

Research paper*Flaveria linearis* Lag. (Asteraceae), a Newly Naturalized Plant in TaiwanYen-Hsueh Tseng<sup>1</sup> Chien-Ti Chao<sup>1</sup> Ching-Yu Liou<sup>2,4</sup> and Ching-I Peng<sup>3</sup>

**【Abstract】** *Flaveria linearis* Lag. (Asteraceae), a shrub native to southern North America and Central America, has naturalized to the coast of Shengkang Hsiang, Changhua County, Taiwan. A taxonomic treatment, distribution and habitat, line drawings, color photographs and voucher specimens are provided to aid in identification of this alien plant. A detailed comparison between *F. linearis* and the closely related species, *F. bidentis* (L.) Kuntze, reported earlier as a naturalized species in Taiwan, is also provided.

**【Key words】** Asteraceae, *Flaveria bidentis*, *Flaveria linearis*, Taxonomy, Naturalized plant, Taiwan.

研究報告

## 臺灣新歸化菊科植物—線葉黃頂菊

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**【摘要】** 線葉黃頂菊 (*Flaveria linearis* Lag.) 原產北美洲南部及中美洲，近年來已歸化於台灣中部彰化縣伸港鄉沿海一帶。本文描述其形態特徵、地理分布及生育地環境，並提供彩色圖片、線繪圖與引證標本以資辨識，此外亦列表與先前已歸化本地的黃頂菊 (*F. bidentis* (L.) Kuntze) 作比較。作者等於1999年即已發現線葉黃頂菊族群，2010年及2011年再進行調查時發現其野外族群穩定成長。

**【關鍵詞】** 菊科、線葉黃頂菊、黃頂菊、分類、歸化植物、臺灣

**INTRODUCTION**

In recent years, many naturalized species of Asteraceae were reported in Taiwan (Tseng & Peng, 2004; Wu *et al.*, 2005; Hsu *et al.*, 2006; Yang & Hsieh, 2006; Chung *et al.*, 2008; Tseng

*et al.*, 2008a, b, c; Chung *et al.*, 2009; Jung *et al.*, 2009ab; Jung and Chung, 2010; Jung *et al.*, 2010; Wang and Chen, 2010; Wu *et al.*, 2010; Jung *et al.*, 2011). The genus *Flaveria* (Asteraceae) comprises 21 species native to North America

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and Mexico, with some members introduced to South America, Asia (India), Africa and Australia (Powell, 1978). Plants of *Flaveria* are frequently found in alkaline, saline, and gypseous soils, often in disturbed and moist areas. In the United States, *F. linearis*, can be found in disturbed areas, hammocks, pinelands, beaches and roadsides in coastal south and central Florida. The plant often grows in marshy areas, in saline and alkaline soils. It tolerates brackish water and even occasional inundation of salt water (Cronquist, 1980). The genus *Flaveria* was not previously recorded in Flora of Taiwan, 2<sup>nd</sup> ed. (Peng *et al.*, 1998). We reported the naturalization of *F. bidentis* (L.) Kuntze in southern seaside (Tseng *et al.*, 2008), in this paper we reported *F. linearis* as the second naturalized species of *Flaveria* on this island.

## TAXONOMIC TREATMENT

*Flaveria linearis* Lag. Gen. Sp. Pl. [Lagasca] 83, n. 407. 1816.

*Flaveria* × *latifolia* (J. R. Johnst.) R. W. Long & Rhamst. Brittonia 20: 249. 1968.

線葉黃頂菊 Figs. 1. 2. & 3.

Perennial herbs, 30-100 cm. Stems erect, glabrous; leaves sessile, blades linear, 5-13×0.4-0.8 cm, opposite, margins entire or serrate. Heads in clusters, 1-several-flowered, usually sessile. Calyculi of 1-3 linear bractlets 1-2.5 mm long. Involucres oblong-angular, 3-5 mm long. Phyllaries 5, linear or oblong, receptacle small, naked or setose. Ray floret 1, pistillate, fertile; corolla yellow, oval to obovate-spatulate, 2-3 mm long. Disc florets 5-7; corolla tube yellow, 0.8-1.2 mm, the limb, 1-1.5 mm long, 5-toothed; anthers entire at the base; style-branches of the disk-flowers truncate. Achenes oblong or linear-oblong, 1.2-1.8 mm long, 8-10 ribbed; pappus none.

