Tuttle mealybug damage on a lawn

Scales and Mealybugs ON TURF

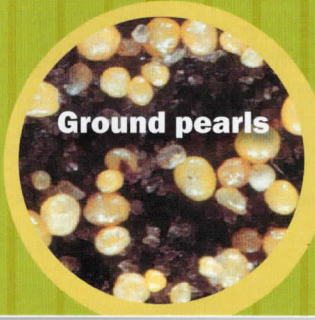
Adam Dale

Rhodesgrass mealybug

Tuttle mealybug

Bermudagrass scale

D. divergens, a scale insect



Ground pearls

Scales are sedentary, sap-feeding insects ubiquitous on landscape plants. There are armored scales, soft scales, mealybugs, and several other less common groups.

IN FLORIDA, there are nearly 200 species of scale insects, which feed on an even larger number of plant species. Almost everyone who has managed landscape plants has come across some form of these insects during their career, and I'm sure many of those folks have battled them with mixed success.

Whenever I mention scale insects or mealybugs to landscape professionals, everyone immediately thinks of ornamental plant pests — cottony cushion scale on pittosporum, tea scale on camellias, or Florida wax scale on hollies, among others. However, this is not always the case. As many pest control operators have recently discovered, scale insects and mealybugs can also be damaging and difficult to control in warm-season turfgrasses.

What are these turf scale insects?

There are at least five species of scale insects that can be damaging pests of warm season turfgrasses in the southeastern United States. These include rhodesgrass mealybug (*Antonina graminis*), Tuttle mealybug (*Brevennia rehi*), bermudagrass scale (*Odonaspis ruthae*), *Duplachionaspis divergens*, and ground pearls (*Dimargarodes meridionalis*), all pictured at left.

Despite the unfamiliar host plant association, the basic biology and behavior of these insects on ornamentals and turf is the same. These are sap-feeding insects that insert hairlike mouthparts into plant tissue and extract vascular fluids or cell contents. They are sedentary and fairly immobile, so they tend to spend multiple generations in the same location or host plant.

Scale insects are able to disperse by wind, but I expect those infesting ground cover are less able to wind-disperse than those on ornamental plants. Research has shown that scale insects can also disperse phoretically — by hitching a ride on other surfaces or organisms — or by the movement of infested plant material. This is the most likely route of movement for turfgrass scale insects. *Continued next page*

The problem child

Most of these insects are only occasional pests. However, one species seems to be increasingly prevalent and problematic in Florida. This is the Tuttle mealybug, *Brevennia rehi*.

This pest is globally distributed, but was first documented in Florida in 1975 in Pompano Beach. It was rarely found on or associated with turfgrass damage until the early 2000s. Until recently, this pest was only found in southern Florida, with one report from Orange County in 2012. In 2016, I received Tuttle mealybug specimens from previously undetected parts of Florida, including Duval (northeast) and Walton counties (northwest), as well as multiple cases from southern counties with known infestations.

Tuttle mealybug is primarily a pest of zoysiagrass, although it is occasionally found damaging bermudagrass. Heavily infested turf gradually declines in vigor, resembling drought stress or disease, and exhibits gray or off-brown discoloration. Damage can be widespread in lawns and rapidly become severe due to its nondescript nature and the insect's size and obscure behavior.

We know very little about the specific biology and ecology of this insect. There are two parasitic wasps known to attack Tuttle mealybug, but neither has been found in Florida. While we assume that generalist predators like lady beetles, spiders, and predatory bugs are providing some level of control, it has not been documented. Therefore, a variety of factors may be at play allowing these insects to outbreak more frequently, and we hope to elucidate some of this soon.

Are they really an issue?

Scale insects and mealybugs cause similar damage in turf and ornamental systems. Plant material turns yellow, brown, and gradually dies. Reduced plant quality and vigor translates to unattractive landscapes and fewer environmental benefits provided by a lawn. Heavily infested areas require more management and open the door for other pest problems like weeds and disease.

Turfgrass scale insects and mealybugs were one of the most common pest management issues that I was contacted about in 2016. The management challenge was often two-fold: 1) He or she did not know what the pest was, and/or 2) He or she was having trouble controlling it.

Both issues stem from the fact that, as an industry, we generally have little experience managing scale insects in turfgrass. Sure, we manage scale insects on ornamental plants all day and have been for decades. However, management strategies do not translate as seamlessly to turfgrass as expected.

Why are these insects difficult to control?

Scale insects are one of the most difficult pests to manage in the landscape no matter the host plant. This is largely because they are very small, have protective coverings,

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Tuttle mealybugs on zoysiagrass

Lyle J. Buss, UFIFAS

Scouting for Tuttle mealybugs in Palm Beach zoysia

and live in tight nooks and crannies that are difficult to see or reach with insecticides. These insects also take advantage of environmental conditions or disturbances that favor their development and survival. My research has found that scale insects often thrive in urban landscapes where conditions are generally warmer and plants are under more stress. Thus, insects in those habitats produce more offspring, build up populations faster, and cause more plant damage.

