TEXAS A&M AGRILIFE EXTENSION

L-5479
12/06

Florida Wax Scales:
Control Measures in Texas for Hollies

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Hollies have historically been good choices as landscape plant species in Texas and are well adapted to the state's environmental conditions. However, in recent years a new pest has begun attacking the hollies (*Ilex* spp.) here.

Landscape hedges of hollies throughout the eastern half of Texas and the southeastern United States are increasingly becoming infested with the Florida wax scale, *Ceroplastes floridensis* Comstock (Homoptera: Coccidae) (Fig. 1). When plants are heavily infested with wax scale, the leaves, or foliage, become blackened with coatings of a fungus called sooty mold.

Figure 1. Holly leaf infested with Florida wax scale.

Wax scales injure plants by removing large amounts of plant sap. Severe infestations may discolor the leaves, cause shoots or branches to die back and occasionally kill the entire plant. Wax scales also produce honeydew, which serves as a medium for the growth of sooty mold and attracts insects such as bees, wasps, hornets and ants (Hymenoptera).

The sooty mold colonizes (or grows) on the honeydew, causing the infested plant parts to turn black and unsightly. This mold also attracts some species of bark lice (Psocidae).

When the plants are infested heavily, it is difficult to control these insects, in part because you must time the spraying properly as well as coat the leaves thoroughly with insecticide. Even after the insects are killed, many of the scales and sooty mold will remain on the plants and continue to disfigure them.

Identification

To keep from wasting time, effort and money on control efforts that work incompletely or not at all, it is important that you first identify the problem correctly. Many species of scale insect infest ornamental landscape plants. However, none have the shape and size of this group of soft-scale insects: wax scales are globe-shaped and coated with a heavy layer of wet-looking white, beige, pinkish white or grayish wax.

From the top view, the insect appears rectangular, oval or lobed at the base. Under the wax cap, the body of the scale is reddish. The adult female Florida wax scale grows to about 3 millimetes (1/8 inch) in diameter.

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Many other species of wax scales occur in the state, including the larger barnacle scale, *C. cirripediformis* Comstock, which grows to almost 1/4 inch in diameter.

Biology

Because timing is vital in controlling Florida wax scale, you need to know about the life cycle of this insect.

The eggs (Fig. 2) of this species are oval and reddish orange. They fill the cavity under the bodies of dead or mature adult female scales.

From the eggs hatch Florida wax scale nymphs. The nymphs feed and develop through three stages, which are known as the first, second and third instars.

First-instar nymphs (Fig. 3) hatch from eggs over 2 to 3 weeks. Then these nymphs, called crawlers, move to and settle on the leaves, twigs and stems of the host, spreading the infestation. When a new flush of growth occurs on a host plant, the crawlers will often migrate to the new growth at the top of the plant.

Scales often line up along the veins on top of the leaf (Fig. 4). Florida wax scale nymphs can move from one place on the plant to another.

After settling, the nymphs insert their thread-like mouthparts into the plant and begin to secrete wax in tufts around their bodies, which gives them a star-like appearance.

After the third instar, the scales become adults, produce eggs, and die. If you remove an individual adult female scale from a leaf at certain times of the year, hundreds of eggs will pour out of its body cavity.

In Texas, the Florida wax scale has two fairly distinct generations per year: The eggs hatch in late April through May and again in late July through August. However, some eggs can hatch during other months.

Florida wax scales overwinter (spend the winter) as newly mature females. Male forms have not been observed in this species.

Other host plants

Florida wax scales infest a wide range of host plants, including shrubs, trees and several herbaceous plants. In Florida, it has been found on many species of holly, elm, crape myrtle, oak, loblolly pine, deodar cedar, citrus and other hardwoods and softwoods. In Texas, wax scale infestations have been observed on hollies as well as elephant ear,

Figure 2. Eggs from beneath an adult female wax scale.

Figure 3. Settled crawlers and (inset) active crawlers.

Figure 4. Adults.

golden euonymous, honeysuckle, pomegranate, winged elm and Virginia creeper.

Florida wax scales are easily spotted on holly because most of them are found on top of the leaves. This location makes the scales easier to reach with foliar insecticide sprays. It also makes them vulnerable to heavy rain and other environmental factors that reduce their ability to survive.

However, some of the scales infest twigs, branches and the undersides of leaves, where they are more protected.

Distribution

Florida wax scale is widely distributed from Maryland to Florida, including the Caribbean archipelago, and from Missouri to California. In recent years, infestations in the eastern half of Texas have become particularly noticeable.

Management

In Texas, you can control Florida wax scale through cultural and chemical methods.

Cultural control: To eliminate the need for repeated insecticide treatments on heavily infested hollies, consider replacing them (and other host plants) with species that are not attacked by Florida wax scale. Alternative shrubs include junipers (except 'Blue Point' juniper), ligustrum, privet, boxwood, pittosporum, bottle brush, sea grapes, oleander and wax myrtle (regular and dwarf).

