



Serpentine leafminer: a decreasing biosecurity risk under a changing climate

A changing climate is likely to decrease the occurrence and spread of serpentine leafminer in areas of NSW.

Developing industry-informed climate planning information

Climate change is altering the biosecurity risks for many agricultural commodities across NSW. Primary producers need evidence-based information about the changing climate, and the risks and opportunities it may bring.

Through its Vulnerability Assessment Project, the NSW Department of Primary Industries is increasing the resilience of our primary industries by providing information and data to help the sector better plan for, and respond to, climate change. The project has determined climate change impacts for extensive livestock, broadacre cropping, marine fisheries, forestry, horticulture and viticulture, and important cross-cutting biosecurity risks to inform sound planning, risk management and adaptation decisions.



Serpentine leafminer in NSW

Serpentine leafminer *Liriomyza huidobrensis* (Blanchard) is an exotic pest insect that was detected in the Sydney Basin of New South Wales, Australia in late 2020. Serpentine leafminer has now been detected in a number of regional NSW locations and into southern Queensland where it is impacting on vegetable and flower production (Figure 1).

Serpentine leafminer can inflict significant damage to plant leaves due to feeding and egg laying wounds. Larvae tunnel through the surface of the leaf leaving behind tell-tale leaf “mines” causing both cosmetic and structural damage to the leaf. In addition to yield reductions, stunted growth and potentially even plant death, serpentine leafminer compromises the marketability of produce involving plant leaves e.g. foliage from the cut flower industry or leafy vegetables such as lettuce or bok choy.

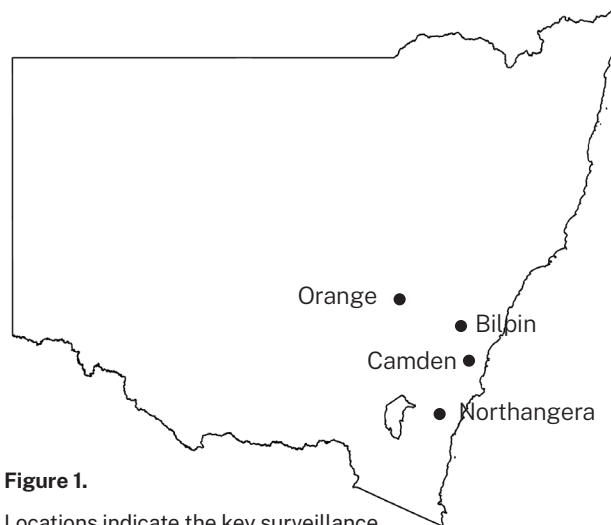


Figure 1.
Locations indicate the key surveillance sites for serpentine leafminer in NSW.

Climate and serpentine leafminer

Overall, the likely impacts of serpentine leafminer by 2050 under a changing climate in NSW are projected to decrease in summer. Changes in climate suitability are likely to occur across all stages of the serpentine leafminer life cycle.

Climate risks likely to change the occurrence and spread of serpentine leafminer include:



Warmer temperatures will likely decrease the spread of serpentine leafminer spread in NSW.

Climate impacts: what to expect

Egg

- **Decrease in climate suitability** for Orange, Bilpin, Camden and Northanger in January (*low to high confidence*) and November and for Orange, Bilpin and Camden in February and December.
- **Maintained historical climate suitability** for all sites from March to October.

Larvae

- **Decrease in climate suitability** for Orange, Bilpin, Camden and Northanger in January (*low to high confidence*), for Orange, Bilpin and Camden in February and November and for Bilpin and Camden in December.
- **Maintained historical climate suitability** in climate suitability for all sites from March to October and for Orange and Northanger in December.

Pupae

- **Increase in climate suitability** for all sites for May, for Bilpin and Camden in June and August, for Camden in July, for Bilpin and Northanger in September and for Orange and Northanger in October.
- **Decrease in climate suitability** for all sites in January (*low to high confidence*), for Orange, Bilpin and Camden in February, for Camden in March, for Orange and Northanger in November and for all sites in December.
- **Maintained historical climate suitability** for Northanger in February, for Orange, Bilpin and Northanger in March, for all sites in April, for Orange and Northanger in June and August, for Orange, Bilpin and Northanger in July, for Orange and Camden in September and for Bilpin and Camden in October and November.

Adult fly

- **Decrease in climate suitability** for Orange, Bilpin and Northanger in January, for all sites in February, for Orange, Bilpin and Camden in March, for Bilpin and Camden in October and November (*low to high confidence*) and all sites in December.
- **Maintained historical climate suitability** for Camden in January, Northanger in March, all sites from April to September, Orange and Northanger in October and November.

Impact on key NSW primary industries

The impact of serpentine leafminer on horticultural production (particularly vegetables) could be significant in areas across NSW with moderate to high climate suitability. This is exemplified within the Sydney Basin, the point of incursion for this pest, where detrimental impacts to marketable yield are being experienced by growers. Overall high temperatures will likely limit the spread, survival and establishment of serpentine leafminer in the future. It is likely that along the eastern seaboard suitable climate (and susceptible host crops) will permit either permanent or sporadic populations of serpentine leafminer to persist. Overall under both climate scenarios, suitable climate may be present within some regions of NSW into the future although the potential range of this pest may be contracted toward coastal or higher elevation areas. Regions west of the Dividing Range may be at less risk from serpentine leafminer spread and establishment into the future due to heat limitations negatively affecting climate suitability.

Methodology and data

Climate projections were sourced from Climate Change in Australia's 'Application Ready Data'. This dataset is comprised of projections from an ensemble of 8 global climate models, each presenting a plausible future climate. The models differ in their projections, giving rise to uncertainty in our modelling. Low confidence in the projected changes due to differences between the models is noted in the text. Care should be taken when interpreting these results.

The Vulnerability Assessment Project is intended to highlight potential industry- or regional-level changes. Intermediate and high emissions scenarios were used in the assessments (RCP4.5 and RCP8.5), but these are not the only future scenarios possible. The inclusion of climate variables important to each biosecurity risk was based on published research, expert knowledge and data quality and availability.



FOR MORE INFORMATION

Please get in touch with vulnerability.assessment@dpi.nsw.gov.au

This work has been produced by the NSW Primary Industries Climate Change Research Strategy funded by the NSW Climate Change Fund.