NEMATODE MANAGEMENT ON ATHLETIC FIELDS

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Cover photo courtesy of John Mascaro.

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Out With the Old and in With the New

The past year was a busy year for FTGA as we battled several fertilizer ordinances across the state and held many successful Regional Turf Seminars, an excellent CEU Round-Up and a great Conference & Show. Also, 2017 marked the year your association brought the publishing of the Florida Turf Digest back in-house.

What makes 2017 different from other years is that the association did this with virtually an entirely new staff at the helm. Heather Russo was promoted to executive director in late 2016, Emily Cox was brought back on board as media operations manager, MJ Plaster returned as editor of the Florida Turf Digest and Mac Carraway was retained to assist in all matters financial and advocacy related. Through their work, we continue to see new growth with each of the Regional Turf Seminars as we tweak education, locations and dates to accommodate attendees. There are new relationships built with our industry partners on several fronts through e-newsletters and the Florida Turf Digest. We also build rapport with those we serve and have begun to see a slight uptick in new members over the previous year. And, through feedback and ideas from outside the association, we were able to successfully tweak the format of the Conference & Show to better accommodate not just the attendees but also the sponsors and exhibitors.

FTGA made another important change in 2017. It marked the year that we left our home base for the past four years as we settled into a new location just south of the old office. Although moving an office can be challenging enough, it also meant we had to get the word out so that any communication didn’t get lost along the way. We are finally settled in and enjoying this new part of Lakeland.

All of this was performed without a single hiccup or without a reduction in services to our membership. In fact, I believe our operation got better as we have brought on new ideas and focus to the association, which pave the way to a successful 2018 and for many years to come.

Looking forward to 2018, this year marks the 30th anniversary of the Interlachen Turfgrass Research Tournament. Held each January, this event benefits the Florida Turfgrass Research Foundation, and through the years, has made numerous research projects possible through its funding. Host Golf Course Superintendent Stuart Leventhal, CGCS, was the guiding force behind the creation and continued success of this event, and it was a delight to be present this year to witness the event being renamed in his honor. The industry owes many thanks to Stuart for his dedication and commitment for making this event a continued success.

Later in 2018, the Conference & Show will head north to the World Golf Village in St. Augustine. This event will offer first-class amenities and accommodations at the all-inclusive World Golf Village Renaissance St. Augustine Resort. Be on the lookout for more information later in the year.

With the growing season right around the corner, I hope that each of you has continued success in 2018. If FTGA can do anything to assist, please feel free to reach out to your association. We are more than happy to help.
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And that’s an end to another chapter in our lives. As 2017 goes into the books, 2018 opens to a new chapter. Everyone has the chance at a fresh start. You have a blank page in front of you to fill any way you want and to make changes you have been thinking about making—for yourself, your family and your industry. The same goes for those who serve the Florida Turfgrass Association membership. It’s a time for us to reflect on the past year to determine what worked and to look at ways in which we can improve.

We always analyze the surveys returned after an event. The FTGA has made a few location changes that I hope the membership and industry will enjoy. The Plantation, Tallahassee and Jacksonville turf seminars have changed facilities as it is time to change the scenery. The Venice turf seminar moves to Manatee County. Check the website (www.ftga.org) for complete information. Attendee registration and CEUs are available. Turn to page 18 for a list of FDACS CEUs and page 19 for seminar locations. Seminars kick off January 9, so register now before the prices increases go into effect.

Make it a family affair
We are headed north for the 66th Annual Conference & Show to World Golf Village in the nation’s oldest city—St. Augustine. An array of attractions awaits you and your family—Castillo de San Marcos, St. Augustine Lighthouse and Maritime Museum, Fountain of Youth, GhoST Augustine Ghost Tours or just a relaxing day on the beach. The conference will be held from September 17–19, but mark your calendars now to be in St. Augustine on September 15 to explore the city and enjoy its many offerings with the entire family.

