

# A TAXONOMIC REVISION OF THE SPECIES OF GENTIANACEAE IN TAIWAN

by

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## ABSTRACT

This paper is a taxonomic revision of the gentianaceous plants native to Taiwan. With few exceptions, most of the species of Gentianaceae occur at high altitudes in the central ranges in the island. Based on morphological and anatomical characters and other important features, the native plants of Gentianaceae are classified into four genera with eighteen species and four varieties belonging to two subtribes. In addition to a few new combinations of species, one new species, *Gentiana itzershanensis*, and one new section, *Tripterospermoidae*, are proposed. For the convenience of identifying the plants, description of species, each with a plate, and preparation of keys to tribes, genera, sections and species have been made.

## INTRODUCTION

While we engaged ourselves in examining the specimens of Taiwan plants, we found that the taxonomy of Gentianaceae is in a state of confusion and the identification of species is a rather troublesome task. Owing to the great morphological variation existing not only in the flowers but also in the leaves, the determination of the species of the family is especially difficult.

As to the records of previous investigations of Gentianaceae of Taiwan, the most important contribution was made by Hayata, who described most of the new species of the family. Up to 1917, Hayata recorded 4 genera and 16 species in his monumental work "Gen. Ind. Fl. Form.". Sasaki (1928) went on treating this family with 11 species in his "List Pl. Form.". Later Yamamoto (1929-1936) and Masamune (1936-1943) successively discovered and named some new species and revised this family in their papers respectively. Until 1936, 4 genera and 16 species were listed in "Short Flora of Formosa" by Masamune. Henceforth, no specialist has made taxonomical work on this family throughly.

Some twenty four years ago, Satake studied the genera *Swertia* (1947) and *Tripterospermum* (1951) in sequence, each genus containing 4 species and 1 variety including those native to Taiwan (Journ. Jap. Bot.

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about 15 mm long. Seeds narrowly oblong, 0.6-0.9 mm long, with minute longitudinal reticulate-striae.

#### Common names

English: Linear-sepaled Gentiana. Japanese: Niimoto-rindo. Chinese: Hwang-hua-long-daan (黃花龍膽).

#### Habitat

Usually grows near pond and in moist glassy land on mountain ridges, frequently found in the middle and northern parts of the central ranges from 1,800 to 3,000 m in the island of Taiwan.

Distribution: Endemic.

#### Notes

Because of their similarity, this species was often misapplied either to *Gentiana scabrifolia* or to *Gentiana angusta*. It also resembles *Gentiana loureiri* Griseb. All of these species are quite different ones. As a whole, the size of plant bodies and flowers of the present species is much smaller, by which it is distinguishable from species listed. Besides the feature mentioned, the present species is chiefly identified by the following characteristics: Leaves distinctly scabrous at base; flowers with pedicels 3-4 mm long, and elongated to 5-8 mm long in fruit; calyx-lobes linear, shorter than the calyx-tube, the apex gradually acuminate ending in a arista, the base dilated, entire; corollas 12-15 mm long, the lobes triangular, purplish, aristate-acute at apex; appendages triangular, as long as the corolla-lobes in length, cuspidate-acute at apex, yellowish; anthers oblong, the filaments attached nearly to the middle part of corolla-tube, and seeds minute, narrowly oblong, 0.6-0.9 mm long.

#### Specimens examined:

Chia-i-hsien: A-li-shan: Y. Kawakami et K. Mori, 3700 (TAI). S. Sasaki, 0103 (TAI). G. Masamune, 3745, (TAI). Huang, s.n. Feb. 18, 1956 (TAI). Chuang, Kuo et Kao, 4100 (TAI). Chao et Kao, 6189 & 6231 (TAI). Chuang, 4224 (TAI). Yu-shan: T. Kawakami s.n. Nov. 2, 1905 (TAIF). S. Sasaki, 0105 (NTUF). Pa-tung-kuan: T. Suzuki, 13312 (TAI). Tai-tung-hsien: Li-lung-shan: K. Mori, s.n. Aug. 10, 1937 (TAI). Pei-nan-chu-shan: T. Sikano, 091308 (TAI). Pa-yeu-chih: C. C. Kuo, 2371 (NTUF). Hua-lien-hsien: Tai-lu-ko-ta-shan: T. Suzuki, 9525 (TAI). Lin-tien-shan: C. C. Kuo, 3216 (NTUF).

6. *Gentiana itzershanensis* Liu et Kuo, sp. nov. ----- Plate 7.