A SINGLE LAWN is often composed of many microclimates with environmental conditions that affect insects living in them. For example, a dense thatch layer creates a microclimate by trapping heat, harboring moisture, and reducing airflow. These conditions can provide a refuge for pests to thrive. Recent research in France has shown that insect pests on the same plant can experience environmental conditions drastically different from one another. Leaves that have warmer temperatures allow insects living on them to reproduce more and survive longer than those on cooler leaves of the same plant. Therefore, insects may be able to flourish in dense thatch, while conditions outside the thatch may otherwise be unfavorable.

In addition to habitat, the location and size of these insects make insecticide control difficult. Thorough coverage is critical for controlling these insects, but also difficult due to the nooks and crannies they live in. Therefore, contacting each individual in a population is unlikely. Moreover, most outbreaks occur in highly managed lawns being regularly treated with cover spray applications of broad-spectrum insecticides for other pests, a practice known to cause secondary pest outbreaks.

What are secondary pests?

The most common secondary pests of landscape plants are spider mites and scale insects. Secondary pests are those that exist in the landscape below damaging levels but increase rapidly following the application of broad-spectrum, nonselective insecticides applied targeting another pest. These products (e.g., pyrethroids, carbamates) are toxic to all exposed insects, both pest and beneficial. Scale insects and mealybugs that survive can reproduce without being hunted and eaten. Therefore, using selective products when possible and spot-treating infestations will reduce toxicity to beneficial insects inhabiting the landscape.

What can we do?

Very little research has been done to determine the best strategies for managing scale insects and mealybugs in turf. In general, management is challenging because the insects are difficult to reach with insecticides, their waxy secretions protect them from insecticide contact, and they are hard to find before they outbreak. Once populations reach high levels, they are difficult to control and often take weeks or months to reduce below damaging levels.

Maintaining a dense, healthy stand of turfgrass while minimizing inputs and disturbances is the best defense against scale insect and mealybug outbreaks. Follow UF/IFAS-recommended irrigation, fertilization, and mowing practices. For example, over-fertilization, drought stress, improper mowing, and thatch buildup may all increase scale insect abundance.

Scale insects and mealybugs are most effectively controlled with thorough coverage of systemic insecticides or those that get into the plant tissue. Contact-toxic products are less effective because they must contact the insect to work, which is difficult for these pests. In contrast, pests ingest systemic products while feeding on the plant. Many systemic products are also compatible with natural enemies, which allows biological control to occur between product applications.

It is important to remember sedentary insects that quickly undergo multiple generations in the same habitat are those most likely to develop insecticide resistance. Therefore, implementing insecticide class rotations into a management program is critical to reduce the likelihood of insecticide resistance.

Use IPM

Although most of these insects are only occasional pests, it is important to be aware of their presence in the landscape. The obscure nature of these insects makes it easy for them to fly under the radar and unexpectedly reach damaging levels. Following the IPM framework discussed in the January/February 2017 issue of *PestPro* magazine will reduce the risk of these pests becoming damaging and give managers five steps towards effective management. PP

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Shore flies crawling on a person's hand

Closeup of a shore fly

Photos by Chadd Chustz and Malcolm Storey

Shore Flies

Lyle J. Buss and Philip G. Koehler

AN OUTBREAK of tiny flies has been plaguing some coastal areas in South Florida. Fortunately, they are not biting flies, but they are quite an annoyance in some beachfront areas. Many of the complaints have come from tourists staying at hotels along the beaches. The initial report that we heard came from Marco Island (near Naples) in mid-January. The following week we heard from the other side of the state in the Miami Beach area, where large numbers of flies were around various beaches from Hallandale down to South Beach. This east coast area also experienced heavy fly populations last year from January until about the beginning of spring, but the flies are even worse this year.

At first, some people thought that they were black flies, which are notorious biters. But the flies instead turned out to be a type of nonbiting fly called a shore fly. For those who like scientific names, the species is *Scatella tenuicosta* in the family Ephydridae. They are very small — only about 2 mm long (a little over 1/16 inch). The body is dark brown to black, and the two wings are somewhat dark, with five small, white spots.

The exact source and cause of the current outbreak is currently unknown. Shore fly larvae feed on algae, and this species is sometimes a nuisance pest in greenhouses when wet conditions lead to algal growth. The highest densities of the flies in South Florida are on beaches, so there are likely some concentrations of algae nearby. The heavy rains in 2015 resulted in tremendous algal blooms in South Florida waters. Part of the problem stemmed from septic tanks that ended up in saturated soil, allowing untreated sewage to enter waterways. This may have caused algal growth that led to an explosion in shore fly populations.

Because they feed on algae and their populations can double in about two days, shore flies can be a problem by resting on structures and outdoor cafes. Although space spraying can kill the flies present at the time of spraying, within a day other flies move in from surrounding areas. Until their food source is washed away or weather conditions change, these flies will remain a problem. PP

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