Somatic chromosome number,  $2n = 36$ . (Powell, 1978).

**Specimens examined:** Taiwan. Changhua County (彰化縣). Shengkang Hsiang (伸港鄉), elev. ca. 5 m, at open grasslands near seashore at mouth of Datu River, 16 Sep. 1999, Tseng 2285 (TCF); same loc., 28 Sep. 2010, Tseng 5082 (TCF); same loc., 12 Nov. 2011, Tseng 5306 (TCF).

**Distributions and Habitats:** *Flaveria linearis* Lag. is native to North America (Florida), Mexico and West Indies (Bahamas, Belize and Cuba) (Powell, 1978). Recently, it has naturalized open grasslands, forming large populations at sea level ca. 5 m near seashore in Changhua County, west central Taiwan (Fig. 4.). It flowers and sets fruits profusely in summer and autumn. We first witnessed a large colony of *F. linearis* in 1999. During our field survey in 2010 and 2011 we found that the wild populations of *F. linearis* have been adapted stably to the southern coast at estuary of Datu River.

**Notes:** *Flaveria linearis* closely resembles *Flaveria bidentis* (L.) Kuntze, but is distinct in being a perennial with sessile, linear leaves, 5 phyllaries, corolla tubes 0.8-1.2 mm long (vs. annual with subsessile, lanceolate - elliptic leaves, 3 phyllaries, and corolla tubes 0.4-0.8 mm long) (Table 1.). Heads in scorpioid clusters of *Flaveria* are unique in Asteraceae. The narrow, linear leaves in this species are diagnostic in the genus *Flaveria*. The new naturalized environments are very similar to native habitats, in disturbed areas, at beaches and roadsides in coastal areas (Cronquist, 1980). We suspect that this weed will spread from Changhua coast to other seashores in western Taiwan.

