The PALLET

Newsletter of Turfgrass Producers of Texas **Summer 2018**

GENETIC RESEARCH SHINES LIGHT INTO ZOYSIA'S FAMILY TREE

By Susana Milla-Lewis, PhD, & Jennifer A. Kimball, PhD
Edited for "Rooted in Research" by Casey Reynolds, PhD

There are approximately 30 different species of turfgrasses commonly found throughout the world, and each has its own set of characteristics that make it uniquely adapted for use. These adaptations can be grounded in climate, rainfall, mowing height, stress tolerance, sunlight requirements, etc., but among all of the different turfgrass species used today, few are as unique as those found in the Zoysia genus. Zoysiagrasses are thought to have originated in a region of the world that spans as far north as Japan and southeast China, and downward through Malaysia and into New Zealand. There are at least 11 recognized species within the *Zoysia* genus, with at least three of them commonly used as turfgrass. These include Japanese zoysiagrass (*Zoysia japonica*), Manilagrass (*Zoysia matrella*), and Mascarenegrass (*Zoysia pacifica*, previously identified as *Zoysia tenuifolia*). Historically speaking, zoysiagrass cultivars used for turfgrass have often been 'very generally' grouped into these three categories based mostly on leaf texture, but also on their shade tolerance and other traits. For example, coarse-textured zoysias have typically been thought of as *Z. japonicas* while fine-textured zoysias were considered *Z. matrellas* or *Z. pacificas*. As a result, some zoysiagrass cultivars have been misclassified with many intermediate types simply being called *japonicas* or *matrellas*. However, recent genetic research is shedding light on the interconnectedness of these species and the diversity in traits they each produce.

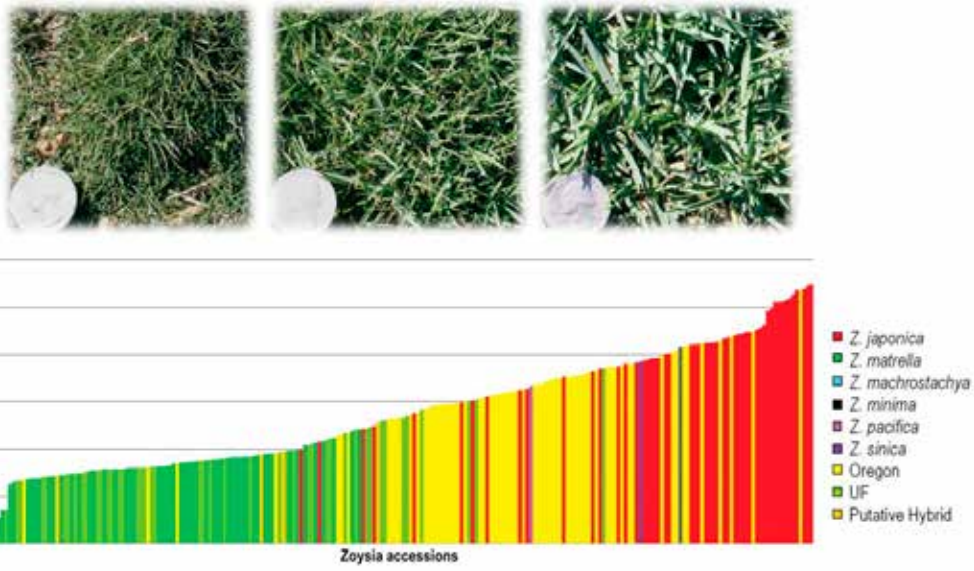

Figure 1

Zoysiagrass species are cross-fertile and easily interbreed with one another. This is somewhat uncommon as the definition of species revolves around being reproductively isolated. While crosses between different zoysiagrass species can occur naturally, they are also often used by plant breeders as a means of mixing traits of interest into new and improved cultivars. Consequently, intermediate types between species are not unusual and a continuous range of variation exists in the *Zoysia* genus for many morphological traits. A few examples of this include cultivars like Cavalier, Crowne, Zeon, and Zorro. While these cultivars typically have finer texture than

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THE PALLET

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Greetings from the new Texas Turfgrass Extension Specialist

Howdy! Allow me to introduce myself. My name is Dr. Becky Grubbs, and I am the new Turfgrass Extension Specialist with Texas A&M AgriLife.

