inflorescences a group of at least several flowers of 1 or both sexes, not surrounded by a common involucre of fused bracts; male flower with 4–5 stamens.
23. Plants decumbent; stigma penicillate when blooming, becoming ovoid when fruiting.....*Chamabainia* Wight
23. Plants erect or ascending; stigma linear.....*Boehmeria* Jacq.
21. Leaves entire.....*Gonostegia* Turcz.

## 1. DROGUETIA Gaudich.

Annual or perennial, monoecious herbs or subshrubs with erect, ascending, creeping, or prostrate stems. Leaves opposite or alternate, petiolate; cystoliths punctiform; stipules lateral, free. Flowers sessile or subsessile, surrounded by a tubular or campanulate involucre, arranged singly or several together in axils or arranged along long, leafless axis to form terminal spike. Male flowers somewhat navicular; perianth connate at base when blooming, cylindrical to conical, splitting along one side, the upper lobe with a somewhat erect tip; stamens 1; rudimentary ovary absent. Female flowers without perianth; stigma linear. Achenes enclosed in a persistent involucre.

About 7 species, distributed in tropical and southern Africa, Madagascar, Mascarenes, southern India, China, and Java. One species in Taiwan, at medium altitudes in the central and southern parts.

***Droguetia iners*** (Forssk.) Schweinf. ssp. ***urticoides*** (Wight) Friis & Wilmot-Dear in Friis, Immelman & Wilmot-Dear, *Nordic J. Bot.* 7: 126. 1987; Friis & Wilmot-Dear, *Nordic J. Bot.* 8: 41. 1988.

Figure 1

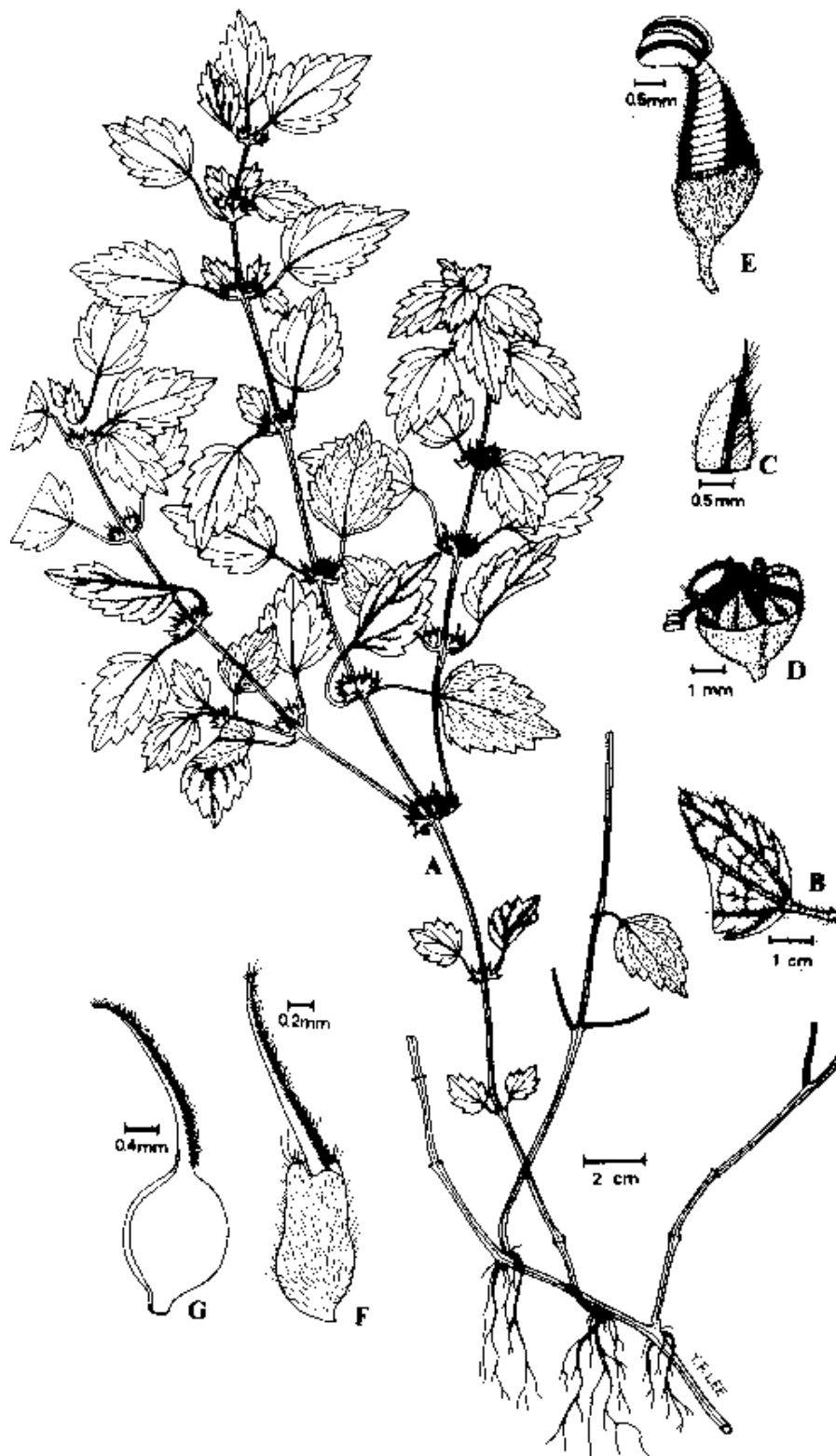
*Forskskaolea* ("Forskohlea") *urticoides* Wight, *Icon. Pl. Ind. Or.*, 6: Tab. 1982. 1853.

Monoecious, perennial, ascending or creeping herbs; stems brownish, hirsute throughout, sometimes bearing adventitious roots at nodes, subquadrate, sulcate at each side. Leaves opposite; petioles 0.5–3 cm long, semiterete, sulcate at adaxial side; lamina trinerved from base with 1–2 upper pairs of veins, membranous, hirsute on upper surface and lower veins, ovate, (1–) 1.5–3.5 (–4) cm long, (0.5–) 1–2.5 (–3) cm broad, obtuse to rounded at base, entire in lower part of margins, serrate and ciliate in upper part of margins, acuminate to caudate at apex; stipules 4, lateral, free, hirsute on abaxial veins, entire, ciliate, ovate to ovate-lanceolate, 2–5 mm long, 1–3 mm across. Inflorescences several aggregated; involucre tubulate or campanulate, 5-toothed, ciliate, tomentose and hirsute outside. Male flowers navicular, ca. 2 mm long, splitting one side, unequally 3-toothed, villous outside; stamen 1, the filament robust, with many transverse vermicular furrows at adaxial side. Female flowers with ovary smooth; stigma filiform-ligulate, puberulent at one side. Achenes ovoid, 1–1.5 mm long, laterally compressed, angled.

*Specimens examined.* TAICHUNG HSIEN: Piluchi, *Shih 3001*. NANTOU HSIEN: Loloku-Kuankao, *Huang, Yang & Hsieh 5260* (TAI). CHIAYI HSIEN: Alisan, *Chang 17227* (PPI). KAOHSIUNG HSIEN: Southern Cross-Island Hwy ("South-Cross-High-Way"), *Shih 3336*.

*Distribution.* Southern India, Java, and China. Taiwan, at medium altitudes in the central and southern parts.

