SPRING 2016

ON THE TURF™

THE OFFICIAL PUBLICATION OF THE FLORIDA CHAPTERS OF THE STMA

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PRESIDENT'S MESSAGE
CFSTMA

Hello Turfers,

Well 2015 is behind us and now we are in the beginning of 2016… WOW where has the time gone?

I need to correct one of the statements that I made in the last issue of ON THE TURF. I stated we had 92 members in the CFSTMA chapter. Great news… a couple of CFSTMA members snuck in under the wire and we were able to raise our membership to 102 by the close of 2015. A total of 102 members, can you believe that? I am just beside myself.

Let me also add this to the moments of wonderment. Our first field day, on June 26, 2013 at Apopka when we started taking the CFSTMA chapter off of life support, we had 24 people attend. At this year's field day, we had 132 people attend the event at ESPN. Is this incredible or what?

Along with this little known fact-- of the 132 attendees at the event, 91 have already renewed memberships for 2016. Where are the other 11 people hiding?

Personally, I think this is huge for CFSTMA. I want to thank each and every one of you who had a part in this membership campaign.

I was once told by a clever individual that if the Florida's STMA chapters ever got organized, we would be a force to reckon with. And CFSTMA is on fire and are doing our part with trying to hit it out of the park. However, as I sit back and think about all the high schools, county parks, colleges, and pro fields in Florida, we are still short on memberships in all our chapters.

So let me say this, if you are unhappy with what your chapter is doing and want to become a member in another chapter, then by all means feel free to do that! I have no ill feelings towards any member of CFSTMA that doesn't feel we have their best interest at heart and would like to move to one of the other chapters. I also hope that the other Board members in other chapters can see the vision and can feel the same way.

I know, I know. Dale is on the membership soap box again; and yes, I am. I have a passion inside of me for all of us in the sports turf industry. I just know we need to all come together somehow and some way.

So I will close by saying find a chapter, join it and get involved. Help Pete and I hit it out of the park when it comes to growing Florida's STMA Chapters.

Thanks for listening.

Dale Croft

CFSTMA President

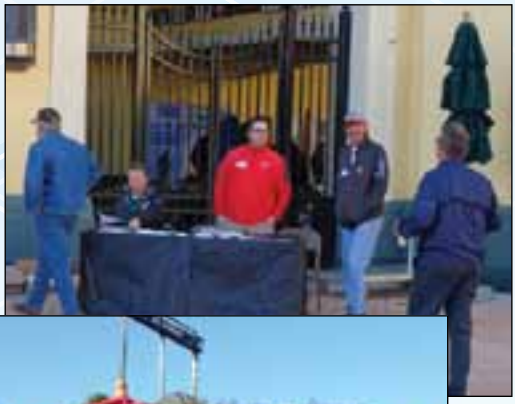
CHAPTER NEWS

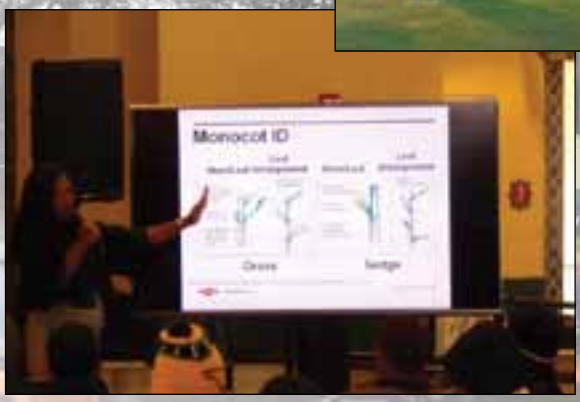
On January 12, 2016 (the coldest day of 2016 thus far), CFSTMA held their 5th Annual Field Day at Disney's ESPN Wide World of Sports Complex and it was a colossal day for the chapter. We had 131 attendees. I am not going to repeat everything that has already been stated in the President's message however, I do want to take a moment and say thank you again to the following supporters:

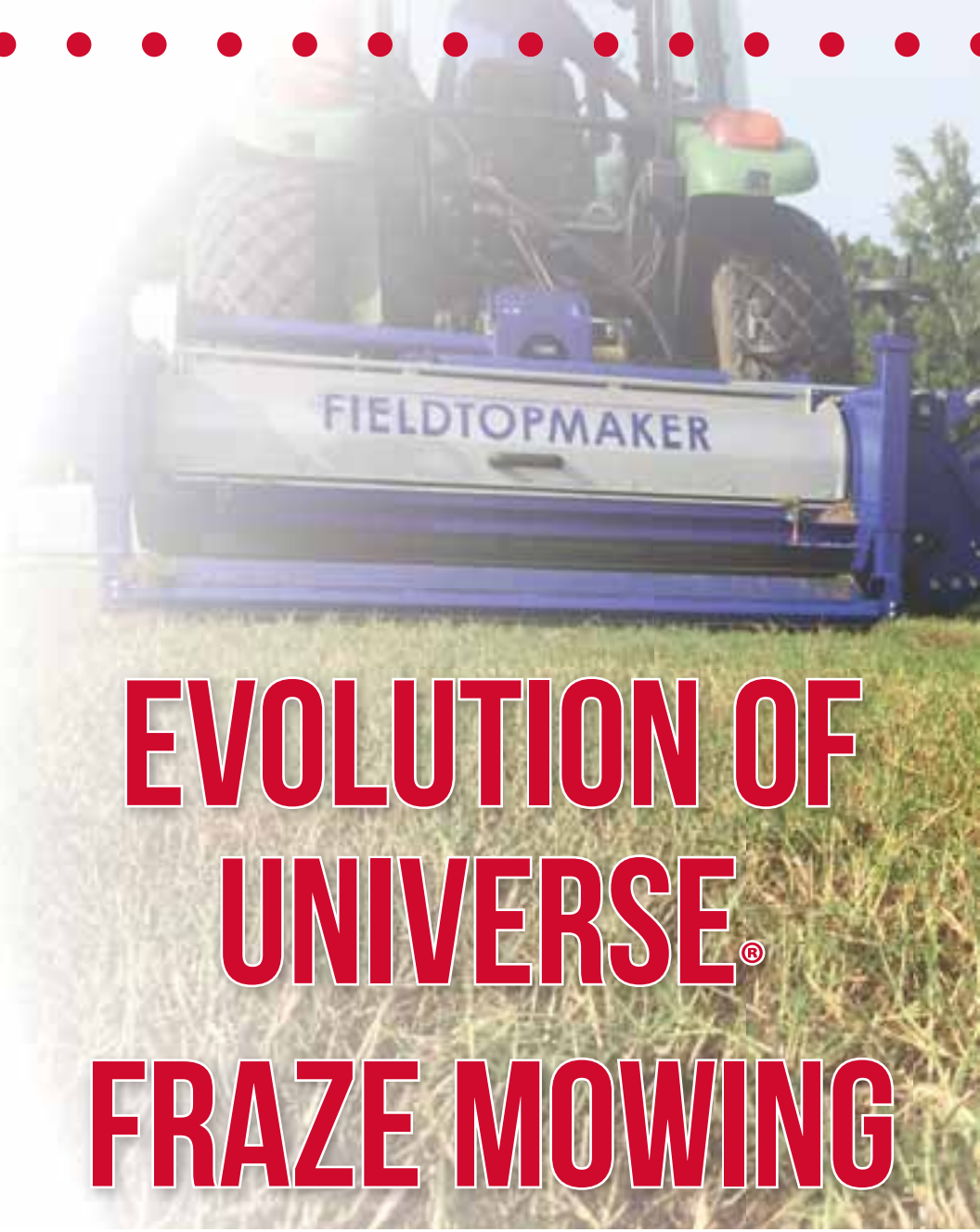
- **Tim Flowers** and the great team (cast members) of sports turf professionals that always go out of their way to make our events a gigantic success.
- **Jerrod Jesso** and **Kevin Scott** with Ewing for supplying the lunch for all of us
- **Celeste White** for the prodigious presentation on CSI Diagnosing Turfgrass Problems
- **Annie Nsafoah** for the fantastic presentation on Weed Id and Management
- **Jim Laiche** and **Andy Voelz** with Toro Irrigation for the exceptional irrigation training
- All the commercial members who supported the Chapter with their display areas and their door prize donations
- All the professional members for asking their supervisor to allow them to attend this event. And, the supervisors who saw the benefit by allowing our members and nonmembers to be there at the event
- The CFSTMA Board Members for their continued selfless efforts to keep CFSTMA in a forward movement, which is helping us to remain the sturdiest and largest chapter of the three in the State

I will let the photos of the day finish out this article however; I do have one last request. We need a photographer (inexpensive) to attend our events and

take photos for us. I have been trying to cover that task as well but my photos are not always the greatest and sometimes I am just wearing too many hats to remember to put that one on as well. So if anyone or a family member who has a photographic eye and who would like to help, please let us know. ●







EVOLUTION OF UNIVERSE® FRAZE MOWING

CAN IT HELP YOUR FIELD?

By: Jerad Minnick

Universe® Fraze Mowing. Perhaps you have heard of or seen photos of this new age aggressive cultivation practice. Or maybe this is the first you have heard of it. Universe® Fraze Mowing, because of its aggressiveness, can seem overwhelming and complicated! But Universe® Fraze Mowing is actually quite simple.

Many of the issues that reduce wear tolerance and quality with natural grass surfaces are at the top layer. Most common are thatch build-up, organic layering, and weed and poa annua seed accumulation. Universe® Fraze Mowing removes the contaminated top layer to a turfgrass manager's desired depth, leaving the crown and/or leaf blades of the strong plants behind to re-generate leaving smooth, more durable surface.

BUT CAN IT HELP YOU ON YOUR BERMUDAGRASS PLAYING FIELD?

First, let's examine where Universe® Fraze Mowing came from. Original fraise mowing started in 1996 with the invention of the KORO Field Topmaker by Ko Rodenburg, Park Maintenance Superintendent in Rotterdam, Holland. Mr. Rodenburg's TopMaker was a new solution to the old challenge of poa annua and poa seed

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accumulation. The Topmaker does just as it describes, removes the top of a soil surface including thatch, organic build-up, weed seed, AND poa annua plants and seed collection.

Yes, the practice was aggressive. But because poa annua was such a problem, the aggressive new solution was widely accepted and fraise mowing spread quickly into the UK. High profile facilities across the country were soon "KORO'ing" to remove the poa from their sport surfaces. Now nearly all natural grass surfaces in the UK employ fraise mowing for poa annua control and organic management.

