

研究報告

## 台灣植物誌新增之二種歸化植物

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【摘要】本文報導台灣兩種首次紀錄之歸化植物：加拿大柳穿魚 *Linaria canadensis* (L.) Dum. Cours. (車前草科)及水苣草 *Samolus valerandi* L. (報春花科)。柳穿魚屬 *Linaria* 及水苣草屬 *Samolus* 亦為台灣的新記錄屬。本文提供這些物種之形態描述，圖片，以及分類及生態學之註記。

【關鍵詞】加拿大柳穿魚、車前草科、報春花科、水苣草、歸化植物

Research paper

## Two new naturalized plants to the Flora of Taiwan

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【Abstract】Two naturalized plants, *Linaria canadensis* (L.) Dum. Cours. (Plantaginaceae) and *Samolus valerandi* L. (Primulaceae), were recently observed in Taiwan. These two genera are also new to the Flora of Taiwan. Descriptions and illustrations of these species, as well as notes on their taxonomy and ecology are provided.

【Key words】*Linaria canadensis*; Plantaginaceae; Primulaceae; *Samolus valerandi*; naturalized plant

### Introduction

Our recent field and herbaria investigation have led to the recognition of two naturalized species new to the Flora of Taiwan: *Linaria canadensis* (L.) Dum. Cours. (Plantaginaceae) and *Samolus valerandi* L. (Primulaceae). They are reported here with descriptions, illustrations, specimen lists, and notes on their taxonomy and ecology.

The genus *Linaria* comprises of about 150 species widely distributed in the northern

temperate zones (Fernández-Mazuecos et al. 2013) and is first recorded from Taiwan. *L. canadensis* is native to North America and Canada (Yatskievych 2013) and has naturalized in South America, Europe (Crawford & Elisens 2006), India (Karuppusamy & Ravichandran 2013), Japan (Shimizu et al. 2001) and China (Miao et al. 2012). It was recorded in Taiwan around the broad Yangmingshan region as early as 2012, presumably introduced along with

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agricultural materials or naturally propagated from neighboring countries.

The genus *Samolus* is also new to the Flora of Taiwan. It comprises of 12–15 species with a mainly Southern Hemisphere distribution (Jones et al. 2012), but also with 4–6 species restricted to North America and one almost cosmopolitan species *S. valerandi*, which is herein newly reported from Taiwan. It was recently recorded from several localities in lowland areas of Northern and Central Taiwan. Since *S.*

*valerandi* has long been introduced to Taiwan as an aquarium plant, its wild populations possibly originated from the escapes of cultivation.

Based on our field observations since 2012, both *Linaria canadensis* and *Samolus valerandi* are short-lived annuals in Taiwan, and their wild populations did not expand rapidly. Hence, we presume that both species have low potential to become invasive and pose a threat to native vegetation.