*Notes.* This is the first record from Taiwan of this genus and its subspecies. Specimens of the subspecies have been collected on Taiwan since 1985. They were previously misidentified as *Chamabainia cuspidata* Wight be-



**Figure 1.** *Droguetia iners* (Forssk.) Schweinf. ssp. *urticoides* (Wight) Friis & Wilmot-Dear. A, Habit. B, Portion of leaf (abaxial view). C, Stipule (abaxial view). D, Inflorescence (a female flower and some male flowers). E, Male flower. F, Inflorescence (enclosing one female flower only). G, Achene with persistent, sublinear stigma. All from *Shih 3001*.

cause the two taxa are very similar in vegetative parts. The subspecies can be distinguished from *C. cuspidata* because it has one stamen enclosed in the navicular- or conical-shaped sepals of male flowers, connate involucre of inflorescences, and subquadrate stems.

Friis and Wilmot-Deer (1988) found many collections of the subspecies among herbarium material collected from southern India and the mountains of Java, where they were previously identified as *Chamabainia*. The extension of *Droguetia* to Taiwan indicates that it should be looked for elsewhere in the mountains of SE Asia and Indonesia.

## 2. ELATOSTEMA Forster & Forster f.

Monoecious or dioecious herbs; stems mostly succulent, herbaceous, rarely woody at base, simple to many branched. Leaves alternate, with or without reduced leaves (namely nanophylls) opposite normal ones, sessile to short petiolate, stipulate; lamina somewhat flush with the stem, very unequal-sided at base, the narrow side facing the stem, mostly chartaceous, rarely subcoriaceous to coriaceous, mostly with somewhat-dense linear cystoliths on both sides or mostly on adaxial side, rarely without cystolith, trinerved to triplinerved or penninerved, coarsely serrate to nearly entire; stipules intrapetiolar, two at a node, the stipule of the reduced leaf opposite that of the normal leaf, usually caducous, rarely deciduous or persistent. Inflorescences mostly many-flowered discoid heads, usually with a well-developed receptacle, rarely 1–3-flowered; the heads usually two-valved, each valve including several glomerules that consist of several flowers and are subtended by a few large bracteoles; flowers sessile to long-pedicelled, mostly subtended by small bracteoles. Male flowers with (3–) 4–5 sepals; sepals connate at base, the segments slightly imbricate, usually corniculate or shortly horned below the apex; stamens (3–) 4–5; rudimentary ovary small. Female flowers with 3–5 sepals or nearly completely reduced; staminodes small, 3–5, scale-like, usually very small when blooming, developing larger during fruiting, rarely absent; ovary straight. Achenes circular in cross sections, mostly with longitudinal ribs, rarely smooth, usually dispersed by reflexing staminodes.

About 350 species (Wang, 1980) in the world. About 15 species found in Taiwan, growing in moist forest floors or along ravines from low to high altitudes.

### *Elatostema platyphylloides* Shih & Yang, sp. nov.

Figure 2

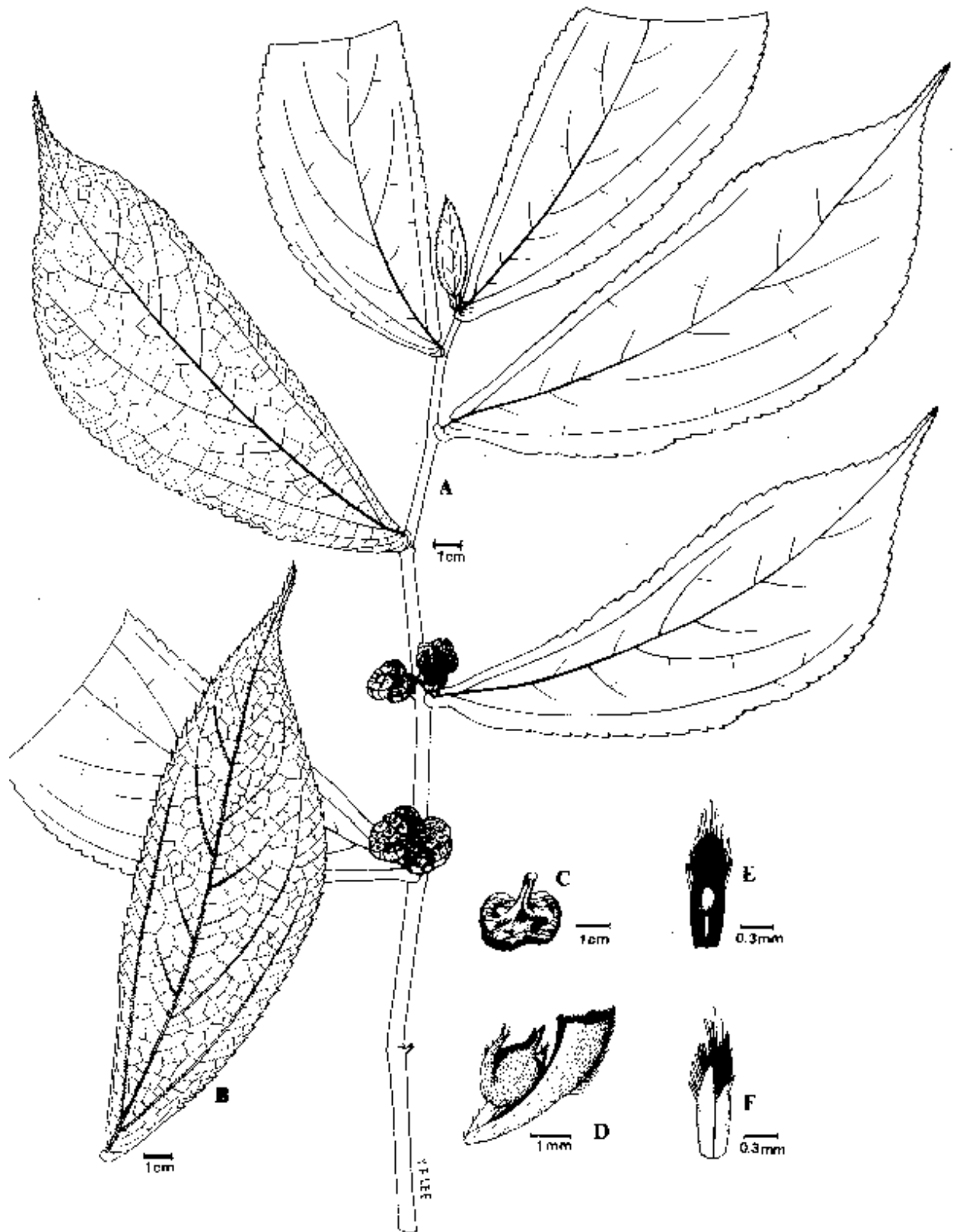
Species nova affinis *Elatostemati platyphyllo* Wedd., sed differt stipulis subtus hirsutis, inflorescentiis 1 (–2) nec 2–3 ad nodum, masculus inflorescentiis majoribus, usque ad 3 cm nec 1 cm.—TYPE: Taiwan. Taitung Hsien: Chipen logging trail, near a small waterfall, *Shih 2598* (holotype: NSYSU; isotype: HAST, TAI, TAIF).

Suffrutex, monoica vel dioica. Caules usque ad 1.5 m alt. Folia sessilia vel brevissime petiolata; laminae chartaceae, plus minusve hirsutae, ellipticae vel oblongae, 10–25 cm longae, 4–7.5 cm latae; stipulae caducae,

ciliatae, viridulae, brunneomaculatae, lanceolatae, cymbiformae, 1.5–2.5 cm longae, 3–5.5 mm latae. Inflorescentiae masculinae 1 (–2) ad nodum i.e. singulariter axillares, pedunculatae; receptaculum ellipsoideum, usque ad 3 cm longae, 2.5 cm latae; bracteae omnino connatae. Inflorescentiae femineae singulariter axillares, sessiles vel subsessiles, usque ad 7 mm longae et latae.