ADAPTATION INTO THE USA

Nearly 16 years after its initial development, fraise mowing as an maintenance practice reached the United States after I was introduced to it at a field day in Holland. I also met Ko Rodenburg himself that day. It was immediately clear that fraise mowing could help high-use natural grass fields in the United States. Campey Turf Care and Imants, the manufacturer of the Field TopMaker, saw the practice as a needed solution for the USA as well. Their relationship with Growing Innovations, a innovation company that creates and provides advocacy for new solutions for natural grass fields, lead to the development of the Universe® rotor for the Field TopMaker and the adaptation to Universe® Fraze Mowing on bermudagrass athletic fields. The Universe® rotor was designed specifically to remove unwanted material and leave behind the established layer of bermudagrass rhizomes and stolons. The Universe® rotor teeth are designed to work similar to fingers, combing through to remove 100% of the debris but leaving behind attached plants. Patents protect the technology for the rotor.

HOW DOES IT WORK/CAN IT WORK FOR YOU?

Universe® Fraze Mowing has now become an accepted maintenance practice for thatch management on bermudagrass athletic fields. The Universe® rotor teeth cut through the bermuda rhizome network, removing unwanted material and leaving behind connected, strong rhizomes. The rhizomes regenerate sideways, supported with regeneration from the stolons exposed below.

No soil is removed with Universe® Fraze Mowing. The goal is to clean out

and promote regeneration. Depth is set differently on each field depending on the organic depth. Depth of removal can vary even across one field.

WHAT EXACTLY ARE THE BENEFITS?

- Thatch removal: Allows bermudagrass to grow sideways instead of vertical up through thatch. The bermuda can knit together for a stronger, more durable surface.

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- Organic layer removal: Organic layering on a grass field is slick and spongy when wet and very hard when dry. Removing organic layering build up improves playability.

- Surface smoothing: High areas are "mowed" off, making the surface smoother

- Weed reduction/Seed cleaning: Weeds pull from the surface and weed seed cleaned.

WHAT ARE THE NEGATIVES?

The sheer amount of material removed!!

That single negative is actually a positive. The volume of material that is removed, just off of the top of the soil, illustrates why a field with a thatch and organic build up has wear tolerance issues. Bermudagrass strength increases immediately with the removal and the field will become more wear tolerant and durable.

HOW FAST IS REGENERATION?

Regeneration on bermudagrass starts immediately after Universe® Fraze Mowing. With a balanced plant health and feeding program, full regeneration can be achieved in only 2-3 weeks. The field surface will re-appear green and be ready to mow within 1 week.

It is important to keep in mind that if the bermudagrass is thin prior to Universe® Fraze Mowing, it will also be thin after. There must be existing plants that can regenerate.

For more on the development and adaptation of Universe® Fraze Mowing visit GrowingGreenGrass.Net

Also, regeneration is much slower from the use of traditional fraise mowing machines that do not use the Universe® rotor. The key to fast, strong regeneration is to leave behind established stolons. Traditional fraise mowing machines do not do that.

CONCLUSION

In the end, you as a Sports Field Manager knows your situation and fields better than anyone. Could Universe® Fraze Mowing help? Yes, Universe Fraze Mowing IS aggressive. But between the cleaning and the re-generation from the turfgrass stand left behind; there is merit to a process this aggressive. Albert Einstein said it best. "If you always do what you have always done, you will always get what you have always got." Can Universe® Fraze Mowing become an accepted practice in your maintenance program to remove your thatch and organic build, clean the weed contamination, and improve the durability of grasses? ●

Jerad Minnick is the Lead Advisor for the Natural Grass Advisory Group™, a independent support and project management firm for natural grass field management. Jerad is credited as the pioneer of fraise mowing in the United States. @JeradRMinnick on Twitter or Jerad@naturalgrass.org. Feedback encouraged!

SOIL COMPACTION, POROSITY, AND SPORTS TURF

▶By Dr. Phil Busey, Agronomist
Phil Busey Agronomy Consulting Inc.

Soil compaction is overstated as a sports turf problem. More focus should be on soil porosity, which is a fundamental to other issues, with a goal of large soil pores capable of gravitational drainage and aeration.

Soil compaction cannot be measured directly. Sand fields common in Florida are quite resistant to compaction but suffer from opposing problems such as instability. Some adverse conditions such as goosegrass infestation are caused by associated traffic factors but compaction, often blamed for goosegrass, may have little or no role.

Before deemphasizing compaction and focusing on more fundamental explanations of sports turf performance such as porosity, what is compaction?

WHAT IS COMPACTION?

Soil compaction is the consolidation of soil particles by mechanical pressure, especially under wet conditions. Soil compaction occurs by reorienting soil particles, cramming them into a smaller volume, by reducing pore volume. Compaction increases soil bulk density or soil weight per volume. The central event of compaction is the crushing of soil pores. Before we can understand loss of porosity and increased soil bulk density as the definition of compaction, we need to understand a companion related term, "soil particle density."

Soil solids are individual particles of varying sizes, sand, silt, and clay. Typical density of inorganic soil particles is 2.65 grams per cubic centimeter, or 2.65 times as dense as water. Soil particle density is the density of the underlying rock minerals of which soil particles are composed, quartz, feldspar, mica, limestone, silicate clays, etc.

