

# Azalea Lace Bug

## Biology and management in commercial nurseries and landscapes

Robin Rosetta

EM 9066 • July 2013

**A**zalea lace bug (*Stephanitis pyrioides*, Figure 1) is a damaging pest of azaleas belonging to the family of insects called Tingidae or lace bugs. This introduced pest, native to Japan, was first detected in New Jersey in 1915. It spread quickly to other mid-Atlantic and southeastern states. *S. pyrioides* was confirmed in 2008 in Washington State and 2009 in Oregon. Damage from this new introduction was noticed first on evergreen azalea plants in landscapes.

### Description and life cycle

Azalea lace bug overwinters in the egg stage. Eggs are generally laid along the midrib on the underside of leaves and covered with dark brown excrement (Figure 2, page 2). Adults can lay 300 eggs, at the rate of 5 to 7 eggs per day.

In the Willamette Valley, azalea lace bugs emerge from their eggs beginning in mid-May to early June. There are five instars, or stages, of the immature bugs. Complete development from egg to adult ranges from 22 days at 30°C (86°F) to 97 days at 15°C (59°F). Development is not successful at 33°C (91.4°F). Two to four generations per year have been reported, based on geographic location and climate. It is not yet known how many generations occur in the Pacific Northwest (PNW).

Upon emergence, the immature lace bugs, or nymphs, are nearly translucent (Figure 3, page 2). They quickly change to a light yellowish-green. As they age, they darken, particularly on the abdomen, and become spiny (Figure 4, page 2). Wing buds can be seen on the fourth and fifth instar nymphs.

Adult lace bugs are around ¼ inch long. Their wings are covered with a network of veins and lightly colored with white and black patterns creating a windowpane effect (Figure 1). The head capsule is round and bulbous as seen from the side.



Figure 1. Azalea lace bug adult with light and dark patterns on its wings.

### Damage

Azalea lace bug feeds on both evergreen and deciduous azaleas and rhododendrons. Damage on rhododendrons appears to be more severe than the damage reported from rhododendron lace bug (*Stephanitis rhododendri*). *S. rhododendri* has been in the PNW for some time and is reported to have only one generation per year compared to the multiple generations reported for azalea lace bug. Mountain laurel (*Kalmia* spp.) and andromeda (*Pieris* spp.) can

---

Robin Rosetta, Extension horticulturist,  
nursery crop pest management, North  
Willamette Research and Extension  
Center, Oregon State University

---

**Oregon State** | Extension  
UNIVERSITY | Service

also sustain damage from azalea lace bug, but they are not considered appropriate hosts for them to complete their life cycle.

Lace bugs have piercing-sucking mouthparts. They feed on the lower surface of leaves by inserting their straw-like stylets through the stomata into the parenchyma tissue. There, they withdraw the chlorophyll, leaving light yellow stippling on the upper surface of the leaves (Figure 5, page 3).

Feeding injury reduces chlorophyll content, photosynthesis, and transpiration. High populations cause severe damage on azaleas, turning the leaves nearly white (Figure 6, page 3). Heavily damaged leaves are desiccated and turn brown, and severe damage may defoliate the plant. On rhododendrons, severe damage looks similar to iron chlorosis (yellow leaves and green veins) (Figure 7, page 4). Azaleas can tolerate up to 14 percent leaf canopy damage without impact on growth or flower production.

Lace bugs deposit very visible black fecal spots on the underside of leaves (Figure 5). White, molted skins are often present.

### Monitoring and thresholds

Careful examination of the lower surface of leaves is helpful to detect newly-emerged nymphs. Nymphs tend to stay in clusters (Figure 8, page 4). On taller plants, such as rhododendrons, holding leaves up to the light reveals the silhouettes of groups of these hatchlings, making them easier to see (Figure 9, page 4).

Monitor closely when overwintering eggs are expected to hatch (mid-May to early June in western Oregon). This is important timing for management. Leaf stippling is seen first on older leaves, then appears later on younger leaves as the lace bugs disperse.