I hope that 2017 was good to you and that 2018 will be even more prosperous. Be kind and pay it forward.
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Turfgrasses help beautify our environment, reduce water runoff, and reduce water and air pollution. They are also essential components of many athletic fields, racetracks and parks. Just like any other crop, grass needs effective pest management to remain healthy. Plant-parasitic nematodes (Figure 1) are probably the least understood and most difficult to manage turfgrass pests in Florida. These nematodes cause turf to decline, need more frequent irrigation and have increased problems with weeds and other pests. Nematodes’ damage to turf roots reduces fertilizer uptake by the turf, indirectly contributing to potential groundwater contamination. Nematode damage on athletic fields can weaken turf root systems and cause turf to pull up during play and thereby contribute to the incidence of player injuries.

Plant-Parasitic Nematodes

Nematodes are unsegmented roundworms, different from earthworms and other familiar worms that are segmented (annelids) or in some cases flattened and slimy (flatworms). Nematodes living in soil are very small and most can only be seen using a microscope (Figure 2). There are many kinds of nematodes found in the soil under any turf. Most are beneficial, feeding on bacteria, fungi, or other microscopic organisms. There are even nematodes that can be used as biological...
control organisms to help manage important turf insect pests. Unfortunately, there are also nematodes that feed on plants called plant-parasitic nematodes (Figure 1). All plant-parasitic nematodes have a stylet or mouth-spear that is similar in structure and function to a hypodermic needle (Figure 3a, b). The nematode uses its stylet to puncture plant cells, injecting digestive juices and ingesting plant fluids through it. All plant-parasitic nematodes that are important turfgrass pests in Florida feed on roots. Some plant-parasitic nematodes remain in the soil and feed by inserting only their stylet into the root. These are called ectoparasitic nematodes (Figure 4). Others, using their stylet to puncture an entry hole in the root, feed with their body inside the root tissue. These are called endoparasitic nematodes (Figure 5). Of the common nematodes that cause damage to turfgrasses in Florida, sting, awl, stubby-root, sheath, sheathoid, spiral and ring nematodes are strictly ectoparasites. Root-knot, lance and lesion nematodes are endoparasites. In Florida, the most common nematodes causing damage to athletic field turf are sting, lance, root-knot and stubby-root nematodes.

**Effects of Nematodes on Athletic Turf**

All of the plant-parasitic nematodes that damage turf in Florida feed on roots. As plant-parasitic nematodes feed, they damage plant root systems and reduce plants’ ability to obtain water and nutrients from the soil. This makes the turf more susceptible to drought and other stresses. When nematode population densities get high enough, or when environmental stresses occur, above-ground symptoms may become evident. Grass may wilt and die. Research has shown that the ability of nematode-damaged turf roots to get water and nutrients from soil is impaired. Nematode-damaged turf typically needs frequent irrigation to avoid wilting and decline. Also, the potential for nutrient leeching is higher from nematode-damaged turf. Additional risk to players may result from plant-parasitic nematodes. This is because the nematode-damaged turf does not have a good root system to anchor it down. When athletes are pushing or make sudden turns, the turf can pull up and lead to knee and ankle injuries.
Symptoms of a Nematode Problem

Nematode-damaged roots may be abnormally short and stubby (Figure 6) or appear darkened or rotten when damaged by plant-parasitic nematodes (Figure 7). Often the roots will appear “cropped off” an inch or less below the soil surface (Figure 8). Root galls or knots associated with certain nematode damage to other crops are usually not evident on grasses but may occur in some cases (Figure 9).

When nematode population densities get high, and environmental stresses such as high temperatures or drought occur, aboveground symptoms may become evident. Symptoms include yellowing, wilting, browning or thinning out. Grass will die under extreme nematode and environmental stress. Often, as the grass thins out, spurge and other weeds may become prominent (Figure 10). Nematode damage usually appears as irregularly shaped declining areas that may enlarge slowly over time (Figure 11). Nematode symptoms on turfgrasses can be very similar to other factors such as localized soil conditions, fungal diseases, or insects and are easy to misdiagnose.