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Soil is not consolidated rock but ideally has about 50% pore volume between rock particles, so its bulk density (soil density including pores) is about 50% that of individual rock particles. Soil bulk density is typically 1.1 to 1.5, about 50% of the 2.65 particle density, depending on pore volume, considering the presence of a little soil organic matter.

A way to measure soil bulk density is to dig a hole, line the hole with plastic film, and measure the volume of water that can be poured into the hole. Next, dry and weigh the dug-up soil and divide the weight by the volume. That's soil bulk density. There are more exacting scientific methods of measuring soil bulk density (Fig. 1). The more "compaction" experienced by a soil, the more increase there is in soil bulk density, which is the reduction in porosity.

Fig. 1. Accurate measurement of soil bulk density and porosity in the field, as a step to understanding compaction, starts with custom equipment and procedures for the extraction of large cores of precise diameter.

For a given soil, soil bulk density is a relative measure of compaction, comparing that soil with itself under different management conditions. Since compaction is based an uncompacted reference of the same soil, no measurement of compaction can be used to compare different soils. Various indicators of relative compaction, such as soil penetrometer resistance and Clegg field hardness are useful for sports field surface evaluation for other reasons. But this equipment cannot be used to compare different field soils for compaction, bulk density, or porosity, because other factors differ so much, and because compaction is a relative term used in comparing one soil with itself. There is no good correlation that I am aware of, among these very different kinds of measurements.

Since compaction is increased soil bulk density, and soil bulk density is mathematically the opposite of porosity or pore volume (or particle density times 1 minus porosity), we should focus on porosity which fundamentally points us to understanding how sports turfgrass can grow well and provide safe playing surfaces.

There can be differences in soil bulk density among different soils due not to compaction but to differences in organic matter. Soil organic matter is much less dense than inorganic sand, silt, and clay particles. Soil organic matter affects soil bulk density, depending on how much organic matter is present and its effect in gluing together soil particles into structural units called aggregates or peds. The role of organic matter in porosity (and soil bulk density) is another example why porosity is a fundamental measureable quality, and compaction is at best a relative concept.

Fig. 2. Turfgrass soils were compacted experimentally prior to growing bermudagrass and goosegrass by dropping a 30-pound weight up to 42 times from a height of 17 inches.

A soil that has good structure is made up of peds that crumble, and it has low soil bulk density because the structure supports extra pore volume within the peds. Sand soils used in sports field construction and native throughout Florida have naturally little or no structure, even when organic matter is present. Sand soils are resistant to compaction but do not necessarily have adequate porosity because they can be too "well-graded" with too many size classes. The biggest problem I have seen is excessive content of very fine sand (particles less than 0.15 mm diameter) which behave like silt in plugging up the pores.

Porosity is a more fundamental property than soil bulk density or compaction. Porosity can be used to compare different kinds of soils as well as the effects of management on an individual soil. When we find entirely sand soils with low infiltration rate, something more is going on than compaction. In the case of the poorly draining sands with high very fine sand, it is usually due to lack of macropores which are large pores in which water can drain by gravity. Ideally there should be at least 10% to 20% large pore or macropore volume and at least 3 inches per hour saturated hydraulic conductively. Saturated

hydraulic conductivity is the measurement of how fast water drains through soil under very carefully controlled conditions in the laboratory. If these two measurable conditions exist, adequate macroporosity and conductivity, the physical soil conditions exist to grow healthy sports turf.

Therefore, for multiple reasons, the word "compaction" is an easy visualized idea with little practical value, especially in sand soils in Florida. We should focus instead on porosity which substantially determines saturated hydraulic conductivity (how fast water moves through soil by gravity) and to some degree infiltration rate (how fast water enters into the soil). To see the many important sports turf consequences of porosity, see Table 1.

THE FLIP SIDE OF NO COMPACTION

Sand fields with high porosity make it difficult to maintain moisture and nutrients. This goes with the territory. Sand fields, while often being incapable of compaction, may lack adequate stability and traction and may undergo settlement. Sand fields may experience "blow-outs" where heavy athletes cause sideways slumping of patches in the field. Fields that are too soft can contribute to injuries in different ways than fields that are too hard.

Stability is often measured as shear resistance. Reduction of porosity can tighten up a soil and provide more anchoring ability for turfgrass roots and for athletes' feet. Some organic matter, at least 10% to 15% by volume, should be worked into a root zone mix prior to installation on the sports turf field. This has no little or no direct effect on compaction, based on the definition of compaction, but affects porosity and several measures of turf performance. Organic matter, particularly Canadian sphagnum peat moss or other fibrous peat improves field stability without reducing porosity.

Sand soils that naturally have high porosity are well-sorted sands with mostly one size class. These soils have lots of "packing pores" which are pores between the primary soil particles. Because the soil particles are so well sorted into a single majority size class, often medium sand, there are not enough smaller particles to fill the "packing pores." Naturally high porosity sands have low cohesion. Their particles have low surface area and do not stick together unless wetted and sometimes rolled. If you have ever tried to make a sand castle on the beach, you will recognize how sand has to be wet to pack, otherwise it is unstable and will fall apart.

In contrast, sand soils with lower porosity may be well-graded sands with more size classes, and more clingy surfaces that stick together, and they are sometimes called "dirty sands." Such sands are more stable but may not have adequate drainage.

