

Lysimachia chingshuiensis (Primulaceae), a new species from eastern Taiwan

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(Received October 14, 1998; Accepted November 9, 1998)

Abstract. A new species of *Lysimachia*, *L. chingshuiensis* C.-I Peng & C. M. Hu, from Taiwan is described and illustrated. This species is found on the gravelly summit of Chingshuishan, a metamorphosed limestone mountain in Taroko National Park, ca. 2,200–2,400 m in elevation. It is very rare, presently known only from the type locality. *Lysimachia chingshuiensis* is a distinct species in sect. *Nummularia* (Gilib.) Klatt., somewhat similar to *L. deltoidea* Wight of NE India, Sri Lanka and SW China, but distinct in its subsessile, subcoriaceous leaves with revolute margins, and flowers subsessile, solitary in the axils of the uppermost leaves. A key is provided to aid in the identification of the ten species of *Lysimachia* indigenous to Taiwan.

Keywords: Chingshuishan; Limestone flora; *Lysimachia chingshuiensis*; New species; Primulaceae; Rare species; Taiwan; Taxonomy.

The genus *Lysimachia* consists of about 180 species mainly in temperate and subtropical areas of the northern hemisphere, of which 138 occur in mainland China (Hu and Kelso, 1996) and nine in Taiwan (Kao and DeVol, 1978). Recently, in our botanical inventory of Taiwan we discovered on the summit of Chingshuishan, a metamorphosed limestone mountain in Taroko National Park, an additional species heretofore unknown to science, which is described here.

Lysimachia chingshuiensis C.-I Peng & C. M. Hu, sp. nov. —TYPE: Taiwan, Hualien Hsien, Hsiulin Hsiang, Taroko National Park, on exposed rocky slope at peak of Chingshuishan, 121°38'36" E, 24°14'69" N, ca. 2,200–2,400 m alt., 2–3 Jun 1993, *W. P. Leu 1780* (holotype: HAST; isotypes: A, MO). ¶W /S, L, ¶

Figure 1

Species distinctissima, inter species sectionis *Nummulariae* *L. deltoideae* Wight subsimilis, sed foliis sessilibus, subcoriaceis, floribus ad apicem caulium ramorumque in inflorescentias capitulatis congestis valde diversa.

Perennial herbs. Stems herbaceous, covered with articulate, crisp, rusty hairs. Lower stems stoloniferous, slender, elongate prostrate, to 60 cm long, with diminutive leaves ca. 2 mm long, internodes to 2–3.5 cm long, rooting at basal nodes. Upper, flowering stems ascending, internodes 0.3–1 cm long; leaves sessile, lower and middle ones opposite, narrowly elliptic, 4–8 mm long, 1.5–2.75 mm wide,

apex obtuse, base broadly cuneate, often somewhat auriculate and subamplexicaul, margins evidently revolute, subcoriaceous, upper surface glabrous and green, lower surface reddish purple, sparsely hairy as on stem, glabrous; midrib impressed adaxially, manifestly elevated beneath, lateral nerves invisible; uppermost leaves subverticillate, ovate-lanceolate, 7–10(–14) mm long, 3–5(–5.5) mm wide, base attenuate to subrounded, upper surface glabrous and green, lower surface brownish. Flowers subsessile, solitary in the axils of the uppermost leaves. Pedicel less than 1 mm long. Calyx ca. 5 mm long, appressed pubescent mainly along midrib abaxially, divided almost to base, lobes lanceolate, apex acute. Corolla yellow, ca. 10 mm long, widely open; tube 1 mm long; lobes obovate-elliptic, to 5 mm wide, apex rounded, dotted with minute, reddish glands. Filaments connate at base into a ring, ring 0.5 mm long, free part ca. 1 mm long; anthers ca. 1.25 mm long, longitudinally dehiscent. Ovaries globose, glabrous. Styles to 3.5 mm long. Caspules ca. 2.5 mm in diam., brown, dehiscent by 5 valves. Flowering May–Jun; fruiting Jul–Aug.

