



Deinostema (Scrophulariaceae) in Taiwan

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Abstract. *Deinostema* (Scrophulariaceae) and its two species, *D. violaceum* (Maxim.) Yamazaki and *D. adenocaulon* (Maxim.) Yamazaki, are reported for the first time in Taiwan, based on specimens collected in the northern part of the island. Some of these specimens had been collected almost 70 years ago but have only recently been recognized to be representatives of this genus.

Keywords: *Deinostema*; *Deinostema adenocaulon*; *Deinostema violaceum*; Scrophulariaceae; Taiwan; Taxonomy.

Introduction

Deinostema (Scrophulariaceae) was defined and described by Yamazaki in 1953. It consists of only two species, *Deinostema adenocaulon* (Maxim.) Yamazaki and *Deinostema violaceum* (Maxim.) Yamazaki, which were originally included in the genus *Gratiola*. *Deinostema* is restricted to the temperate region of eastern Asia, i.e. from China, and Korea, to Japan (Boufford et al., 1990; Hong, 1979; Ohwi, 1965; Yamazaki, 1981). The genus and its species have not been previously reported in Taiwan.

In May of 1992, Mr. Fa-kwei Chen collected an unknown aquatic plant in a pond at Kuanhsi, Hsinchu County, and sent a fresh specimen to the authors. The plant was a member of Scrophulariaceae and seemed to be related to *Dopatrium* and *Gratiola*, but differed from them in having leaves present on flowering culms and in lacking bracteoles. After reviewing relevant references and examining specimens of the family in the herbarium of the Department of Botany, National Taiwan University (TAI), the authors concluded that the morphological features displayed by the unknown plant agreed with those of *Deinostema violaceum*.

During examination of specimens of Scrophulariaceae at TAI, the first author found two specimens (*T. Suzuki* 21413 and *Y. Simada* 26734) of *Deinostema violaceum* that had been collected in Taiwan. Suzuki's specimen was gathered at Pa-te in 1941, and Simada's at Taoyuan in 1925; both localities are in Taoyuan County. The former specimen had been correctly identified as *Gratiola violacea* Maxim., which is the basionym of *Deinostema violaceum*, but had been incorrectly filed

under *Veronica*. The latter specimen was correctly identified as *Deinostema violaceum* but unfortunately had been misfiled as a Japanese collection.

In 1990, the first author had collected a sterile aquatic plant in a wet-field at Pinghsi, Taipei County. The plant was initially identified as a member of either *Ilysanthes* or *Deinostema* (Scrophulariaceae). In August 1992, following the recognition of *Deinostema violaceum*, he revisited the wet-field, and collected fruiting specimens of the plant. Subsequent detailed studies of the specimens and of individual plants cultivated in an aquarium led to the conclusion that it, too, belongs to the genus *Deinostema*. In this case, however, it was the second species of the genus, *Deinostema adenocaulon*. Both species of the genus are now known to occur in Taiwan.

Deinostema Yamazaki

Annual aquatic plants. Leaves opposite, sessile, 3-, 5-, or 7-veined. Flowers at axils of upper leaves, mostly pedicelled; calyx campanulate, deeply five-lobed, lobes valvate; corolla bilabiate, campanulate; stamens 4, didynamous, posterior 2 fertile, anterior 2 staminodes, filaments short, inserted on corolla-tube. Fruit a capsule, surrounded by persistent calyx; seeds oblong or elongate ovoid, reticulate.

Key to the Species

1. Leaves ovate to elliptic, more than 3 mm wide 1. *D. adenocaulon*
1. Leaves linear to linear-lanceolate, less than 1.5 mm wide 2. *D. violaceum*
1. *Deinostema adenocaulon* (Maxim.) Yamazaki, J. Jap. Bot. 28: 132. 1953. 毛澤番椒 Fig. 1

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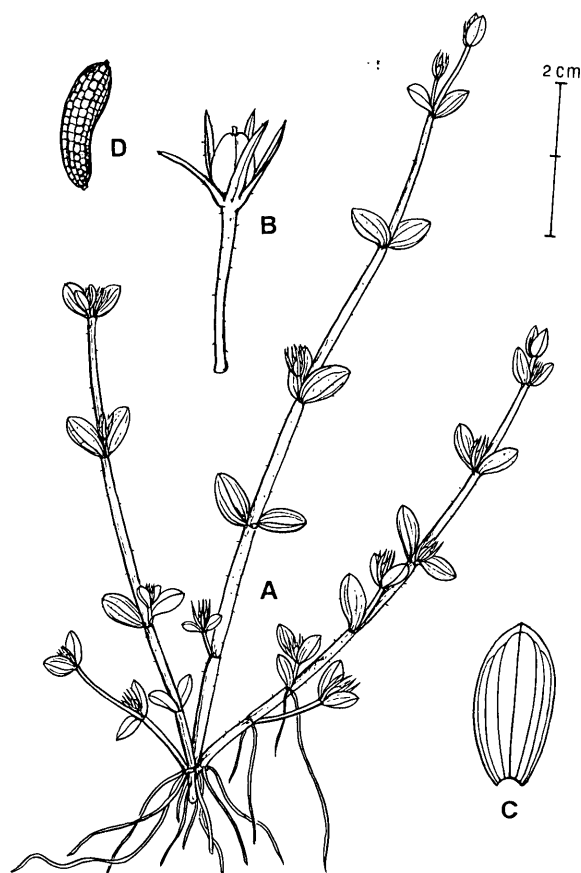


Fig. 1. *Deinostema adenocaulon* (Maxim.) Yamazaki. A) habit; B) fruit with persistent calyx; C) leaf; D) seed.