Nematode Diagnosis

With any plant problem, an accurate diagnosis is important to address the problem and to avoid wasting time, money, effort and pesticide applications. The only reliable way to determine if plant-parasitic nematodes are involved in grass damage is by having a nematode assay conducted by a professional nematode diagnostic lab. The University of Florida has such a facility and will assay nematode samples for a cost of $20 each (out-of-state samples cost $25 each). Forms and instructions for submitting nematode samples to the Florida Nematode Assay Lab can be downloaded at http://nematology.ifas.ufl.edu/assaylab/

A nematode assay requires different sampling guidelines than those required for soil analysis or disease samples. When a disease sample is submitted to most labs, a nematode analysis is
not normally performed unless specifically requested. A nematode assay often requires separate payment and may even be sent to a separate address. Familiarize yourself with the procedures required by the lab where you intend to submit the sample. The accuracy of the diagnosis depends on the quality of the sample that you submit. Following the guidelines below will help ensure an accurate diagnosis:

- A sample must consist of multiple soil cores. Nematodes are not evenly distributed in soil, but rather congregate in “hot spots.” Nematode populations may be high at one spot and low just a few feet away. By collecting multiple cores with a device such as a “T” type soil sample tube, an average population density can be measured. A good rule of thumb is to have 16 to 20 cores per field. Cores should be taken to a depth of 4 inches.
If damage is evident, then sample near the margin of the affected area (Figure 12). Nematode populations will decline in severely damaged areas because they have nothing left to eat. Therefore, populations tend to be highest near the edges of a declining area where the grass is still alive. If damage is occurring in multiple areas of a field, take a few cores from the border of several affected areas to make the 20 cores. When taking samples from turf that is not showing symptoms, or if sampling before planting, sample in a “zig-zag” pattern across the area (Figure 13).

- Put the soil from each sampled area into a separate plastic bag and seal it. Nematodes require moisture to survive, so drying the soil will kill them. This is different than submitting a sample for nutrient analysis where dry soil is preferred. Make sure that each bag is labeled with a permanent marker so that the diagnosis can be assigned to the correct area. If using a self-sealing bag, seal it with tape also because the zippers often come open in transit.

- Handle samples carefully. Do not expose samples to direct sunlight or heat. Nematodes are sensitive to high temperatures and UV light. Leaving samples on the dashboard or in the back of a pickup truck can kill them quickly and reduce the accuracy of the diagnosis. Keeping the nematode sample in a cooler is best. The nematodes will be sandwiched between soil particles so rough handling will destroy them. Pack the samples well to minimized shifting during shipping.

- Submit the sample right away. Next-day delivery is best. One study found greatest nematode recovery from hand-delivered samples, the next highest from next-day delivery and the lowest from regular postal delivery.

The staff at the University of Florida Nematode Assay Lab will identify any plant-parasitic nematodes found, count them, and determine whether or not nematodes are a potential problem. Not all plant-parasitic nematodes are equal in their ability to harm grass. For example, one sting nematode can cause damage equal to hundreds of individuals of other types of plant-parasitic nematodes. The number of each type of nematode in 100 cc of soil from the submitted sample will be used to determine the risk level for the turf species indicated. The risk level will tell if the turf is at low, moderate or high risk of damage from plant-parasitic nematodes. Be aware that different diagnostic labs may use different extraction techniques, different quantities of soil or different thresholds. Because of this, samples submitted to separate labs may report different quantities of nematodes. In most cases, the different thresholds used are adjusted to account for the differences in methodology and local conditions. However, if using...
a lab located in a geographically distant location, local conditions or regional variations in nematode aggressiveness may not be taken into account. Local labs will provide the most accurate assessments.

**Nematode Management**  
**Cultural practices**

**Before planting**

**Use Clean Sod:** It is always preferable to avoid a potential problem than to deal with an existing one, so it is best to consider nematodes before planting or replanting. Contaminated planting material (sod or sprigs) can spread nematodes into new areas. It may be worthwhile to have potential sod tested for the presence of large numbers of the most damaging turf nematodes (sting and lance nematodes) before purchase. Sod grown on soilless media offers the best chance of avoiding nematodes, but is beyond the budget of most athletic facilities and parks.

**Tolerant grasses:** Not all turfgrass species and cultivars are equally affected by nematodes, so grass selection can be important if nematodes are a major concern. Generally, bahiagrass is the most tolerant of all turfgrasses to nematodes and is a good choice for chronically affected areas. Seashore paspalum is the least tolerant grass to spiral nematodes. The University of Florida research has found that the bermudagrass cultivars Celebration and Princess 77 have the greatest tolerance to sting nematode among athletic field cultivars used in Florida. This does not mean that those cultivars were not damaged by the nematodes, but that they were damaged less than was the conventional cultivar. Seashore paspalum is more tolerant of sting nematode than bermudagrass, but is more susceptible to damage from spiral nematodes.