A little about me…

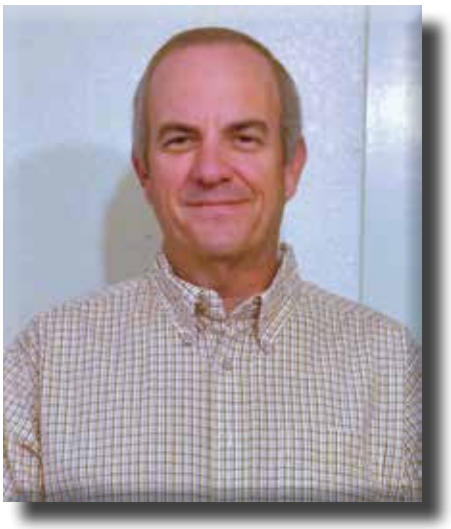
I grew up in the DFW area (Lewisville, TX), and my parents still reside in that part of the state today. My first two degrees were completed at Texas Tech University in Lubbock, and then I went on to pursue my PhD in Crop and Soil Sciences at the University of Georgia in Athens, GA. There, my research in turfgrass focused on three main areas: precision turfgrass management (PTM), nutrient management, and effectively communicating research findings to the public. In April of this year, I was thrilled to return to Texas and start my new position here in College Station.

My mission statement…

It is my personal mission in this position to effectively serve the needs of every facet of the turfgrass industry throughout the state of Texas ranging from home lawns to golf courses to sod farms. As turfgrass producers, I firmly believe that you are responsible for growing the grass that Texans live their lives on – you provide the stage on which we create so many of our best outdoor memories. Moving forward, my objective is to provide resources and education tools that support the needs of producers and turfgrass managers in every region of the state. It will become my priority to identify and communicate best management practices that allow you to produce healthy grass as efficiently as possible. As I continue to plan the direction of my program, I look forward to receiving input from growers like you with their "boots on the ground" throughout the state, and hope that we will forge a strong and productive relationship.

Executive Director's Message

By BRENT BATCHELOR



What's your story?

I follow the writings of several folks who make a living telling other people how to be better.

Better Leaders, Marketers, Fathers, Husbands, and on and on. The reason I like reading or listening to what they have to say is I always want to be better at anything I attempt, not only for my benefit but more importantly to me those that I work along side and serve in my many capacities. Plus, I believe I have had very few opportunities that did not come from what others see in me not what I see in myself. Recently one of the fellows I follow Seth Godin wrote the following Blog Post that got me to thinking.

Putting a value on a story

Walk through the diamond district in Manhattan and in the course of one block, at least a dozen men will stop you and ask if you're hoping to sell a diamond ring. A few blocks away, Tiffany will happily sell you a diamond ring. Buy a $7,000 ring at Tiffany's and walk over the one of these guys and you'll be lucky to get $1,000 for your new ring. That $6,000 is what you paid for the story. It's the cost of the box, the lighting, the salespeople, the architecture and most of all, the special feeling. Do a blind taste test. In one glass, wine from a $10 bottle. In the other, wine from a $200 bottle. The untasted difference between the two is what you paid for the story. The list goes on and on. Just about everything we buy comes with a story included.

And yet, most creators, sellers and marketers don't invest enough, don't take enough care, and don't persist enough in making sure the story is worth what you paid for it.

As I ponder this statement from a turf marketing standpoint I am struck by the fact that our association does and needs to continue to tell our story and the story of natural turf produced on Texas farms that provides the best option for folks to enjoy the managed open spaces they encounter. That may be a home lawn, a golf course, a sports field, a park or any other area that turf is an option. SO, going forward think about our collective turf story and how we tell it to our end users.

A second angle on this Blog Post is what is your story? Everyone has a story some are straight forward others have a winding road that has led them to their current place. I am interested in hearing your story and how the turf business has been a part of it. I would like to feature some farm stories in future Pallet issues. I will ask for volunteers but will call on some of you if I don't get some volunteers.

On the Turfgrass Producers front I have spoken with several of you who are having a busy spring and by the number of trucks I see and reading the results of our inventory survey I would say it has been a good spring for turf farmers. By the time you read this our June field day in

Dallas will have happened. We want to offer more opportunities for you to gain knowledge and be around other turf producers. We are in the early stages of planning a fall equipment field day.

