

VEGETABLE LEAFMINER SURVEILLANCE INFORMATION



EXOTIC PEST - CALL THE HOTLINE IF SUSPICIOUS ON 1800 084 881

**Hort
Innovation**

Why look for VLM?

The vegetable leafminer fly (*Liriomyza sativae*, VLM) is a small fly that poses a threat to many vegetable and horticultural crops grown in Australia. It's Australian range is currently restricted to Seisia, on the tip of Cape York.

What should I look for?

Adult VLM are very small, black and yellow flies (1 - 2 mm) that are difficult to see by eye. Surveillance should focus on the damage they create on plants.

VLM is most damaging as a larva (immature fly). Adults inject eggs underneath the surface of a leaf, and when the eggs hatch after about 3 days, the larvae begin to tunnel through the leaf, creating thick white spirals, or 'leafmines', as they feed. VLM adults also cause damage as they feed and inject eggs, creating stippled appearance on leaves.

Symptoms visible on leaves

- White serpentine mines (A)
- Stippling appearance (B)

Symptoms visible on fruit

- Fruits are unaffected, with the exception of bean pods which may show white serpentine mines (C)

It is important to note that some native flies create very similar looking damage (see the 'More Information' section.)

Where and when do I look?

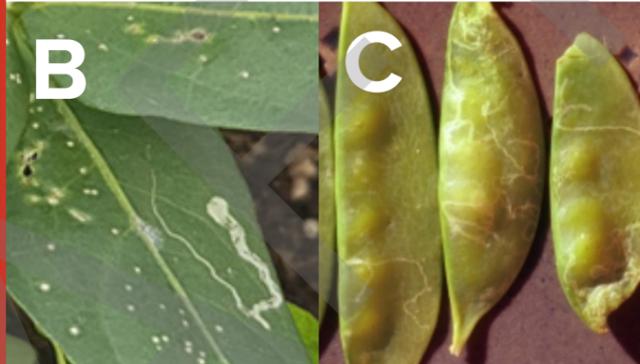
Crops at risk include Cucurbits, Solanaceae, Asteraceae, Brassicaceae, Fabaceae, Ornamentals (eg. marigolds, snap dragon and petunia), and most allium species, including onions and garlic. Tomatoes, melons, celery, and beans are highly preferred. For access to a complete list of hosts, see the 'More Information' section.

In tropical QLD, VLM is expected to be in largest numbers in the autumn when the climate is most suitable for their growth. In temperate NSW and VIC, populations are expected to be largest in the summer, while winter is expected to be too cold to allow populations to grow. See the 'More Information' section for a link to an interactive tool to explore regional risk across the season at your location.

Symptoms in leaves



Moderate damage on melons (left) and heavy damage on ornamental flowers (right)

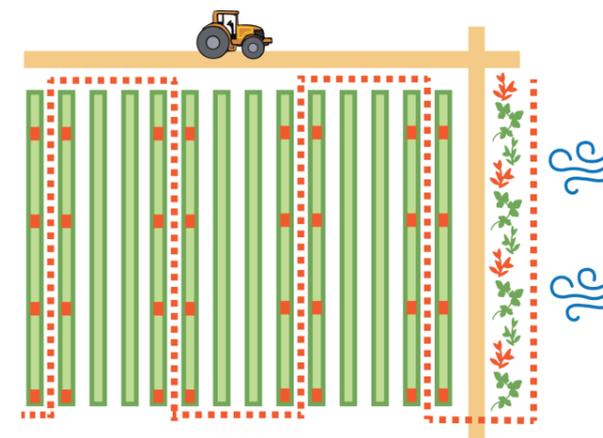


Stippling and mining damage on beans (left) and mining in bean pods (right)



Yellow larvae, creating a black trail of frass, may be visible at the thicker end of a leafmine

To survey, walk a transect...



Walk a transect that preferences crop edges along high traffic areas and/or incoming wind, including weedy crop margins (dotted orange line). For both weeds and crops, scan all plants as you walk, and at regular intervals, stop and closely inspect a one to four meter long patch of plants (indicated in orange), spending 1 minute per patch.

and collect suspicious samples

Snap

a photo of the damage

Collect

damaged leaves into a sealed plastic bag, label, and store in a cool, dark place

Call

The Exotic Plant Pest Hotline (1800 084 881)

You may observe small orange pupae collecting at the bottom of the bag within a day. Your local DPI may arrange to collect these for genetic identification.



IF YOU SEE ANYTHING UNUSUAL,
CALL THE EXOTIC PLANT PEST HOTLINE

1800 084 881

How do I survey my farm?