Turf can often exist with a given population density of plant-parasitic nematodes with no visible damage. Damage usually becomes evident when one of two things occur: 1) some other factor increases the susceptibility of the grass to nematode damage and/or 2) some factor causes nematode population densities to increase to damaging levels. Once the grass is planted, the best way to reduce the likelihood of nematode damage is to minimize these factors as much as possible.

**After planting**

**Mowing:** Generally speaking, raising mowing height slightly can reduce nematode damage considerably. Infrequent mowing should be avoided. The more foliage is removed at each mowing, the greater the stress that is put on the grass.

**Fertilizing:** Excessive nitrogen fertilization can increase succulent root growth and encourage rapid foliage

continued on page 14
growth. Succulent root tips are more susceptible to nematode damage, and the proliferation of root tips can cause nematode population densities to rise dramatically. Rapidly growing foliage drains nutrient reserves from the roots that are needed to compensate for the nematode damage. Under-fertilization should also be avoided. Roots damaged by nematodes will already have a reduced capability to extract nutrients from soil. This makes nutrient deficiencies more pronounced on nematode-infested plants.

**Irrigation**: Deep, infrequent watering encourages deep root growth. A deep root system is more tolerant of nematodes than a shallow root system resulting from shallow, frequent watering. However, once nematode damage is extensive, frequent watering may be required to keep the grass from declining. In this case water should be applied as often as permitted by ordinance to avoid wilting.

**Aeration**: Over-compaction reduces oxygen availability to the root system and enhances susceptibility to nematode damage. Regular aeration encourages a healthy root system and thereby enhances tolerance to nematodes.

**Soil Amendments**: Generally anything that promotes healthy root growth can enhance tolerance to nematodes. Some organic amendments such as composted manures or composted municipal sludge may also reduce nematode damage and speed up the recovery process after damage has occurred.

**Shade**: By damaging roots, nematodes impair the ability of turf to store energy. Therefore, nematode-damaged turf is more prone to decline from shade or prolonged cloudy conditions. If areas are in partial shade, trimming or thinning trees to increase light to the turf will greatly enhance the turf’s ability to withstand nematode damage. Too much shade may also mean that the site is not suitable for a dense stand of turfgrass.

**Overseeding**: University of Florida research has shown that overseeding can increase nematode numbers on bermudagrass during transition by providing an alternate food source to the nematodes during the winter. Therefore, from a nematode management standpoint, it is best to avoid overseeding when possible.

**Pesticides and Biopesticides**

When using any nematicide, the product label must be strictly followed in order to minimize human and environmental health impacts and to avoid liability risks. Nematicides labeled for athletic turf in Florida that have shown consistent efficacy in University of Florida research trials are discussed below. This information is not a substitute for the product label. Always follow directions on the product label when applying any pesticide. There is no single nematicide that is best to use in all situations and against all kinds of nematodes. Therefore, monitoring nematode populations through sampling and selecting products based on their expected efficacy on the nematodes present is important. Using the same nematicide repeatedly can shift nematode populations from one type of nematode to another, or could cause nematodes
to develop resistance to that nematicide. Therefore, it is generally recommended to rotate active ingredient classes as much as possible. Fortunately, all the nematicides listed below belong to a different chemical class.

**Nortica® 10 WP:** The active ingredient in Nortica is the bacterium strain I-1582. This bacterium colonizes the root system of the turf and produces compounds that protect the root system from nematodes. Nortica is a wettable powder that disperses in water. It is sprayed onto the turf surface and then moved into the soil with irrigation. University of Florida research has shown this biological agent to be effective in protecting turfgrass roots from nematode damage when it is applied properly. However, to achieve good results, timing is critical. An application map for Florida counties, available from Bayer Environmental Sciences at http://www.backedbybayer.com/nortica, should be consulted when scheduling applications. Since Nortica has more of a root-protecting mode of action than a nematode-killing one, it works better when used prior to periods of nematode activity to prevent a nematode problem from occurring rather than to “fix” an existing nematode problem.

