



Department
for Environment
Food & Rural Affairs

Plant Pest Factsheet

Liriomyza species – leaf mining flies

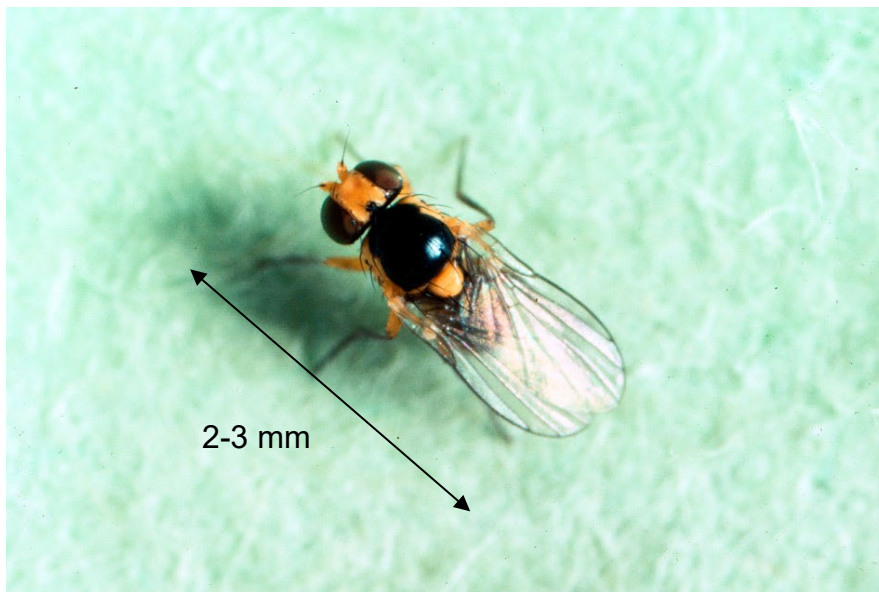


Fig 1. Adult *Liriomyza sativae* © Crown copyright courtesy Fera Science Ltd.

Background

The fly genus *Liriomyza* (Diptera: Agromyzidae) currently contains more than 400 species. The larvae of most are leaf miners which tunnel within leaf tissues forming damaging and disfiguring mines. The majority of species are either host-specific or are restricted to a small group of plants that are related to each other. A few species are highly polyphagous, able to feed on many different types of plants and have become important agricultural and horticultural pests in many parts of the world. These include three species that are regulated quarantine pests in all parts of the UK i.e. *L. huidobrensis* (South American leaf miner or serpentine leaf miner), *L. sativae* (vegetable leaf miner) and *L. trifolii* (American serpentine leaf miner). The wide host range of these pests means that they will attack both vegetable and ornamental plant production.

Geographical Distribution

Currently, 49 species of *Liriomyza* are known to occur in the UK, including *L. bryoniae* which has long been established as an important pest of tomatoes grown under glass in England, and is found across Europe and Asia, as well as parts of North Africa. The regulated species, *L. huidobrensis*, *L. sativae* and *L. trifolii*, all originate from the Americas, but have been spread around the world in recent decades, particularly to parts of Africa, Asia, and the Pacific by the trade in plants and plant products. None have become established in the UK, although all three are regularly intercepted on imported plant material at ports-of-entry. To date, *L. sativae* has been found in parts of Europe (Malta, Russia (European) and Türkiye) whilst both *L. huidobrensis* and *L. trifolii* are well established in parts of the European continent and are widespread in some European countries, particularly those with suitable climates. There have been several outbreaks of *L. huidobrensis* and *L. trifolii*, in crops under protected cultivation in England, but these have been eradicated.

There are also several other recognised pest species of *Liriomyza*, but all have a much more restricted host range. They are also intercepted on imported plant material at ports-of-entry from time to time but pose a less substantial threat to UK agriculture and horticulture.

Host Plants

The regulated *Liriomyza* species are all highly polyphagous with numerous different plant hosts recorded for each, including both vegetables and ornamentals.

Description

Adult *Liriomyza* flies are all small (2 – 3 mm in length) and, from above, are seen to be largely black with yellow areas on the head and sides. Their most distinctive characteristic is a yellow spot on the back of the scutellum (Figure 1), although this colour combination is not unique to *Liriomyza* species. The different species of *Liriomyza* can only be identified with certainty by means of laboratory examination.

The larvae are typical, legless, fly maggots, but never more than 3 mm long. They can be off-white or orange-yellow, depending on species, but are seldom seen as they remain within the mine. Pupae, are more cylindrical, about 3 mm long, and can vary in colour from yellow through to brownish-black (figure 2).



Fig 2. *Liriomyza huidobrensis* puparia © Crown copyright courtesy Fera Science Ltd.



Fig 3. *Liriomyza trifolii* mine and feeding punctures on chrysanthemum © Crown copyright courtesy Fera Science Ltd.