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Zoysia Geaneology

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Z. japonicas like Zenith or Chinese Common, they don't have texture as fine as many *Z. matrellas* such as Diamond or L1F. The wide range in leaf texture that exists among the zoysiagrasses listed in **Figure 1** is an example of not only the variation that exists between various zoysia species, but also the shared traits in which they overlap.

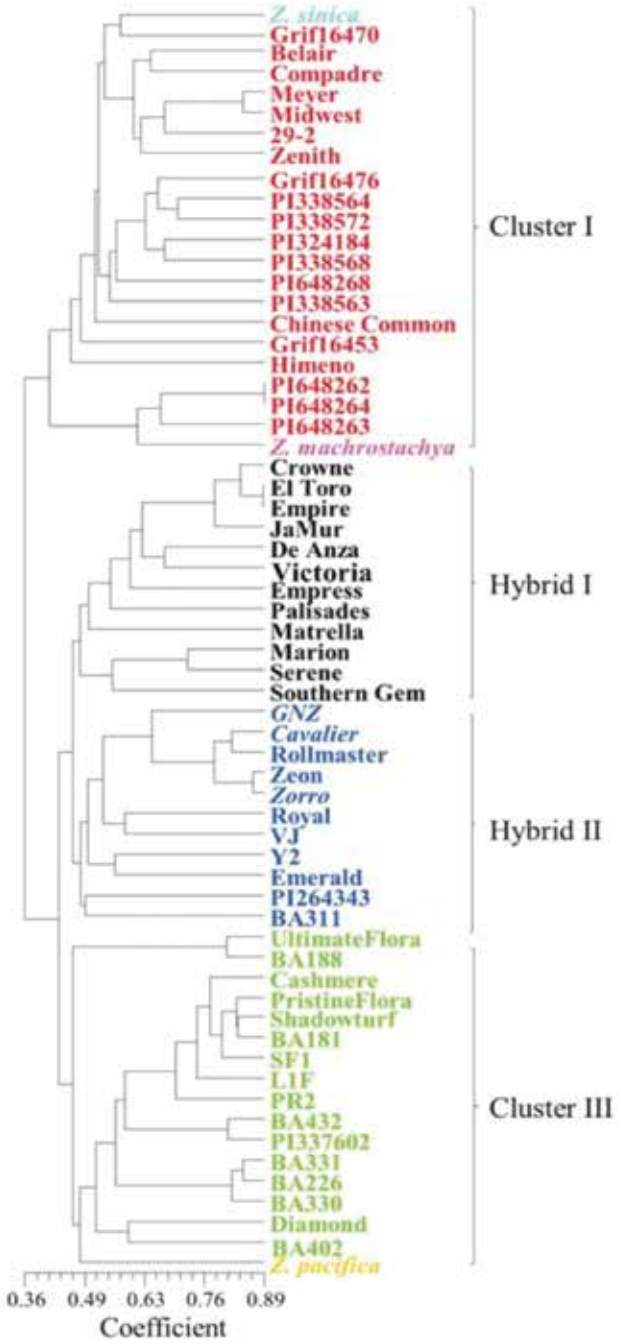
These intermediate types can be difficult to classify and their relationships with other zoysia species have not always been clearly understood. In order to investigate this, researchers at North Carolina State University (Raleigh, NC), in collaboration with the University of Florida, USDA-ARS in Tifton, GA, and Blue Moon Farms conducted a study which evaluated 62 zoysiagrass cultivars and collections representing five different zoysia species: *Z. japonica*, *Z. matrella*, *Z. machrostachya*, *Z. minima*, and *Z. sinica*. In order to determine the true genetic relationships among these individuals, DNA markers were used to investigate their genetic constitution. Molecular or DNA markers are changes in short sequences that occur at specific locations on an individual's DNA

When individuals have differences in those sequences, they can be used to distinguish one individual from another. In this case, 55 DNA markers were evaluated and the relationships among the 62 zoysiagrasses included in this study were determined based on differences in their sequences. For example, if Meyer were to have a lot of markers in common with Zenith and just a few markers in common with Diamond, then Meyer would be more genetically similar to Zenith and therefore more closely related to it.