Of course, these landscape ornamental plants may have other limitations. If you decide to plant hollies, inspect the plants thoroughly to avoid buying infested plants. When planting them, choose and prepare appropriate planting sites, then water and fertilize the hollies properly.

Check the plants regularly for early signs of an infestation of wax scale or other pests. If you decide to preserve the plants once they have become infested, first prune away and discard all the heavily infested foliage. This will remove some of the pests and open the canopy, which will allow you to spray the leaves more thoroughly and get better coverage.

Chemical control: The goal of using insecticides should be to prevent new plant growth from becoming infested by crawlers. The treatment options include:

- Systemic insecticides (those that are absorbed and circulated by a plant so as to kill the pests that feed on it) applied to the soil, and/or
- Foliar sprays

Choose a product that has a label listing scale insects or soft scale on ornamental landscape plants. Specific chemical application guidelines are detailed on the following pages.

Similar treatments on other landscape plants may help control other pests such as azalea lace bugs and crape myrtle aphids, but check the timing of applications because they vary for different pests and plants.

Systemic soil treatments: Because systemic insecticides generally do not eliminate all the scales from the branches or twigs, you may need to apply them more than once to eliminate the population.

If you choose a soil-applied systemic insecticide, such as one containing imidacloprid (for example, Merit®, Bayer Advanced™ Tree & Shrub Insect Control), apply it before egg hatch to allow the active ingredient to be moved from the soil through the roots and into the leaf tissue.

The scales that are attached to the branches or twigs may be unaffected by this systemic soil treatment. Those killed by the insecticide may persist for a period of time before falling off. Carefully follow the directions on the product label.

Foliar sprays: Leaf treatments are best applied after the crawlers hatch from the eggs and begin to settle on new foliage. Beginning in late April and again in mid-August, examine the leaves on the infested plants every 1 or 2 weeks for newly settled nymphs. They will appear small, white and starlike as they begin secreting their wax coating.

You may need to spray the leaves several times in 7- to 10-day intervals or as directed on the product's label. This spray schedule will protect the new foliage through the period of egg hatch, particularly if it is the type of insecticide that offers little or no residual (long-lasting) activity, such as insecticidal soap or horticultural oil.

For a longer period of control, use a contact systemic foliar spray such as products containing acephate (example: Orthene® Tree, Turf and Ornamental Spray). This type of pesticide kills insects on contact, but it is absorbed into the leaf tissue, providing a longer period of control.

Biological control: In some parts of the United States, three parasitic wasp species (*Coccophagus lycimnia*, *Scutellista cynea* and *Metaphycus eruptor*) have been used to biologically control Florida wax scale. However, no natural enemies (pathogens, parasites, predators) of wax scale have been observed in Texas.

Chemical Application Guidelines

Applying a systemic insecticide to the soil

1. **Assemble the proper equipment and supplies—product, applicator and protective clothing.** Before proceeding, be sure that your protective clothing and the application equipment are clean and in good repair after the previous use. After making an application, clean and store the equipment and protective clothing properly.
2. **Mark the designated equipment properly.** If you are using a sprinkler can or other equipment to apply a pesticide, write a warning such as *Insecticide Use Only* on the container. Do not use this equipment for other purposes. Do not use herbicides in the same equipment used for insecticides or miticides.
3. **Read the product label thoroughly.** The label will specify the safety equipment required, such as gloves or goggles, long-sleeved shirts, pants and shoes. Review this section to determine the application rate and the concentration of material to be applied.

   Also check the re-entry interval (the period immediately after the application of a pesticide to an area when unprotected people should not enter it), if any.
4. **Measure the height of the plant.** When using Bayer Advanced™ Tree & Shrub Insect Control containing imidacloprid, the use rate (gallons of diluted solution to pour around the root zone) varies according to plant height. Other products may contain ingredients and have different rates and directions for use.

   Prune the plant to eliminate heavily infested leaves to reduce the plant height, which will allow the new growth to be protected by the insecticide.
5. **Wear proper personal protection.** Possibly the most dangerous step in using a pesticide is when you are mixing water with the concentrated insecticide from the container. Wear gloves and other clothing described on the product label before opening the container and mixing the concentrate.
6. **Shake the container.** When stored for long periods, some pesticide formulations settle and separate. Always shake the container to agitate the contents before opening it.
7. **Partially fill the applicator tank or container with water.** This step will help the concentrate go into solution and prevent the concentrated insecticide from coating the sides of the applicator container. Adding more water later will also help stir this solution.
8. **Add the proper amount of insecticide.** The product label will list the amount of the pesticide to mix with a certain amount of water. To control soft scales (including Florida wax scales) on holly shrubs using Bayer Advanced™ Tree & Shrub Insect Control, apply 3 fluid ounces per foot of plant height to the root zone or the soil under the shrub. Use a well-marked measuring cup (mark it *Poison*).
9. **Pour the concentrate into the application container, and rinse the measuring cup or spoon.** Using water to fill the applicator, rinse the measuring cup or spoon three times to help remove the concentrated insecticide and mix it into solution.
10. **Apply the diluted solution to the root zone.** Sprinkle the insecticide solution on the soil under the canopy of the shrub and then water it in as directed. Systemic insecticides such as imidacloprid are moved from the roots in the soil to the leaves. Do not apply them to very wet or saturated soils. The solution must penetrate into the soil and stay in place so the roots can pick up the active ingredient.

