

Research paper

## *Gibasis pellucida* (Martens & Galeotti) D.R. Hunt (Commelinaceae), A Newly Naturalized Plant in Taiwan

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**【Abstract】** Commelinaceae is a monocot family mainly distributed in tropical and temperate region. Several naturalized species were recorded in Taiwan these years. Recently we found a newly naturalized species-*Gibasis pellucida* (Martens & Galeotti) D.R. Hunt in Northern Taiwan. This species was native to Mexico, and introduced as ornamental plant in many countries. This is a newly naturalized species and genus for Flora of Taiwan. Line drawing, photos and distribution map were provided in this study. Finally, we revised naturalized species of Commelinaceae in Taiwan, the naturalization of them were related to ornamental activity, some species had set up large population already, especially the *Tradescantia* species. Thus we need pay more attention to these potentially invasive plants.

**【Key words】** *Gibasis pellucida*, Commelinaceae, naturalized plant, Taiwan

研究報告

## 臺灣產鴨跖草科一新馴化植物－細梗鴨跖草

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**【摘要】** 鴨跖草科為熱帶常見的單子葉草本植物，之前多位學者已相繼報導數種本科的馴化植物。最近作者等又於臺灣北部發現一種新馴化植物，經查為原產於墨西哥之細梗鴨跖草。本種為一園藝觀賞植物，無性繁殖容易且適應力強，推測是人為引進而逸出於野外。根據這幾年野外的調查發現其野外族群數量有穩定成長，未來動態值得注意。對台灣的植物誌而言，細梗鴨跖草屬與細梗鴨跖草均為本島的新記錄。

**【關鍵詞】** 鴨跖草科、細梗鴨跖草、馴化植物、臺灣

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## Introduction

Commelinaceae is a monocot family with 40 genera and ca. 650 species distributed in tropical and temperate region, eight genera and 19 species were recorded in Flora of Taiwan (Wang *et al.*, 2000). Several naturalized species were reported in Taiwan, such as *Tradescantia fluminensis* Vell. (Yang *et al.*, 2008), *Callisia fragrans* (Lindl.) Woodson (Wang and Chen, 2008) and *C. repens*

(Jacq.) L. (Tseng *et al.*, 2010). *Gibasis* Raf. comprising 11 species, distributed mainly in neotropical, centered in Mexico (Rosen and Feden, 2005; Hunt, 1986). Recently, we found a new naturalized species, *G. pellucida* (Martens & Galeotti) D.R. Hunt, in northern Taiwan. This is a newly record genus and species for Flora of Taiwan.

## Key to Commelinaceae genus in Taiwan

1. Flowers with staminodes
  2. Petals dimorphic, lateral ones bigger
    3. Leaves petiole; flowers white ..... *Rhopalephora*
    3. Leaves sessile or subsessile; flowers blue ..... *Commelina*
  2. Petals subequal
    4. Stem procumbent; leaves sessile..... *Murdannia*
    4. Stem erect; leaves petiolate..... *Pollia*
1. Flowers without staminodes
  5. Flowers zygomorphic..... *Floscopa*
  5. Flowers actinomorphic
    6. Inflorescences rupturing leaf sheaths..... *Amischotolype*
    6. Inflorescences not rupturing leaf sheaths
      7. Flowers with bracts and bracteoles
        8. Bracts and bracteoles isophenous ..... *Belosynapsis*
        8. Bracts and bracteoles dimorphic
          9. Petals free, rarely connate below ..... *Tradescantia*
          9. Petals connate below, formed a tube..... *Cyanotis*
      7. Flowers without bracts, bracteoles persistent
        10. Cymes sessile ..... *Callisia*
        10. Cymes pedunculate ..... *Gibasis*

## Taxonomy treatment

*Gibasis* Raf., Flora Telluriana 2: 136, 1836.

細梗鴨跖草屬 (新擬)

Herbs, perennial or annual. Roots fibrous (tuberous). Leaves 2-ranked; blade sessile. Inflorescences terminal, and sometimes axillary, pairs or umbels of cymes, cymes pedunculate, axis sharply angled at junction with peduncle; spatheaceous bract absent; bracteoles persistent. Flowers bisexual, radically symmetric; pedicels well developed; sepals distinct, subequal; petals distinct, white (to pink or blue), equal; stamens 6, all fertile, equal; filaments bearded; ovary 3-locular, ovules 2 per locule, 1-seriate. Capsules

3-valved, 3-locular. Seeds 2 per locule; hilum elongate-punctiform to linear; embryotega abaxial.  $x = 4, 5, 6, 8$  (Faden, 2000; Hunt, 1986)

Eleven species, mainly distributed in Mexico, some species extent to Cuba (*G. geniculata* and *G. pauciflora*), West Indies, Brazil and N Argentina (*G. geniculata*).