Fig 4. *Liriomyza sativae* mine on cucumber © Crown copyright courtesy Fera Science Ltd



Fig 5. Adult *Liriomyza* on a sticky trap © Crown copyright courtesy Fera Science Ltd.

Biology

The duration of a life cycle is largely determined by temperature with the optimum for all three of the regulated species being around 25°C. At this temperature the generation time from oviposition to adult emergence is generally between 21 - 28 days but can be as short as ~19 days. The duration of each life stage is as follows: egg (up to 3 days to hatch); larvae (passing through 3 instars) 4-6 days; Pupa (up to 9 days). Newly emerged adults have a preoviposition period (~1 day) before the females start to lay eggs. Because the generation time is so short populations can increase rapidly under suitable conditions.

Eggs are laid within the leaf tissue and are not visible to the naked eye. On emergence, the larva begins to feed within the leaf, tunnelling forward as it proceeds. The three larval stages are all active feeders, and the width of the mine they produce gets progressively wider as the larva grows (Figure 4). When the larva is fully mature, it exits the leaf by cutting a semi-circular slit at the end of its mine and usually drops to the soil where pupation then takes place. However, pupae are sometimes found attached to the external

surface of leaves or can become lodged in natural plant structures such as leaf axils. When the adults emerge, they return above ground to feed, mate and lay eggs.

Dispersal and Detection

Liriomyza huidobrensis, *L. sativae* and *L. trifolii* are all regularly intercepted during routine import inspections in England and Wales carried out by the Plant Health and Seed Inspectorate (PHSI). These findings have been on a wide variety of plants originating from many different parts of the world.

Feeding punctures and leaf mines are usually the first and most obvious signs of the presence of *Liriomyza* within a crop. Feeding punctures are rounded, about 0.2 mm in diameter, and appear as white speckles on the upper surface of the leaf (figure 3). The larvae feed mostly in the upper part of the leaf, mining through the green palisade tissue. In *L. huidobrensis*, the mine can also undulate between the upper and lower surfaces of the leaf. Mines are usually off-white, with trails of frass (insect faeces) appearing as broken black lines along the length of the mine. Repeated convolutions in the same area of leaf tissue can eventually lead to dampened black and brown patches appearing. A mine will remain intact and relatively unchanged over a period of weeks, even once the larva has left the mine.

The mines tend to have a general corridor-type shape, though there is a greater or lesser twisting of the mine according to species and other factors (figures 3 and 4). Although the different quarantine species show certain characteristic tendencies in the appearance of their mines, there is too much variation (particularly when comparing mines on different host plants) for identification to be made with certainty on the basis of mine configuration alone.

Chromatomyia syngenesiae and *C. horticola* are the two native polyphagous leaf miners that are most often found on crops under protective cultivation in the UK. Their mines tend to appear cleaner than those of the *Liriomyza* species and are usually less convoluted. Furthermore, these species pupate within the mine, with the extended-cylindrical pupa found *in situ* at the end of the mine and usually visible on the underside of the leaf.

Adult *Liriomyza* flies are readily caught on yellow sticky traps placed adjacent to an infested crop (figure 5).

Economic Impact

The damage caused by *Liriomyza* leaf miners reduces the photosynthetic ability of plants thus reducing their vigour and productivity. For ornamentals the damage can also reduce the plants aesthetic and retail value. Damage in severe infestations can lead to total crop losses.

Pest Management and Reporting

Liriomyza huidobrensis, *L. sativae* and *L. trifolii* are notifiable regulated quarantine pests for GB; *Liriomyza sativae* is a notifiable regulated quarantine pest for Northern Ireland (NI), and NI is an EU regulated Protected Zones for *L. bryoniae*, *L. huidobrensis* and *L. trifolii*. Any suspicions of their presence must be reported to the relevant authorities (see below).

For **England and Wales**, contact your local **APHA Plant Health and Seeds Inspector** or the **PHSI Headquarters**, York.

Tel: 0300 1000 313

Email: planthealth.info@apha.gov.uk

For **Scotland**, contact the **Scottish Government's Horticulture and Marketing Unit**:

Email: hort.marketing@gov.scot

For **Northern Ireland**, contact the **DAERA Plant Health Inspection Branch**:

Tel: 0300 200 7847 Email: planthealth@daera-ni.gov.uk

Web: <https://www.daera-ni.gov.uk/topics/plant-and-tree-health>

For additional information on UK Plant Health please see:

<https://planthealthportal.defra.gov.uk/pests-and-diseases/uk-plant-health-risk-register/>

<https://planthealthportal.defra.gov.uk/>

<https://www.gov.uk/plant-health-controls>

<http://www.gov.scot/Topics/farmingrural/Agriculture/plant/PlantHealth/PlantDiseases>

<https://www.daera-ni.gov.uk>

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