**Indemnify®:** The active ingredient of Indemnify nematicide is fluopyram, which is also an SDHI fungicide. Indemnify is very effective against most of the nematodes that damage turfgrasses in Florida and is labeled for all turf uses, including golf course, athletic field, sod, and lawn. Unlike other nematicides it has very long residual activity and can provide nematode suppression for months after application. The maximum broadcast rate for Indemnify is 0.39 fluid ounces per 1000 ft² per year. However, areas of 10,000 ft² or less (per acre) may be “spot-treated” up to 4 times per year at 0.39 fluid ounces. Because of its fungicide activity, Indemnify should be considered in the FRAC group 7 for resistance management. While Indemnify has provided excellent...
control of root-knot, sting and other nematodes, in University of Florida trials, it has not been shown effective against lance nematode.

**Nimitz® Pro G**: The active ingredient in Nimitz Pro G is fluensulfone, a nematicide in its own chemical class. This formulation is a granular product applied to the turf surface using a spreader and then moved into the soil with irrigation. Fluensulfone has both contact and systemic activity, so it is effective against nematodes in soil and inside roots. Nimitz is labeled for all turf uses, including golf course, athletic field, and lawn. A maximum of 240 pounds per acre per year may be applied, but this can be broken up into multiple applications of lower doses. In University of Florida trials, best results have been achieved with either 4 monthly applications of 60 pounds per acre or 3 monthly applications of 80 pounds per acre.

**Multiguard Protect®**: Multiguard Protect is labeled for golf courses, sports fields, sod farms and field-grown ornamentals and contains the active ingredient furfural. University of Florida research has found that Multiguard Protect, when used properly, is effective against ectoparasitic nematodes, especially 2–6 inches deep in the soil profile. The maximum single application rate is 8 gallons per acre at a spray concentration no greater than 10% by volume with the maximum amount per year being 48 gallons per acre. Typically, multiple applications applied at 2–3 week intervals are required for good results, preferably in the spring and fall. To avoid phytotoxicity, make sure the soil is moist; pre-irrigate if necessary. After applying Multiguard Protect, irrigate immediately with 1/4 inch of water and do not irrigate again for at least 24 hours after application. Do not apply if significant rainfall is expected within 24 hours.

**Curfew Soil Fumigant®**: Curfew Soil Fumigant is different from most other turfgrass pesticides in that it is injected into the soil profile as a liquid that then volatilizes and moves through the soil as a gas (fumigant). The active ingredient in Curfew Soil Fumigant is 1,3-dichloropropene (1,3-D). Curfew Soil Fumigant may only be applied by approved custom applicators. Applications are scheduled through certain industry distributors. Slits are made in the turf by knives that have a metal drip tube welded onto the back. As the knives are pulled through the soil, the fumigant is injected 5–6 inches deep into the soil profile, and the slits are then pressed back together to reduce fumigant loss. The 1,3-D turns into a gas that disperses through the soil profile and kills nematodes on contact.

Curfew Soil Fumigant is highly effective against sting nematode and other ectoparasites. It also is effective against mole crickets. However, because it is a contact nematicide, its efficacy against endoparasitic nematodes such as lance or root-knot nematodes is less consistent. Dow AgroSciences instructions for irrigation and turf care following a Curfew Soil Fumigant application should be followed closely to avoid problems and maximize the benefits of Curfew. Curfew cannot be applied within 30 feet of buildings, and a 24-hour reentry restriction applies. In areas of Florida with certain geologic features, Curfew Soil Fumigant cannot be used.

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For additional information regarding nematodes, nematode management, or help interpreting nematode assay results contact:

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For information on submitting samples to the UF/IFAS Nematode Assay Lab or to check on the status of a sample you submitted, contact:

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Gainesville, FL 32611
(352) 392-1994
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## Upcoming Events

### Earn CEUs at the 2018 FTGA Regional Turf Seminars

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<td>Plant City Morning Session</td>
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Visit the FTGA website: [www.ftga.org](http://www.ftga.org) for complete information on dates and locations and to sign up for a seminar. Register early to avoid price increase!
2018 FGTA Regional Turf Seminars

TURF SEMINAR LOCATIONS
The 2018 FTGA Turf Seminars will be held in 12 locations across the state, with four new locations added to this year’s schedule. Lunch is provided.

