

NSW Cut Flower Industry

Managing Leafminers in Cut Flowers

Description

Leafminers are commonly small inconspicuous flies (1.3 - 2.3mm long) with shiny black bodies (while some leafminers are moths these are not as important as flies in ornamental and cut flowers). Female flies lay eggs in plant tissue, particularly the leaves, and emerging legless larvae feed internally on the tissues, creating characteristic meandering mining trails that are a clear sign of infestation. This behaviour makes leafminers difficult to control because larvae are protected from contact sprays. The timing of the life cycle varies with temperature, typically ranging from 13 to 26 days.

There are currently two species that can damage ornamentals and cut flowers: serpentine leaf miner (SLM) (*Lyriomyza huidobrensis*), and cineraria (or chrysanthemum) leafminer (*Phytomyza syngenesiae*). SLM is the most important and is a recently established (2020) pest, notorious for developing resistance to insecticides which makes management efforts challenging. These two leafminers have a wide host range that includes various ornamental and cut flower plants as well as vegetable crops.

When mature, the mining larvae of SLM pupate in the soil or substrate beneath the plants, whereas in cineraria leafminer they pupate at the end of their tunnel in the leaf, emerging as adult flies that then lay eggs on surrounding host plants. SLM can be difficult to distinguish from other leafminer species and usually requires specialist diagnostics for confirmation.

Figure 1 (right). Adult serpentine leaf miner (SLM)
(Central Science Laboratory, Harpenden, British Crown, Bugwood.org | Licenced under CC BY-NC 3.0 US)

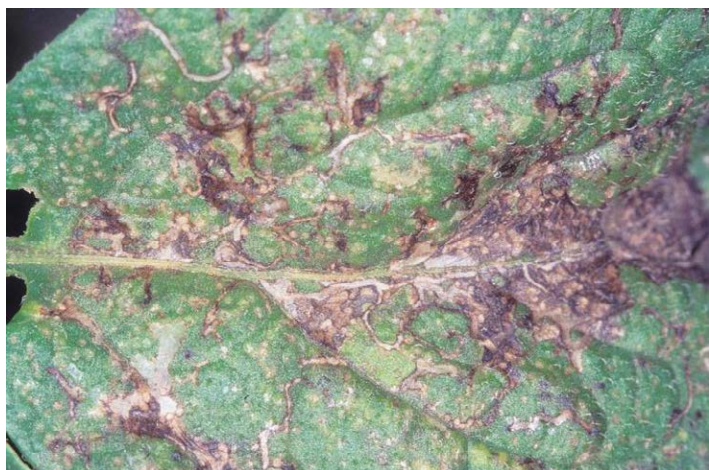


Figure 2. Damage caused by larvae
(Merle Shepard, Gerald R. Carner, and P.A.C. Ooi, Insects and their Natural Enemies Associated with Vegetables and Soybean in Southeast Asia, Bugwood.org | Licenced under CC BY 3.0 US)

→ Quick Facts

- **HOST PLANTS:**
Chrysanthemums, gerberas, and other ornamental plants
- **WHERE TO CHECK:**
Inspect the upper and lower surfaces of leaves for leafminer trails
- **WHEN TO MONITOR:**
Year-round, with increased vigilance during warmer months when activity is higher
- **HOW OFTEN TO MONITOR:**
Weekly inspections are recommended, especially during peak growing seasons



Damage

Damage is primarily caused by larvae tunnelling or mining through leaf tissues, creating characteristic pale-coloured mines within the leaves, which may have black or brown areas. These mines can be linear or meandering and increase in width as the larvae mature. This mining reduces photosynthetic capacity and leads to reduced plant vigour and growth. Heavily infested leaves may become necrotic and prematurely drop, significantly affecting flower quality. Additionally, adult female flies cause minor damage by puncturing upper surfaces of leaves to lay eggs or to feed on plant sap, which appear as white speckles (Figure 2, left). High levels of infestations affect the plant's ability to photosynthesise, reducing plant growth, and seriously impacting the visual quality of leaves.