Monoecious or dioecious perennial herbs; stems somewhat woody at base, branched, somewhat hirsute at nascent parts, glabrescent, green, slightly geniculate, distinctly striated in specimens, up to 1.5 m high, 1 cm thick. Leaves alternate, sessile to short-petiolate, distichous; lamina chartaceous, somewhat hirsute, with very dense, 0.3–0.4 mm-long cystoliths on upper surface and mostly along veins on lower surface, dark green to green on adaxial side, pale green to light green on abaxial side, narrowly elliptic to oblong, (5–) 10–25 (–30) cm long, (2–) 4–7.5 (–8.5) cm wide, the base of the wide side semi-sagittate with an earlike limb that crosses the petiole to the opposite side, the margins ciliate and serrate to serrulate, the apex caudate, ciliate and densely serrulate, the semi-triple-nerves prominent beneath, the secondary veins 4–6 pairs; petioles 0–5 mm long; stipules 2, opposite, caducous, ciliate, glabrous on adaxial sides, hirsute on abaxial veins, greenish with minute brown spots, lanceolate-cymbiform, 1.5–2.5 (–3) cm long, 3–5.5 mm wide. Inflorescences 1–2 at a node, greenish, somewhat minutely puberulent outside, discoid, the male ones with two ellipsoidal parts, 1.5–3 × 1–2.5 cm in diameter, the peduncles glabrous, 3–18 mm long, the female ones usually in a butterfly-like outline, up to 7 × 6 mm in size, sessile or subsessile; bracts somewhat minutely puberulent, completely connate into an unlobed, narrowly oblong to oblong involucre, up to 3 cm long, 1 cm wide in male inflorescences, up to 7 mm long, 2 mm wide in female inflorescences. Male flowers pedicellate, subtended by a bracteole; bracteoles semi-transparent, with minute linear cystoliths paralleled with the midvein, cymbiform, ca. 5 mm long, the apex ciliate, truncate or mucronate, the margins entire, minutely hirsute on one-third of the abaxial veins; sepals 4, connate at base, semi-transparent, somewhat puberulent and minutely ciliate near apex, somewhat corniculate, cymbiform, ca. 2.3 mm long in blooming flowers, acute at apex; pedicels sparsely puberulent. Female flowers pedicellate, subtended by a bracteole; bracteoles semi-transparent, narrowly oblong, ca. 0.9 mm long, 0.3 mm wide when blooming, the upper margins and apex fimbriate, the lower margins entire, the abaxial veins puberulent subterminally; sepals 3, free, slightly unequal, narrowly triangular, ca. 0.1–0.3 mm long; staminodes 4, minute, enlarged when fruiting; stigma penicillate; ovary glabrous, ellipsoidal. Achenes ellipsoidal.

*Additional specimens examined.* TAIPEI HSIEN: Yin-ho-tung, *Wang 2745* (TAI). ILAN HSIEN: Tu-chian, *Suzuki 3734* (TAI). HSINCHU HSIEN: Wuchihshan, *Liau 404* (TAI). TAICHUNG HSIEN: Maopu-Chinghu, *Yang 1323* (TAI). NANTOU HSIEN: Chitou, *Ou & Kao 9126*



**Figure 2.** *Elatostema platyphyloides* Shih & Yang. **A**, Flowering branch with male inflorescences. **B**, Leaf (abaxial view). **C**, Male inflorescence (ventral view). **D**, Male flower with a bracteole. **E**, Female flower with a bracteole. **F**, Bracteole of a female flower (abaxial view). All from *Shih* 2598.

(TAI). CHIAYI HSIEN: Fan-lu Hsiang, Alisan-Highway, *Shih* 2948; The Third Highway (at 353.3 km), *Shih* 2727. KAOHSIUNG HSIEN: Shan-ping, 1995, *Lin s. n.* TAITUNG HSIEN: Chipen Logging Trail, Lichai Logging Trail, *Shih* 3366; Du-two-shan, *Shih* 2738. HUALIEN HSIEN: Tienhsiang, *Shimizu & Kao* 10613 (TAI).

*Distribution.* Endemic; throughout Taiwan from low to medium altitude, except the Hengchun Peninsula. Grows mostly along streams and ravines, and on moist forest floors.

*Notes.* This is a widely distributed species in Taiwan. It has for a long time been erroneously recognized as *Elatostema edule* C. Robinson. *Elatostema platyphylloides* is distinctly different from *Elatostema edule* in having hairs almost throughout the plant, serrate leaf apices, and chartaceous leaves when fresh. In contrast, the plants of *Elatostema edule* are glabrous and have leaves fleshy when fresh and with a single, entire, long-tooth apex. *Elatostema platyphylloides* was also mis-identified as *Elatostema platyphyllum* Wedd. *Elatostema platyphylloides* can be distinguished from *Elatostema platyphyllum* by having hirsute hairs on the abaxial sides of stipules, and 1–2 inflorescences at a node.

With the separation of this new species, *Elatostema edule* is now found only in a strict distributional range from the Lutao and Lanyu islets of Taiwan to the Batan islands of the Philippines (Robinson, 1911). The first author has never seen the species on the main island of Taiwan—especially surprising in Hualien, Taitung, and the Hengchun Peninsula, which are close to Lutao and Lanyu.

Dr. Wilmot-Dear mentioned that Kew has 3 specimens of *Elatostema edule* from Hainan, which appear to fit the description of this new species. Therefore, it probably occurs in Hainan as well.