JANUARY
Plantation • Tues., Jan. 9  NEW LOCATION
Plantation Central Park Multi-Purpose Center
9151 NW 2nd St.  |  Plantation, FL 33324

Lake Worth • Wed., Jan. 10
Polish American Club
4725 Lake Worth Rd.  |  Lake Worth, FL 33463

Port St. Lucie • Thurs., Jan. 11
2195 SE Airoso Blvd.  |  Port St. Lucie, FL 34984

Ocala • Tues., Jan. 23
Marion County Extension Office
2232 NE Jacksonville Rd.  |  Ocala, FL 34470

Orlando • Wed., Jan. 24
Orange County Extension Education Center
6021 South Conway Rd.  |  Orlando, FL 32812

Cocoa • Thurs., Jan. 25
Brevard County Extension Office
3695 Lake Dr.  |  Cocoa, FL 32926

FEBRUARY
Milton • Tues., Feb. 13
Guy Thompson Community Center
5629 Byrom St.  |  Milton, FL 32570

Tallahassee • Wed., Feb. 14  NEW LOCATION
Tallahassee Elks Lodge
276 North Magnolia Dr.  |  Tallahassee, FL 32301

Jacksonville • Thurs., Feb. 15  NEW LOCATION
San Jose Country Club
7529 San Jose Blvd.  |  Jacksonville, FL 32217

Ft. Myers • Tues., Feb. 27
Florida Gulf Coast University - Cohen Building
10501 FGCU Blvd. South  |  Fort Myers, FL 33965

Manatee • Wed., Feb. 28  NEW LOCATION
Manatee County Extension Office
1303 17th St. West  |  Manatee, FL 34221

MARCH
Plant City • Thurs., March 1
Hillsborough Community College - Trinkle Center
1206 North Park Rd.  |  Plant City, FL 33563
A foundation of integrated pest management (IPM) in urban and residential landscapes is to put the right plant in the right place. This form of preventive pest management can reduce plant stress, pest infestations, and pesticide applications. Although “right plant, right place” may have become cliché to some, its importance has never been greater in Florida. Matching a plant species to its local environment based on that plant’s needs is critical for the plant to provide benefits. And healthy plants provide a lot of benefits. For example, trees in developed landscapes reduce temperatures, filter the air, and provide habitat for wildlife. Lawns do much of the same, filtering stormwater runoff, sequestering carbon from the atmosphere and making landscapes more attractive. Each of these services and more directly benefit human mental and physical health, which is significant considering that 90% of Florida’s 20 million residents live among these plants. The key here is that these plants need to be healthy. My lab is working toward determining methods to maintain that health without the need for superfluous inputs.

Our ability to manipulate plants in urban landscapes also presents a huge opportunity. Previous research has shown that increasing the diversity of plants in a community can increase that community’s resilience to stress, whether that is a pest or environmental condition. Thus, we can, and should, use research to make evidence-based planting decisions. Cultural practices such as plant selection or manipulation are a critical early step in IPM with the goal of setting up plants for success.

Selecting pest-resistant plants can be an excellent approach. Alternatively, since resistant plants are often not available, increasing the diversity of plants in an area can reduce insect pest abundance and damage by making it more difficult for plant pests to locate favored hosts and move from host to host. More importantly, increasing the diversity of plants in a given area may make that area more resilient to stress.

Insect pests (such as the southern chinch bug) regularly attack and damage Florida lawns, reducing plant services and increasing pesticide applications targeting insect pests and subsequently invading weeds. Most Florida lawns are composed of St. Augustinegrass (Stenotephrum secundatum). St. Augustinegrass, like most southern turfgrass species, is produced, planted and maintained as genetic monocultures. In other words, each plant in a weed-free sod lawn is a clone of itself. These plants have been selectively bred so that we have the best of the best in terms of aesthetic quality and tolerance to stressors. Just as pest-resistant plants are excellent IPM tools, breeders have painstakingly selected turfgrass cultivars because they are superior to others and are the “pest resistant” cultivars to a multitude of stress factors such as climate, maintenance practices, disease, insects and weed pests, while remaining

continued on page 22
Welcome New Members!