After analyzing the commonalities and differences between each pair of zoysiagrass samples, a tree of relationships was established that reflected not only the relationships among zoysiagrass species, but also the true delineation between them. This is useful in determining where commonly used zoysiagrass varieties should be properly classified. The zoysiagrass tree of relationships presented in **Figure 2** indicates that the 62 zoysiagrass samples analyzed fell into four sub-groups, or clusters. Cluster I includes true *Z. japonica* cultivars, while Cluster III includes true *Z. matrella* cultivars. Cluster II, consisting of hybrids, is right in the middle of both species.

More importantly, Cluster II is divided into two subgroups: Hybrid I which includes *Z. japonica* x *Z. matrella* hybrids that have a higher contribution of genetic material from *Z. japonica*, and Hybrid II which are also hybrids between the two species but have a higher contribution of *Z. matrella* genetic material. To validate the DNA marker results, information on flowering characteristics from the 62 samples was also collected.

These included peduncle width, pedicel length, raceme length, number of seeds per raceme, seed length and seed width for a number of flowers per entry. This is an important step because these are the characteristics that have been traditionally used by botanists to classify the 350,000+ species of the world's flowering plants



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Zoysia –

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TABLE 1

Table 1. Morphological- versus marker-based classification of zoysgrass commercial cultivars.

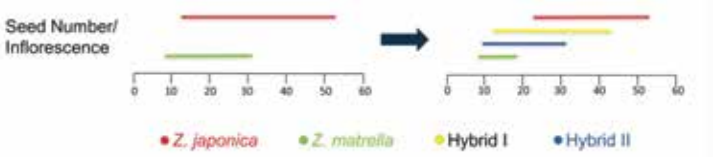
Identity	Common species designation	Marker-based species designation
29-2	Z. japonica	Z. japonica
Belair	Z. japonica	Z. japonica
Cashmere	Z. matrella	Z. matrella
Cavalier	Z. matrella	Hybrid II
Chinese Common	Z. japonica	Z. japonica
Compadre	Z. japonica	Z. japonica
Crowne	Z. japonica	Hybrid I
DeAnza	Z. japonica	Hybrid I
Diamond	Z. matrella	Z. matrella
El Toro	Z. japonica	Hybrid I
Emerald	Z. japonica x Z. pacifica	Hybrid II
Empire	Z. japonica	Hybrid I
Empress	Z. japonica	Hybrid I
GNZ	Z. japonica	Hybrid II
Himeno	Z. japonica	Z. japonica
JaMur	Z. japonica	Hybrid I
L1F	Z. matrella	Z. matrella
Marion	Z. japonica	Hybrid I
Matrella	Z. matrella	Hybrid I
Meyer	Z. japonica	Z. japonica
Midwest	Z. japonica	Z. japonica
Palisades	Z. japonica	Hybrid I
PristineFlora	Z. matrella	Z. matrella
Rollmaster	Unknown	Hybrid II
Royal	Z. matrella	Hybrid II
Serene	Z. japonica	Hybrid I
Shadowturf	Z. matrella	Z. matrella
Southern Gem	Z. japonica	Hybrid I
UltimateFlora	Z. japonica	Z. matrella
Victoria	Z. japonica	Hybrid I
VJ	Unknown	Hybrid II
Y2	Z. japonica	Hybrid II
Zenith	Z. japonica	Z. japonica
Zeon	Z. matrella	Hybrid II
Zorro	Z. matrella	Hybrid II

The results in Table 1 show the presence of a large number of cultivars that have previously been misclassified. Many of the cultivars historically thought of as Z. japonicas or Z. matrellas are actually hybrids carrying genetic material from both species. For example, cultivars previously considered Z. japonicas that are actually hybrids include Crowne, DeAnza, El Toro, Empire, Empress, GNZ, Jamur, Marion, Palisades, Serene, Southern Gem, Victoria, and Y2. All of these cultivars were more genetically similar to Z. japonica than Z. matrella except for GNZ and Y2. Cultivars previously considered matrellas that are actually hybrids include Cavalier, Matrella, Royal, Zeon, and Zorro and all of them had more markers in common with Z. matrella than Z. japonica, except for Matrella which, despite its name has more in common with Z. japonica.

Looking at the data for the inflorescence traits that were collected, not only were the Z. japonica, Hybrid I, Hybrid II and Z. matrella groups different from each other for these traits, but Hybrid I measurements were closer to those of Z. japonica and Hybrid II measurements were closer to Z. matrella (Figure 3). These observations further support the DNA results indicating the presence of hybrids among various zoysiagrass species. So, what does this all mean? This study not only verified the presence of interspecific hybrids between Z. japonica and Z. matrella, but more importantly it was able to tell us that these hybrids are the reason for the continuous range of variation commonly observed between the two species.

