



Department
for Environment
Food & Rural Affairs

Plant Pest Factsheet

Liriomyza species – leaf mining flies



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

Background

The fly genus *Liriomyza* (Diptera: Agromyzidae) consists of hundreds of species, most of which are leaf miners; their larvae tunnel within leaf tissue 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. However, a few species are highly polyphagous, able to feed on many different types of plants, and have become agricultural and horticultural pests in many parts of the world. These include four species that are listed in the plant quarantine legislation of various countries, including the European Union: *L. bryoniae* (tomato leaf miner), *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 crops and ornamental plant production.

Geographical Distribution

There are 41 species of *Liriomyza* found 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 other three 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 not been found in Europe, although it has been introduced into both Israel and Turkey. Both *L. huidobrensis* and *L. trifolii* are now established in parts of the European continent and are widespread in some countries, particularly those with suitable climates. There have been a number of outbreaks in the past three decades of *L. huidobrensis* and *L. trifolii*, attacking crops under protected cultivation in England, but these have always been eradicated.

There are a number of other recognised pest species of *Liriomyza*, but all have a much more restricted host range; these 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 four regulated species of *Liriomyza* are all highly polyphagous with numerous different plant hosts recorded for each species. These include both vegetable crops and plants used in ornamental flower production.

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, on 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).



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



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



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



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

Biology

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. There are three larval stages, all active feeders, and the width of the mine gets larger as the larva grows (Figure 4). When the larva is fully mature, it leaves the leaf by cutting a semi-circular exit slit at the end of its mine. Usually it drops to the soil where pupation then takes place; however, pupae are sometimes found attached to the external surface of leaves. When the adults emerge, they return above ground to feed and lay eggs.

Dispersal and Detection

Liriomyza huidobrensis, *L. sativae* and *L. trifolii* are all regularly intercepted during routine port-of-entry 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 likely to be found on crops under protective cultivation in the UK. Their mines tend to appear cleaner than those of the *Liriomyza* species, and are often less convoluted. Furthermore, these species pupate within the mine, and the extended-cylindrical pupa can be found *in situ* at the end of the mine, 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* leafminers reduces the photosynthetic ability of the plants, thus reducing the vigour and productivity of the plant. For ornamentals the damage also reduces the aesthetic and retail value of the plants. Damage in severe infestations can lead to total crop losses.

Advisory Information

Liriomyza huidobrensis, *L. sativae* and *L. trifolii* are all quarantine species and are notifiable pests in the UK. Any suspicions of their presence must be reported to the

relevant authorities (see below). *Liriomyza bryoniae* remains absent from the island of Ireland, and as such remains a notifiable pest in both Northern Ireland and the Republic of Ireland.

Suspected outbreaks of quarantine *Liriomyza* species, or any other non-native plant pest, should be reported to the relevant authority:

For **England and Wales**, contact your local **APHA Plant Health and Seeds Inspector** or the **PHSI Headquarters**, Sand Hutton, York. Tel: 01904 405138

Email: planthealth.info@apha.gsi.gov.uk

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

Email: hort.marketing@gov.scot

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

Tel: 0300 200 7847 Email: planthealth@dardni.gov.uk

For additional information on UK Plant Health please see:

<https://secure.fera.defra.gov.uk/phiw/riskRegister/>

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

<https://www.dardni.gov.uk/>

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