# GROWING KNOWLEDGE

Series content is coordinated by Dr. Jay Pscheidt, professor of botany and plant pathology at Oregon State University in Corvallis, Oregon.

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Images of common lace bugs in Oregon. From left to right: Hawthorn lace bug (*Corythucha cydoniae*), rhododendron lace bug (*Stephanitis rhododendri*), and the newly invasive azalea lace bug (*Stephanitis pyrioides*).

PHOTO BY THOMAS SHAHAN, OREGON DEPARTMENT OF AGRICULTURE

# Biocontrol of azalea lace bugs

*By Michael Flores, Barry Finley, Robin Rosetta, Megan Woltz and Jana Lee*

RHODODENDRONS are commonplace in the Pacific Northwest and for good reason. They produce beautiful flowers that aesthetically enhance greenspace wherever they are planted.

Unfortunately, rhododendrons are not free from problems. The azalea lace bug (*Stephanitis pyrioides*), while pretty to look at, has become a major pest of azaleas and rhododendrons in the Pacific Northwest since being discovered in Oregon in 2009 (Rosetta, 2013).

This insect feeds on the chlorophyll of the plant leaves by piercing and sucking the cell contents from the undersides of the leaves. The result is ugly: stippling on the tops of the leaves as well as fecal deposits on the undersides of the leaves.

This damage is permanent to the leaf, reduces plant vigor and is aesthetically displeasing to potential customers in a nursery. So, controlling azalea lace bug has become very important for these beautiful flowering plants.

As with many pests, the common control method for azalea lace bug is to use insecticides. However, the chemicals can be harmful to beneficial insects. Since this is a landscape plant, these chemicals often must be used in close proximity to humans. Therefore, alternative control measures are desired, such as the release of a commercially available predator for biological control.

If these predators can efficiently control the pest population, the need for chemical use would diminish, as would any immediate and residual effects on humans or animals.

Green lacewings, which are available commercially, have reduced azalea lace bug populations among azalea plants in the short term. Here we present results from the first trials done on rhododendrons, which often have a more sparse leaf architecture.

Green lacewings can be purchased in the egg, larval or adult stage, and each distribution method has its advantages and costs (Table 1). The larvae are the predatory stage, and ideally should be transported in hexcel units to keep them from cannibalizing each other.

Following are some common questions regarding the use of this biological control method.

**While it is recommended to tap the hexcel unit over the plant, how many larvae actually land on the plant?**

In our trials with 1- and 5-gallon rhododendron potted plants, 88–99 percent of the larvae landed on the plant, so this distribution method seems reliable. Tapping trials were done in a commercial nursery with five plants per variety or pot size.

**Loose eggs are economical, but how many of the eggs land on the plant by bottle shaking?**

In our trials, 38 percent of eggs landed on rhododendrons with dry leaves. Wetting the plant beforehand can increase efficacy, as 79 percent of eggs landed on wet leaves. After the water dried, the original eggs still remained on the plant. Three potted 10-inch plants that were dry and three that were wet received eggs.

**Okay, we have workable predator distribution methods, but do these predators do their job of pest control?**

In 2014, we tested a release of green lacewing larvae (*Chrysoperla rufilabris*) specifically, in controlling natural infesta-

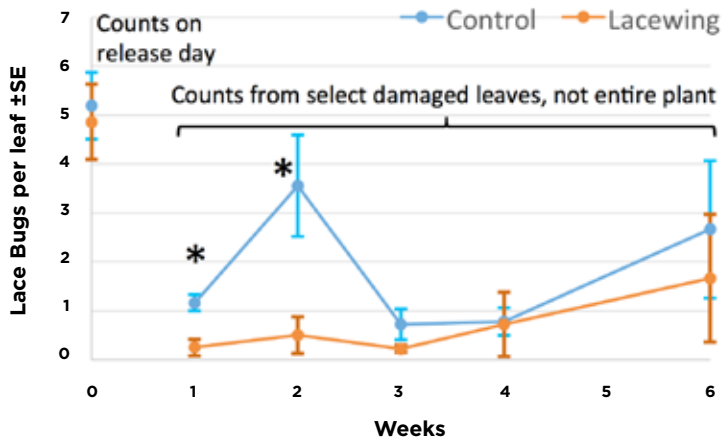


**Figure 1.** Average number of azalea lace bug per infested leaf over six weeks with methyl salicylate lure treatments on potted rhododendrons. Treated (lacewing) and non-treated (control groups) shown. Asterisks indicate significantly more azalea lace bugs on plants without lacewings.