When these hybrids were divided into their own groups, a clear separation between the two species could be observed for the majority of the traits analyzed. In other words, it's not that Z. japonica and Z. matrella species are so variable that they overlap, but instead it's the presence of interspecific hybrids between the two species that makes it appear that way. The reality is that once these hybrids are accounted for, there is a clear distinction between Z. japonica and Z. matrella species with the presence of hybrids in the middle.

Figure 3



A working knowledge of this new information on relationships between zoysiagrass species is helpful in many ways. One, it can help plant breeders to exploit the variation present in germplasm collections for improving important performance and appearance traits. Two, it may help sod farmers, golf course superintendents, and landscape industry personnel develop management plans more tailored to the specific zoysiagrass species they are managing.

The significant presence of hybridity in Zoysia

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Zoysia–

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highlights both the historical and future importance of hybrid-based breeding strategies in the genus. Moreover, it provides further support to the hypothesis from a group of researchers in 1955 who suggested that what we now call Zoysia species are not really separate species but rather subpopulations or ecotypes of the same species.

Researc-hers examine Zoysiagrass plots at North Carolina State University.

Thus, the question, "Is Z. *japonica* really a different species than *Z. matrella* or *Z. pacifica*?" will continue to merit research by plant breeders and geneticists.

This research was performed by the North Carolina State University Turfgrass Breeding Program (https://nctbg.wordpress.ncsu.edu/) and was published in the academic journal Crop Science 53:285-295.

Susana Milla-Lewis, PhD, is associate professor of Crop Science at North Carolina State University. Jennifer A. Kimball, PhD, is assistant professor in the Department of Agronomy and Plant Genetics at the University of Minnesota. Casey Reynolds, PhD, is executive director of Turfgrass Producers International.

All graphics, tables and photos courtesy of the North Carolina State Turfgrass Breeding Program.

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TIPS TO PREVENT DISTRACTED DRIVING

Statistics show that driver distraction is one of the leading causes of traffic accidents. According to the American Automobile Association, drivers conversing on mobile devices, whether hands-free or hand-held, are up to four times more likely to be involved in a crash. Drivers engaged in visual-manual interactions with cell phones, such as texting, are eight times more likely to be involved in a crash than those who are focused on the road. Crashes can happen almost instantly. Taking your eyes off the road for even two seconds doubles your risk of being in a collision. At a speed of 35 mph, you will have travelled over 100 feet without looking at the road in front of you. Even checking a text message for 5 seconds at highway speed means you will have likely traveled almost the length and a half of a football field without looking at the road.

Here are some tips for employers and workers to help avoid driver distraction:

Employers can:

- Educate workers on the risks of distracted driving.
- Instruct workers to have a voicemail message that indicates they are driving and cannot respond to calls.
- Ensure work schedules are established that allow employees to focus on driving, and not their phones, while operating a vehicle.
- Use or install hands-free devices if phone calls are absolutely necessary for work.

Workers can:

- Avoid using the phone or device.
- Have a voice mail option and allow it to pick up messages. Let it tell your caller you will phone them back after you have parked.
- Pull over to a safe location to make or take a call or check a text. Pull out of the flow of traffic especially when on a major highway (do not stop on the shoulder).
- Have a passenger answer or place the call.
- Use a hands-free device when using the phone (e.g., voice activation, single touch) but remember the activation process and conversation itself is still a distraction.
- Make sure other devices are mounted (not moving around) while driving.
- Pre-program commonly used numbers.
- Pause conversations if driving conditions become hazardous (e.g., rain, snow, construction, heavy traffic).

This article is reprinted from The Health and Safety Report a free monthly newsletter produced by the Canadian Centre for Occupational Health and Safety (CCOHS).

PROTECTING YOUR INVESTMENTS — BEFORE AND AFTER A DISASTER

By STEVE TRUSTY

The Oxford Dictionary defines disaster as: *a sudden event, such as an accident or a natural catastrophe, that causes great damage or loss of life*. What if disaster hits you and your investments? Are you ready? Whether fire, flood, wind or other natural or man-made disaster, the amount of preplanning can make the difference between the business surviving or not. Insurance is an obvious first step, but there is much more to consider. We'll start with insurance and then move on to other steps.

