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# Lace Bug in Macadamias

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## Key Points

- Macadamia lace bugs (MLB) have a rapid lifecycle, hatching to adult takes 12-19 days at 25°C
- Adult females can lay up to 21 eggs in 6 days, so numbers can rapidly increase and spread within an orchard.
- MLB feeds on developing racemes through to small nutlets.
- Weekly monitoring from raceme emergence is recommended to manage MLB.
- MLB are very small, so look for damage on flowers using a 10x hand lens or shake flowers over white paper to see MLB or their moulted skins.
- MLB are active during flowering, to minimise negative impacts on pollinators and crop set, any chemical applications must be applied strategically and according to label instructions.

## Introduction

Macadamia Lace Bug (MLB) emerged around 2003 as a pest in a small number of orchards in the NSW Northern Rivers growing region. It is now a serious pest in NSW, the Glass House Mountains, Gympie, and the Atherton Tablelands in QLD. The Bundaberg and Emerald growing regions are currently free of MLB.

Cassis (2019) suggests that there are at least three different lace bug species that attack macadamias. Generally, these species are found in certain regions, although multiple species may be present in some regions. The damage caused by all the species is similar and all species are considered significant pests.

## What do macadamia lace bug look like?

MLB are small sap sucking insects. Adults are 3-4 mm long and the juveniles (nymphs) are smaller. Nymphs are yellowish to brown in colour with red eyes (Figure 1). As the nymphs mature, they shed their skins, going through 5 instar (growth) stages. Adults are generally brown and paddle-shaped with red eyes and a lace-like pattern on their wings (Figure 1). Females lay their eggs inside florets.

## How to monitor for MLB

Start monitoring from bud break. Weekly monitoring is recommended during flowering as MLB has a rapid lifecycle. From hatching to adult takes 12-19 days at 25°C and one adult female can lay up to 21 eggs in 6 days, so numbers can rapidly increase and spread within an orchard. MLB are present all year round, overwintering on the bark and rarely cause damage outside of the flowering period.

The best place to start monitoring is any hotspot areas in previous seasons. This is where you are likely to find MLB first.

MLB feed on flowers causing florets to blacken and dry (Figure 2). Damage generally starts at the raceme tip and progresses up the raceme as the nymphs move up and down, feeding on the developing florets. Dry flower symptoms (a fungal disease) are similar to MLB damage. Typically, dry flower affected florets dislodge easily from the raceme when shaken whereas lace bug affected florets remain attached and you will often find cast skins present. If you are unsure consult your agronomist or Grower Liaison Officer. MLB can also damage fresh shoots and small nutlets, causing the nutlets to drop.

MLB adults and nymphs are difficult to see with the naked eye, so inspect suspected MLB damage with a 10x hand lens or microscope. Shaking the flower over white paper can dislodge MLB or their moulted skins to help with identification.



Figure 1. *Macadamia lace bug nymph, a moulted skin (arrow) and feeding damage on Macadamia florets(L)* (J. Coates, Coates Horticulture) and *Macadamia lace bug (Cercotingus decoris) adult showing distinctive markings on the wings and red eyes (R)* (R. Hofner, UNSW).

MLB can survive temperatures down to 5°C and overwinter in bark when no flowers are present. MLB populations will increase in subsequent seasons if they are not managed. Uncontrolled MLB can cause reduced nut set or, in extreme examples, complete crop failure.

Flowering (early July to October) is when MLB are most active in orchards. Ensure you monitor early flowering varieties for initial infestations and check hotspots from previous seasons. Weekly monitoring is recommended to identify MLB emergence. If MLB caused a crop failure in a previous season it is best to start monitoring from when buds break (late May to early June) as early damage is likely.

Out of season flowering creates a favourable environment for MLB development, which can lead to early infestations and a prolonged period of MLB pest pressure. Ethephon, used for inducing nut drop, will also burn off any out of season flowering and can assist in returning trees to normal flowering patterns.

## How do I control macadamia lace bug?

The rapid lifecycle of MLB means populations can quickly increase, so frequent monitoring is critical. Monitoring frequency should increase in blocks or orchards that have a history of MLB. It is recommended that an experienced consultant is used for monitoring.



Figure 2. *Macadamia* raceme and floral structures (L) and *Macadamia* lace bug damage and nymphs on a *Macadamia* flower (R) (J. Coates, Coates Horticulture).

Any spray decision needs to strike a balance between achieving effective control and not affecting pollinators and subsequent crop set. When making a spray decision, it is important the decision is based on sound monitoring data and the stage of flowering, to determine chemical choice. The decision should also consider if the whole orchard needs to be sprayed, as targeted, hotspot spray applications have been an effective strategy for MLB management.

Always check the APVMA website (<https://portal.apvma.gov.au/pubcris>) for registered and permitted chemicals before you spray. At the time of review (August 2022) four chemicals are registered or permitted to manage MLB. These include Sivanto Prime (note that the maximum application of Sivanto Prime is 1L/ha/season. Therefore, when used at the label rate of 50ml/100L, the maximum spray volume is 2000L/ha), Diazinon (PER14276, expires 31 August 2025), Sulfoxaflor (Transform®) and Trichlorfon (PER13689, expires 28 Feb 2027, also note that the new permit prohibits spray volume exceeding 1500L/ha). The choice of control option will vary depending on the crop stage.

If you are applying at the pre-flower stage, prior to 10% open flower, Sivanto Prime, Diazinon, Trichlorfon or Sulfoxaflor are suitable. Diazinon residues remain dangerous to bees for up to 1 week after application, so do not apply Diazinon if more than 10% of flowers are open. Instead, use either Sivanto Prime, Trichlorfon or Sulfoxaflor. Trichlorfon and Sulfoxaflor are less persistent than Diazinon but are still toxic to bees on direct contact. Only apply Trichlorfon or Sulfoxaflor when bees are not foraging, usually very late in the afternoon or at night. Sivanto Prime, a newly registered insecticide for Lacebug control, has low toxicity to both native and European honeybees and can be applied during the crop flowering. Additionally, Sivanto Prime is soft on beneficial species such as parasitoids, predatory mites, lacewings, hoverflies and ladybeetles.

Flowering is a period of high insect activity in macadamias, so it is important your insecticide choice and timing of application are targeted to minimise the impact on pollinators and other benefits yet maximise the control of the target pests.

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*Always check the label and product information prior to use of any agricultural chemicals. If the information you need is not on the label, either contact the reseller or manufacturer for the information. If you are unsure about compatibility of products you intend to use, contact the manufacturer or conduct a jar compatibility test. Remember that physical compatibility does not equal chemical compatibility. Ensure only registered and permitted products are used and the appropriate personal protective equipment is worn when mixing and applying. All products listed are correct at the time of publishing*

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