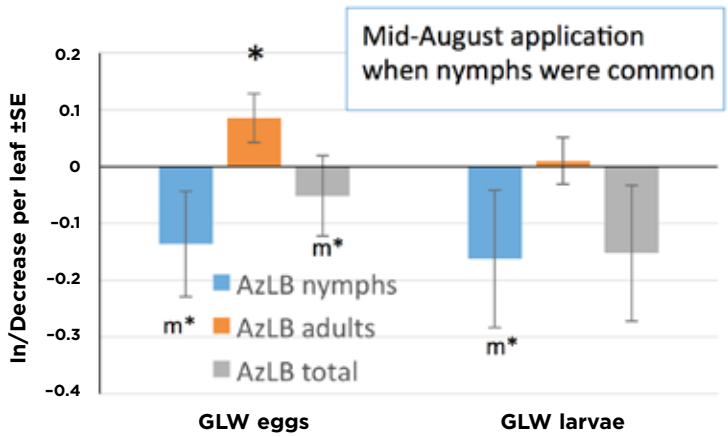


**Figure 2.** Average increase or decrease in the number of azalea lace bug (AzLB) nymphs, adults and total per leaf following the release of green lacewing eggs or larvae. Asterisk indicates significantly more lace bug adults after release, and m* indicates marginally fewer lace bug nymphs or total lace bugs after release.

| Product | Number | Price | $/Predator | Comments |
|---|---|---|---|---|
| Eggs—loose | 1,000/bottle<br>5,000/bottle | $5<br>$15 | 0.01<br>0.003 | Eggs require hatching, delay in predatory activity |
| Eggs—card (30 cards) | 5,000, 167/card | $19 | 0.004 | Cards susceptible to ants |
| Larvae—loose | 1,000/bottle<br>5,000/bag | $18<br>$80 | 0.02<br>0.02 | Larvae predate immediately |
| Larvae—hexcel unit | 400/unit | $19 | 0.05 | Hexcel prevents cannibalization |
| Adults | 100/cup<br>250/cup<br>1,000/cup | $37<br>$70<br>$130 | 0.37<br>0.28<br>0.13 | Adults must lay eggs, so there is a time delay; most adults are not predaceous, may not leave area |

**Table 1.** Green lacewing predators available and pricing (based on www.evergreengrowers.com, shipping not included).

Hexcel unit that contains about 400 larvae ready to be released. PHOTO BY EVERGREEN GROWERS

tions on rhododendrons in a nursery. We coupled predator releases with a plant volatile, methyl salicylate (MeSA, AgBio Predalure®), which has been shown to attract natural enemies in other studies.

There were six potted plants as controls, and six plants with 10 green lacewing larvae per pot plus a MeSA lure. Treatments were more than 10 meters apart due to space limitation, and MeSA volatiles may have overlapped to control pots. The release of the predators reduced azalea lace bug counts on leaves as compared to the control group during the first two weeks (Figure 1).

In 2015, we followed up on this experiment by testing green lacewing larvae and MeSA, each alone and combined, on potted rhododendrons placed in the USDA garden and farm. This time we found no difference in azalea lace bug numbers between the control group and treated groups.

In another experiment at a rhododendron garden, releases of 44 lacewing larvae or approximately 200 viable eggs per large plant did not reduce pest abundance compared to untreated plants. This may have been due to the higher infestation densities found in 2015 as compared to 2014, and a failure to increase the release rate of predators accordingly.

In a separate 2015 experiment at the same rhododendron garden, releases of green lacewing eggs or larvae marginally decreased the number of lace bug nymphs compared to pest counts before the predator release (Figure 2).

Damage on rhododendron leaves caused by azalea lace bug. PHOTO BY ROBIN ROSETTA

Between 30–70 eggs or larvae were released per plant depending on plant size. Two releases were made, and timing appears to matter. The predator release made when most of the pest population was in the nymphal stage was more effective than one made when most of the population was in the adult stage.

### Conclusions

Based on this research, we have concluded that the release of lacewing predators holds promise for short-term azalea lace bug control. Hexcel unit tapping or egg shaking on wet plants is a reliable method, and predatory releases appear to work better at targeting the nymphal stage of the pest. However, more work is needed to determine green lacewing release rate.

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### References

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