***Elatostema hirtellipedunculata* Shih & Yang, sp. nov.**

Figure 3

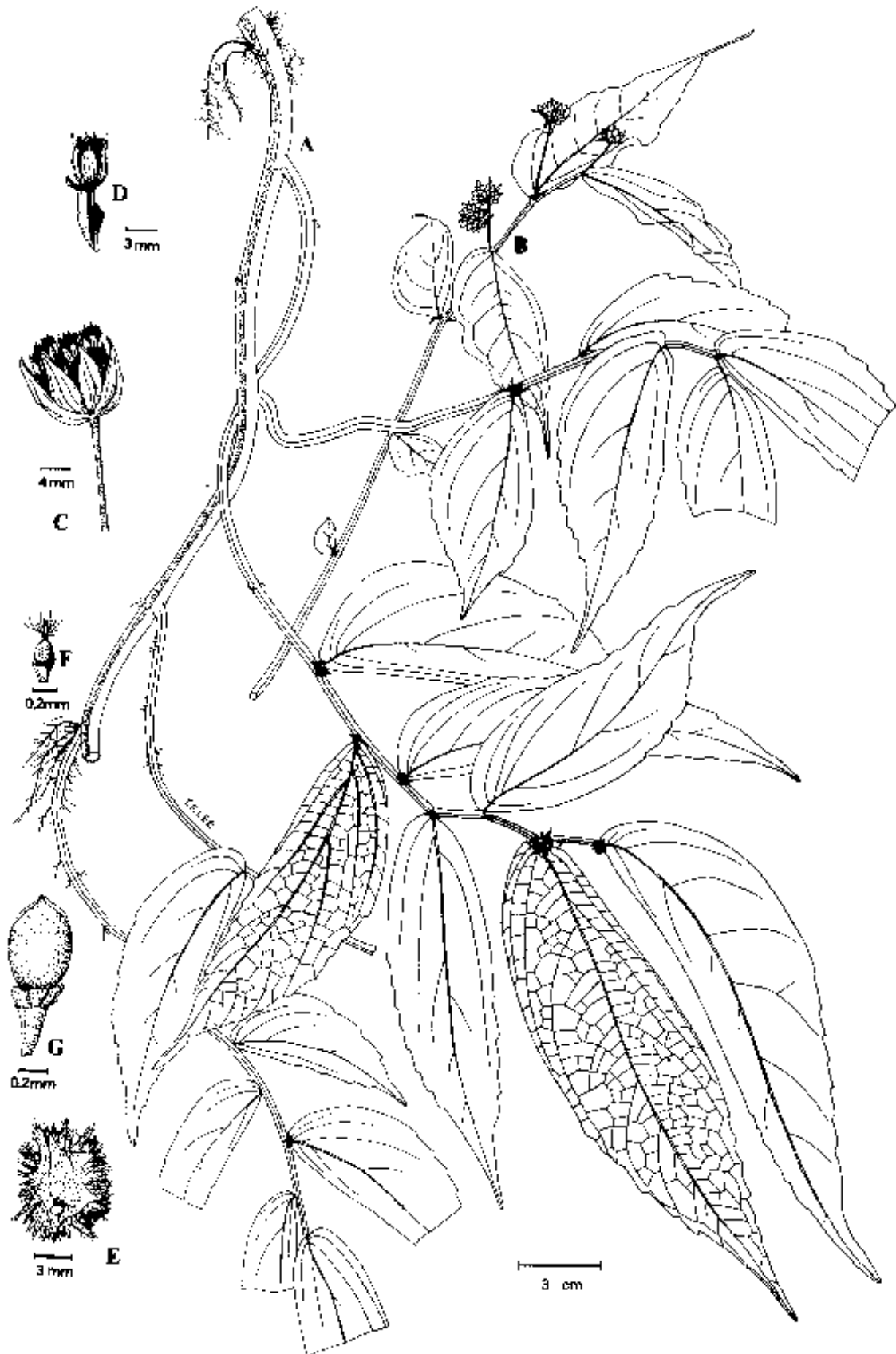
Species nova affinis *Elatostemati herbaceifolio* Hayata, sed differt lamina minute hirtella obtuse dentata nec hirsuta acute serrata.—TYPE: Taiwan. Hualien Hsien: Chimay, on wet rocks in a small waterfall, *Shih* 3257 (holotype: NSYSU; isotype: HAST, TAI, TAIF).

Herba perennis, monoica. Caules usque ad 1 m longae, frequenter pauciramosi; ramuli plus minusve hirtellae. Folia sessilia vel subsessilia raro brevissime petiolata; laminae chartaceae, plus minusve hirtellae, asymmetrico-ellipticae vel obliquo-ovatae, usque 20 cm longae, 1.5–7 cm latae, ad apices integrae; stipulae persistentia, albo-iridulatae, subulatae, 2–5 mm longae. Inflorescentiae masculinae frequenter singulariter axillares, longe pedunculatae; receptaculum viridulo-album, ellipsoideum, usque 1.8 cm longae, 1.2 cm latae; bractae liberae vel basi connatae; pedunculi nonnunquam 1-ramosi, plus minusve dense hirtelli. Inflorescentiae femineae singulariter axillares, sessiles vel subsessiles, raro pedunculatae, usque 8 mm longae, 6 mm latae ubi fructifer.

Monoecious perennial herbs; stems suberect or ascending, sometimes suspended from wet rocks, often simple-branched, canaliculate at the side opposite the substrate, somewhat hirtellous at nascent parts, soon glabrescent or nearly glabrous, red-brown or whitish-green, up to 1 m long, 8 mm thick. Leaves alternate, sessile to subsessile, rarely short-petiolate, distichous; lamina chartaceous, somewhat hirtellous on both sides and with somewhat-dense, 0.15–0.35 mm-long cystoliths on upper surface, sometimes very sparse cystoliths near the margins, light yellowish-green to green on adaxial side, pale-greenish on abaxial side, narrowly asymmetrical-elliptic to oblique-ovate, up to 20 cm long, 1.5–7 cm wide, the base of the wide side rounded, the margins entire for at least 1/3 of the wide-side and 1/2 of the narrow-side, dentate to crenate or crenulate at other parts, sometimes entire throughout, the apex long-acuminate to long-caudate, the acumen entire, up to 5 cm long, the palmate-nerve, semi-triple-nerve and penninerve prominent beneath, the secondary veins 4–7 pairs; petioles 0–2 mm long; stipules 2, opposite, persistent, white-greenish, subulate, 2–5 mm long. Inflorescences 1–2 at nodes, sometimes simple-branched, greenish-white, somewhat puberulent outside, discoid, the male ones ellipsoid, 7–18 × 7–12 mm in diameter, the peduncles somewhat densely hirtellous, (1–) 1.5–4.5 (–5) cm long, the female ones ellipsoidal, up to 8 × 6 mm in size when fruiting, sessile or subsessile, rarely with a peduncle of 5–8 mm long; bracts somewhat puberulent, free or connate at base only, ovate to elliptic, up to 9 mm long, 7 mm wide in male inflorescences, almost completely connate into an asymmetrical involucre with 6 teeth of ca. 2 mm long in female inflorescences. Male flowers ca. 3.5 mm long, 3 mm wide, pedicellate, subtended by a bracteole; bracteoles semi-transparent, corniculate, cymbiform, up to 6 mm long, acute to acuminate, the margins entire or somewhat ciliate near the apex, glabrous; sepals 5, connate at base, semi-transparent, glabrous, corniculate, cymbiform, acute at apex; pedicels glabrous, ca. 4.5 mm long. Female flowers pedicellate, subtended by a bracteole; bracteoles semi-transparent, linear, ca. 2.5 mm long, 0.3 mm wide when blooming, the upper margins and apex fimbriate, the lower margins entire; sepal rudimentary; staminodes 5, minute, enlarged when fruiting; stigmas penicillate; ovary glabrous, ovoid. Achenes ovoid, ca. 1 mm long.

*Additional specimens examined.* TAIPEI CITY: Peitou, 1908, *Kawakami & Sasaki s.n.* (TAI). ILAN HSIEN: Wushihpi, Suao, 1992, *Ying s.n.* (NTUF). TAITUNG HSIEN: Chihpen Logging Trail, *Shih* 3269, 2599, 2645; Taiyuan, *Shih* 2787; Dutwoshan, *Shih* 2736; Lanyu, *Shih* 3400. HUALIEN HSIEN: Chingshuishan, *Shih* 3314.

*Distribution.* Endemic; at low to medium altitudes on Lan-yu Island, the eastern part of Taiwan, and in the vicinity of Taipei. Grows primarily along streams and ravines, and sometimes on moist forest floors or rocky places.



**Figure 3.** *Elatostema hirtellipedunculata* Shih & Yang. **A**, Older plant with female inflorescences at axils. **B**, Portion of a nascent stem with male inflorescences. **C**, Male inflorescence. **D**, Male flower with a bracteole. **E**, Female inflorescence (ventral view). **F**, Female flower. **G**, Achene with staminodes and pedicel. From Shih 3257 & 3269.

*Notes.* *Elatostema hirtellipedunculata* Shih & Yang is allied with *E. herbaceifolia* Hayata because of their similarity in leaf shape and size, *E. hirtellipedunculata* has leaves and stems with very-sparse short hairs and leaf-teeth with obtuse to rounded tips, and *E. herbaceifolia* has leaves with many long-hirsute hairs, and leaf-teeth with very sharp tips.

