

Table 1. Risk and monitoring period for citrus leafminer activity.

Flowering			Fruit drop			Golf ball			Colour break		Maturation	
Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	

Description

Adults are about 2 mm long, silvery-white, and have wings fringed with long hairs (Figure 1). They can be seen when they are active in the morning and night.

Larvae: When they first hatch, they are pale green and difficult to see. As they begin feeding on young, flushing foliage, they excrete their faeces into the mine, forming a visible snake-like trail (Figure 1) or 'mine'. This causes the leaves to twist and curl.

Life cycle

Females lay up to 50 eggs singly under the leaf. Newly emerged foliage (10–20 mm) is the preferred egg-laying site. Larvae hatch after 2–10 days and go through 3 larval stages.

Larvae cannot move from leaf to leaf or from the lower to upper leaf surface, remaining on the same leaf throughout their life. When larvae complete their feeding (5–6 days in summer), they mine near the edge of the leaf, causing the leaf margin to fold over. The larva moults into the fourth instar or pre-pupa.

Pupation occurs in a fold on the edge of the leaf. The pupa remains in the mine until it emerges as an adult moth. The pupal stage lasts about 6 days.

Damage

Damage is done by larvae as they attack the young growth flush and cause leaves to twist and curl. This damage is easily identified by the mines that the larvae produce in the leaves (Figure 2). Severe infestations can slow the growth of young trees in their first few years of establishment.

Although leafminer infestations can be severe and look bad in older trees, shoots continue to photosynthesise, and economic damage is unlikely.

Threshold: In trees younger than 5 years old, control is recommended if 25% of the block is flushing and 10% of the more advanced flushes are infested.

Risk period: January to April (Table 1).

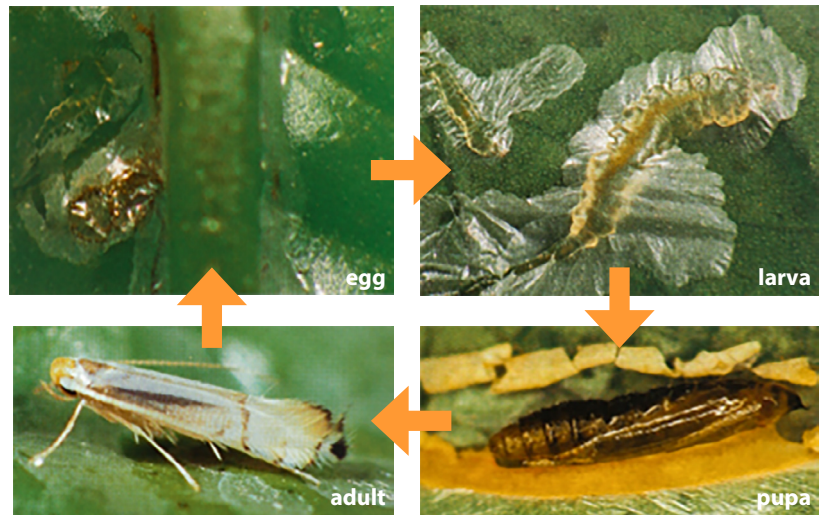


Figure 1. Citrus leafminer life cycle stages.



Figure 2. Citrus leafminer damage to a leaf.

Monitoring

For trees younger than 5 years old, monitor the production of significant growth flushes (more than 25% of trees flushing) weekly from December onwards. Look for evidence of leafminer larvae on at least 20 advanced shoots (those that have emerged earlier than most of the other foliage).

Management and control

Biological: the parasitic wasp *Semielacher petiolatus* (Figure 3) is the main parasite of citrus leafminer in southern districts. Natural predators such as green and brown lacewings (Figure 4) and small parasitic wasps feed on citrus leafminer. Three of the most effective parasitic wasps in Asia were introduced into Queensland in the 1990s. Leafminer severity was greatly reduced following parasitoid establishment. However, with increases in pesticide use, leafminer numbers have increased in recent years.

Cultural: infestations can be reduced in several ways by limiting the production of new leaves when leafminer numbers are highest:

- Fertilise in late winter to promote strong spring growth when the leafminer is less abundant.
- Avoid hedging in summer and autumn.
- Do not overwater or over-fertilise in late summer and autumn.

Chemical: soil-applied systemic insecticides can provide adequate leafminer control in young trees. Control with contact insecticides is difficult because the larvae are shielded within their mines. The rolled leaf margin also protects the pupal stage. Control efficacy varies with differing contact insecticide active ingredients. Horticultural oil sprays have a very low impact on beneficial insects in the orchard. Horticultural oil sprays reduce numbers by reducing egg lay. The tiny moths avoid surfaces sprayed with oil, so sprays should be applied before too many eggs have been laid. Two or more sprays might be required when new leaves are produced over an extended period. Suppression from January to mid-March is the goal. Full control is not necessary, even in young trees and damage to late growth in April can be tolerated.

New growth should be protected as soon as it has formed. Once leaves have hardened, they are resistant to leafminer attack.

More information

NSW DPI. 2022. Citrus leafminer. *Primefact 22/126*, NSW Department of Primary Industries. <https://www.dpi.nsw.gov.au/agriculture/horticulture/citrus/content/insects-diseases-disorders-and-biosecurity/insect-pest-factsheets/leafminer>

Smith D, Beattie GA and Broadley R. 1997. *Citrus pests and their natural enemies: integrated pest management in Australia*. Queensland Department of Primary Industries, <http://hdl.handle.net/10462/pdf/9446>



Figure 3. *Semielacher petiolatus* wasp attacking citrus leafminer larvae.

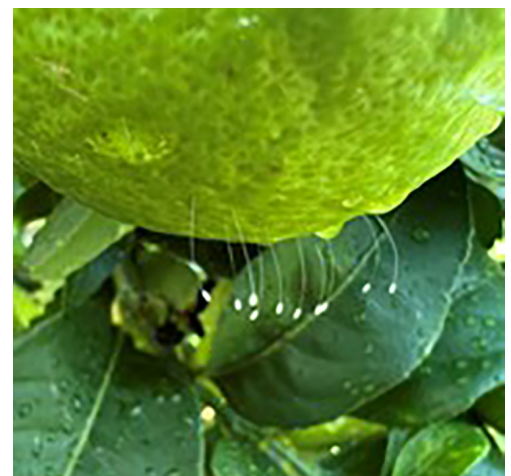


Figure 4. Lacewing eggs in a citrus tree.