Gratiola adenocaula Maxim., Bull. Acad. Imp. Sci. Saint-Petersbourg **20**: 440. 1875.

Amphibious annual herbs. Stems creeping or erect, 5–10 cm long, simple or branched, glabrous or slightly pilose with spreading glandular hairs on upper portion. Leaves opposite, ovate to elliptic, 5–8 mm long, 3–6 mm wide, acute to subobtuse at the apex, 5–7-veined, entire, sessile. Flowers solitary or fasciculate, axillary; pedicels slender, 1–2 cm long in chasmogamous flowers, less than 1 cm long or lacking in cleistogamous flowers; calyx deeply 5-lobed, 3–4 mm long, the lobes usually lanceolate, 2–3 mm long; corolla pale purple, about twice as long as the calyx, the upper lip broadly orbicular, deeply bilobed, the lower lip 3-lobed; stamens 4, didynamous, the anthers glandular. Fruit a capsule, ellipsoid, 2–3 mm long; seeds oblong-lanceolate, ca. 0.5 mm long, reticulate.

This species is distributed in Korea, Japan, and southward to northern Taiwan.

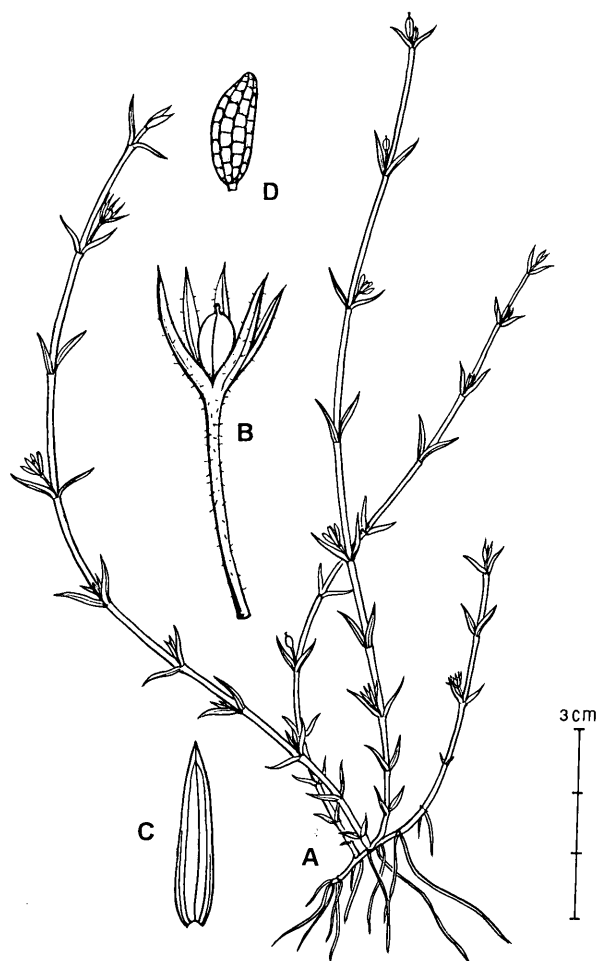


Fig. 2. *Deinostema violaceum* (Maxim.) Yamazaki. A) habit; B) fruit with persistent calyx; C) leaf; D) seed.

Specimen examined. TAIPEI COUNTY: Pinghsi, in 1992, S. H. Yen s. n. (TAIF).

2. *Deinostema violaceum* (Maxim.) Yamazaki, J. Jap. Bot. **28**: 132. 1953. 澤番椒 Fig. 2

Gratiola violacea Maxim., Bull. Acad. Imp. Sci. Saint-Petersbourg **20**: 440. 1875.

Amphibious annual herbs. Stems creeping or erect, 5–10 cm long, simple or branched, glabrous. Leaves opposite, linear to linear-lanceolate, acute at the apex, 3–10 mm long, 1–1.2 mm wide, mostly 3-veined. Flowers sessile or pedicellate, solitary or fasciculate, axillary; pedicels 10–15 mm long or absent in cleistogamous flowers; calyx deeply 5-lobed, the lobes usually lanceolate, 3–6 mm long; corolla violet, ca. 1.5 times as long as the calyx, the upper lip broadly orbicular, deeply bilobed, the lower lip 3-lobed; stamens 4, didynamous, the anthers glandular. Fruit a capsule, oblong, ca. 3 mm long; seeds narrowly ovoid-oblong, ca. 0.5 mm long, reticulate.

This species is distributed mainly in temperate Asia, including northeastern China, Korea, Japan, the Ryukyus, and Taiwan. *Deinostema violaceum* grows in shallow water in ponds and ditches. When submerged, it may produce cleistogamous flowers, which are often fascicled in the axils of leaves.

Specimens examined. HSINCHU COUNTY: Kuanhsi, in 1992, *S. H. Yen s. n.* (TAIF). TAOYUAN COUNTY: Pa-te, *T. Suzuki 21413* (TAI); Taoyuan, *Y. Simada 26734* (TAI).

Acknowledgements. The authors are indebted to Dr. Ho-yih Liu for his scientific suggestions and to Drs David E. Boufford, Thomas G. Lammers, Takashi Yamazaki, and Kung-Ping P. Shao for their critical readings of the manuscript.

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本文為記錄並描述在台灣北部分布之玄參科之澤番椒屬與其兩种植物，澤番椒與毛澤番椒。澤番椒早於七十年前在台灣已有採集之標本，但兩者皆為在台灣首次之報導。

關鍵詞：澤番椒屬；澤番椒；毛澤番椒；玄參科；台灣；分類學。