Consequence	Mechanism
Diminished Water Capacity	Pore spaces that contain soil water are crushed and eliminated by compaction
Reduced Infiltration	Pore spaces, particularly large pores (macropores) become plugged up and soil loses its water absorbing potential
Reduced Hydraulic Conductivity	Large pores (macropores) necessary for gravitational drainage are closed by compaction. Gravity is not strong enough to move water quickly through small pores (micropores)
Ponding and Pocketing	Surface water accumulates in low points in the sports field which are kicked up by feet and further deepen
Runoff	Water that cannot infiltrate and percolate through the soil forms ponds on the surface and is moved horizontally off the sports field by gravity
Reduced Aeration	Oxygen moves too slowly through the few remaining micropores to supply the respiratory needs of roots
Toxic Gases	Carbon dioxide and other soil gases cannot quickly diffuse out of the compacted soil, thus gases injure turfgrass roots
High Impedance	Compaction increases soil strength to values stronger than roots' can penetrate
Reduced Root Growth	Roots cannot grow in lack of oxygen or conditions where there are no large pores to penetrate or soil is too strong
Yellow, Unresponsive Turf	Turf roots cannot absorb nutrients and water and no amount of fertilization and irrigation has any positive effect
Field Hardness	Soils with small porosity will have high soil strength and be very hard, particularly when they are dry

Table 1 - Negative Consequences of Reduced Soil Porosity.

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PROTECTING SOIL POROSITY

Fig. 3. Bermudagrass and goosegrass plants were grown separately and together in competition in compacted and uncompacted soils.

Athlete's feet exert high pressure on soil particles, higher than equipment wheels. The athlete's effort to accelerate quickly and change directions will impact soil particles, destroying what little cohesion was present, and collapsing surface soil pores. Physical damage to turfgrass is also caused by athletes' feet. Cleats give the athlete the extra leverage to move quickly, but further concentrate pressure on very small areas, crushing soil pores, ripping up stolons, and kicking up divots.

Moisture management is highly critical in all sports turf fields. Sand fields that are allowed to be played in a dry condition have little particle cohesion and sand will be kicked up and bermudagrass stolons uprooted. Fields that are played when wet will puddle and have excessive particle movement from the puddles forming deep pockets that are hard to regrass.

Cultivation by various aerification equipment is quite useful for alleviating compaction but should be done cautiously in porous sand fields. Core cultivation using hollow times approximately four times per year is beneficial as long as there is sufficient turfgrass growth to allow recovery. The key is to vary tine depth and ensure that there is good surface penetration, on the order of 10% per aerification event. Sometimes topdressing is included after cultivation. This is also an excellent opportunity to do dragging and rolling. Despite the benefits of topdressing, it is extremely difficult if not impossible to modify a soil by this procedure.

Different kinds of approaches can be used to manage traffic under conditions of high soil porosity. One is to concentrate traffic and the other is to spread it out. Practice activities that exert enormous negative effect on soil porosity can be restricted, and then rotated around to damage new areas while old areas are given about 3 weeks to recover. In any case, practice areas should

Fig. 4. Goosegrass plants showed a severe negative response in root dry weight and root depth penetration as a result of high compaction (left) compared with low compaction (right). Goosegrass is no more fond of growing in compacted soil than is bermudagrass. Where goosegrass infests traffic areas, it may be the wear and lack of turfgrass cover that is the problem, not compaction.

be designated and carefully watched. Alternatively, field use can be spread out as much as possible. There is a tendency for coaches to like to play or practice constantly in the same spot. They are sometimes reluctant to move or unaware of the need to move soccer goal posts a few feet this way or that to preserve soil porosity.

In my experience, sports complexes with good communications between coaches, user groups, and sports turf managers are helpful in attaining the maximum number of games per season while protecting a community's investment in sports turf fields. The soil porosity is a critical part of this effort. ●

5 REASONS WHY YOU SHOULD ELIMINATE IRON, MANGANESE AND MAGNESIUM FROM YOUR GRANULAR FERTILIZER

Travis Shaddox, Ph.D., is an assistant professor at the University of Florida's (UF) Fort Lauderdale Research and Education Center. J. Bryan Unruh, Ph.D., is a professor and the associate center director at the UF's West Florida Research and Education Center in Milton. Jason Kruse, Ph.D., is an associate professor in the UF environmental horticulture department in Gainesville. Rates used in these studies are for experimental purposes. Always follow labeled rates.

►By Travis Shaddox, Ph.D., J. Bryan Unruh, Ph.D., and Jason Kruse, Ph.D.

Iron (Fe), manganese (Mn) and magnesium (Mg) are plant essential elements just as important to plants as carbon, hydrogen and oxygen. As such, turfgrass deprived of these elements would eventually become unacceptable either in terms of quality, playability or damage recovery. Thus, sport turf should be maintained with sufficient nutrients at all times when recovery from traffic is desired. This is why you likely include a 'minors' package in your granular nutrition programs. However, it has been our observation that very little thought has been given to the form in which Fe, Mn and Mg are applied. Foliar versus granular applications vary greatly in their ability to introduce these three elements into the turfgrass system. Disadvantages of granular micronutrient applications include low particle distribution, poor distribution uniformity, poor response, reduced plant availability, and increased cost.

