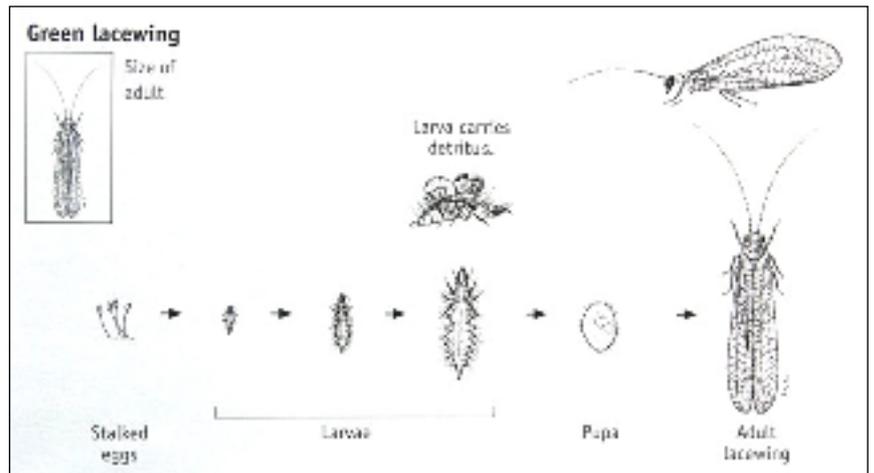


# GREEN LACEWINGS

## *Mallada signata*

Green lacewing larvae are important generalist predators feeding on moth eggs, aphids, scales, thrips, mites and lace bug.

BioResources is mass rearing them on macadamia nutborer eggs and we have improved the efficiency of the production system so are able to reduce the price!



### Background

Lace bug and sigastus weevil have emerged as important pests in recent years. Spraying for these pests may well be necessary at the time, but unfortunately decimates their natural enemies and also those of “secondary pests” like thrips, mites, felted coccid and scale. These secondary pests can then cause damage in their own right provoking more spraying which can make things worse and setting things up for same the following season. A costly and frustrating exercise for growers and consultants.

### The strategy

Recent research and observations by crop consultants has indicated that good inter-row growth and plant variety increases non-economic insect populations and subsequently the numbers of beneficial insects in the orchard. This helps provide a buffer in the system and gives more time to make spray decisions and, in some instances, these natural enemies are able to keep pest populations in check on their own.

**Lacewing larvae** are important predators in this mix and get knocked around during the “spraying season”. Further, close mowing during harvest period makes it harder to re-establish beneficial insects, including lacewings, in the inter-row. By releasing lacewings we aim to speed up the re-establishment and boost the orchard population of lacewings. If we wait for local populations to build, this may happen very slowly or may not happen.

### Adult lacewings

Lacewing adults feed on nectar, pollen and insect honey dews and lay their eggs in the canopy nearby and in the inter-row. Out of season macadamia flower is the means by which lace bug moves from season to season and is a likely site for lacewing egg laying.

So the release strategy is to boost lacewing populations through autumn and winter to keep lace bug and other pest numbers down and result in a slower build up of these pests in spring, providing more time for nuts to set and so delay the demand to spray. Good inter-row growth and plant diversity will also help this process.



Lacewing adults are packed in plastic containers with shredded paper and a little honey for sustenance.

### **In macadamias**

We think that releasing lacewing adults is likely to be more effective than releasing just eggs or larvae. Its hard to apply eggs and larvae up into the trees where we want them - near pest outbreaks - and where they can get a feed quickly.

Adult lacewings feed on honey dew and nectar in flowers, also likely sites for pests like lace bug and thrips, which may be high in the trees. So, having adult lacewings laying eggs in the crop is highly desirable and is the best lacewing egg distribution system.

### **Mass rearing**

In the wild, when lacewing adults emerge from their pupal case they disperse and seek a food source before laying eggs. In the laboratory, we rear them through to adulthood and ship them to growers when several days old. They have been well fed and are ready to lay eggs - there may be some lacewing eggs already laid in the container. Each adult female should lay over 200 eggs and live for a month or so. 100 females x 200+ eggs = 20,000+ eggs.



Green lacewing adults packed ready for despatch

### **Releasing**

Make sure the closed containers are not exposed to high temperatures or direct sunlight. If conditions are bad - very wet or extreme heat - keep the containers in an esky with a few ice bricks until outdoor conditions improve.

Release the adults at numerous locations, a couple of rows in from the windward side. Upon release, the adults are likely to move downwind and are attracted to food sources like honey dew from insects, nectar and pollen. If there are eggs on the shredded paper hung in the trees.

### **Despatch method and release rates**

Lacewing adults are sold in packs of 200 (more than half females) and in a program. For example, every 3 weeks and up to the first spray at flowering or through flowering in organic orchards.



Green lacewing larva feeding on **lace bug**. Also feeds on aphids, mites, thrips, moth eggs, and deposit debris on their backs for camouflage. (Photo by Chris Fuller)

Lacewing adults are reasonably cold tolerant and remain active on sunny winter days in most districts where macadamias are grown. Determining release rates is difficult at this stage but we suggest 50-100 adults per hectare per delivery.

### **Recommended Retail Price:**

Packs of 200+ lacewing adults per delivery. \$70 per pack for 2 to 3 packs per delivery.

\$63 per pack from 4 to 7 packs per delivery.

\$58 per pack for 8 or more packs per delivery.

Add Express Postage (\$17) and GST.

### **Place orders now**

We are now calling for orders to start in February. Let us know ASAP .

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