

# THE PURDUE LANDSCAPE REPORT

Issue: 18-09  
June 19, 2018

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## Tips for Controlling Persistent Problems with Scale Insects

(Cliff Sadof, [csadof@purdue.edu](mailto:csadof@purdue.edu))

Scale insects appear to be designed to avoid exposure to insecticides. Fortunately, these pests are often kept under control by a wide range of natural enemies. Successful management of these pests depend on helping these natural enemies thrive, while making it difficult for scale insects to grow and reproduce.

### *What are scales insects?*

Scales are sucking insects that are closely related to aphids and mealybugs. They live most of their lives glued to a branch or leaf so they can drill a wire like straw into the plant so they can suck out and feed on plant juices. Armored scales cover themselves in a dry waxy armor and live most of their lives on a twig (Figure 1) or leaf (Figure 2). In contrast, soft scales are sticky to the touch and most spend the winter and spring on twigs (Figure 3) and summer on leaves (Figure 4). Soft scales are sticky because they are covered with liquid excrement that eventually turns black with a mold that can turn a plant black and reduce its capacity to grow and survive (Figure 5). Each scale insect lays large numbers of eggs under their shells (Figure 6) that hatch into a crawling stage that walks to a new site to feed (Figure 7). This mobile stage, known as a crawler, is the most susceptible to insecticides.



Fig 1 Oystershell scale on maple twig (armored scale).

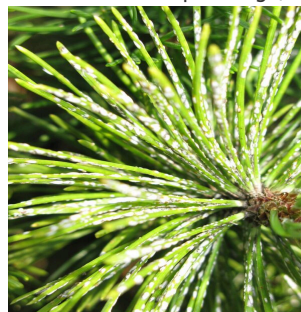


Fig 2 White waxy covers of pine needle scale on pine needles



Fig 3 Crabapple encrusted with Calico scales (soft scale.) Photo by C. Quesada



Fig. 4 Calico scales on honeylocust leaf in summer



Fig 5 Black sooty mold on pine (left) heavily infested with striped pine scale (soft scale)



Fig 6 Eggs laid by calico scale (soft scale). Photo by C. Quesada



Fig 7 Crawler of brown soft scale. (Photo by J. Obermeyer)

Why are scale problems becoming more of a problem?

There are two reasons scales have become more of a problem. First, is that climate change is making our region more prone to periods of excessive heat and drought. This stresses plants and make them better food for sucking insects. Scale insects that feed on plants exposed to heat and drought will produce more eggs than those plants that are not stressed. This weather extreme can also kill the parasites and predators that attack scales and keep them from harming plants. Pesticides applied to the landscape to control other plant pests or mosquitos and ticks can also harm natural enemies.

How to prevent scale problems?

Keeping plants watered during drought can help reduce the kinds of stresses that promote scale problems. Having a diverse community of flowering plants can feed the beneficial insects that keep scale problems in check. Refraining from pesticide use, or selecting products with short residual toxicity to insects can also be helpful.

How to fix a scale problem.

Start by determining the kind of scale you have so you can find out when crawlers are active. Use the Purdue Tree Doctor App ([Purdueplantdoctor.com](http://Purdueplantdoctor.com)) to identify the problem. Horticultural oil applied at the summer rate (2%) works well on armored scales when they are in the crawling stage. When plants are dormant in the spring they can be used to kill armored scales that do not winter as eggs. Horticultural oil does NOT work as well against soft scale insects. Soft scale insects can be controlled with insecticidal soap, when scales are actively crawling. Soil applied neonicotinoid insecticides can work against armored or soft scales, but results can be somewhat inconsistent and these products may harm pollinators if applied before flowering. Professionals have access to insect growth regulators that when timed correctly will kill scale insects and conserve natural

enemies. For more details on identification and control see this publication: [Managing scale insects on shade trees and shrubs](#)

Useful links

Effectiveness of horticultural oil and insecticidal soap on selected armored and soft scales

<http://horttech.ashspublications.org/content/27/5/618.abstract>

## Spreading Ornamentals

(Rosie Lerner, [rosie@purdue.edu](mailto:rosie@purdue.edu))

People often select plants first for their beauty and second for their functionality in the garden. Frequently, we don't know or don't consider a plant's behavior when we're selecting them.



Vinca minor – high potential for invasive habit, Do Not Plant!

Photo Credit: Rosie Lerner, Purdue Extension

Almost by definition, a species that is an effective ground cover will have a spreading habit. But does that make the species aggressive or invasive? There can be much confusion about the meaning of the terms aggressive and invasive.