***Elatostema hypoglauca* Shih & Yang, sp. nov.**

Figure 4

Affine *Elatostemati cuspidato* Wight, sed differt planta minore, lamina minore, dentibus obtusis, inflorescentiis masculinis longe pedunculatis.—TYPE: Taiwan. Taoyuan Hsien: Rarashan, on moist forest floor, *Shih 3111* (holotype: NSYSU; isotype: HAST, TAI, TAIF).

Herba perennis, gracilis, monoica. Caules succidae, ascendentes, quadratae, 15–25 cm alti, raro usque 35 cm alti; ramuli parce hirtelli. Folia sessilia vel subsessilia; laminae membranaceae, minime parce hirtellae, angustillicae, obovatae vel oblongae, 2–3.5 cm longae, 1–1.5 cm latae, parce minute ciliatae; stipulae caducae, alboviridulae, lanceolatae, ca. 2 mm longae, 0.5 mm latae. Inflorescentiae masculinae axillares, pedunculatae; receptaculum viridulum, ellipsoideum, ca. 7 mm longum et latum; bracteae parce puberulae; pedunculi parce puberuli, usque 4 cm longi. Inflorescentiae femineae sessiles vel subsessiles, usque 4 mm longae, 3 mm latae ubi fructifer.

Monoecious perennial slender herbs; stems juicy, ascending, quadrate with distinct angles, often simple-branched, sparsely puberulent at nascent parts, soon glabrescent, greenish, 15–25 cm high, rarely up to 35 cm high, 1–2 mm thick. Leaves alternate, sessile to subsessile, distichous; lamina membranous, very sparsely puberulent or mostly glabrous, with somewhat dense cystoliths on upper surface, very sparsely puberulent on lower surface, light green on adaxial side, pale-green on abaxial side, narrowly elliptic, obovate or oblong, (1.5–) 2–3.5 (–5.5) cm long, (0.5–) 1–1.5 (–2) cm wide, semi-cordate or semi-rounded at base, sparsely minutely ciliate or without and dentate or crenate at margins, acute at apex, minutely ciliate and acute or obtuse at the tip of apex, semi-triplinerved or penninerved, the nerves elevated beneath and impressed above, the secondary veins 2–3 pairs; stipules caducous or deciduous, ciliate near apex, entire at lower margins, glabrous on adaxial sides, minutely puberulent on abaxial sides, whitish-green, lanceolate, ca. 2 mm long, 0.5 mm wide. Inflorescences greenish, somewhat minutely puberulent outside, disc-like, the male ones ellipsoid, ca. 7 mm in diameter, with sparsely minute-puberulent peduncles up to 4 cm long, the female ones usually in an oblique-quadrate outline, up to 4 × 3 mm in size when fruiting, sessile or subsessile; bracts sparsely minute-puberulent, completely connate into an unlobed, oblong involucre, up to 3.5 mm long, 2 mm wide in female inflorescences. Male flowers ca. 1 mm long and wide, pedicellate, subtended by a bracteole; sepals 5, connate at base, semi-transparent, somewhat minute-

puberulent outside, mostly corniculate, cymbiform, acute at apex; pedicel glabrous. Female flowers pedicellate, subtended by a bracteole; bracteoles semi-transparent, cymbiform, acute, fimbriate at the upper half, entire at the lower half, the abaxial veins puberulent at upper half; sepals 3, free, very minute or rudimentary; staminodes 3, minute, enlarged when fruiting; stigmas penicillate, deciduous; ovary glabrous, ovoid. Achenes ovoid or ellipsoidal, ca. 0.7 mm long, 0.4 mm wide.

*Additional specimens examined.* TAIPEI HSIEN: Saukan & Kyanrawa, *Suzuki 6999* (TAI). ILAN HSIEN: Taipingshan, *Suzuki 545* (TAI). TAOYUAN HSIEN: Rarashan, *Shih 3121*. NANTOU HSIEN: Randaishan, *Kawakami & Hayata 7129* (TAIF). CHIAYI HSIEN: Mt. Morrison, *Kawakami & Mori 1987* (TAIF).

*Distribution.* Endemic; at medium altitude, growing on moist forest floors or beside streams and ravines.

*Notes.* *Elatostema hypoglauca* is related to *E. cuspidatum* Wedd., but can be distinguished from it by the combination of the characters: plants dwarf, less than 35 cm high, stems slender, leaves with obtuse teeth, and male inflorescences with a distinct peduncle. *Elatostema hypoglauca* was misidentified as *E. platyphyllum* Wedd. by Liu and Huang in 1976, but *E. hypoglauca* can be easily distinguished by its dwarf habit with slender stems. *Elatostema hypoglauca* is also similar to *E. microcephalantha* Hayata, but can be distinguished by the quadrate-angular and sparsely puberulent stems and the completely connate female involucre.

### 3. DENDROCNIDE Miq.

Dioecious trees or large shrubs with stinging hairs. Leaves alternate, simple, petiolate, stipulate, somewhat coriaceous; cystoliths punctiform; stipules intrapetiolar. Inflorescences axillary, pedunculate, paniculate, bracteate. Flowers in small fascicles of male ones or on flabellate receptacles of female ones, unisexual. Male flowers 4–(5-) merous, the parts opposite. Female flowers sessile to subsessile, with a single whorled 4-merous perianth, the stigma linear or ligulate, without staminode. Achenes compressed, asymmetrically ellipsoidal to ovoid.

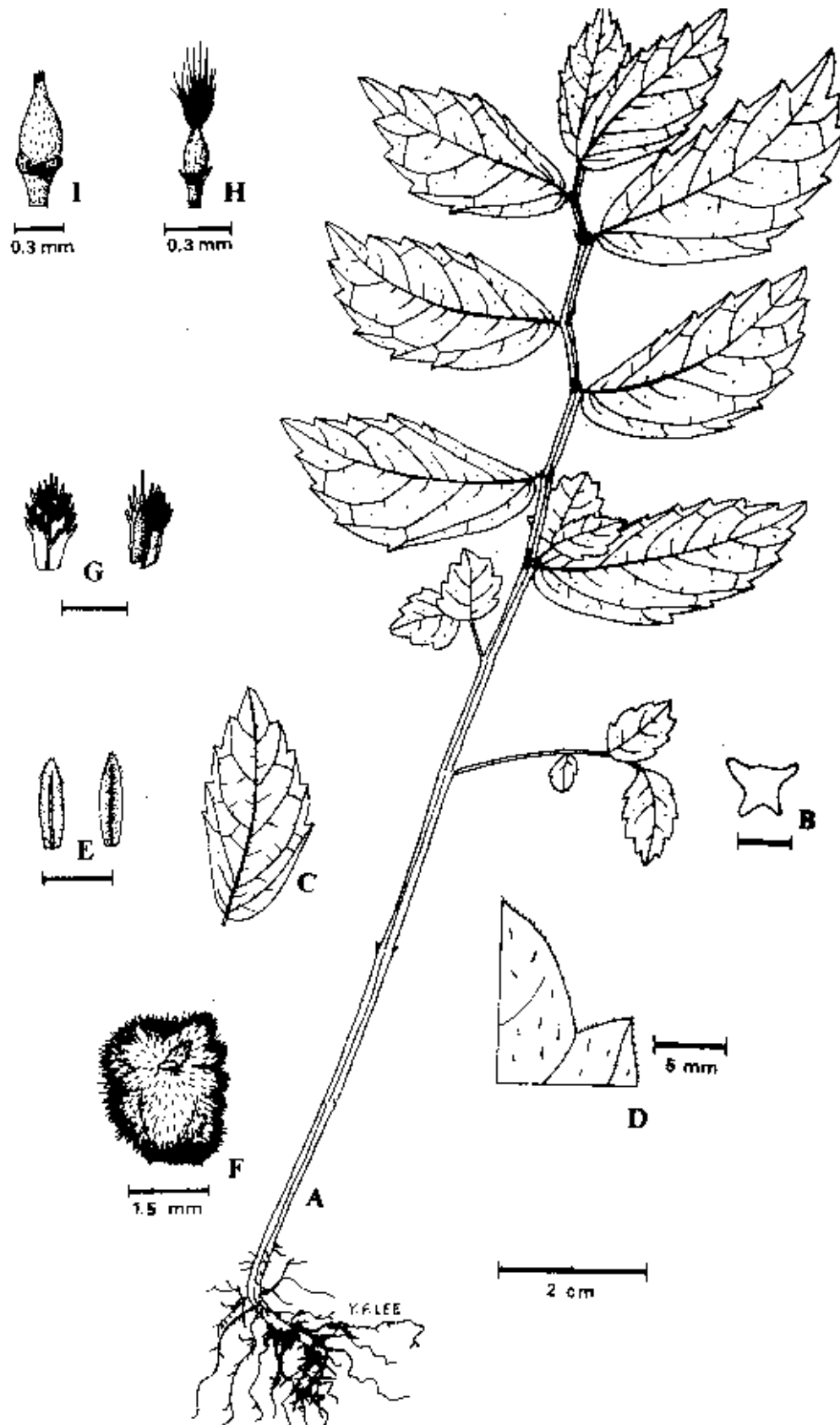
About 37 species distributed in tropical Asia and on islands of the western Pacific, 2 species in the lowlands of Taiwan.