Additional specimen examined. TAIWAN. HUALIEN HSIEN: Hsiulin Hsiang, Taroko National Park, at summit of Chingshuishan, a limestone mountain, very rare, 121°38'36" E, 24°14'69" N, ca. 2,300 m alt., 23 Jul 1993, *Ho 1250* (HAST).

Distribution and notes. Extremely rare, presently known only from the gravelly summit of Chingshuishan, Taroko National Park, Hualien, Taiwan (Figure 2). *Lysimachia chingshuiensis* occurs in open to semi-shady, mossy or lichened habitat, often with abundant leaf litter, and associated with *Juniperus chinensis* L. var.

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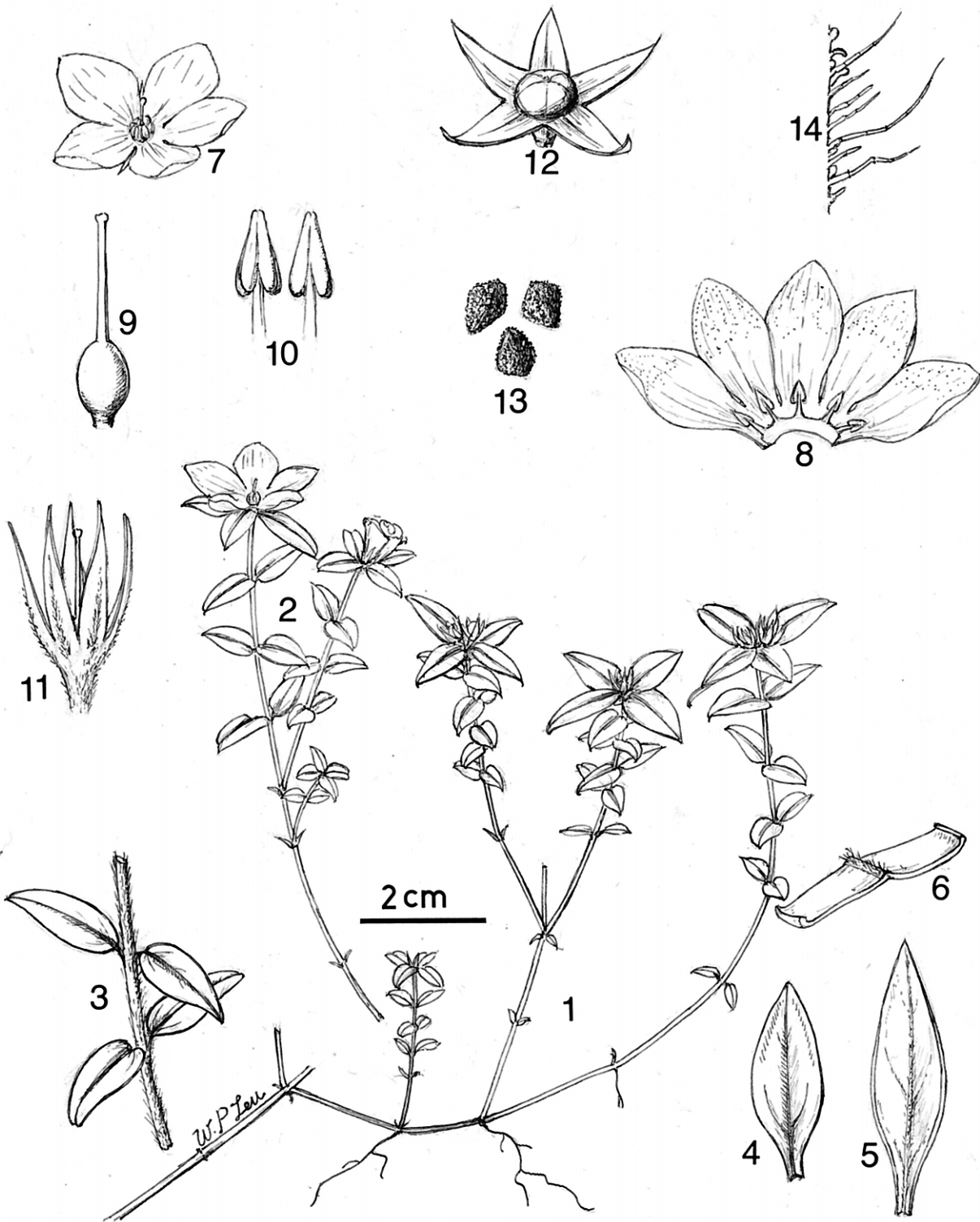