Degree-days, a measure of heat unit accumulation, is a method to predict key events in the azalea lace bug life cycle. Egg hatch is predicted to occur at 213 degree-days above 10.2°C (50.4°F). Complete development is predicted at 394 degree-days above 11.2°C (52.2°F). Microclimate effects can be very important. Heat reflecting from buildings can accelerate the life-cycle process relative to weather station data. There is an online phenology and degree-day calculator that can be customized by location, at: <http://uspest.org/cgi-bin/ddmodel.pl>

Both customers and trained professionals tend to detect azalea lace bug feeding damage at a 2 percent level of leaf damage. Levels of tolerance for damage



Figure 2. Azalea lace bug eggs along leaf midrib covered with brown excrement.



Figure 3. Newly emerged azalea lace bug nymphs are nearly translucent.

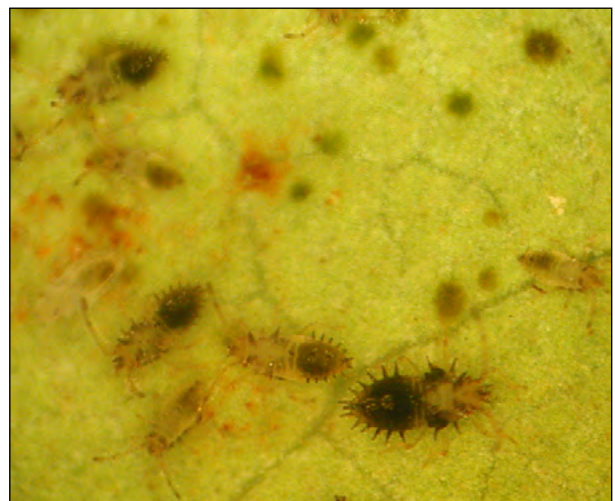


Figure 4. Azalea lace bug nymphs darken and become spiny as they age.

on nursery products differ from that on landscape plants. There is very little tolerance for lace bug damage on nursery products. Customers are unwilling to buy plants with more than 11 percent damaged leaves (leaves exhibiting signs of insect feeding). So, insect management is suggested with the first detection of azalea lace bug activity in nurseries.

In landscapes, there is more tolerance of damage. To monitor groups of plants in landscapes systematically, divide individual plants into four sections and beat just one section of the plant three times over a collection bin. If seven or more lace bugs are found, take management action. Treatment thresholds for individual plant specimens, particularly in highly visible areas, should be based on aesthetic preferences.

### Biological control

A variety of predators are reported to feed on azalea lace bug, including earwigs, green lacewings, lady beetles, minute pirate bugs, plant bugs, spiders, and tree crickets. An egg parasite, *Anagrus takeyanus*, is reported to occur in much of the mid-Atlantic and southeast U.S. As many as one-third of the lace bug eggs may be parasitized by this wasp in some locations.

Augmentation of green lacewings (Figure 10, page 5) for azalea lace bug control has had mixed results in research studies. In one study, release rates of green lacewing larvae at 5 per plant and 10 per plant, targeting newly hatched azalea lace bug nymphs on 1-gallon azaleas, have given 79 to 88 percent control 6 days after the application. Another study showed lacewing releases alone did not significantly control lace bug nymphs or adults, but, in combination with soap (for nymphs) or oil (for adults), lacewing releases improved control.

Biological control of azalea lace bug is enhanced under shady conditions and in landscapes with more structural complexity, particularly the presence of overstory trees and flowering plants.

### Cultural control

Shade-grown plants are the preferred feeding and ovipositional hosts for lace bugs, and in the Pacific Northwest damage is worse on azaleas grown in the shade. In the eastern United States, where



Figure 5. Azalea lace bug adult on leaf with stippling and fecal spots.



Figure 6. High populations of azalea lace bug cause severe damage on azalea, turning leaves nearly white.

shade-loving natural enemies of azalea lace bug have established, azaleas in the sun, particularly the afternoon sun, are reported to be nearly twice as likely to be infested. Drought-stressed plants are more susceptible to lace bug attack. Nitrogen fertilization increases host plant attractiveness to azalea lace bug but does not lead to increased damage, survivorship, or fecundity. In nurseries, research has shown lower azalea lace bug populations in container plots with wood mulch.

