**Lomatogonium chilaiensis** (Gentianaceae), a newly recorded genus and new species in Taiwan

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**Abstract.** A newly recorded genus *Lomatogonium* A. Braun (Gentianaceae) from Taiwan, and a new species *L. chilaiensis* C. H. Chen & J. C. Wang are described and illustrated. *Lomatogonium chilaiensis*, thus far known only from one population, was found on the high-altitudinal (ca. 3,100-3,300 m) moist gravelly slopes and cliff faces of Mt. Chilaishan of Taroko National Park. The new species is most similar to *L. carinthiacum* (Wulfen) Reichenbach, a widely distributed species, but differs from the latter by its nearly white corolla, calyx lobes almost equal in length to the corolla lobes, with the apex acute to acuminate, and appendages on nectaries few or absent.

**Keywords:** Gentianaceae; *Lomatogonium*; *Lomatogonium chilaiensis*; New species; Newly recorded genus; Taiwan; Taxonomy.

**Introduction**


Recently, in our botanical exploration near the summit of Chilaishan in Taroko National Park, Taiwan, a new species of *Lomatogonium*, a genus heretofore unknown in Taiwan, was found. The genus *Lomatogonium* A. Braun (Gentianaceae) consists of about 20 species mainly in temperate Asia, with only few species occurring in North America and Europe (Liu and Ho, 1992; Ho and Pringle, 1995). *Lomatogonium* is distinguished from other genera of the Gentianaceae by having nectaries on the corolla tube near the base of the lobes and stigma decurrent on ovary (Ho, 1988). On the basis of data on chromosome numbers and morphology, *Lomatogonium* appears to be most closely related to *Comastoma* (Yuan and Küpfer, 1993); studies of seed-coat morphology are compatible with this conclusion (Yuan, 1993). According to Ho (1988), this new species belongs to *Lomatogonium* sect. *Lomatogonium* because of its blue anthers and tubal nectaries.

**Systematic Treatment**

*Lomatogonium* is a newly recorded genus for the flora of Taiwan. In Gentianaceae, five genera were recorded from Taiwan (not including *Nymphoides*, which should be placed in *Menyanthaceae*). In order to distinguish it from other genera of Taiwan, a key is provided here:

**Key to Genera of Gentianaceae in Taiwan**

1. Corolla with plicae between lobes.
   2. Stems ascending to erect; stamens equal, straight ........................................... *Gentiana*
   3. Stems twining or trailing; stamens unequal, recurved ........................................... *Tripterospermum*

1. Corolla without plicae between lobes.
   3. Stems twining; calyx tube with wings ............................................................. *Pterygocalyx*
   4. Stems ascending to erect; calyx tube without wings.
      4. Corolla lobes without nectary on inner surface .................................................. *Centaurium*
      5. Stigma elevated above ovary, not decurrent; nectaries on corolla lobes ............. *Swertia*
      6. Stigma decurrent on ovary; nectaries on corolla tube near base of lobes ........... *Lomatogonium*


Herbs annual or perennial. Roots fibrous or woody. Stems prostrate, ascending, erect, striated or angled,
branched or simple. Inflorescences few- to many-flowered, terminal and axillary cymes, sometimes flowers solitary and terminal. Flowers (4-or) 5-(or 10-) merous; pedicel usually longer than flower. Calyx and corolla rotate, lobed nearly to base or with a distinct tube. Corolla dextrorse in flower bud. Nectaries 2, at base of corolla lobes. Stamens inserted at summit of corolla tube; filaments somewhat flattened; anthers usually blue, shorter than or rarely as long as filaments. Ovary ensiform, cylindric, or ovoid-ellipsoid; style absent; stigma lobes decurrent along carpel sutures. Capsule 2-valved, seeds many. Seed coat almost smooth.

About twenty species: North America, temperate Asia, Europe; only one species in Taiwan.

**Lomatogonium chilaiensis** C. H. Chen & J. C. Wang, sp. nov.—TYPE: Taiwan, Hualien Hsien, Hsiulin Hsiang, Taroko National Park, Chilaishan, elev. ca. 3, 100-3,300 m, 23 Oct 1999, Chen 2922 (holotype: TNU; isotype: HAST, TAI, TAIF, TNU).

Figures 1, 2A

Species **L. carinthiacum** (Wulfen) Reichenbach affinis, sed corolla fere albi, calyx lobis cum corolla lobis circa æquilongae et acutatus vel acumintus apice, paucus vel nullus appendix ad nectario, differt.