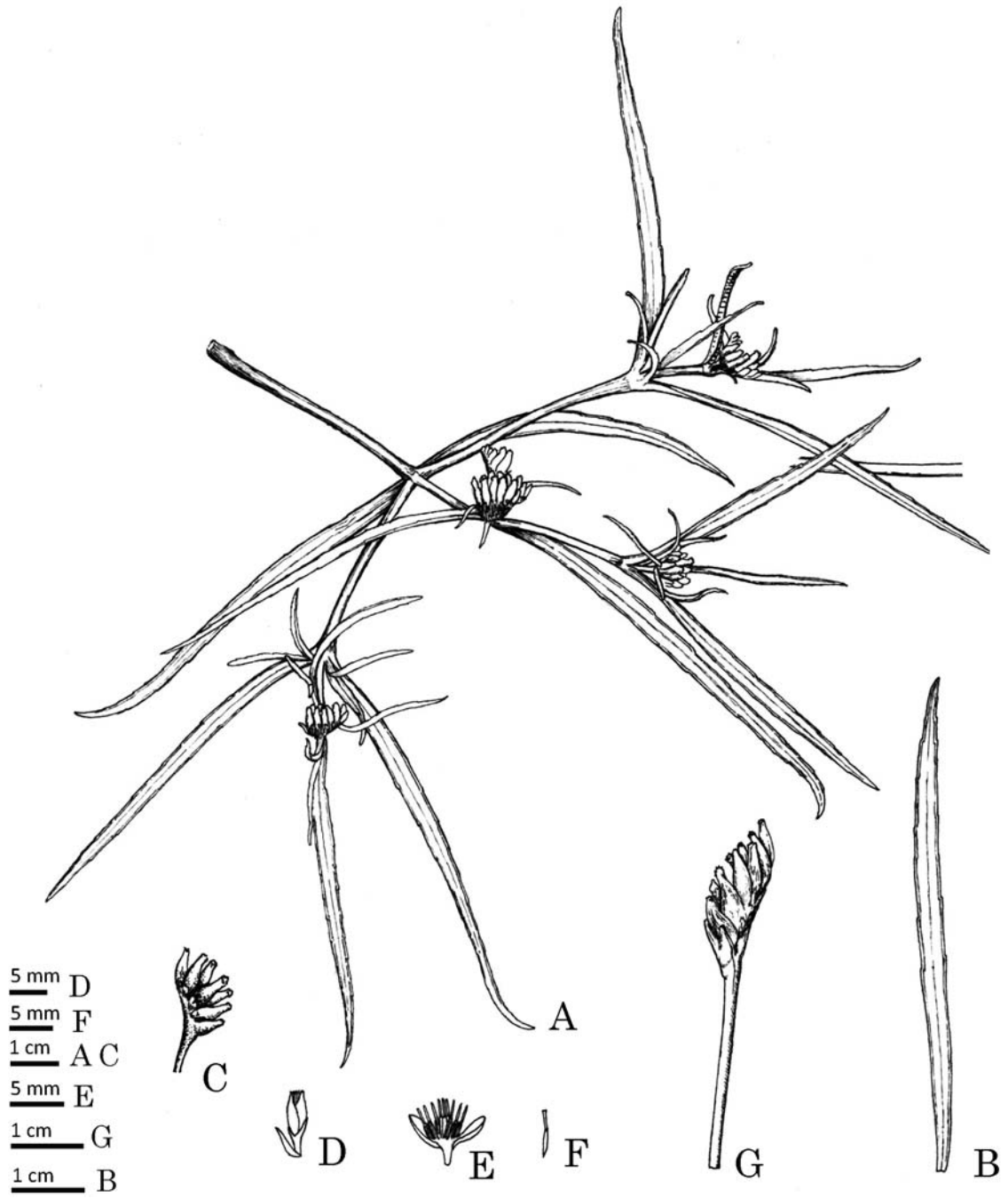


Fig. 1. *Flaveria linearis* Lag. A. Habit B. Leaf C. Inflorescence D. Single head E. Head F. Single floret G. Infructescence.