Some plants, given their optimal habitat, can become quite prolific in the garden. A plant can be considered *aggressive* if it spreads and has the potential to take over a garden area. However, some planting sites may call for an aggressive habit.

A spreading plant can be considered *invasive* if it can also escape the garden setting and move into natural areas (prairies, wetlands, and so on) and displace native vegetation. Truly invasive plants have the potential to dominate natural vegetation.

Many useful plants get bad reputations for their spreading behavior when they may simply be in the wrong place or managed the wrong way.

Some spreading ornamental plants have a high propensity for becoming invasive. You should always avoid using these plants in the landscape. The publication we link to below lists some of these plants to avoid.

As you consider what to plant, it may seem that more and more plants are classified as invasive — and you would be correct. There are more invasive plants for several reasons, including an increasingly unstable climate, more gardeners who unwittingly plant invasives, greater scrutiny of invasives, and changes in



species (that is, individual species have adapted to cooler or warmer environments).

To help you make better informed plant selections, we recently revised our publication [Spreading Ornamental Plants: Virtues and Vices](#) (Purdue Extension publication HO-295-W, formerly HLA-1-W).



Vinca major – high potential for invasive habit, Do Not Plant!

Photo Credit: Rosie Lerner, Purdue Extension

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## Gypsy moth: Don't panic, be vigilant, get organized

(Elizabeth Barnes, [barne175@purdue.edu](mailto:barne175@purdue.edu))

Gypsy moth is tearing through trees in northern Indiana this summer following dry weather in the spring. Although these caterpillars are close to being out of our hair for another year (they'll stop feeding soon), there are still a few steps you can take this year and next year to protect your trees.

### Don't panic

Gypsy moths (*Lymantria dispar*) are an invasive pest that occasionally fills the forest with hungry caterpillars. Although they can eat all the leaves on trees and are unpleasant to be around, they rarely kill the trees they defoliate. Most healthy deciduous trees (oak, birch, etc.) can withstand a year of complete defoliation and will produce new leaves later in the summer or the following year. However, if gypsy moths attack coniferous trees (pine, spruce, etc.), sickly trees, or defoliate deciduous trees two years in a row they may kill them. To keep these trees alive they will need protection.

### What you can do now

**Burlap band method:** Gypsy moths can be trapped using a folded over [burlap band that catches](#) caterpillars as they make their daily migration from the leaf canopy to the trunk to hide from birds during the day.

**Soapy water:** Wear gloves and pick caterpillars, egg masses, or pupae off of trees and throw them in soapy water. This method will kill the caterpillars and help cut down on the number that survive your other treatments. Remove and [Destroy egg masses](#) after adults complete laying their eggs in August.

**Chemical control:** It is too late in the year for most people to use chemical insecticides to treat the gypsy moth problem. Most of the caterpillars are preparing to pupate (enter a non-feeding stage) and will no longer be affected by many insecticides. However, if you are interested in trying this method of treatment, you can find [more information here](#).

### Be Vigilant

Based on what we have observed this year, the pathogens that often keep gypsy moth populations in check are present, but have not infected enough caterpillars to guarantee a low caterpillar population next year. Therefore, the most important action you can take to protect your trees is to be vigilant this fall and next spring. This fall, make note of how many egg masses you see on your trees and remove any you find. Next spring, look for gypsy moth caterpillars around the time that redbud trees start to flower. Gypsy moths often go unnoticed until they are already big enough to defoliate trees so it is important to keep careful watch on your trees and respond at the first signs of damage. If we have a dry spring it is more likely that we will have another outbreak because the fungi that attack gypsy moth only thrive in humid weather.

In addition to all of the treatment options listed above, you can also try two others next spring:

**Trunk injection:** You can protect your trees for a year by injecting them with emamectin benzoate before the gypsy moths hatch. However, bear in mind that this treatment can be expensive, only lasts a year, and must be done by professionals.

**Areal spray of *Bacillus thuringiensis*:** This bacteria is harmless to humans and other animals but deadly to caterpillars. It can be sprayed from the air over a neighborhood that was infested by gypsy moths the previous year. This treatment is only effective when the caterpillars are still young. You must also have the permission of all of the landowners in a spray area before this treatment can be done.

### Get Organized

If your neighborhood had an outbreak of gypsy moths this year, take precautionary measures to prevent another infestation next year. Gypsy moths can move between trees so community wide management plans are the most effective. In addition, many treatments are less expensive if a group of trees are treated at the same time. Remember, gypsy moths seem overwhelming but can be managed with attentiveness and forethought.