We extend a hearty welcome to our new members, and we look forward to seeing you at one the FTGA events. In the meantime, we hope you enjoy the Florida Turf Digest and other member benefits.

Romualdo Flores
Gainesville Golf Country Club

Brett Raflowitz
Equestrian Services International
aesthetically attractive. Maintaining this superiority is only achievable if you reproduce clones of the same plant.

From a diversity perspective, this leaves something to be desired. A lack of diversity in Florida lawns could be a major issue, since over half of our 4.4 million acres of turfgrass is St. Augustinegrass. Based on our understanding of how insects and plants interact, such large stands of turfgrass monocultures may predispose lawns to attack from plant pests and repeated pesticide applications. Different turf species look very different from one another and have different maintenance requirements. However, cultivars of St. Augustinegrass are difficult to differentiate and typically have similar maintenance requirements.

My lab is currently conducting research to see if increasing the diversity of St. Augustinegrass in a lawn can reduce insect pests, their damage and the need to control them. Not only are we increasing diversity, but we are doing so by mixing cultivars that have been selected because they are the best of the best. Therefore, we are combining plants that are resistant to multiple stressors with the strategy of increasing the plant community’s resilience to any threats.

To test this experimentally, we have worked with several generous Florida sod producers and the Florida Nursery, Growers and Landscape Association to plant large plots of St. Augustinegrass as cultivar mixtures and monocultures at the UF/IFAS Plant Science Research and Education Unit in Citra, Florida. We are also conducting greenhouse and laboratory experiments to determine the effects of mixing St. Augustinegrass cultivars on its most damaging insect pests: southern chinch bug, tropical sod webworm, and fall armyworm. Our primary goal is to determine the effects of mixing cultivars on factors such as pest development, reproduction, population growth, pest establishment, and plant damage. As insect-centric as I like the world to be, I realize that insects are not all that matters. This is certainly the case with turfgrasses in Florida where drought, nematodes, pathogens, weeds and other pests are a high priority. Fortunately, increasing turfgrass diversity may provide benefits on multiple fronts. Research in cool-season turf and agricultural systems has shown that increasing plant diversity can also increase tolerance to drought, disease, and weed establishment. These are other factors that we hope to investigate as this research moves forward.

So, what will happen if we plant a mixture of multiple St. Augustinegrass cultivars in the same lawn? Our prediction is that mixtures will be more resistant to insect pests and provide greater aesthetic and environmental benefits. Our long-term answer is, “We don’t know.” Graduate students, Ethan Doherty and Brianna Whitman, have been working hard to figure this out, and their preliminary evidence is encouraging. Southern chinch bug populations seem to grow significantly more slowly when developing in more diverse compared to monoculture lawns. Caterpillar pests develop into much smaller individuals and do not survive as well when feeding on diverse compared to monoculture lawns. Interestingly, caterpillars also prefer to feed on monocultures over cultivar mixtures when presented with the option.

Finally, at this year’s North-Central Florida Turfgrass Field Day, graduate student, Brianna Whitman, presented turf industry professionals with three St. Augustinegrass lawn options: monocultures, mixtures of two cultivars, and mixtures of four cultivars. She asked them to rate each one on a scale of 1 to 9, where 9 is the best. On average, participants rated the mixture of four St. Augustinegrass cultivars higher than monocultures and mixtures of two cultivars. This suggests that mixing cultivars could gain traction in application.

There is still a lot of research to do, but if these predictions and our preliminary evidence hold true, this planting strategy could have major benefits for Florida’s turf and landscape industries. As urbanization continues to progress, restrictions on water, fertilizer and pesticide use increase, and landscape plant health becomes more important, we must come up with alternative approaches to management. My lab’s objective is to help figure those out, and we are looking forward to working with Florida’s turf and landscape industries to do so. ☺

Adam Dale is an assistant professor and extension specialist of turf and ornamental entomology at the University of Florida in Gainesville, Florida. His primary responsibilities are to address the pest management needs of Florida’s green industry and disseminate information to industry professionals across the state. He aims to develop more sustainable pest control strategies by investigating interactions between plants, insects and their environment.
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