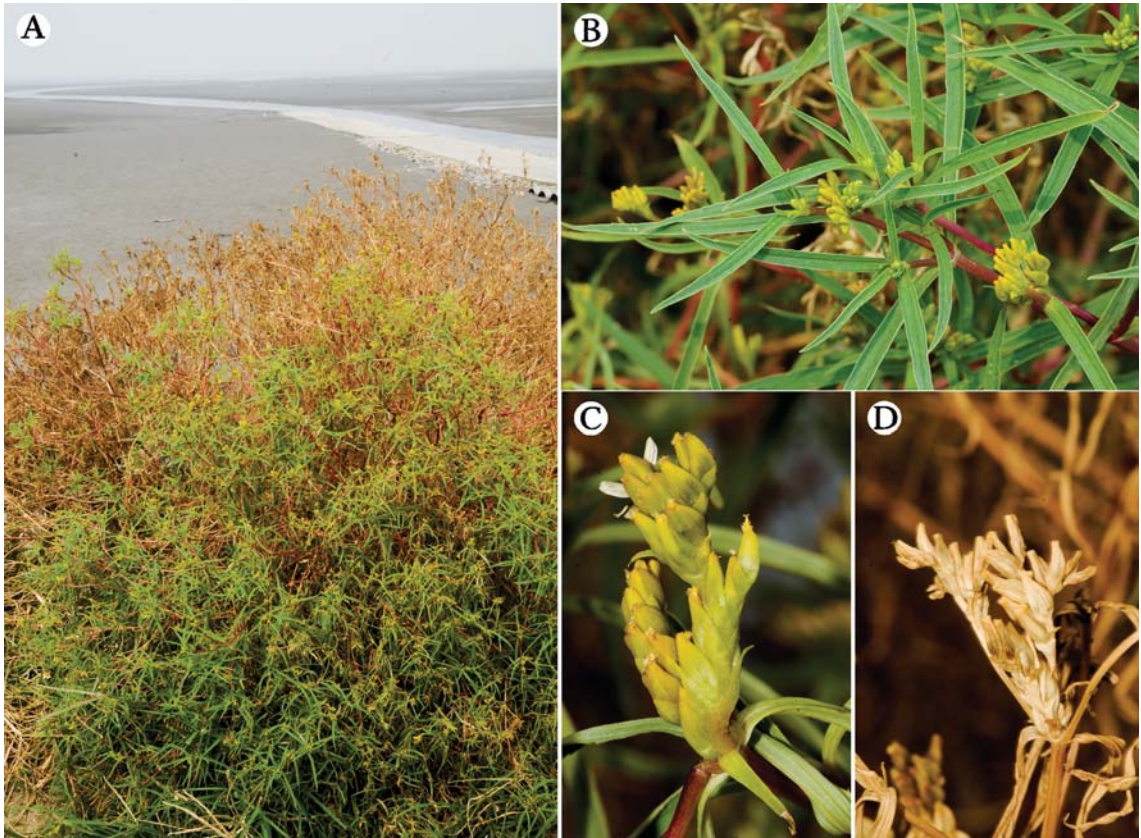


Fig. 2. *Flaveria linearis* Lag. A. Habitat B. Habit C. Inflorescences D. Infructescence.