#### *Key to species*

1. Inflorescence branches with dense poisonous stinging hairs, reddish-green; bracts of female inflorescence linear ..... *D. meyeniana*
1. Inflorescence branches with sparse non-poisonous stinging hairs, whitish-green; bracts of female inflorescence triangular ..... *D. kotoensis*

***Dendrocnide kotoensis* (Hayata ex Yamamoto) Shih & Yang, comb. nov.**





**Figure 4.** *Elatostema hypoglauca* Shih & Yang. **A**, Habit. **B**, Cross section of upper stem. **C**, Leaf (abaxial view). **D**, Portion of leaf margin. **E**, Stipules: left, abaxial view; right, adaxial view. **F**, Female inflorescence (ventral view). **G**, Bracteoles: left, abaxial view; right, sublateral view. **H**, Female flower. **I**, Achene with staminodes. All from *Shih 3111*.

*Laportea kotoensis* Hayata ex Yamamoto, Suppl. Ic. Pl. Formos. 1: 2. 1925; Kanehira, Formos. Trees rev. ed. 170. 1936.

*Laportea batanensis* auct. non C. Robinson: Liu, Sasaki & Keng, Quart. J. Taiwan Mus. 8: 288. 1955; Li, Woody Fl. Taiwan 134. f.43. 1963; Liu & Huang in Li et al., Fl. Taiwan 2: 192. p. p. & excl. pl.262. 1976.

*Dendrocnide meyeniana* (Walp.) Chew form. *subglabra* (Hayata) Chew, Gard. Bull. Singapore 25: 22. 1969. p.p.

Trees, the bark smooth and glabrous almost throughout to the end of branchlets, with indistinct lenticels. Leaves long-petiolate; lamina nearly glabrous, with a few non-poisonous stinging hairs, ovate, ovate-oblong, to obovate-oblong, up to 40 cm long, 21 cm wide, entire, rarely dentate or crenate at margins, rounded, slightly cordate to subpeltate at base; petioles up to 15 cm long; stipules broadly triangular, ca. 1 cm long and wide. Male flowers with light, non-poisonous, stinging hairs on the branches and flowers, arranged into cymose paniculate glomerules. Female flowers sessile, several in a flabellate receptacle; the receptacles arranged into cymose paniculate dichasium, usually less than 8 cm long when fruiting, the branches sparsely pubescent, with a few non-poisonous stinging hairs, whitish green, the terminal branches with branching-angle less than 90 degrees; bracts triangular without vein.

*Specimens examined.* TAITUNG HSIEN: Lanyu ("Botel Tobago"), Chang 3225, 7905 (PPI); Huang & Kao 5332 (TAI); 1912, Kawakami & Sasaki s. n. (TAIF); L. K. H. & C. 34 (TAI); 1919, Sasaki s. n. (TAIF); 1934, Sasaki s. n. (TAI); Shih 3206.

*Distribution.* Endemic to Lanyu Island. Found in forests near the seashore and along streams.

*Notes.* This species, initially published as *Laportea kotoensis* Hayata, was treated as a synonym of *L. batanensis* C. Robinson by Liu, Sasaki and Keng (1955), Li (1963), and Liu and Huang (1976). According to Robinson (1910), however, *L. batanensis* is very poisonous and has leaves with rounded or truncate base. Because *L. kotoensis* is not poisonous and has leaves with cordate or subpeltate base, it is treated as a different species from *L. batanensis*.

Chew (1969) made a new combination, *D. meyeniana* form. *subglabra* (Hayata) Chew, from *L. subglabra* Hayata, and synonymized *L. kotoensis* in this form. The form, however, is virtually identical with its typical phase (see notes under the following species), and differs from *L. kotoensis* by the following characters: inflorescence reddish green, densely pubescent with stinging hairs, the terminal branches with branching angle greater than 100 degrees; bracts linear, the larger ones with a midvein; bark rough with distinct lenticels; two-year-old branchlets slightly pubescent with stinging hairs; leaves pubescent with stinging hairs. In contrast, *L. kotoensis* has the following characters: inflorescence whitish green, sparsely

pubescent with a few non-poisonous stinging hairs, the terminal branches with branching angle less than 90 degrees; bracts triangular, without vein; bark smooth with indistinct lenticels; two-year-old branchlets glabrous; leaves nearly glabrous with a few non-poisonous stinging hairs. We treat *D. kotoensis* as a distinct species.

*Dendrocnide meyeniana* (Walp.) Chew, Gard. Bull. Singapore 21: 204. 1965 & 25: 21. f.6. 1969.

*Urtica meyeniana* Walp., Nov. Act. Nat. Cur. 19. Suppl. 1: 422. 1843.

*Laportea pterostigma* Wedd., DC. Prodr. 16 (1): 87. 1869; Kanehira, Formos. Trees rev. ed. 168. f.120. 1936; Li, Woody Fl. Taiwan 134. 1963; Liu & Huang in Li et al., Fl. Taiwan 2: 192. 1976.

*Laportea subglabra* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30 (1): 278. 1911.

*Laportea pterostigma* Wedd. form. *subglabra* (Hayata) Li, Woody Fl. Taiwan 135. 1963.

*Laportea pterostigma* Wedd. var. *subglabra* (Hayata) Liu & Huang in Li et al., Fl. Taiwan 2: 194. 1976.

*Dendrocnide meyeniana* (Walp.) Chew form. *subglabra* (Hayata) Chew, Gard. Bull. Singapore 25: 22. 1969, excl. syn. *Laportea kotoensis*.