1. Particle Distribution

Particle distribution is the number of fertilizer particles per area of turf. When blended with other fertilizer components such as nitrogen (N) and potassium (K), the number of micronutrient particles can be very low. We counted the number of fertilizer particles per pound of material of various fertilizer raw materials. We concluded that

for fertilizer particles sizes used on sport turf (SGN 220), the number of fertilizer particles in a 15-0-15 with 1% Fe, Mn and Mg (derived from Fe sulfate, Mn sulfate and sulfate of potash magnesia) applied at 300 lbs. per acre would be 107 particles per square foot. Of those particles, 2 would come from Mn sulfate, 6 from Fe sulfate, and 7 from SPM. With such a low particle count, it is unlikely that any turf response would be observed.

2. Distribution Uniformity

Distribution uniformity is a measurement of how uniform the fertilizer particles are spread across the turf. As fertilizers are blended, shipped, and spread; smaller, heavier particles tend to migrate towards the bottom of the bag. Iron, Mn and Mg are all metals and tend to be heavier than N and K particles and therefore tend to migrate to the bottom of the bag. This lack of uniformity in the bag leads to a reduction in uniformity when the fertilizer is spread. This leads to some areas of turf receiving larger portions of micronutrients than others. We all know how our turf appears when certain areas receive larger amounts of water than others. The same holds true for nutrients.

3. No Documented Turfgrass Response in Florida

We are unaware of any study conducted in Florida that has documented a turfgrass response to granular Fe except in cases where the Fe was applied as EDTA, DTPA or EDDHA. In most cases where granular Fe is suspected as causing a response, further investigation has found that the fertilizer contained either N or phosphorus components. Both N and phosphorus have been well documented as causing turfgrass greening. Granular Mn and Mg responses have been documented in some cases. However, turfgrass response to granular Mn and Mg are not consistently observed (Table 1) and are likely species and soil dependent.

4. Reduced Plant Availability

Iron and Mn oxidize so rapidly in Florida soils that most applied Fe and Mn is unavailable to the plant before you put your spreader away. In fact, our most recent study concluded that more than 95% of Fe and 50% of Mn became

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Table 1. Summarization of field and greenhouse studies investigating turfgrass responses to various forms of Fe, Mn, Mg

Fertilizer	Form	Derived From	Fe	Mn	Mg	Studies	Response	Response
			Percent			*Number*		*Percent*
Fe-Gluco	L	Glucohepatonate	6	0	0	2	2	100
Fe-Sulfate	L	Sulfate	6	0	0	6	6	100
Fe-Sulfate	G	Sulfate	30	0	0	7	0	0
Fe-Sucrate	G	Sucrate	50	0	0	7	0	0
Fe-Chelate	G	EDTA	5	0	0	4	2	50
Fe-Humate	G	Humate	14	0	0	4	1	25
Fe-Oxide	G	Oxide	50	0	0	5	0	0
Mn-Gluco	L	Glucohepatonate	0	5	0	2	0	0
Mn-Sulfate	L	Sulfate	0	5	0	2	0	0
Mn-Sulfate	G	Sulfate	0	32	0	2	0	0
Mn-Sucrate	G	Sucrate	0	50	0	2	0	0
Mg-Gluco	L	Glucohepatonate	0	0	4	2	0	0
Mg-Sulfate	L	Sulfate	0	0	4	2	0	0
Mg-Sulfate	G	Sulfate	0	0	10	2	0	0
Mg-Sucrate	G	Sucrate	0	0	50	2	0	0
Chelated Minors	P	Unknown Chelate	8	4	0.5	2	0	0
Chelated Minors	P	Unknown Chelate	13	0	0	2	0	0
Chelated Minors	P	Unknown Chelate	7.5	8	0	2	0	0
Chelated Minors	P	Unknown Chelate	13	0	0	2	0	0
L = liquid, G = granular, P = sparged powder								

unavailable within 1 hour of entering the soil solution. This finding alone would warrant the removal of all non-chelated Fe and Mn from granular fertilizer used for turfgrass. However, Mg is quite different from Fe and Mn. Our findings indicate that Mg will remain soluble for more than 3 weeks after application. Although we have yet to observe a turfgrass response to granular Mg, clearly Mg remains plant available; therefore you may find value from granular Mg applications in some cases.

5. Increased Cost

Any time a component is added to a single-source fertilizer (N for example), that component will increase the cost per acre of that fertilizer. Therefore, anything we add to our fertilizer mix should coincide with a return on that investment. As you read the results of our recent Fe, Mn and Mg studies, you will find that the return on investment is zero with sulfate, sucrate or oxide forms of granular micronutrients.

Since 2014, we have conducted 10 studies investigating various aspects of Fe, Mn and Mg nutrition. The following is a synopsis of our Fe, Mn and Mg research.

STUDIES 1-4: BERMUDAGRASS RESPONSE TO IRON FERTILIZERS

Location: Citra and Jay | Length: Six weeks | Applications: One

Treatments: Untreated control, Fe sulfate liquid, Fe sulfate, Fe sucrate, Fe humate, Fe oxide and Fe chelate (EDTA) (see Figure 1)

Rate: 20 lbs. of Fe per acre (This rate far exceeds the recommended rate for EDTA and foliar applications, but is normal for granular applications.)

Results: In the first year, only Fe sulfate liquid increased turf quality. In the second year, Fe sulfate liquid, Fe EDTA and Fe humate increased turf quality. Granular Fe sulfate, Fe sucrate and Fe oxide did not influence turf quality.