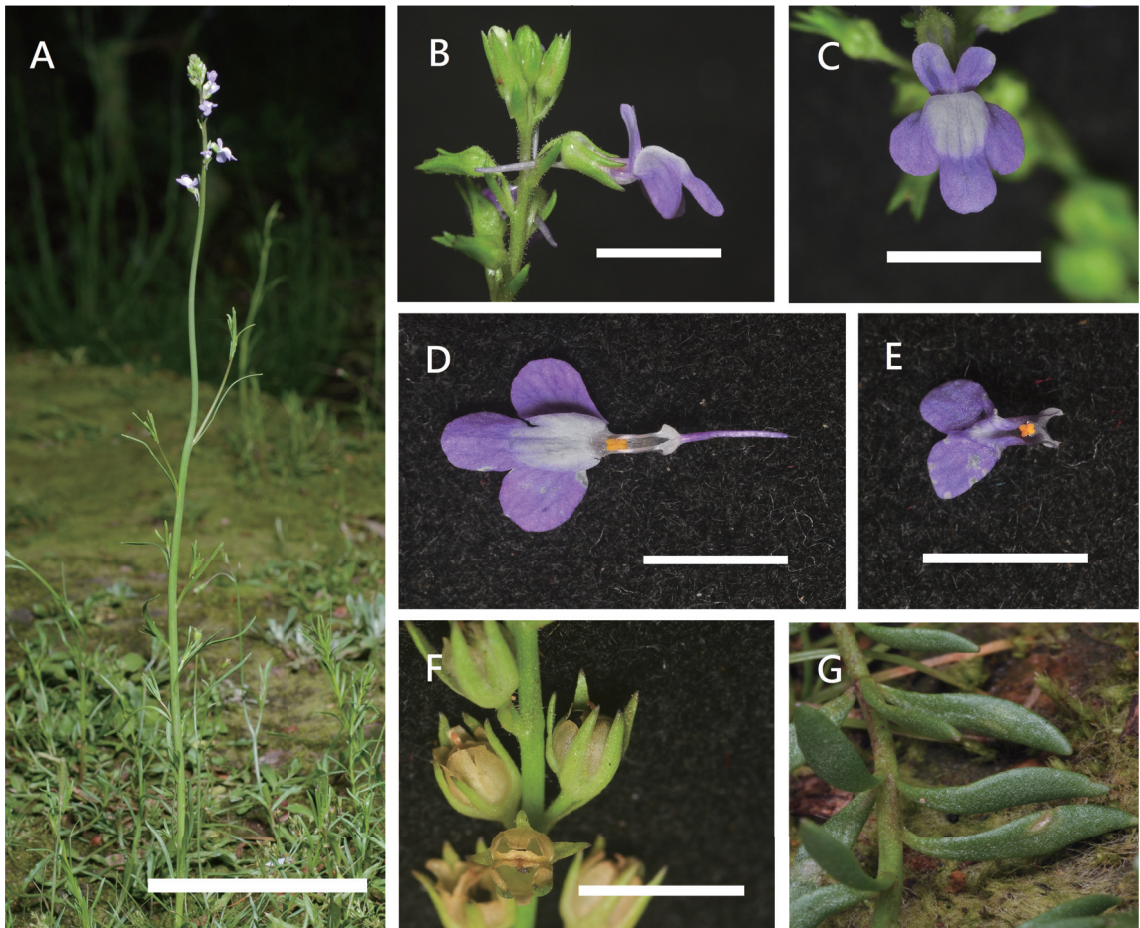


Figure 1. *Linaria canadensis* (L.) Dum. Cours. A. habitat B. inflorescence and flower (lateral view) C. flower D. lower lip E. upper lip F. mature capsules G. leaves. Scale bars: 10 cm in A, 5 mm in B–F. Photographed by Tian-Chuan Hsu (A, G) and Po-Hao Chen (B–F).

## Taxonomic Treatment

### 1. *Linaria canadensis* (L.) Dum. Cours., Bot.

Cult. 2: 96. 1802. ≡ *Antirrhinum canadense* L., Sp. Pl. 2: 618. 1753. ≡ *Nuttallanthus canadensis* (L.) D. A. Sutton, Revis. Antirrhineae 457. 1988. Figure 1.

**Type:** CANADA, *P. Kalm s.n.* [lectotype: LINN-767.69 image!, designated by Pennell (1919)].

**Morphology:** Stem erect, slender, glabrous, 40–70 cm tall. Leaves alternate, glabrous, linear, margin entire, 1.3–4.1 cm long, 1–2 mm wide, sessile. Raceme 20–70 flowered, terminate; pedicel 2.0–4.5 mm long; a linear bract at pedicel base, 2.0–2.5 mm long; calyx lobes 5, linear to lanceolate, 2.0–4.0 mm long, persistent; peduncle, bract and calyx covered with glandular hairs; corolla blue-violet, 2-lipped, bilaterally symmetrical; upper lip erect, 2-lobed, 2.2–2.6 × 3.5–4.0 mm; lower lip 3-lobed, 4.5–6.0 × 5.0–7.5 mm, a white spot at the lip base and as big as the lobes; corolla 1.1–1.2 cm long, including a purple and slender spur 3.5–4.0 mm long at base; throat of the corolla white, swollen; stamens 4, in 2 pairs, the shorter pair attached to the upper side of the throat, 1.0–1.2 mm long, the longer pair attached to the lower side, 2.0–2.5 mm long; ovary oval, 1 mm long; style 1, unlobed, persistent, 1 mm long. Capsule globular, ca. 2.5 × 3 mm, locules 2, each top split into 3 teeth when mature; seed black, numerous, 0.5 mm long.

**Chinese name:** 加拿大柳穿魚

**Distribution and ecology:** *Linaria canadensis* is native to North America and Canada and has naturalized in South America, Europe, India, Japan and China. It grows in open area such as riverbank, disturbed land and grassland, often in

sandy soil (Swink & Wilhelm 1994; Magee & Ahles 1999; Crawford et al. 2006; Yatskievych 2013; Beidleman & Kozloff 2014). In Taiwan, it was found in open grasslands and fallow fields. Flowering and fruiting were observed from March to May. Habits withered in early summer. It is weakly invasive, since it is annual, with short life span.