Irritant trees, bark rough with distinct lenticels; two-year-old branchlets slightly pubescent, with stinging hairs. Leaves long-petiolate; lamina pubescent, with stinging hairs having a large bulb at base, ovate, ovate-oblong to obovate-oblong, up to 55 cm long, 27 cm wide, acute, cuspidate to acuminate at apex, entire, rarely dentate or crenate at margins, obtuse, rounded, slightly cordate to subpeltate at base; petioles 5–18 cm long; stipule broadly triangular ca. 1 cm long and wide. Male flowers with dense stinging hairs on the branches of inflorescence and flowers, arranged into cymose paniculate glomerules, ca. 12 cm long. Female inflorescence usually longer than 10 cm and reddish green, densely pubescent, with stinging hairs, the terminal branches with branching angle greater than 100 degrees; bracts linear, the larger ones with a midvein.

*Specimens examined.* TAIPEI HSIEN: Kogotu & Nankei, Suzuki 7603 (TAI). NANTOU HSIEN: Shwandon (Tsaotun), Chen et al. 458 (HAST). CHIAYI HSIEN: Houtapu, Chang 2409 (TAI). KAOHSIUNG HSIEN: Liukuei, Kiang et al. 78 (TAI); Shoushan, Shih 3321. PINGTUNG HSIEN: Manchou, Chialoshui, Huang & Tsou 10138 (TAI). TAITUNG HSIEN: Taimali, Shih 3394; Lutao, 1911, Sasaki s. n. (TAIF). HUALIEN HSIEN: Luanshan, Huang 4281 (TAI).

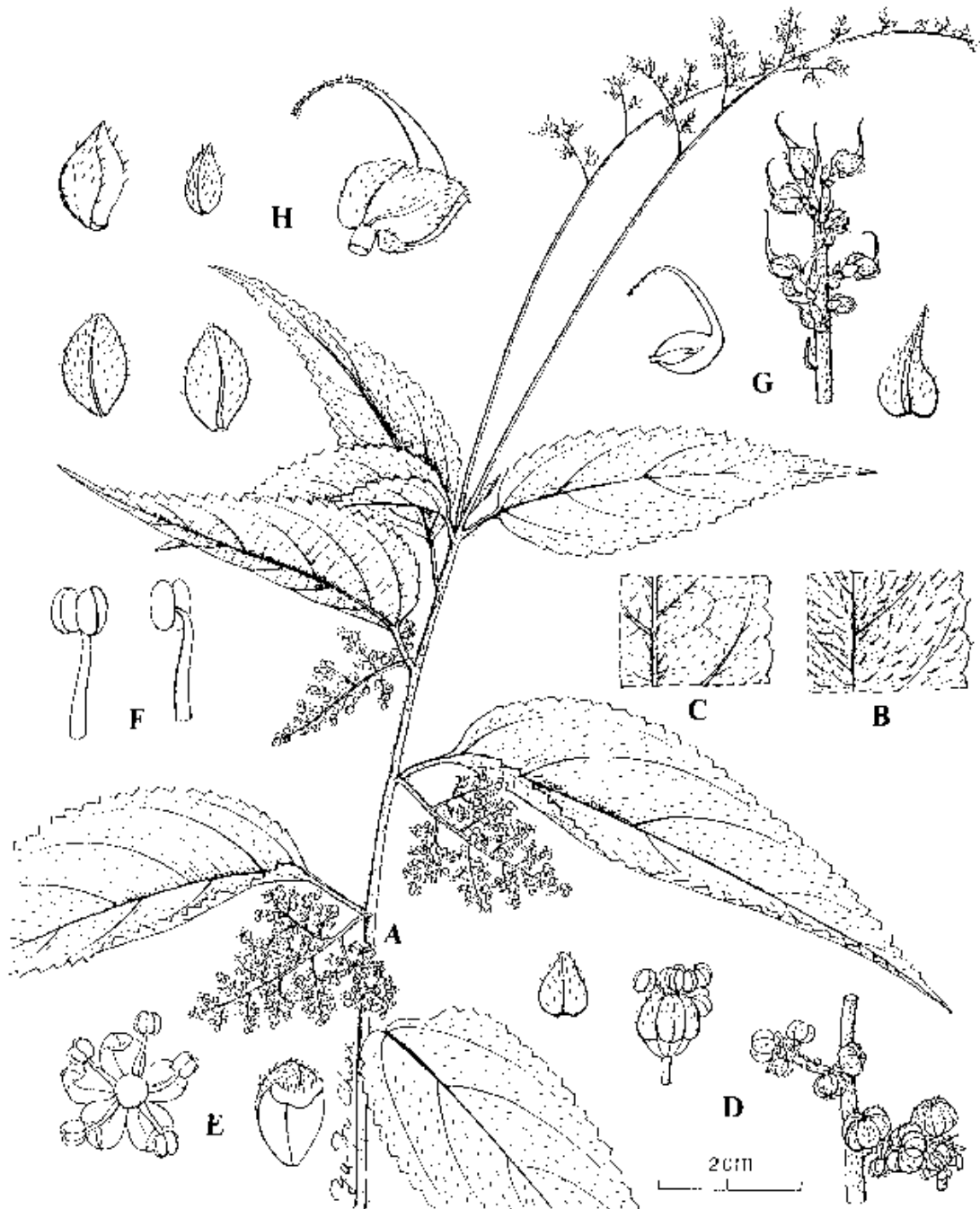
*Distribution.* Philippines. In Taiwan, usually found in small valleys and secondary forests at low altitude, nearly throughout the island and Lutao Islet.

*Notes.* In 1911, Hayata first described *Laportea subglabra*, and distinguished it from *L. pterostigma* [currently *Dendrocnide meyeniana* (Walp.) Chew] only by its much smaller and nearly glabrous leaves. In 1963, Li re-

garded it as a form of *L. pterostigma*, and made a new combination as *L. pterostigma* Wedd. form. *subglabra* (Hayata) Li. In 1969, Chew treated *L. pterostigma* as a synonym of *Dendrocnide meyeniana*, and accordingly made another combination for *L. subglabra* as *Dendrocnide meyeniana* (Walp.) form. *subglabra* (Hayata) Chew. Because individual plants with either fewer-haired

(subglabrous) or short-villose leaves can be found in the populations of the southern part of Taiwan, the authors reduce it to typical phase.

In 1969, in his monograph on *Dendrocnide*, Chew reported the occurrence of *Dendrocnide stimulans* (L. f.) Chew in Taiwan. A specimen of *Wilson 11015* collected at Koshun (currently Hengchun) in Pingtung was cited by



**Figure 5.** *Laportea bulbifera* (Sieb. & Zucc.) Wedd. A, Flowering branch. B, Portion of leaf (adaxial view). C, Portion of leaf (abaxial view). D, Portion of male inflorescences, a male flower and a bracteole. E, A male flower (top view) and one of its sepal. F, Stamens. G, Portion of female inflorescences, a female flower with its sepals removed (a bud attached at base) and a bracteole. H, A female flower and its sepals. All from *Lu 23825*.

Chew under that binomial. Meanwhile, he also cited a specimen of *Wilson 11015* as *D. meyeniana* without a note. Chew used cordate versus rounded leaf base to distinguish these two species in his key. Based on the field experiences of the first author, however, the leaf base of *D. meyeniana* varies from cordate through rounded to obtuse, and the entire range of variation can be found on an individual plant. Since the specimens of *Wilson 11015* are not available to the authors, and none of the herbarium specimens in Taiwan fits the description of *D. stimulans*, the authors doubt that *D. stimulans* occurs in Taiwan.

#### 4. LAPORTEA Gaudich., nom. cons.

Herbs, rarely shrubs, with stinging hairs. Leaves alternate, spirally arranged, stipulate; lamina chartaceous, variously toothed at margins; stipules partially connate, bifid at apex, intrapetiolar. Inflorescences solitary, axillary, cymose-dichotomous panicles, rarely simple racemes. Flowers unisexual, 4- or 5-merous, in loose glomerules; male perianth somewhat membranous, connate in bud, splitting halfway when blooming; female perianth with 4 unequal segments slightly imbricate; pedicels of female flowers winged. Fruit usually a reflexed achene, often stipitate, sometimes several on a gynophore, with persistent, linear stigmas.