Figure 1. Aerial photograph of Princess bermudagrass three weeks after applying iron. Each dark green rectangle received liquid iron sulfate. All other rectangles received granular iron sources or no iron.

STUDIES 5-6: ST. AUGUSTINEGRASS RESPONSE TO FE, MN AND MG FERTILIZERS

Location: Citra and Jay | Length: Four months | Applications: Monthly

Treatments: Untreated control, Fe sulfate liquid, Fe glucoheptonate, Fe sulfate, Fe sucrate, Mn sulfate liquid, Mn glucoheptonate, Mn sulfate, Mn sucrate, Mg sulfate liquid, Mg glucoheptonate, Mg sulfate and Mg sucrate

Rates: Granulars = 20 lbs. of element per acre; liquids = 2 lbs. of element per acre

Results: Liquid Fe sulfate and Fe glucoheptonate consistently increased turf quality. After the fourth application, Mg sulfate liquid increased turf quality. Granular forms of Fe, Mn or Mg did not influence turf quality.

STUDY 7: BERMUDAGRASS RESPONSE TO SPARGED, CHELATED MINOR ELEMENTS

Location: Citra | Length: Four months | Applications: Monthly

Treatments: Untreated control, Fe sulfate, Fe sucrate, Fe chelate 13%, chelated Fe (13% Fe) sparged on gypsum, chelated minors (8% Fe, 4% Mn, 0.5% Mg) sparged on gypsum and chelated minors [7.5% Fe, 8% Mn, 4.5% zinc (Zn), 2.3% copper (Cu), 1.3% boron (B), 0.04% molybdenum (Mo), 13% sulfur (S)] sparged on gypsum

Rates: Granulars = 20 lbs. of Fe per acre; sparged = 0.5 lbs. of Fe per acre

Results: None of the treatments increased turf quality.

Results: None of the treatments increased turf quality.

STUDY 8: BERMUDAGRASS RESPONSE TO VARYING RATES OF SPARGED, CHELATED MINOR ELEMENTS

Location: Gainesville | Length: Six weeks | Applications: One

Treatments: Untreated control, Fe chelate 13%, chelated Fe (13% Fe) sparged on gypsum, chelated minors (8% Fe, 4% Mn, 0.5% Mg) sparged on gypsum and chelated minors [7.5% Fe, 8% Mn, 4.5% zinc (Zn), 2.3% copper (Cu), 1.3% boron (B), 0.04% molybdenum (Mo), 13% sulfur (S)] sparged on gypsum

Rates: 0, 1, 5, 10 and 20 lbs. of Fe per acre

Results: Treatments did not increase turf quality at any rate.

STUDY 9: RAPID EXTRACTION OF IRON FERTILIZER SOURCES

Location: Gainesville

Treatments: Fe EDTA, Fe sulfate, Fe humate, Fe sucrate and Fe oxide

Results: Fe extracted from Fe EDTA, Fe sulfate, Fe humate, Fe sucrate and Fe oxide was 313, 103, 35, 4 and 0.5 percent, respectively, of the guaranteed analysis.

Results: None of the treatments increased turf quality.

STUDY 10: SOLUBILITY OF FE, MN AND MG IN TWO ALKALINE SOILS (INCUBATION STUDY)

Location: Gainesville | Length: 3 weeks

Treatments: Untreated control, Fe sulfate, Fe glucoheptonate, Mn sulfate, Mn glucoheptonate, Mg sulfate and Mg glucoheptonate

Results: More than 95% of applied Fe became insoluble within one hour of entering the soil solution. Approximately 50% of applied Mn became insoluble within one hour. The remaining Mn remained sparingly soluble for three weeks. About 90% of applied Mg remained soluble for three weeks. Glucoheptonate did not increase solubility of Fe, Mn or Mg.

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SUMMARY DISCUSSION

The primary reason why turfgrass is not responding to granular forms of Fe and Mn is due to the rapid oxidation of these metals in our soils. Our incubation study clearly found that nearly all Fe was unavailable within one hour of entering the soil solution, and most Mn was insoluble after the first day of application. In order to increase the amount of soluble Fe and Mn in the soil solution, you may choose to use a chelate. While this decision seems logical, we found that glucoheptonate is incapable of increasing the solubility of Fe, Mn or Mg in the soil solution. While glucoheptonate formulations of Fe, Mn and Mg may provide other benefits such as foliar absorption and liquid fertilizer stability, they do not provide any advantage or disadvantage with respect to chelation in Florida soils.

Foliar applications of Fe, Mn and Mg are more effective than granular applications for many reasons. First, foliar applications avoid the soil solution where oxidation of these elements renders much of the nutrients unavailable for plant uptake. Second, foliar applications greatly increase the uniformity of nutrient distribution, especially when very small quantities of micronutrients are needed. Lastly, leaf absorption can be much more rapid than root uptake. The use of granular Fe, Mn or Mg at rates normally applied in blended fertilizer may not necessarily be detrimental to your turfgrass management program. However, in order to maximize product efficiency and turfgrass quality, foliar-applied Fe, Mn or Mg would be a better choice than granular-applied. ●

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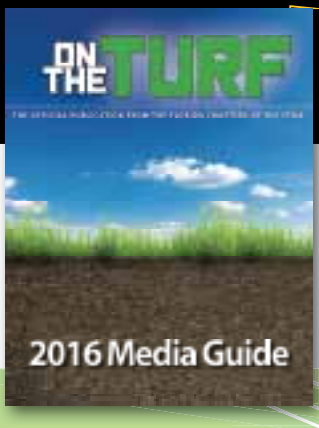

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Professional

MEMBER SPOTLIGHT

Richard Harmic

Fifteen years ago my wife and I made the decision to move south from western Pennsylvania. That decision has turned out to be one of the best we ever made. After 11 years of construction work and 12 years of self employment in the lumber industry it was time for a change.