Annual herbs. Stem erect, purplish, glabrous, angular, 3-12 cm tall. Basal leaves short-petiolate, spatulate, 3-8 mm long, 2-4 mm wide, apex obtuse. Stem leaves sessile, ovate to lanceolate, 5-10 mm long, 2-5 mm wide, base

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**Figure 1.** *Lomatogonium chilaiensis* C. H. Chen & J. C. Wang. 1, Habit; 2, Cross section of stem; 3, Leaf; 4, Flower; 5, Bract; 6, Outside view of calyx; 7, Corolla; 8, Nectaries on base of corolla lobes; 9, Enlarged appendage on nectary; 10, Stamen; 11, Pistil; 12, Capsule; 13, Seeds. (*Wang et al. 11177*)
cuneate, apex acute, margin finely denticulate, midvein distinct beneath. Cymes lax, terminal and axillary. Flowers 4 or 5-merous. Pedicel spreading to erect, 5-30 mm long, angular, glabrous. Calyx tube 0.6-1 mm long; lobes lanceolate to narrow-lanceolate, 6-9 mm long, 1.5-2.5 mm wide, apex acute or acuminate. Corolla slightly bluish white, tube 0.8-1.2 mm long; lobes ovate, 7-9 mm long, apex acuminate. Nectaries 2, at base of each corolla lobe, the rim prolonged into a tube, with filamentous appendages usually absent, few when present; appendages ca 0.5 mm long. Stamens inserted at summit of corolla tube; filaments curved outward in fresh flowers, 3-4 mm long; anthers blue, ellipsoid, ca. 1 mm long. Ovary elliptic-oblong, 5-6 mm long, ca. 1.5 mm wide, apex triangular acute; stigma lobes triangular, decurrent on apical part of ovary. Capsules cylindric, as long as persistent corolla, 8-10 mm long, 2.5-3.5 mm wide, dehiscent by two valves at apex. Seeds dark brown, smooth, subglobose, 0.6-0.8 mm in diam.

Additional specimen examined. TAIWAN. HUALIEN HSIEN: Hsiulin Hsiang, Taroko National Park, on the way from Cheng-kung-pao No. 2 to peak of Chilaishan, 3,150-3,350 m alt., 3 Oct 1998, Chen 2609 (TNU); Taroko National Park, the saddle between Chilaishan and Chilaipeifeng, ca. 2 km SW of Chilaipeifeng, 3,200-3,300 m alt., 2 Sep 1999, Wang et al. 11177 (TNU).

Distribution and Note. Endemic to Taiwan, so far known only from one population on moist gravelly slopes and cliff faces of Mt. Chilaishan of Taroko National Park, ca. 3,100-3,300 m alt. Very rare. Flowering Aug-Oct, fruiting Sep-Nov.

In Asia, with the discovery of the Taiwanese Lomatogonium, the known distribution of the genus extends southeastward to Taiwan. Most members of the genus are on high mountains (more than 3,000 m alt.), as is L. chilaiensis. In Taiwan, this species was only found in an exposed and moist area, usually mixed with other heliophytic herbs, including Clinopodium laxiflorum (Hayata) Mori, Adenophora uehatae Yamamoto, Scabiosa lacerifolia Hayata, Anaphalis nepalensis (Spreng.) Hand.-Mazz., Gentiana scabrida Hayata, etc.

Lomatogonium chilaiensis is a member of the section Lomatogonium according to Ho (1988). This species is most similar to L. carinthiacum (Wulfen) Reichenbach, a widely distributed species in the temperate zone of Asia and Europe (Liu and Ho, 1992), but differs from the latter in having a nearly white corolla, and calyx lobes almost equal in length to the corolla lobes, with the apex acute to acuminate (Figure 2B), and scarce or absent appendages on nectaries.

The flowers of L. chilaiensis are 4- or 5-merous, and are variable even if within an individual. The larger plants

Figure 2. Lomatogonium chilaiensis C. H. Chen & J. C. Wang. A, Habit. Bar = 2 cm; B, Upper portion of a stem, showing calyx lobes almost equal in length to corolla lobes and with an acute apex. Bar = 5 mm; C, Capsule dehiscent by two valves at apex, with perianth removed. Bar = 2 mm.
usually bear a majority of 5-merous flowers, and the smaller ones bear mostly 4-merous flowers. The capsules are slightly exserted beyond the persistent corolla, and dehisce by two valves only at the apex when mature (Figure 2C). The plants turn yellow and wither after fruiting in winter.

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