### Host plant resistance

Azaleas show variable resistance to azalea lace bug feeding. One study showed that azalea lace bug numbers were 72 percent lower in landscape plots using resistant deciduous azaleas. Neither bloom color, leaf pubescence, nor the size of stomatal structures determine host acceptance. Instead, leaf surface waxes are the key factor in azalea resistance or susceptibility to azalea lace bug oviposition, development, survival, and leaf area damaged.

Encore Azalea cultivars found to be less susceptible include: 'Autumn Amethyst', 'Autumn Twist', 'Autumn Royalty', 'Autumn Sangria', 'Autumn Cheer', and 'Autumn Rouge'. Evergreen azaleas evaluated for azalea lace bug resistance showed the cultivar 'Micrantha' had reduced lace bug oviposition and the lowest levels and percentage of leaf injury.

Deciduous azaleas with the highest levels of resistance to azalea lace bug are *Rhododendron canescens* and *R. periymentoides*. In a study of andromeda plant resistance, *Pieris phillyreifolia* and *P. japonica* 'Variegata' were consistently resistant to both azalea lace bug and andromeda lace bug (*S. takeyai*).

### Chemical control

Pest management programs based on least toxic controls may incorporate products such as insecticidal soap, horticultural oil, microbial, and botanically-based products for management of azalea lace bug. Insecticidal soaps and oils must directly contact the insects to control them, so complete coverage, particularly on the leaf underside, is critical.

Early season control is very important to reduce future generations and to prevent damage. These least toxic sprays are most effective on newly hatched nymphs and have shown as much as 90 percent



Figure 7. On rhododendrons, severe damage looks similar to iron chlorosis, with yellow leaves and green veins.



Figure 8. Azalea lace bug nymphs tend to stay in clusters.



Figure 9. Examine the lower surface of leaves to find groups of azalea lace bug nymphs.

control if used correctly. Single applications of insecticidal soaps and horticultural oils are not as effective as synthetic insecticides, so repeated applications may be necessary for acceptable control. The egg stage is embedded in the plant material, so it is protected from most control (except for horticultural oils).

Neem-based products act as anti-feedants, insect growth regulators, and repellants. Research from Maryland has shown a 50 percent reduction of azalea lace bugs after a neem application, but this was not significantly different from the natural mortality of 37 percent.

Most of the remaining chemical options act either as contact insecticides (such as the pyrethroids or carbaryl) or have systemic activity (such as acephate or the neonicotinoids). Contact insecticides and some of the systemic insecticides may have a detrimental impact on beneficial insects. There is concern about the use of neonicotinoids on plants that attract honey bees and bumblebees.

Acephate has been found to be the most effective synthetic insecticide for the cost of control.

In a trial evaluating neonicotinoid insecticides for azalea lace bug control, dinotefuran and thiamethoxam provided the best control 3 and 7 days after treatment, but the efficacy of clothianidin was similar after 14 days. All neonicotinoid treatments significantly reduced azalea lace bugs by 60 days compared to the untreated control. Imidacloprid is less water-soluble than dinotefuran and may take longer to become active, but it is equally effective and may be more persistent over time.

Dinotefuran, with the highest water solubility and mobility in the plants, acts more quickly than other neonicotinoids with lower water solubility. However, in June 2013, the ODA placed a 180-day restriction on the use of products containing dinotefuran on ornamental plants, turf, and agriculture, in order to evaluate the safety of this specific pesticide on bees. Before you use any pesticide containing dinotefuran, be sure to find out if this restriction is still in place.

### Selected references

Braman, S.K., J.C. Latimer, R.D. Oetting, R.D. McQueen, T.B. Eckberg, M. Prinster. 2000. Management Strategy, Shade, and Landscape Composition Effects on Urban Landscape Plant



Figure 10. Green lacewing eating an azalea lace bug.