I spent almost three years with the City of Oviedo Parks before accepting a position with Orange County Parks & Recreation. In 12 years with Orange County I have been able to advance four times from the entry level position to a Program Manager level. I believe by starting at the bottom and getting to experience the various levels of service and responsibilities it has greatly enhanced my overall leadership abilities.

My current areas of responsibilities literally cover from one side of the county to the other. On any given day I may check on a boat ramp in the east side at the St. John's River to the far west side at the Lake County line where the West Orange Trail begins. In between those sites I have 19 athletic fields all with Tifway 419 Bermuda turf. The athletic fields require the most maintenance and I rely heavily on the site supervisors for the daily maintenance upkeep.

During the peak seasons our fields may see over 40 hours of play per week. Keeping the fields in a safe and playable condition becomes our greatest challenge. With the assistance of our in house spray/fertilizer crew, irrigation crew and onsite maintenance personnel we do a great job of keeping the fields in the best condition possible.

I don't have the formal education in turf care so all of my learning has been hands on and by asking tons of questions. Florida turf is totally different than Pennsylvania and it took me

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Commercial

MEMBER SPOTLIGHT

Annie Nsafoah

Annie Nsafoah is a Turf & Ornamental (T&O) sales representative for Dow AgroSciences. She covers eastern Florida from Jacksonville south to Homestead, representing the golf, nursery and lawn care markets. She has been with Dow AgroSciences since January 2013, when she was hired as a T&O sales trainee in Southern California.

Currently, Annie spends a large part of her time serving the golf market. She especially enjoys visiting different courses and helping customers with unique challenges and opportunities. Her favorite thing about her job — providing customer solutions to problems big and small. She also serves customers in the nursery market, as well as the lawn care market — an area where she is eager to grow her experience.

Annie received a bachelor's degree in agricultural biotechnology from the University of Kentucky and a master's degrees in agricultural economics and international agricultural development from Oklahoma State University.

In her free time, Annie enjoys spending time with her family, playing soccer and volleyball, and traveling to new places.

Give Annie a call to discuss your weed, insect and disease concerns today! ●

To submit profiles, please send them to ontheturf@crgnet.net. Maximum word count is 300.

some time to adapt. As our division continues to expand with at least 12 more fields planned at this time our cultural practices will become extremely important. One of my favorite things is learning and sharing ideas. The CFSTMA has been a great way to meet new people and share ideas as we are always learning better methods of turf care. ●

Upcoming INDUSTRY EVENTS

CFSTMA Chapter Meeting - June 1, 2016 | 9:00am-1:00pm

Orange County Parks & Recreation at Barnett Park
4801 West Colonial Drive, Orlando, FL 32808
Topic: Fraze Mowing Demos

Registration includes lunch. Want to sign up to attend? Visit cfstma.org and click events. Free to Florida STMA members; $25 for non-members.

Florida STMA Chapter Application Form

Name: _____ Title: _____

Employer: _____ _____Contact Phone: _____

Address: _____ City: _____

Zip: _____ Email : _____

If vendor, type of business: _____

Florida's STMA Chapters welcomes new members. We are a very inclusive organization and have a membership category for anyone interested in learning more about sports field management.

____ **$50 Sports Turf Manager** - If you are primarily responsible for managing or maintaining a sports field(s). This position is an eligible voting member and hold elective office.

____ **$35 Sports Turf Manager Associate** - If you are primarily responsible for managing or maintaining a sports field(s) and your organization already has a Florida STMA chapter member employed. The Associate(s) has the same benefits and privileges as the Sport Turf Manager. Dues are lower because of multiple members (groundskeepers, turf specialists, grounds maintenance, etc.).

____ **$50 Academic** - If you are in teaching, extension or research. This position is an eligible voting member in the Chapter and hold elective office.

____ **$75 Commercial** - If you work for a company engaged in a commercial enterprise providing services and/or products to the sports turf profession (consultants, architects, designers, contractors, management companies, distributors and manufacturers, etc.). This position is an eligible voting member and can hold elective office available to the commercial category.

____ **$50 Commercial Associate** - If you are the 2nd person (or more) from a commercial company. All Commercial Associates **must** first have a Florida STMA Chapter commercial member at their company before the lower dues category can be selected. This is a non-voting member and not eligible to hold office.

____ **$35 Affiliate** - If you are indirectly or on a part-time basis involved in the maintenance/management of sports field(s) (coaches, athletic directors, volunteers, or full-time students). This is a non-voting member and not eligible to hold office.

After being accepted for membership, members of any Florida Chapter have the same member benefits and privileges in all chapters except the right to vote and hold office.Voting rights and right to hold office are restricted to a member's home chapter, defined as the chapter to which member's dues are paid. Members may only claim Home Chapter membership in a single chapter.

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