

A newly invaded insect pest *Liriomyza trifolii* (Diptera: Agromyzidae) in Taiwan¹

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Abstract: *Liriomyza trifolii* (Burgess) was first found in Taiwan in Feb. 1988. High leafminer populations and serious leaf damage were observed in gerbera fields. Characteristics of this species was described, an comparison of the species with *L. bryoniae* and a key to the species of *Liriomyza* of Taiwan were made.

There were eight species of genus *Liriomyza* recorded from Taiwan: *L. brassicae* (Riley), *L. cepae* (Hering), *L. compositella* Spencer, *L. subpusilla* (Malloch), *L. yaosumatsui* Sasakawa (Sasakawa, 1972), *L. chinensis* (Kato), *L. viticola* (Sasakawa) (Sasakawa & Fan, 1985) and *L. bryoniae* (Kaltenbach) (H. S. Lee, 1988, personal communication). Among these species, *L. bryoniae* was the most common and wide spread one. Usually it causes leaf damage on melons, mustards, garden peas, gypsophila and many other horticultural crops. Our previous survey showed that *L. bryoniae* was the only leafminer on gerbera. It was found in low populations and the damage was neglectable.

In February 1988, a distinct type of leafminer was found by authors on gerbera (*Gerbera jamesonii* Bolus.) at Da-Kan of Taichung area. Leaves of gerbera in this field were seriously damaged (Fig. 1). This leafminer could not be efficiently controlled by farmers' weekly sprays of highly toxic insecticides such as furadan, tamaron, azodrin, dimethoate, and all kinds of pyrethroids. It is evident that this species is not the same

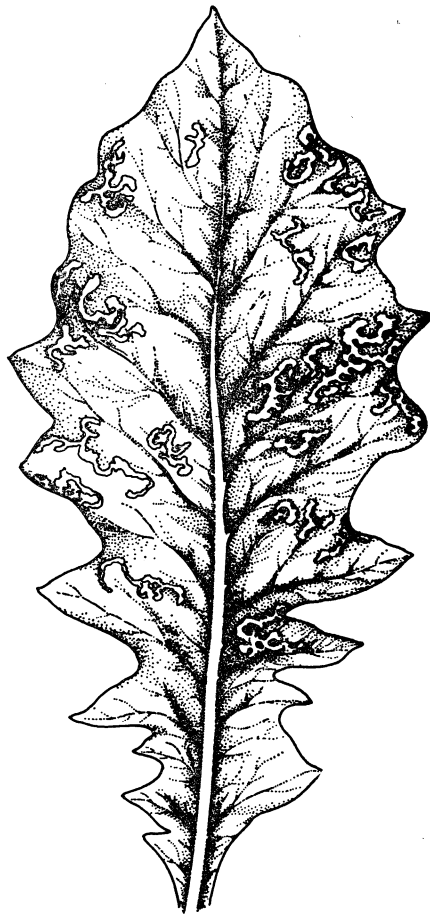


Figure 1. Leaf of gerbera damaged by *Liriomyza trifolii*.

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with *L. bryoniae*.

A comparison of the morphological characteristics of this species with *L. bryoniae* was made and results showed that they are quite different. (Table 1).

Specimen of this leafminer were sent to Mr. M. van de Vrie at Floriculture Research Station in the Netherlands and Dr. M. Sasakawa at Kyoto University in Japan for ide-

Table 1. Comparison of *Liriomyza trifolii* with *L. bryoniae*

Growth Stage	Characteristics	
	<i>L. bryoniae</i>	<i>L. trifolii</i>
Larva:	<ol style="list-style-type: none"> 1. body yellow anteriorly and white posteriorly. 2. a flat area between the 1st and the 2nd teeth (Fig. 2a). 3. seven to twelve pores on spiracle (Fig. 2b) 	<ol style="list-style-type: none"> 1. same color in the body. 2. the 1st and the 2nd teeth closely connected (Fig. 3a). 3. three pores on spiracle (Fig. 3b).
Pupa:	gold-yellow or darkbrown black.	yellowish brown.
Adult:	<ol style="list-style-type: none"> 1. length of M_{1+2} vein of discal cell about three times of m-m vein (Fig. 2c). 2. yellow strips on abdomen tergites with even margins (Fig. 2d). 	<ol style="list-style-type: none"> 1. length of M_{1+2} vein of discal cell about twice of m-m vein (Fig. 3c). 2. yellow strips on abdomen with central point protruding ahead (Fig. 3d).