Timing: For Florida wax scale, you need to apply the insecticide to the soil several weeks before the eggs hatch. In Texas, this species has two distinct generations: one in late April and the second in late August.

Because the scales on the branches and twigs may be unaffected by systemic insecticides applied as a soil drench, you may also need to treat the leaves with a foliar spray to eliminate the infestation. In late May and late September, check for new young scales on the leaves to determine whether the treatment was successful.

Applying a foliar spray

1. **Carefully read the label directions on the container or the labeling leaflet supplied with the product's container.** The directions provide information about personal protective clothing, timing(s) for making application(s), equipment required and the rate of product to apply. Orthene® Tree, Turf and Ornamental Spray is a soluble powder formulation, one of several formulations containing the active ingredient acephate (75 percent concentrate).
2. **Add some water to the applicator container.** Make sure the applicator works, as the nozzle may be clogged or the seals in older compression sprayers can prevent pressure from building up in the tank. Also, use this water to help agitate the concentrate insecticide so it can mix into a dilute solution.

3. **Measure out the proper amount of concentrate insecticide.** For scale insect control, Orthene® Tree, Turf and Ornamental spray is applied at a rate of 1 teaspoon per gallon. Wear proper application clothing and use a designated measuring spoon (mark it *Poison*).
4. **Fill the applicator with remaining amount of water.** Add water after adding the insecticide powder or concentrate to help agitate the solution and mix the insecticide to make a dilute solution. Use larger equipment for larger tasks.
5, **Wear goggles, gloves, long pants and a long-sleeved shirt.** As directed on the product label, and particularly when using fine, droplet sprays and needing to crawl through shrubbery, take all precautions to avoid getting the insecticide in your eyes or on your skin or clothing.
6. **Pump up the sprayer.** Follow the manufacturer's recommendations to pressurize the sprayer tank. Agitate the insecticide solution again before spraying.
7. **Start spraying the most inaccessible areas first, and back away from treated foliage areas.** Avoid brushing up against just-sprayed foliage. Spray the undersides of the lowest leaves first.
8. **Treat the upper leaf surfaces last.** The Florida wax scale settles mainly on the upper leaf surfaces. However, some egg-laying females can be found on branches, twigs and the underside of leaves. You need to cover the leaves thoroughly to eliminate the whole population.

   Use all of the mixed-spray solution. Do not leave unused solution in the sprayer because the insecticide will decompose and the liquid will corrode and ruin the applicator.

Orthene® or acephate is a contact and systemic insecticide that is applied to leaves, absorbed into leaf tissues and moved by the plant to new growth. Scales that come into contact with the spray will be killed, and the foliage containing acephate will kill young scales that settle on the leaves and begin to feed on the plant sap.

Timing: In Texas, the Florida wax scale eggs hatch primarily twice per year, although some eggs can hatch at any time. Egg hatch occurs over several weeks during each generation (late April and late August). Foliar sprays are most effective when applied during the crawler stages of this scale insect first settle on the foliage to start feeding.

The Orthene® label recommends applying this foliar spray at 2-week intervals through the egg hatch period. If you use products with ingredients that do not provide a long period of control, such as insecticidal soap or horticultural oil, you may need to retreat more often.

Always monitor your plants for signs of phytotoxicity (pesticide spray injury), such as discoloration, browning or leaf drop. To monitor the success of the foliar spray, look for newly settled young scale insects developing on leaves after treatments.

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All pesticides are potentially hazardous to human health and the environment.

As a pesticide user, you are legally required to read and carefully follow all directions and all safety precautions on the container label. Label instructions are subject to change, so read the label carefully before buying, using and disposing of any pesticide. Regardless of the information provided in an Extension publication, always follow your product's label.

When in doubt about any instructions, contact your pesticide seller, or the manufacturer listed on the label, for clarification. All pesticides should be stored in their original labeled containers and kept out of the reach of children. Never pour leftover pesticides down a storm drain or any other drain.

Acknowledgments

The authors are grateful to Carlos Bogran and Scott Ludwig for review comments; to Gary Plaia of Katy, TX, for monitoring scale crawler hatches and reporting success in treating infested hollies in southeast Texas; and to Chris Fox for providing suggestions of nonhost ornamental plant alternatives to hollies.

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