The newly record genus *Gibasis* is very similar to *Callisia* in some morphology aspect, such as sessile leaves, bisexual flowers, and without spathaceous bracts, but the inflorescences in *Gibasis* is pedunculate and sessile in *Callisia*. According to tuber present or not, leaf shape and chromosome number and size, *Gibasis* was divided into 2 sections (Hunt, 1986), sect. *Heterobasis* and sect. *Gibasis*, the species found in Taiwan was belongs to the later one.

***Gibasis pellucida*** (Martens & Galeotti) D. R. Hunt in Kew Bulletin 38: 132, 1983.

細梗鴨跖草 (新擬) (fig. 1, 2)

***Tradescantia pellucida*** Martens & Galeotti in Bull. Acad. Brux. 2: 376, 1842.

*Tradescantia schiedeana* Kunth, Enum. Pl. 4: 90, 1843.

*Tradescantia geniculata* Jacq. var. *schiedeana* (Kunth) C. B. Clerke in DC., Monogr. Phan. 3: 301, 1881.

*Gibasis schiedeana* (Kunth) D. R. Hunt in Curtis's Bot. Mag. 179(2): pl. 636, 1972.

*Tradescantia geniculata* Jacq. var. *botterii* C. B. Clerke, in DC., Monogr. Phan. 3: 301, 1881.

*Tradescantia lundelii* Standley in Publ. Field. Mus. Nat. Hist. Chicago, Bot. ser. 22: 5, 1940.

*Tripogandra lundelii* (Standley) Woodson in Ann Missouri Bot. Gard. 29: 153, 1942.

Perennial herbs, stem creeping or ascending, 1-row pubescent along leaf sheath conjunction part. Leaves simple, alternate, distichous, lanceolate-oblong, base oblique, apex acute, 2-3 cm long, ca. 1 cm wide, adaxial surface dark-green, glabrous, abaxial surface purple, very sparsely pubescent; sheaths fleshy, conjunction part pilose. Inflorescences cyme, pairs into compound inflorescence, peduncle 1-2 cm, bract linear, pilose. Flowers bisexual, sepals 3, keeled, 2.5-3 mm long, green, glabrous; petals 3, subequal, wide-rhomboid, white. Stamen 6, filaments bearded at base and middle part; anthers yellow, longitudinal dehiscent. Ovary superior, 3-loculed.

$2n=10, 16$  (Hunt, 1986)

Native to Mexico, naturalized in Southern America, found in Northern Taiwan. Often in moist slope under forest.

Specimen examined: Taiwan, Taipei city (台北市), Yangmingshan National Park, Ertzuping (二子坪), 8 May 2010, *Chao* 1590 (TCF), same loc., 12 May 2013, *Chao* 2901 (TCF).