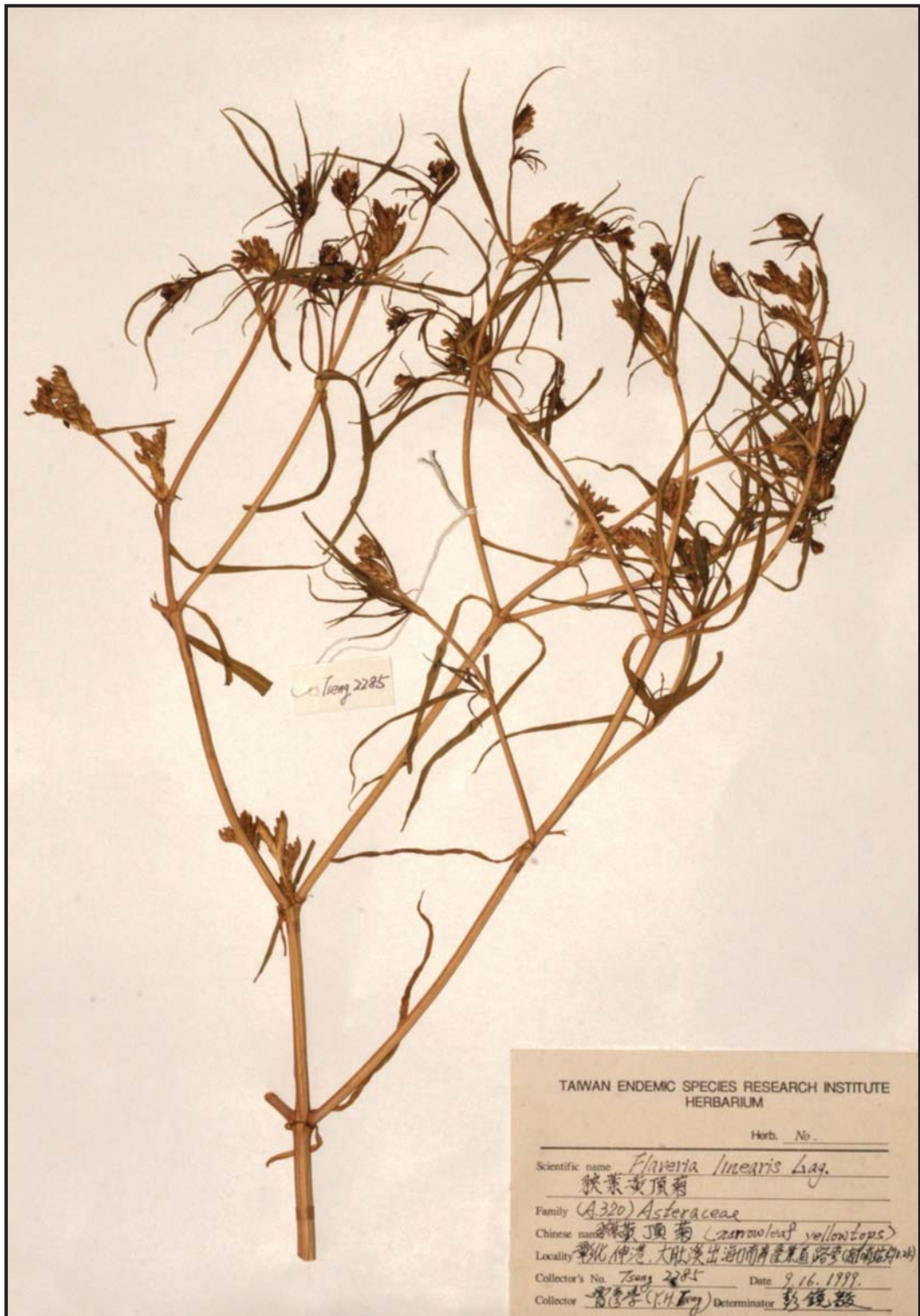
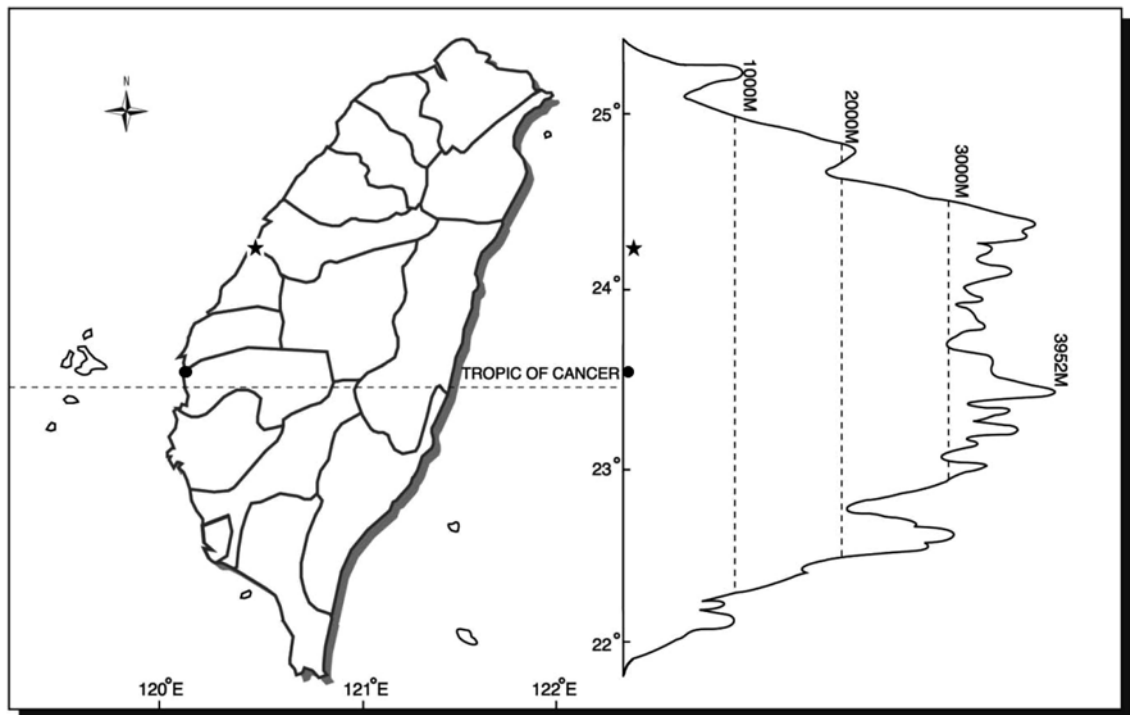


Fig. 3. Voucher specimen of *Flaveria linearis* Lag. (Tseng 2285, TCF).

Table 1. Comparison of *Flaveria linearis* Lag. and *Flaveria bidentis* (L.) Kuntze

	<i>Flaveria linearis</i>	<i>Flaveria bidentis</i>
Habit	perennial	annual
Leaves		
Petiole	sessile	subsessile
Blades	linear 5-13×0.4-0.8 cm	lanceolate - elliptic 5-12×1.2-2.5cm
Phyllaries	5	3
Corolla tubes	0.8-1.2mm	0.4-0.8mm

Fig. 4. Distribution of *Flaveria linearis* (★) and *F. bidentis*(●) in Taiwan**LITERATURE CITED**

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