Figure 1. In a street in northern Indiana where gypsy moth caterpillars


stripped all of the oak tree of their leaves this summer

## Cultural Plus Chemical=A good weed control combo in landscape beds

(Kyle Daniel, [daniel38@purdue.edu](mailto:daniel38@purdue.edu))

This article, and many others, will be presented at the 2018 Purdue Turf and Landscape Field Day on July 10th. Registration is open and available online: [https://www.mrtf.org/event/turf-and-landscape-field-day/?event\\_date=2018-07-10](https://www.mrtf.org/event/turf-and-landscape-field-day/?event_date=2018-07-10)

Here is the lineup for the field day.

**Purdue Turf & Landscape  
Field Day**  
4.0 cat. 3a/3b/RT, 3.0 cat. 2/6/7a, 1.0 cat. 5 CCHs requested

**July 10, 2018**  
**W. H. Daniel Turf Center**  
1340 Cherry Lane  
West Lafayette, Indiana

**Morning Schedule**  
8:00 am Registration  
8:00 - 9:00 am Tradeshow & Equipment Demonstration  
9:00 - 9:20 am Opening Remarks and Recognition of the MRTF Award of Achievement Winners  
- Mr. Gary Crum, Lawn Tamer, LLC  
- Mr. Troy Rippey, Syngenta  
- Mr. Chad Will, TenBarge Seed & Turfgrass Supplies  
9:30 - 11:30 am Morning Turf Research Tours  
**Lawn Tour**  
Stop 1: Where Does All the Nitrogen Go After an Application?, Ross Braun  
Stop 2: Monitoring Clipping Yields and Adjusting Your Agronomic Program, Aaron Patton  
Stop 3: Your Spray Water Makes a Difference! Keys to Successfully Spraying Herbicides, Geoff Schortgen  
Stop 4: Cleaning and Winterizing Sprayers, Fred Whitford  
Stop 5: Potassium Fertilization – Does it Matter?, Cale Bigelow  
Stop 6: Spring Seeding: What Strategies Work Best?, Kevin Jackson, Jada Powlen, and David Flores  
Stop 7: State Chemist, What Have We Seen in 2018?, Joe Becovitz  
**Golf Tour**  
Stop 1: Successfully Cultivating Turf, Quincy Law  
Stop 2: Monitoring and Managing Caterpillars on the Course, Doug Richmond  
Stop 3: Comparing Phosphates for Disease Control and Turf Health, Rick Latin  
Stop 4: Cleaning and Winterizing Sprayers, Fred Whitford  
Stop 5: Choice is Yours. Attend Lawn Stop #1,2,3, 5, or 6 based on your interest.  
Stop 6: Choice is Yours. Attend Lawn Stop #1,2,3, 5, or 6 based on your interest.  
Stop 7: State Chemist, What Have We Seen in 2018?, Joe Becovitz

**Sports Tour**  
Stop 1: Choice is Yours. Attend either the Lawn or Golf Stop #1  
Stop 2: Choice is Yours. Attend either the Lawn or Golf Stop #2  
Stop 3: Your Spray Water Makes a Difference! Keys to Successfully Spraying Herbicides, Geoff Schortgen  
Stop 4: Cleaning and Winterizing Sprayers, Fred Whitford  
Stop 5: Potassium Fertilization – Does it Matter?, Cale Bigelow  
Stop 6: Spring Seeding: What Strategies Work Best?, Kevin Jackson, Jada Powlen, and David Flores  
Stop 7: State Chemist, What Have We Seen in 2018?, Joe Becovitz  
**Landscape Tour**  
Stop 1: Selecting Native Plants for the Landscape  
Stop 2: Perennials for Shade, Rosie Lerner  
Stop 3: How did bagworms survive the cold winter and a discussion about local pest management needs?, Cliff Sadof and Sujana Dawadi  
Stop 4: Cleaning and Winterizing Sprayers, Fred Whitford  
Stop 5: Cultural Plus Chemical – A Good Weed Control Combo in Landscape Beds, Kyle Daniel  
Stop 6: Stake or Not to Stake, That is the Question!, Lindsey Purcell  
Stop 7: State Chemist, What Have We Seen in 2018?, Joe Becovitz  
**Afternoon Schedule**  
12:00 - 1:00 Pork Chop Lunch by Shoup's Catering  
11:30 - 3:00 Trade Show & Equipment Demonstration  
12:15 - 12:45 Marketing Session (meet in classroom)  
Identifying Green Industry Business and Marketing Practices, Arlana Torres  
1:00 - 3:00 pm Afternoon Pollinator Workshop (meet in classroom)  
Understanding How to Promote and Protect Pollinators in the Landscape, Lawn, and Golf Course, Doug Richmond, Cliff Sadof, Mark O'Brien, Ryan Cummings  
1:00 - 3:00 pm Afternoon Landscape Discussion (meet under tent-North)  
Making a Plan: Developing a Herbicide Program for Your Landscapes, Kyle Daniel  
1:00 - 3:00 pm Weed ID and Control Tour (meet under tent-South)  
It's all fun and games. Tour Purdue's latest weed control trials and test your knowledge. Aaron Patton, Ross Braun, Geoff Schortgen, Quincy Law