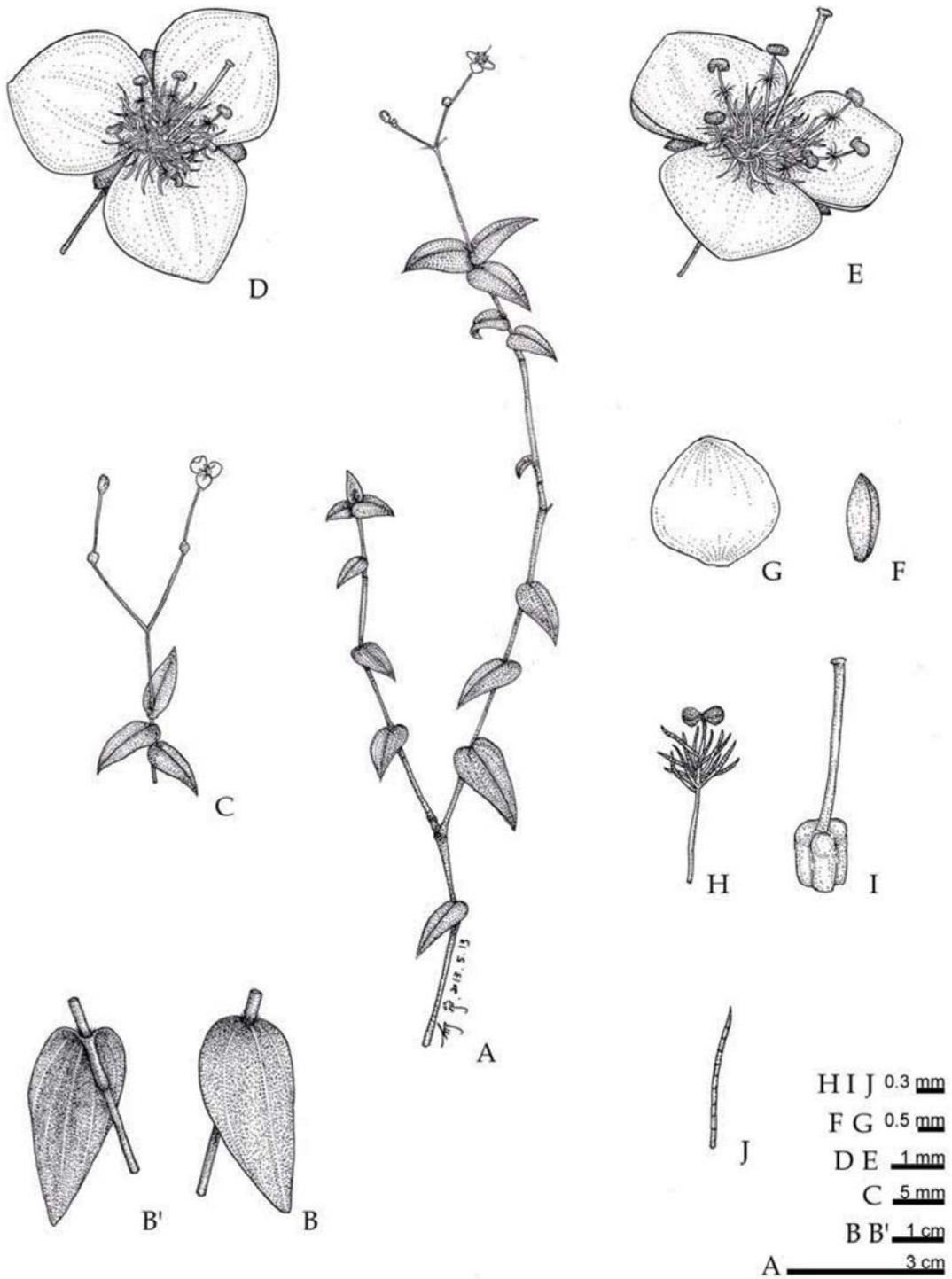


Figure 1. *Gibasis pellucida* (Martens & Galeotti) D. R. Hunt. A. Habit B. Leaves adaxial surface B' Leaves abaxial surface C. Inflorescences D. Flowers E. Flowers side view F. Sepal G. Petal H. Stamens I. Pistils J. Hair at the base of the stamen.