- Quality and Arthropod Abundance. *Journal of Economic Entomology* 93 (5):1464–1472.
- Braman, S.K., A.F. Pendley, B. Sparks, W.G. Hudson. 1992. Thermal Requirements for Development, Population Trends, and Parasitism of Azalea Lace Bug (Heteroptera: Tingidae). *Journal of Economic Entomology* 85 (3):870–877.
- Buntin, G.D., S.K. Braman, D.A. Gilbert, D.V. Phillips. 1996. Chlorosis, Photosynthesis, and Transpiration of Azalea Leaves after Azalea Lace Bug (Heteroptera: Tingidae) Feeding Injury. *Journal of Economic Entomology* 89 (4):990–995.
- Held, D.W., S. Parker. 2011. Efficacy of Soil Applied Neonicotinoid Insecticides Against the Azalea Lace Bug, *Stephanitis pyrioides*, in the Landscape. *Florida Entomologist* 94 (3):599–607.
- Klingeman, W.E., G.D. Buntin, S.K. Braman. 2001. Using Aesthetic Assessments of Azalea Lace Bug (Heteroptera: Tingidae) Feeding Injury to Provide Thresholds for Pest Management Decisions. *Journal of Economic Entomology* 94 (5):1187–1192.
- Klingeman, W.E., S.K. Braman, G.D. Buntin. 2000. Evaluating Grower, Landscape Manager, and Consumer Perceptions of Azalea Lace Bug (Heteroptera: Tingidae). *Journal of Economic Entomology* 93 (1):141–148.

- Nair, S., S.K. Braman. 2012. Integration of Insecticides with the Natural Enemy *Chrysoperla carnea* (Stephens) for Management of Azalea Lace Bug (Hemiptera: Tingidae). *Journal of Entomological Science* 47 (3):278–281.
- Neal, J.W., Jr., L.W. Douglass. 1988. Development, Oviposition Rate, Longevity, and Voltinism of *Stephanitis pyrioides* (Scott) (Heteroptera: Tingidae). *Journal of Economic Entomology* 17 (5):827–831.
- Shrewsbury, P.M., M.J. Raupp. 2000. Evaluation of Components of Vegetational Texture for Predicting Azalea Lace Bug, *Stephanitis pyrioides* (Heteroptera: Tingidae), Abundance in Managed Landscapes. *Environmental Entomology* 29 (5):919–926.
- Trumble, R.B., R.F. Denno. 1995. Light intensity, host-plant irrigation, and habitat-related mortality as determinants of the abundance of azalea lace bug (Heteroptera: Tingidae). *Environmental Entomology* 24 (4): 898–908.

### Acknowledgements

Much appreciation goes to Dr. Kris Braman, University of Georgia, for generously sharing her extensive knowledge and research on azalea lace bug.

#### Use pesticides safely!

- Wear protective clothing and safety devices as recommended on the label. Bathe or shower after each use.
- Read the pesticide label—even if you’ve used the pesticide before. Follow closely the instructions on the label (and any other directions you have).
- Be cautious when you apply pesticides. Know your legal responsibility as a pesticide applicator. You may be liable for injury or damage resulting from pesticide use.

### Dedication

For Dr. Robert Ticknor, an ardent supporter of growers and a renowned plant breeder, whose talent was matched only by his kindness and generosity.

All photos in this publication by Robin Rosetta, © Oregon State University.

Trade-name products and services are mentioned as illustrations only. This does not mean that the Oregon State University Extension Service either endorses these products and services or intends to discriminate against products and services not mentioned.

Any use of a pesticide contrary to instructions on the printed label is neither legal nor recommended.

© 2013 Oregon State University. This publication was produced and distributed in furtherance of the Acts of Congress of May 8 and June 30, 1914. Extension work is a cooperative program of Oregon State University, the U.S. Department of Agriculture, and Oregon counties. Oregon State University Extension Service offers educational programs, activities, and materials without discrimination based on age, color, disability, gender identity or expression, genetic information, marital status, national origin, race, religion, sex, sexual orientation, or veteran’s status. Oregon State University Extension Service is an Equal Opportunity Employer.

Published July 2013.