Herbae 15-20 cm altae. Caulis leviter quadrangularis ramosus vel pauciramosus purpureus vel purpurascens, scaber vel interdum ad inferum partitum glaber. Folia scabra apice istato-a-acuta, margines albo-lamellati. minute scabris; folia radicalia ovato-lanceolata vel interdum lanceolata 18-20 mm longa 6-8 mm lata; folia caulina lanceolata vel oblongo-lanceolata 12-15 mm longa, vaginae circa 2 mm longae. Flores pedicellati terminales solitarii; pedicelli 1-2 mm longi. Calyx campanulatus manifeste cum 5 costis scaber, 5-6 mm longus, 5-lobatus; lobis linearibus longioribus quam calyco-tubos 9-10 longis, apice aristatis basi dilatatis et minutissime scabro-serrulatis. Corolla tuboso-campanulata, 18-22 mm longa, 5-lobata; lobis late ovatis 4 mm longis, apice aristato-acutis, sinibus plicatis appendiculatis 2-3 mm longis, apice lobatis, lobis 2-3-dentatis irregulariter minuto-serrulatis. Stamina 5, antheris angustatis 3 mm longis, filamentis ad basin corollo-tubi affixis parvis. Ovarium stipitatum ellipticum vel fusiforme 7-8 mm longum, cum margine serrulato-alatis; stipes 4-5 mm longus, stylo 4-5 mm longo, stigmate 2-lamellato leviter revoluto. Capsula oblanceolata vel obovato-lanceolata 8 mm longa 2-valvata dehiscentia cum margine serrulata alata. cum stipite 15 mm longa persistens corolla exserta. Seminibus ovato-lanceolatis vel elliptico-lanceolatis 1.3 mm longis longitudinaliter minute reticulato-striatis.

Hab. Itzershan, in the central ranges, Hsinchuhsien, Taiwan, leg. H. Simada, SH512 July 15, 1935, Type. in TAI.

Stems slightly quadrangular, branched or few-branched, purple or purplish, scabrous or occasionally glabrous in lower part, 15-20 cm tall. Leaves scabrous, aristate-acute at apex, the margins white-lamellate, minutely scabrous; radical leaves ovate-lanceolate or sometimes lanceolate, 18-20 mm long, 6-8 mm wide; cauline leaves lanceolate or oblong-lanceolate, 12-15 mm long; sheaths about 2 mm long. Flowers pedicellate, solitary on top of branches; pedicels 1-2 mm long. Calyx-tube campanulate, 5-6 mm long, prominently with 5 scabrous costas, 5-lobed; lobes linear, longer than calyx-tube, 9-10 mm long, aristate at apex, dilated and very minutely scabrous-serrulate at base. Corollas tubular-campanulate, 18-22 mm long, 5-lobed; lobes broadly ovate, 4 mm long, aristate-acute at apex; sinuses plicate, with appendages 2-3 mm long; appendages with 2-3-dentate lobes, the lobes irregularly minute-serrulate. Stamens 5; anthers narrowed, 3 mm long; filaments attached to place a little above the base of corolla-tube. Ovary stipitate, elliptical or spiniform, 7-8 mm long; margins with serrulate wings, the stipes 4-5 mm long; style 4-5 mm long; stigma 2-lamellate, the lamellas slightly revolute. Capsules oblanceolate obovate-lanceolate, 8 mm long, dihiscent in 2-valves, the margins serrulate winged, with long stipes exerted beyond the persistent corolla; stipes 15 mm long. Seeds ovate-lanceolate or elliptic-lanceolate, 1.3 mm long, with minutely longitudinal reticulate-striae.

## Common names

English: Itzer shan Gentian. Chinese: I-tzer-shan-long-daan  
(伊澤山龍膽)

## Habitat

Grows in grassy land on mountain ridges in I-tzer-shan, tsyh-kaoshan and Tao-shan in the northern part of the central ranges at about 3,300 m altitudes.

Distribution: Endemic.

## Notes

This species bears a close resemblance to *Gentiana scabrada* Hayata (tabe 1) in appearance, but is quite separable from the latter by the linear calyx-lobes which are dilated and very minutely scabrous-serrulate at base and longer than the calyx-tube, the corollaceous appendages with 2-3-dentate lobes which are irregularly serrulate, and the filaments attached to place a little above the base of the corolla tube. The ovary with serrulate wings is also a distinct character of the plant. Basing upon the above mentioned characteristics, we think that it is sufficient to treat it as a new species.

## Specimens examined:

Hsin-chu-hsien: I-tzer-shan: H. Simada, SH512, Type. sp. in Herb. TAI. S. Sasaki, s.n. July, 7, 1932 (TAI). Tao-shan: T. Hosokawa, s.n. July, 12, 1931 (TAI). I-lan-hsien: Tsyh-kaoshan: K. Mori, s.n. Oct. 24, 1936 (TAI).

7. *Gentiana loureiri* Griseb. in DC. Prodr. 9:108 (1845). Miq. in Bot. Néerl. 1:112 (1861). Hance in Ann. Sc. Nat. 5 me Série, 5:229 (1866). Forb. et Hemsl. in Linn. Soc. Journ. Bot. 26:129 (1890). Merr. in Sunyat. 1(1): 29 (1930). Yam., in Trop. Agr. 8:71 (1936) p.p.

-----Plate 8.

*Gentiana aquatica* Lour. Fl. Cochinchin. 172 (1790) non Linn.

*Gentiana humilis* sensu Hay., Fl. Mont. Formos. 167 (1908) non Stev.

Small herb. Stems simple or caespitose, unbranched, purplish, 2-4 cm tall. Leaves lanceolate, 8-14 mm long, 3-4 mm wide, acuminate-aristate at apex, glabrous, the margins white-lamellate and entire, slightly scabrous