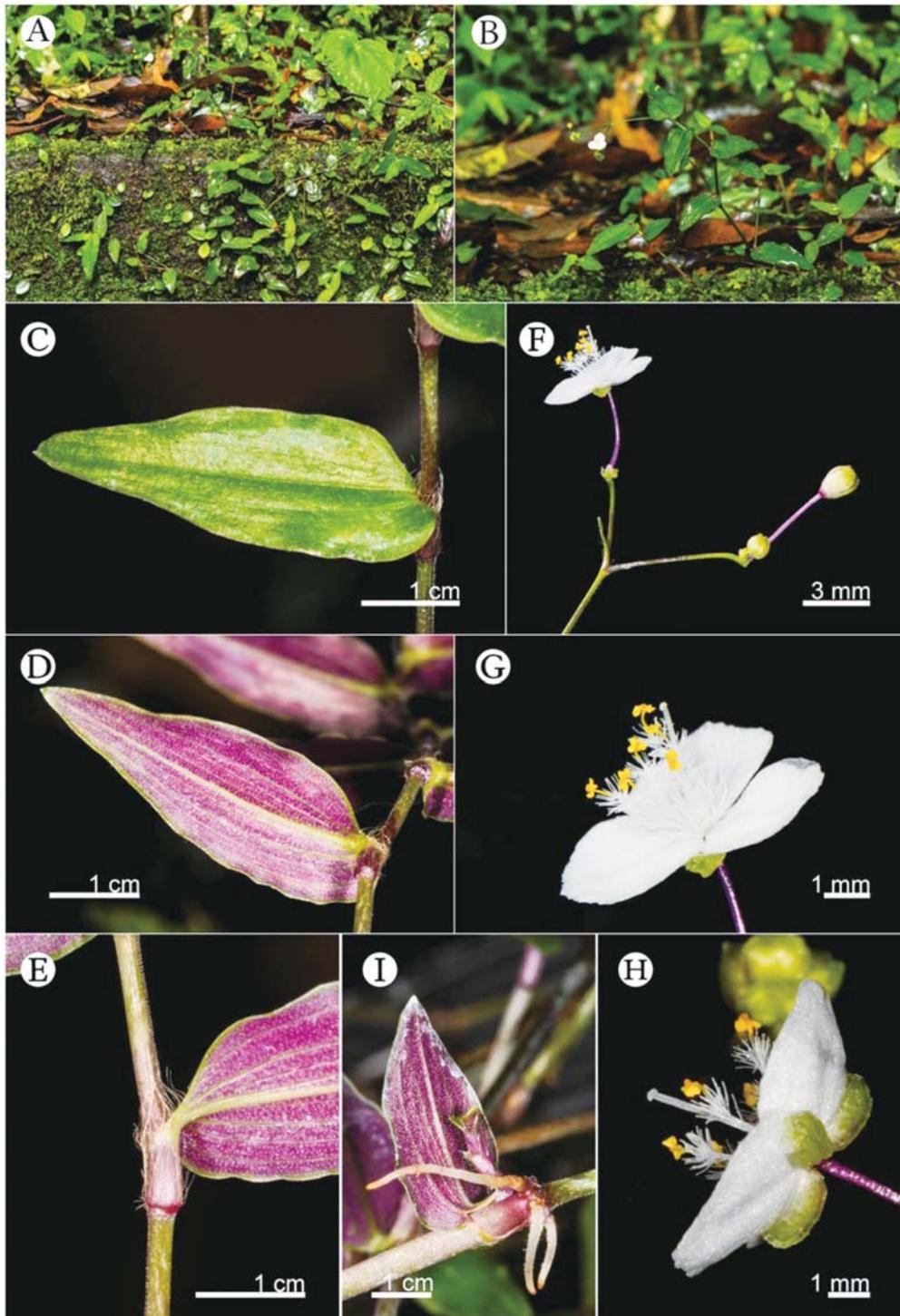


Figure 2. *Gibasis pellucida* (Martens & Galeotti) D. R. Hunt. A. Habitat B. Habit C. Leaves adaxial surface D. Leaves abaxial surface E. Sheaths F. Inflorescences G. Flowers H. Flowers side view I. Adventitious roots

## Distribution and Ecology

*Gibasis pellucida* was native to Mexico, which was occurred as a weed in citrus groves in North America (Rosen and Faden, 2005), and also reported as naturalized plant in Texas (Rosen and Faden, 2005). Recently we found this species naturalized in northern Taiwan (fig. 3), occurred on the moist slope under forest, at trail side, the elevation ca. 800 m. According to our observation and other information, the population is stable during 2010 to 2013, and we don't find any cultivation nearby, thus we confirmed this is a newly naturalized species. This species were cultivated as ornamental plant, the cultivated population need to be more cautioned in the future.