Figure 1. *Lysimachia chingshuiensis*. 1, Habit, showing fruiting stems and branches; 2, Flowering branches; 3, Portion of a branch; 4, Lower leaf, adaxial view; 5, Upper leaf, abaxial view, showing revolute margins; 6, Portion of a leaf, abaxial view, showing revolute margins and pubescent midrib; 7, Flower; 8, Corolla, showing connate filaments forming a shallow ring at base; 9, Gynoecium; 10, Stamens; 11, Developing fruit enclosed by calyx; 12, Mature fruit; 13, Seeds; 14, Vestiture on stem (1, 11, 12, 13 from *Ho 1250*; others from *Leu 1780*).

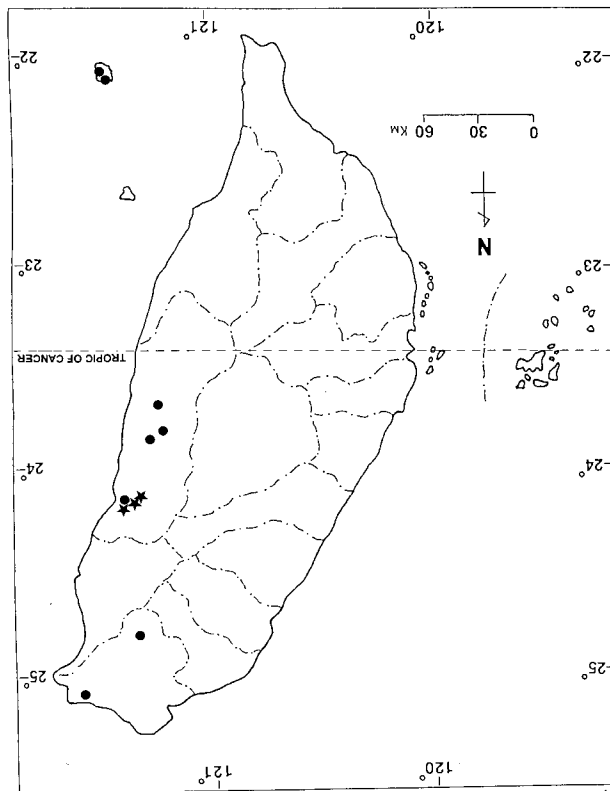


Figure 2. Distribution of *Lysimachia chingshuiensis* in Taiwan.

tsukusiensis Masamune. The specific epithet is based on the type locality, Chingshuishan (literally, “Clear Water Mountain”), well known for harboring many narrowly endemic species and varieties that are adapted to limestone habitats, such as *Aster chingshuiensis* Y. C. Liu & C. H. Ou (Asteraceae), *Berberis chingshuiensis* T. Shimizu (Berberidaceae), *Gentiana tarokoensis* C. H. Chen & J. C. Wang (Gentianaceae), *Hypericum nakamurai* (Masamune) Robson (Clusiaceae), *Juniperus chinensis* L. var. *tsukusiensis* Masamune (Cupressaceae), *Ligustrum seisuiense* T. Shimizu & M. T. Kao (Oleaceae), *Pourthiaea villosa* var. *chingshuiensis* (T. Shimizu) Iketani & H. Ohashi (Rosaceae), and *Rhamnus chingshuiensis* T. Shimizu (Rhamnaceae).