Figure 1. Purdue Turf and Landscape Field Day is July 10th in West Lafayette. Don't miss the latest research and best management updates!

A cultural weed control method is one that involves steps to reduce or eliminate weeds via maintenance techniques. In landscapes, the most common type of cultural control is mulching. Mulching provides many benefits in the landscape, including moisture retention, temperature consistency of the root zone, improvement of soil structure, addition of organic matter, aesthetics, and, perhaps most important, a significant reduction in weeds.

Mulch prevents weeds a couple of different ways. Many weed species require sunlight for germination to occur. By shading the soil beneath the mulch, weed seeds that require sunlight will not begin to germinate. The other way that mulch prevents weeds from germinating is by providing large air spaces (macropores) between the pieces of mulch. Since moisture is required for germination, the macropores in the mulch keep the area free from moisture. Mulch will also suppress weed growth by not allowing the root system to become fully established in the macropores. The larger the mulch (i.e. pine bark nuggets vs. shredded hardwood) the more effective the mulch is in preventing

and suppressing weeds.

Working in olive, it was found that mulching alone provides about 50% control after 12 weeks as compared to bare ground. In the same study, isoxaben, mesotrione, oryzalin, and oxadiazon were sprayed to bare ground and controlled weeds 97, 93, 90, and 97% respectively. This study also sprayed prior to mulch application with the same herbicides and controlled weeds 94, 100, 90, and 92% respectively (Henry et.al, 2015). This trial showed that combining herbicides with mulch will give much better control than mulch alone and equivalent, or often better, control when herbicides and mulch are used in combination.



Figure 2. Mulch plus preemergence herbicides make for effective weed control

In another study, weed control effectiveness increased with depth of mulch regardless of herbicide rate (Marble, 2014) of up to seven cm. Other resources mention mulch greater than seven inches provides very effective weed control. As we would expect, the deeper the mulch, the less weeds. This is often impractical, as the recommended depth of mulch in landscape beds is three inches.

An added benefit of applying preemergence herbicides followed by an application of mulch at three inches is to prevent volatilization and breakdown of susceptible herbicides, such as dichlobenil or DNA herbicides (i.e. trifluralin, oryzalin, and pendimethalin) by limiting sun exposure and providing moisture.

The trial we are presenting consists of mulched plots with several preemergence herbicides that are currently available to green industry applicators. Weed control effectiveness with the herbicides will be compared to the control plot that has mulch but no herbicides.





Figure 3. A mulch and herbicide research trial will be presented at field day on July 10th.

#### References:

Gerald, G.M, Hoyle, J.A., Beck, L.L., Cooper, T., Montague, T., and McKenney, C. 2015. Evaluation of Mulch and Preemergence Herbicide Combinations for Weed Control in High Density Olive (*Olea europea* L.) Production. HortSci. 50(9). 1338-1341.

Marble, C. 2014. Herbicide and Mulch Interactions: A Review of the Literature and Implications for the Landscape Maintenance Industry. Weed Tech Manuscript Draft.

## Japanese Beetles on the Horizon

(Cliff Sadof, csadof@purdue.edu)

As we move into summer it is time to be on the lookout for Japanese beetles. They are already being reported by Indiana Nursery Inspectors in Southern Indiana. Continued warm weather and precipitation should bring them out throughout the rest of the state over the next few weeks. See our bulletin [Japanese Beetles in the Urban Landscape](#) for tips on controlling them without killing pollinators.

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Japanese beetle now active in Southern Indiana

## Winter of 2018 killed some, but not all of the bagworms

(Cliff Sadof, csadof@purdue.edu)

After surveying 72 sites across Indiana and Illinois in the coldest part of our states where bagworms are found, we determined that while many bagworms were killed, enough survived to keep bagworms near the top of our landscape problem list. NOW is the time to inspect your plants for bagworms. For details on the cold snap and how to control bagworms see this article in the February issue of the Purdue Landscape Report.

<https://www.purduelandscapereport.org/article/824/>



Young bagworms are now active and easy to control with insecticide

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