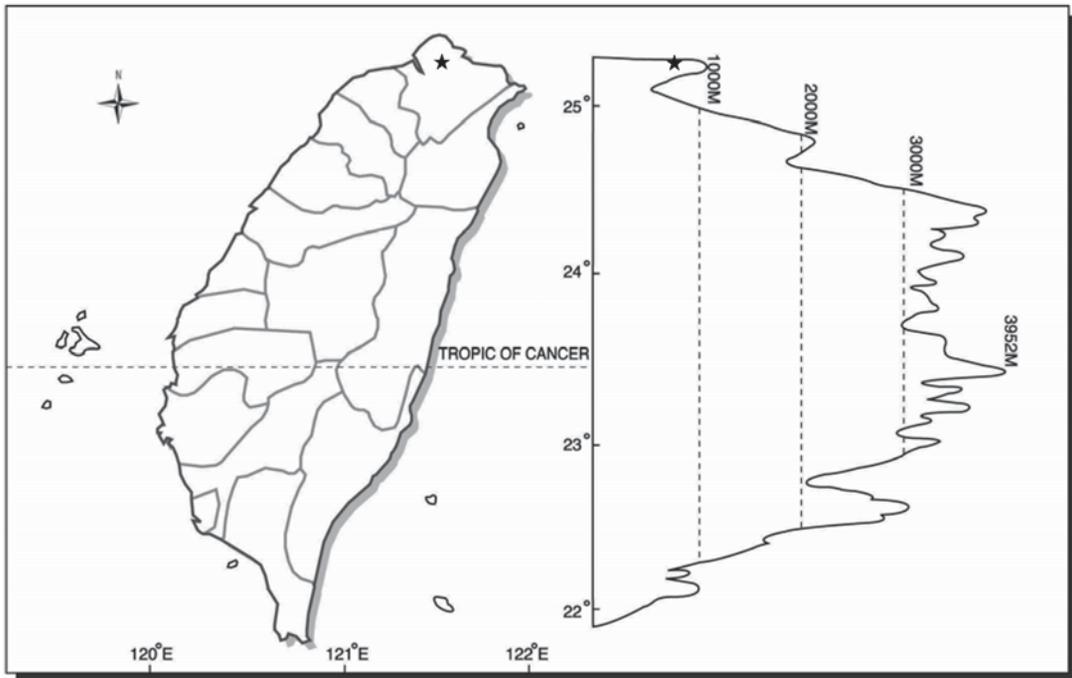


Figure 3. Distribution map of *Gibasis pellucida* (Martens & Galeotti) D. R. Hunt in Taiwan.

### Discussion and revision of Commelinaceae naturalized species in Taiwan

When we revised the naturalized species of Commelinaceae in Taiwan, we found all of them were ornamental cultivar (Table 1). This revealed the possible naturalized way of this family was through ornamental introduction and escape from grown one. Among the species listed here, *Tradescantia pallida* (Rose) D.R. Hunt and *T. zebrina* Heynh. ex Bosse had no formal reports discussing their current naturalized situation, only some reports listed them as ornamental species (Yang *et al.*, 2008) or listed as alien species but without any description and distribution information (Wu *et al.*, 2010, as *Setcreasea purpurea*), but in many place we saw large populations had already set. The other species *T. fluminensis* Veil. is an invasive plant in New Zealand (Standish, 2001), with some population control methods had been applied or proposed. In Taiwan this species had already set up very large populations, but there is no any control method had been applied.

Table 1. Commelinaceae species naturalized in Taiwan

Species	Origin	Reference in Taiwan	Distribution in Taiwan	Naturalized	Utility
<i>Callisia fragrans</i>	Mexico	Wang and Chen, 2008	1,100-1,200 m in central Taiwan	Hawaii (Staples <i>et al.</i> , 2000)	Ornamental plant
<i>C. repens</i>	Southern North America to Argentina	Tseng <i>et al.</i> , 2011	low land to 1,500 m mountain area	Hong Kong (Hong and DeFilipps, 2000)	Ornamental plant
<i>Gibasis pellucida</i>	Mexico	present study	Northern Taiwan	Texas (North America) (Rosen and Faden, 005)	Ornamental plant
<i>Tradescantia fluminensis</i>	Brazil-Argentina	Yang <i>et al.</i> , 2008	50-1,200 m in northern and central Taiwan	New Zealand (Standish, 2000)	Ornamental
<i>T. pallida</i>	Mexico	Wu <i>et al.</i> , 2010*	low to medium altitude area**	No record	Ornamental plant
<i>T. zebrina</i>	Tropical America	Wu <i>et al.</i> , 2010*	low to medium altitude area**	Hong Kong (Hong and DeFilipps, 2000) Hawaii (Staples <i>et al.</i> , 2000)	Ornamental plant

\* list only

\*\*authors' observation

Compared to the *Tradescantia* species, the *Callisia* species seems had different distribution type. *C. repens* is an ornamental plant introduced for long time (Tseng *et al.*, 2010), with the most naturalized localities found in the urban or people activity area, and is often found on the roof, rock fence, overbridges or other architecture surface. *C. fragrans* was only found in few places in central Taiwan (Wang and Chen, 2008), without population information, but we need pay attention to this species as its habitat near nature forest.

Key and discussion to the Commelinaceae naturalized species in Taiwan

- 1. Leaves purple; flowers purple
  - 2. Leaves without silver strips ..... *Tradescantia pallida*
  - 2. Leaves with silver strips..... *T. zebrina*
- 1. Leaves green; flowers white
  - 3. Leaves 15-30 cm long, lanceolate to oblong ..... *Callisia fragrans*
  - 3. Leaves 1-5 cm long, ovate to lanceolate
    - 4. Flowers big, 1-3 cm in diam. .... *T. fluminensis*
    - 4. Flowers small, ca. 1 cm in diam.
      - 5. Leaves abaxial surface green; inflorescence sessile and axillary ..... *C. repens*
      - 5. Leaves abaxial surface purple; inflorescence peduncle slender and terminal..... *Gibasis pellucida*

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