About 21 species distributed in tropical and warm-temperate eastern Asia and eastern North America. Two species found in Taiwan, at low and medium altitudes.

#### Key to species

1. Stigma trifid; inflorescence in simple branched, cymose glomerules; leaves cordiform or triangular-ovate; leaf base truncate to truncate-cordate... ..... *L. interrupta*
1. Stigma simple; inflorescence in many branched, paniculate glomerules; leaves ovate to lanceolate; leaf base rounded to broad-cuneate ..... *L. bulbifera*

**Laportea bulbifera** (Sieb. & Zucc.) Wedd., Arch. Mus. Hist. Nat. Paris **9**: 139. 1856 et in DC., Prodr. **16** (1): 82. 1869; Chew, Gard. Bull. Singapore **25**: 121. 1969.

Figure 5

*Urtica bulbifera* Sieb. & Zucc., Abhandl. Math.-Phys. Kl. Baier. Akad. **4** (3): 214. 1846.

Monoecious perennial herbs up to 1.5 m high. Stems somewhat woody at base, sparsely covered with stinging hairs, with or without (in Taiwan, apparently always without) woody bulbils at leaf axils. Leaves alternate, with stinging hairs well distributed on upper surface, and only on lower midrib and veins, stipulate; lamina with minute punctiform cystoliths, the cystoliths numerous on upper surface and absent from lower surface, ovate to lanceolate, 10–17 cm long, 3–9.5 cm broad, rounded to broadly cuneate, or rarely, cordate at base, dentate at margins, acuminate at apex, penninerved, the lateral veins 4–6 pairs; petioles 3–6 cm long; stipules connate, bifid, 0.5–1 cm long, intrapetiolar, fugacious. Inflorescences unisexual, axillary, paniculate, much branched; male inflorescences

up to 10 cm long, usually at lower parts of plants; female inflorescences up to 17 cm long, usually at upper parts of branches. Male flowers subsessile; perianth ca. 1 mm long and broad, with light to dense stinging hairs; sepals 5, rarely 4, cymbiform, non-corniculate; stamens 5, rarely 4. Female flowers subsessile; perianth with 4 free sepals, the two lateral sepals larger, enclosing the ovary, asymmetrical, ca. 1 mm long and broad, the dorsal sepal strongly geniculate, ca. 0.4 mm long and broad, the ventral sepal narrow-cymbiform, ca. 0.25 mm long; ovary asymmetrically ovoid, ca. 1 mm long and broad; stigma linear, reflexed, densely puberulent at inner side. Achenes smooth, semi-circular, up to 3 mm long and broad, without wing and ridge, one-quarter covered by the lateral sepals; pedicels strongly winged laterally, glabrous, up to 2.5 mm long.

*Specimens examined.* TAIPEI HSIEN: Tryanari anbu, Sasaki s.n. (TAI). HUALIEN HSIEN: Chingshuishan, *Shih 3046*, Lu 23825 (TAIF).

*Distribution.* Japan, Korea, mainland China, Tibet, Sikkim, India, Ceylon, Burma, Thailand, Vietnam, Sumatra, and Java. In Taiwan, found at medium altitude, around Chingshuishan and the vicinity of Taipei.

*Notes.* This species is a new record of the Urticaceae of Taiwan. Specimens of this species were first collected in the vicinity of Taipei by Sasaki in 1925, and were identified as *Laportea* sp. It was then collected by Sheng-you Lu at Chingshuishan, Hualien in 1988, and was also gathered by the first author at the same locality. Plants of the species in Taiwan are very similar to those in Japan, except they lack bulbil in the axils of leaves.

**Laportea interrupta** (L.) Chew in Gard. Bull. Singapore **21**: 200. 1965 & **25**: 145. 1969.

*Urtica interrupta* L., Sp. Pl. 985. 1753.

*Fleurea interrupta* (L.) Wight, Ic. Pl. Ind. Or. **6**: 10. tab. 1975. 1853; Liu & Huang in Li et al., Fl. Taiwan **2**: 184. 1976.

Monoecious annual herbs up to 60 cm high. Stems woody at base, sparsely covered with stinging hairs. Lamina with stinging hairs distributed on upper surface, and only on lower midrib and veins, ovate to broadly ovate, 5–12 cm long, 4–8 cm broad, truncate to truncate-cordate at base, serrate at margins, acuminate at apex, penninerved, the lateral veins 3–6 pairs; petioles 3–10 cm long. Inflorescences bisexual, axillary, simple branched, cymose glomerules, up to 17 cm long. Achenes lateral compressed, asymmetrically ovoid, ca. 1.1 mm long and wide.

*Specimens examined.* PINGTUNG HSIEN: Kuwakusa, Ako, *Matuda 716* (TAIF); Ako, 1916, *Shimada s.n.* (TAIF); Paoli Forest Station, *Yang 24749* (PPI).

*Distribution.* Tropical and subtropical regions of Africa and Asia, and the Pacific Islands. In Taiwan, found at low altitude in the southern parts.

*Notes.* The authors agree with Chew's decision (1965, 1969b) to treat this species as a member of *Laportea*.

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## 台灣蕁麻科植物小誌

施炳霖<sup>1</sup> 楊達波<sup>1</sup> 劉和義<sup>1</sup> 呂勝由<sup>2</sup>

<sup>1</sup> 國立中山大學生命科學研究所

<sup>2</sup> 台灣省林業試驗所

由過去兩年來對於台灣蕁麻科植物的研究中，發現一個新紀錄屬：單蕊麻屬 (*Droguetia* Gaudich.)，代表種為單蕊麻 (*Droguetia iners* (Forssk.) Schweinf. ssp. *urticoides* (Wight) Friis & Wilmot-Dea)；三種樓梯草屬 (*Elatostema*) 的新種植物，闊葉樓梯草 (*Elatostema platyphylloides* Shih & Yang)，糙梗樓梯草 (*Elatostema hirtellipedunculata* Shih & Yang)，白背樓梯草 (*Elatostema hypoglauca* Shih & Yang)。並依據 Chew 的界定劃分咬人狗屬 (*Dendrocnide* Miq.) 及桑葉麻屬 (*Laportea* Gaudich.)；將分布於台灣本島的咬人狗 (*Dendrocnide meyeniana* (Walp.) Chew) 重新界定以包含光背咬人狗 (*Dendrocnide meyeniana* f. *subglabra* (Hayata) Chew)；將產於蘭嶼的咬人狗處理為一獨立種並重新組合成紅頭咬人狗 (*Dendrocnide kotoensis* (Hayata) Shih & Yang)；另外並首次紀錄桑葉麻屬的珠芽桑葉麻 (*Laportea bulbifera* (Sieb. & Zucc.) Wedd.)；桑葉麻 (*Laportea interrupta* (L.) Chew) 則列出由 Chew 處理的學名供參考。另外，並將文中所處理的種分別給于形態描述。由於多數分類學者向來認為蕁麻科植物難以辨認，因此，在此以營養器官為主要特徵作一檢索表，以便利檢索出本科各屬。

**關鍵詞：**紅頭咬人狗；咬人狗；單蕊麻屬；單蕊麻；闊葉樓梯草；糙梗樓梯草；白背樓梯草；珠芽桑葉麻；台灣；蕁麻科。