**Voucher specimens in Taiwan:** Taipei City: Beitou Dist., Chutzuhu, 500–700 m, 15 Mar 2012, *Hsu 5488* (TAIF); 22 Apr 2012, *Hsu 5629* (TAIF); Chutzuhu Road, 650 m, 25 Apr 2015, *Chung 12138* (TAIF); 15 Mar 2015, *Chung 12139* (TAIF); Shihlin Dist., Shuangxi Riverside, 20–30 m, 14 Apr 2015, *Chung 12924* (TAIF).

**Taxonomic remarks:** *Linaria canadensis* is easily distinguished from other native and naturalized species of Plantaginaceae in Taiwan by the combination of annual habits, small entire linear leaves, long erect racemes and purplish flowers with 1.1–1.2 cm long corollas and 3.5–4.0 mm long slender spurs. This species was often placed under the genus *Nuttallanthus* (Sutton 1988; Crawford & Elisens 2006; Miao et al. 2012). However, recent molecular data (Fernández-Mazuecos et al. 2013) did not support the separation of *Nuttallanthus* from *Linaria*.

### 2. *Samolus valerandi* L., Sp. Pl. 1: 171. 1753. Figure 2.

**Type:** “Herb. Clifford - 51, *Samolus* 1.” [lectotype: BM image!, designated by Ali (1976)]

**Morphology:** Stem erect, solitary or branching at the base, glabrous, 10–45 cm tall. Two types of leaves: larger basal form, and smaller stem form, both glabrous. Basal leaves obovate to oblong-obovate, base tapering to petiole and forming short wing, margin entire, 3.3–6.8 cm long, 0.8–1.5 cm wide. Stem leaves smaller, nearly sessile. Raceme