Figure 2. Serpentine leafminer pupae (Merle Shepard, Gerald R. Carner, and P.A.C Ooi, *Insects and their Natural Enemies Associated with Vegetables and Soybean in Southeast Asia*, Bugwood.org | Licenced under CC BY 3.0 US)

Prevention

- **Quarantine and Inspection of Incoming Stock:** Inspect all incoming plants, cut flowers, and nursery stock for signs of leafminer infestation before introducing them to your production areas
- **Implement a Strict Sanitation Program:** Regularly remove plant debris, weeds, and other potential hosts from growing areas (look for plants with leaf mines and remove them).
- **Enforce Strict Access Controls:** Limit access to production areas to essential personnel only. This reduces the risk of inadvertently introducing pests through contaminated clothing, tools, or equipment
- **Crop Rotation and Host Plant Management:** Where possible, rotate susceptible crops with non-host species, to break the lifecycle of these leafminers. Additionally, group host plants together to localise any potential infestations and make monitoring and management efforts more efficient.

Monitoring

- **Regular Monitoring and Early Detection:** Use yellow sticky traps (for adults) and visual inspections for damage to detect the presence of leafminer early. Monitoring should be conducted weekly, with more frequent checks during high-risk periods.
- **Educate and Train Staff:** Ensure that all staff members are trained to recognise the symptoms of leafminer damage. Early identification of SLM is important (via entomology/IPM specialists, or through on-line sources such as the Pest Identification Tool, www.pestid.com.au).
- **Maintain Records of Preventive Actions:** Keep detailed records of all preventive measures, including inspection reports, monitoring results, and any treatments applied
- **Sample Submission:** Where significant quantities of oviposition or leaf mines are detected on known host plants, prepare a sample and submit it for laboratory analysis to confirm the species. Identification based on mines alone is unreliable, as several species of leaf miners produce similar damage.
- **Consultation:** Work with experienced IPM consultants or other qualified advisors to refine monitoring and control strategies.

Control

Cultural

- **Plant Disposal:** Remove and destroy heavily infested plants to prevent SLM from spreading to healthier crops. Discard infested plants in closed bins away from production areas to prevent spread
- **Minimise movement:** Limit staff movement between infested and clean areas to prevent the spread of SLM on clothing or tools. Visit infested areas last during routine inspections
- **Host weeds:** Control host weeds surrounding crops and gardens especially those which are known hosts of these leafminers.
- **Protected Cropping:** For intensive greenhouse production, floors and pathways in greenhouses should be designed to prevent SLM from pupating in soil. Black plastic, aggregated gravel to a min 75mm deep or concrete helps prevent contamination.
- **Environmental Control:** If growing a single crop, once the crop is finished, cease irrigation and close up the house to increase interior temperature. High temperatures are lethal to SLM.

Biological

- **Natural enemies:** There are currently no commercially available natural enemies for leafminers in Australia. However, there are native parasitoid wasps, particularly *Zagrammosoma* spp., which can be effective in open growing situations.



Figure 2. Australian native parasitoid of leafminers, *Zagrammosoma latilineatum* (Dr Elia Pirtle, Cesar Pty Ltd | Licenced under CC BY-NC)

Chemical

Due to the female laying eggs below the leaf surface and larvae developing inside the leaf, they cannot be effectively reached by many insecticides. This makes chemical management of leafminers difficult.

Furthermore, resistance to Groups 1A, 1B and 3 insecticides has already been detected in SLM, so their use is not recommended. If these chemicals are required, always rotate to a different group for subsequent sprays and critically, never reapply the same chemical following a failure. Check the APVMA website for updates on permitted pesticides for managing leaf miners, especially SLM.

Exotic leafminer detection

Since 2015, three of the five serious, pest exotic leaf miners have made their way to Australia. Therefore, if you suspect an exotic leaf miner infestation, please report it immediately to the exotic plant pest hotline (1800 084 881).



Take Aways

- **Monitoring:** Regular monitoring and early detection is key for leafminer management.
- Because there are currently no commercial biological control options available, quarantine, sanitation and strategic and timely use of permitted insecticides form the basis of effective management programs.
- Confirm APVMA-approved insecticides for SLM before applying and rotate among different mode of action chemicals to reduce incidence of resistance build-up.

References / More Information

- <https://www.greenlifeindustry.com.au/static/uploads/files/slm-management-plan-final-03-08-21-wfctutwybclk.pdf>
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