Lysimachia chingshuiensis is a very distinctive member of sect. *Nummularia* (Gilib.) Klatt., somewhat resembling *L. deltoidea* Wight of NE India, Sri Lanka and SW China, but differing in its subsessile, subcoriaceous leaves with revolute margins, and flowers subsessile, solitary in the axils of the uppermost leaves, thus appearing like a few-flowered terminal cluster. In foliage and aspect, *Lysimachia chingshuiensis* resembles species of *Hypericum*, for which it may be mistaken in vegetative state. The following key is provided to aid in the identification of the ten species of *Lysimachia* indigenous to Taiwan. We have excluded the recently published *Lysimachia sauraiifolia* S. S. Ying (Ying, 1987), which is synonymous with *Rhynchotechum formosanum* Hatusima (Gesneriaceae) (Li and Hsieh, 1997).

Key to Species of *Lysimachia* in Taiwan

1. Flowers axillary, yellow; filaments connate and forming a short tube at base, tube adnate to base of corolla.
2. Stem erect or ascending; leaves alternate, glabrous; pedicels 1.5–5 cm long; anthers dehiscing by apical pores.
3. Plant not fragrant when dry; stem terete; leaves often confined to upper part of stem; persistent calyx much shorter than capsule *L. ardisioides*
3. Plant fragrant when dry; stem angled; leaves evenly spaced on stem; persistent calyx slightly shorter than capsule *L. capillipes*
2. Stem prostrate or decumbent; leaves opposite, pubescent; pedicels 0.1–0.8 cm long; anthers dehiscing by lateral slits.
4. Leaves subcoriaceous, narrowly elliptic, margins manifestly revolute, sessile *L. chingshuiensis*
4. Leaves chartaceous, usually ovate or cordate, margins flat, petiolate.
5. Trichomes on stem appressed; corolla not dotted with reddish brown glands; stolons obscure; plants of lowlands and coastal areas.
6. Leaves broadly ovate to rounded, usually dotted with reddish glands; flowers in axils all along stem; capsules abundantly produced *L. japonica*
6. Leaves ovate to rhomboid-ovate, usually not dotted with glands; flowers congested at apices of stems; capsules often not produced *L. remota*
5. Trichomes on stem spreading; corolla dotted with reddish brown glands; stolons distinct, creeping; plants of mid to high elevations.
7. Leaves 2–6 cm long, ovate; internodes 3–8(–10) cm long; petals punctate only on upper half *L. congestiflora*
7. Leaves 0.3–1.5 cm long, cordate to broadly ovate; internodes 1.5–3(–3.7) cm long; petals punctate throughout . *L. nigropunctata*
1. Flowers in terminal racemes, white to pinkish to lightly purple; filaments free, adnate to base of corolla or basally connate, but not forming a tube.
8. Leaves obovate-spatulate, somewhat succulent; filaments connate at base; plants of coastal areas
..... *L. mauritiana*
8. Leaves elliptic-lanceolate, chartaceous; filaments free at base; plants of lowland, not near coast.
9. Stem terete; stolons conspicuous, elongate; sepals oblong-ovate, apex obtuse, margins membranaceous and ciliate; filaments shorter than corolla lobes; style base swollen *L. fortunei*
9. Stem angled; stolons obscure, short; sepals lanceolate, apex acuminate, margins entire; filaments well exerted beyond corolla lobes; style base not swollen *L. decurrens*

Acknowledgments. We thank Thomas G. Lammers and Porter P. Lowry II for helpful comments on the manuscript; Wen-Pen Leu for the handsome illustration; and Taroko National Park Headquarters, Taiwan for collect permit. This study was supported in part by research grants from the National Science Council, and the Council of Agriculture, Taiwan to Ching-I Peng.

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