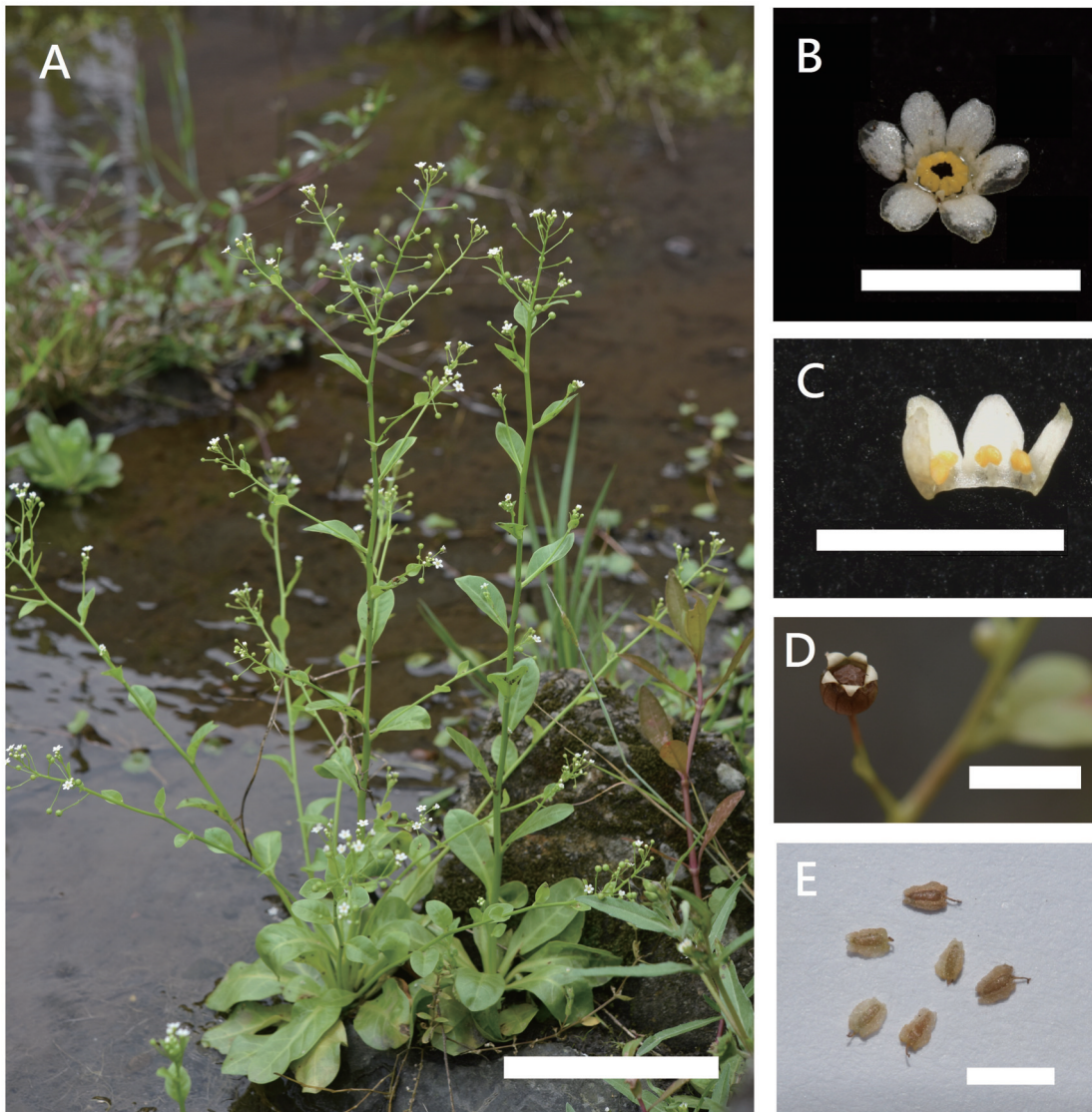


Figure 2. *Samolus valerandi* L. A. habitat B. flower C. corolla D. mature capsule E. seeds. Scale bars: 10 cm in A, 5 mm in B–D, 1 mm in E. Photographed by Shih-Wen Chung.

10–22-flowered, terminate or axillary, 6–22 cm long; pedicel 3–11 mm long, with a 1.5–2.5 mm long bract on it. Calyx campanulate, 1–2 mm long, with shallow lobes. Corolla white, 5–6 oblong lobes, each lobe 1.5 mm long and 1 mm wide; tube short, 1/3 long of the lobe. Capsule globose, 2–3 mm, split into 5 teeth on top in mature. Seeds

oblong, with irregular angled margin, brown, slightly tuberculate, 0.5 mm long.

**Chinese name:** 水苗草.

**Distribution and ecology:** *Samolus valerandi* is nearly worldwide distributed, including Europe, Australia, and Asia (Jones et al. 2012). *Samolus*

members have similar habitat that near lakes and salt marshes (Ståhl 2004). Similarly, *S. valerandi* often appears in calcareous or saline soils (Preston & Hill 1997; Preston et al. 2002), and near permanently wet environment, such as creek or river banks, and damp sand (Stanley & Ross 1986; Collette 1999). It is more cosmopolitan distributed than other *Samolus* species because it can serve as cultivated ornaments, vegetable and medicine, so human activity would help its dispersal (Jones et al. 2012). *S. valerandi* has naturalized in Northern and Central Taiwan, recorded in Pingxi Elementary School, New Taipei City; Chinese Culture University, Taipei City; and artificial pond of National Museum of Natural Science, Taichung City. It mainly grows around low altitude wetlands, river or stream banks. It flowers and fruits from April to August.

**Voucher specimens in Taiwan:** Ilan Co.: Yuanshan Township, Jhuangwei Township, Juangwoi, cultivated, 8 Apr 2001, *Lin 209* (TAIF); Yuanshan Township, Yuanshan, 50–100 m, 20 Aug 2014, *Hsu 7212* (TAIF); Pachia Road, 40–50 m, 16 Apr 2017, *Chung 12915* (TAIF). New Taipei City: Tamsui Dist., Tamkang Farm, 21 May 2012, *Tsai TSY355* (TAIF). Taichung City: Peitun Dist., 18 March 2010, *Ling s.n.* (TNM). Changhua Co.: Tienwei Township, 30 m, roadside of broadleaf forest, 11 June 2009, *Wang 13006* (TNM).

**Taxonomic remarks:** *Samolus valerandi* is easily distinguished from other herbaceous Primulaceae members in Taiwan by the combination of entire obovate rosette leaves and elongate racemes with laxly arranged, long pedicellate small white flowers. Wild populations in Taiwan also fall within the concept of *Samolus parviflorus* Raf. which was sometimes separated from *S. valerandi* (eg. Cholewa 2009) or treated as an infraspecific

taxon of the later (eg. Crusio 1981). However, recent systematic study (Jones et al. 2012) suggested accepting the broad-sensed *S. valerandi* including *S. parviflorus*.

## Acknowledgements

We thank the curators of HAST, PPI, TAI, TAIE, TAIF and TNM for herbaria access, and two reviewers for providing valuable comments.

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