1. Choose a block of crops that may be at highest risk, due to being:
 - A preferred host plant
 - Near to transport routes and unloading areas
 - On the incoming wind side of a paddock
2. Within the block, survey by following a snaking transect line, which begins with any broadleaf weeds present along the highest risk edge of the block (grasses do not need to be inspected) and includes every fourth row of plants.
 - Scan plants at a slow walking pace
 - At regular intervals along the transect, stop and spend one minute closely inspecting a one to four meter patch of plants. This guideline is based on surveillance trials that measured the 'detectability' of leafmines.
 - Continue until you have closely inspected at least *n* patches (the project team is still exploring the time trade off between the need for intensive searches and area coverage, to develop this recommendation).
 - Record your survey results. You can contact Dr. Elia Pirtle (see back page for contact information) for a draft survey recording form which meets standard minimum data set requirements for exotic pest surveillance.

How do I assess each plant?

1. **Scan:** Scan the upper surfaces of leaves as you walk, looking for signs of stippling or mining
 2. **Snap:** Take a photo of any suspicious damage and record a GPS point.
 3. **Collect:** Take a sample of the damage
 - Place a sheet of paper towel into a large plastic freezer bag, followed by the affected leaves. Seal the bag, partially inflated, and place bag in a dark cool place (ideally a refrigerator).
 - Collect as many mined leaves as possible
 - You may notice small orange pupae collecting at the bottom of the bag. This greatly increase chances of identification.
- Label the bag using a smudge-proof permanent marking pen with the following information:
- Your name; contact number; date; address, town, postcode; crop type
- Immediately report the suspicious damage to **The Exotic Plant Pest Hotline (1800 084 881)** for further instructions.

VLM surveillance information

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Can traps be used?

Commercially available yellow sticky traps attract adult VLM, but are not expected to be as effective as visual surveillance for early detection. However, if suspicious leafmining damage is observed and reported, traps should then be hung nearby, at about plant canopy height. Each traps may remain hung for no more than 2 weeks, before being collected, gently folded sticky side inwards and placed in a sealed plastic bag, and then stored in a refrigerator (not freezer) until analysis can be arranged.

How to report

If you think you have detected vegetable leafminer, preserve a specimen and phone **The Exotic Plant Pest Hotline (1800 084 881)**. This will put you in touch with the Department of Primary Industries or Agriculture in your state or territory.

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Other information

What regions are at highest risk?

To explore your regional risk though the year, go to <http://www.cesaraustralia.com/our-projects/VLM/> and access the interactive risk map.

Where can I find a complete host list?

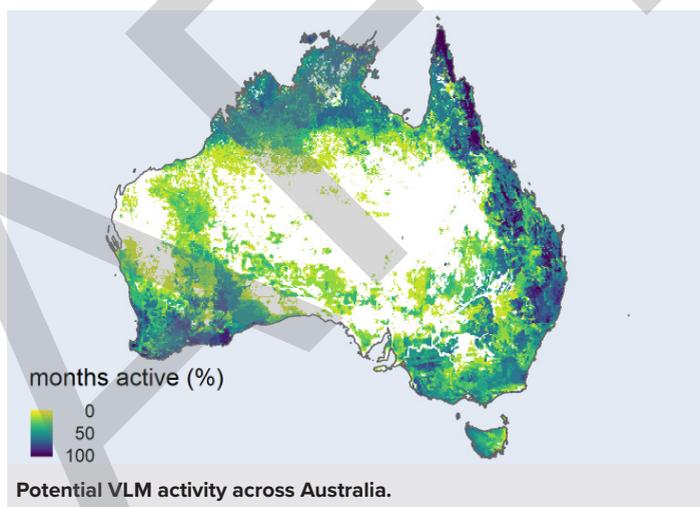
A complete host list for VLM will be included in a VLM Contingency Plan, available before the conclusion of the Hort Innovation Project MT16004. In the meantime, contact Dr. Elia Pirtle (see right) for more information on VLM's possible host plants.

What can be confused with VLM?

Several fly species in Australia can create indistinguishable leafmines on the same crops that could be affected by VLM. These include the cabbage leafminer, the chysanthemum leafminer, the beet leafminer, and the plantain leafminer. Some natives (including the cabbage leafminer) are indistinguishable by any means other than microscope dissection of adults, or genetic analysis. **Always contact the Exotic Plant Pest Hotline if you are suspicious!**



Left: Yellow sticky traps can attract exotic leafminer flies, and can be placed near suspicious damage to try and catch an adult.
Right: Close up of an adult vegetable leafminer on a sticky trap.



Potential VLM activity across Australia.

Other questions or feedback on this guide?

Contact Dr. Elia Pirtle, at epirtle@cesaraustralia.com or 0414143456 with any questions or feedback.

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