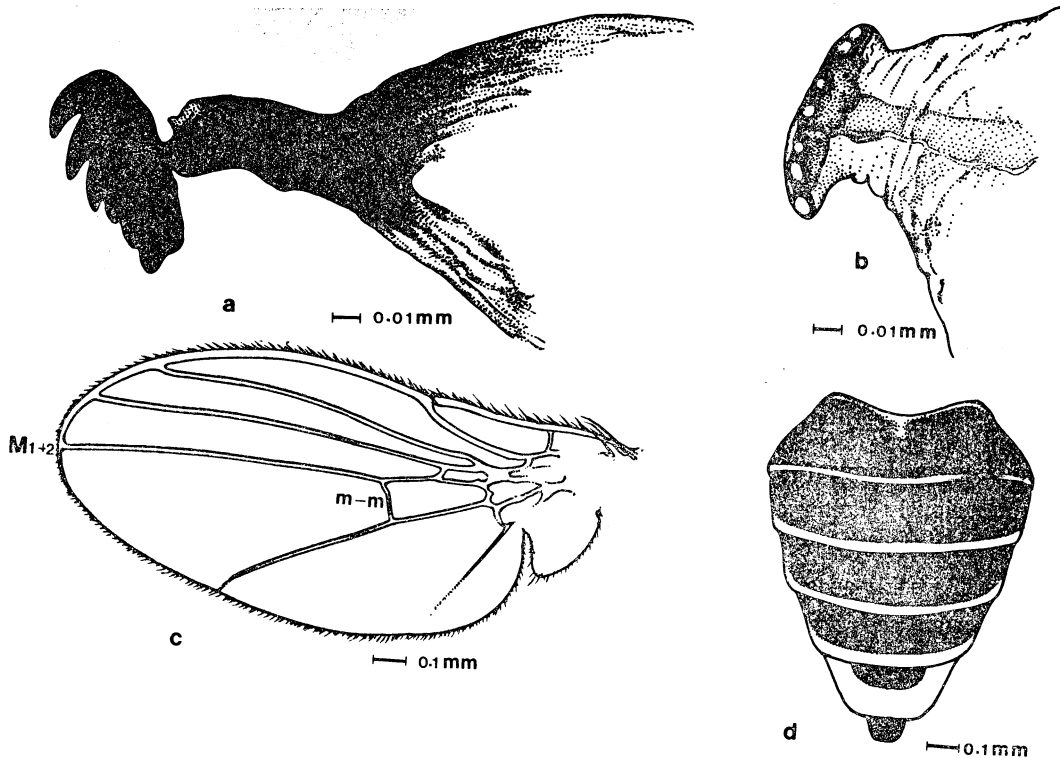


Figure 2. *Liriomyza bryoniae*: a, mouth hook of larva; b, posterior spiracle of larva; c, wing; d, dorsal view of abdomen.

ntification. They both confirmed the authors suspect that it was *L. trifolii* (Burgess).

A provincial survey (under the sponsor of the Provincial Department of Agriculture and Forestry) on the occurrence of *L. trifolii* on gerbera, chrysanthemum, leguminous and cucurbitaceous crops was conducted in June, 1988. Our preliminary results showed that this leafminer occurred only in central Taiwan at several gerbera fields. It is likely that *L. trifolii* is invaded into Taiwan along with the import of gerbera seedlings from the Netherlands or other countries.

L. trifolii is an important pest on ornamental and vegetable crops, and has been reported in at least 40 countries (Minkenberg, 1988). Very large populations were frequently present and heavy infestations usually cause destroying of leaves which may cause reductions in crop value or yield (Spencer, 1973). Its distribution has expanded rapidly in the past ten years than ever. The frequent trading of plant products and seedlings among various areas and the development of insecticide-resistance of *L. trifolii* are usually considered the reasons of its rapid spread (Minkenberg & Lentern, 1986).

The taxonomic characteristics of *L. trifolii* was described as following:

Oscinis trifolii Burgess, 1880. Rep. U. S. Agr. 1879 : 200-201.

Liriomyza trifolii de Meijere, 1925. Tijdschr. Ent. 68 : 195-293.

Liriomyza alliavora Frick, 1955. J. Kansas Ent. Soc. 28(3) : 88-92.

Adult: Orbits entirely yellow, both vertical bristles on yellow ground; all antennal

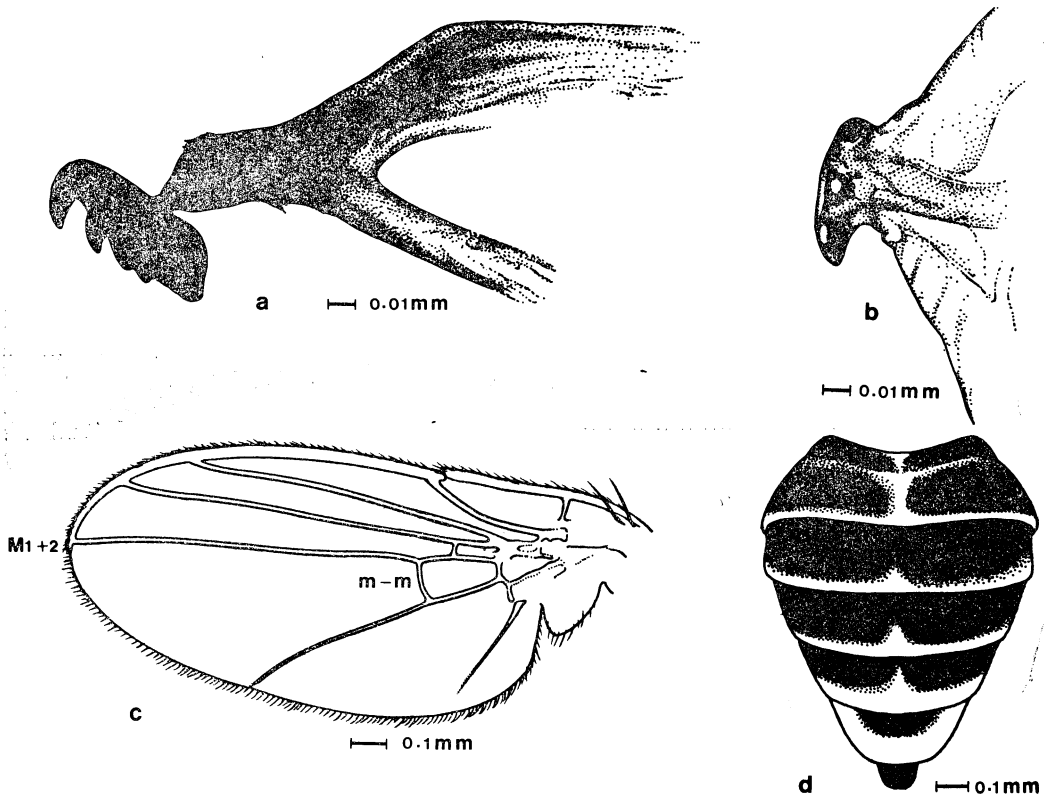


Figure 3. *Liriomyza trifolii*: a, mouth hook of larva; b, posterior spiracle of larva; c, wing; d, dorsal view of abdomen.

segments bright yellow, third with inconspicuous pubescence; mesonotum blackish gray, distinctly mat, acrostichals in three or four rows in front, reduced to two rows behind, yellow patch at each hind corner adjoining scutellum; mesopleura with black patch extending along lower margin; abdomen with tergites variably yellow laterally and on hind margins. legs: coxae yellow, femora largely so but with slight, variable brownish striation; tibiae and tarsi darker, brown, wing length from 1.25mm in male to 1.9mm in female, discal cell small, last section of vein M_{3+4} three times length of penultimate. Early stages: Egg oval, ca. 0.2×0.1 mm, originally transparent and later turns creamy. Larva initially colorless, darkens to yellow as it matures. Three instars. Posterior spiracles each with three pores, the outer two elongate; mouth hook with four teeth, the first one more separated from the others. Puparium yellowish-brown.

In order to identify the various leafminers of *Liriomyza*, a key was made:

Key to species of *Liriomyza* of Taiwan

1. Mesonotum with yellow semicircular area adjoining scutellum.....*subpusilla* (Malloch)
Mesonotum without such yellow prescutellar area.....2
2. Scutellum entirely black.....3
Scutellum largely yellow.....5
3. Third antennal segment rounded.....*viticola* (Sasakawa)
Third antennal segment with pointed angle dorsoapically.....4
4. Coxa black, femora largely black on upperside, more yellow below.....*cepa* (Hering)
Coxa and femora bright yellow.....*chinensis* (Kato)
5. Parafrontalia normally brownish to black.....*brassicae* (Riley)
Parafrontalia entirely yellow.....6
6. Inner vertical bristle growing on yellow area but the outer on black.....*compositella* Spencer
Head with both vertical bristles arising from yellow area.....7
7. Mesonotum conspicuously mat grey.....*trifolii* (Burgess)
Mesonotum shining black.....8
8. Ultimate section of M_{3+4} about twice length of the penultimate
.....*bryoniae* (Kaltenbach)
Ultimate section of M_{3+4} about three and half times as long as the penultimate.....*yasumatsui* Sasakawa

Acknowledgements: Thanks are due to Dr. Y. I. Chu, National Taiwan University, Mr. K. S. Lin and Mr. L. Y. Chou, Taiwan Agriculture Research Institute, Mr. M. van de Vrie, Floricultural Research Station in the Netherlands and Dr. M. Sasawaki, Kyoto Prefectural University in Japan for their help in the identification of the leafminers. We also thank Mr. C. H. Yang for the drawings.

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新侵入臺灣之非洲菊斑潛蠅 *Liriomyza trifolii*¹ (雙翅目：潛蠅科)

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摘 要

臺灣原已有 8 種斑潛蠅 (*Liriomyza*) 之記錄，民國 77 年 2 月又於臺中市北屯區大坑附近之非洲菊園中首次發現非洲菊斑潛蠅 (*Liriomyza trifolii* (Burgess))，其於發生園中族群密度極高，葉片被害嚴重。本種潛蠅為花卉、蔬菜之重要害蟲，分布於世界四十餘國，由於其本身高度抗藥性之產生，以及植物種苗之國際交易頻繁，其於最近十年間之世界性擴散尤其迅速。本種潛蠅在臺灣最初之分布均在非洲菊上，故有可能是藉由國外進口之非洲菊苗而侵入。本文除描述其分類特徵外，並與在臺灣多種園藝作物上普遍發生之 *L. bryoniae* (Kaltenbach) 做一外形鑑識上之比較，此外亦製做一分辨臺灣所有 9 種斑潛蠅之檢索表。

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