Getting the Right Insurance

Look at all the different scenarios that you might insure against. What type of weather events might occur in your area? To what other disasters might you be exposed? Don't forget break-ins, robbery, theft or vandalism. What are the values of the things that you want to insure? What might it cost to replace them? What would you like to insure against? What can you insure against? The answer to the last question will probably need to come from an insurance agent. So, after you've made your lists, talk to one. If you already have an agent you are comfortable with, set up your meeting. If you don't have an agent, talk to acquaintances about their experiences. You might reach out to suppliers, customers or other sod producers for recommendations. Arrange a meeting with those that sound promising and determine what they can offer and how comfortable you feel in dealing with them. When you sit down with your agent of choice, have your lists ready and discuss your options. Your agent can advise you on what areas you can and cannot obtain insurance. The cost of insurance for some coverage may be quite expensive. You may need to make a cost/benefit calculation in deciding on some types of coverage. You may need to enlist the services of your accountant to help you make some decisions. For situations in which you can't obtain insurance, or you decide you can't or do not want to make the expenditure, you should consider an alternate plan should that event occur. If you have been in business for some time and already have insurance, you'll still want and need to review it on, at least, an annual basis. Policies change. New company's may offer coverage not previously available. A company that is currently covering an aspect of your business may decide to no longer provide that coverage or raise the rates out-of-reach. Replacement costs on certain items may change, requiring coverage adjustments. Record keeping requirements might change. Not knowing any of these things will not help you when it comes time to file a claim.

Other Insurance Considerations

Business Interruption Insurance: What is the potential for lost business due to a disaster? Talk to your agent about coverage for that eventuality. There may be coverage for specific periods, for specific occurrences, certain limits, or other variables. This is another area where you will need to weigh the cost against exposure and benefits.

Flood Insurance: Floods are not covered as a part of other property insurance policies. Flood insurance is very specific and specialized. There are many variables in determining the availability of this specific insurance. In the US, the Federal Emergency Management Agency (FEMA), which is part of Homeland Security, administers the National Flood Insurance Program (NFIP). For extensive information on obtaining flood insurance, visit the FEMA website at: *wwwfema.gov/national-flood-insurance-program/How-Buy-Flood-Insurance.*

Liability Insurance: Another important consideration in protecting your investment is your liability if someone is injured on your property or by yourself, your family members, employees, or the result of any of your activities. Even if you are not found at fault, in some situations, you may still be liable for attorney fees in defending yourself or your business. Sometimes the biggest expense in a liability claim is the cost of defending it. If you are not at fault, or only partially at fault, you will want good representation. Make sure you understand what is—and is not—covered when shopping for liability insurance.

Land Insurance: While you don't insure the land itself, you do need to think about insurance on any vacant land or hunting land you own. Some liability policies specifically exclude from coverage land that is vacant. If someone is injured on this vacant property, you can be held liable with no insurance to cover you.

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TEXAS A&M AGRILIFE EXTENSION

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Farm Employers and Form I-9 Compliance

Tiffany Dowell Lashmet
Assistant Professor and Extension Specialist
Texas A&M AgriLife Extension Service

If you are a farm employer, you are required to complete and retain copies of Form I-9, an employment authorization confirmation, for all employees. This includes all agricultural operations, regardless of size, type, or organizational structure. The following questions provide an overview of the I-9 form along with tips to ensure employer compliance.

Who? Any employer, including agricultural operations, should have an I-9 on file for all employees. There is no exception for small operations or family operations; *any* employee of *any* operation should complete an I-9 form. On the other hand, independent contractors are not required to complete the I-9 form. Generally, an employer exerts great control over an employee; whereas, an independent contractor provides his or her own tools, often works on only a specific project, and is not directly supervised by the business owner. Consult your attorney if you need advice on whether someone qualifies as an employee or as an independent contractor.

What? The purpose of the I-9 form is to verify the identity and employment authorization status of employees. The document requires the employee to present information and the employer to verify

that information, proving the employee's identity and authorization to work in the United States.

When? Complete the I-9 form after making an offer of employment and within at least three business days of hiring. Usually, these forms are completed on the employee's first day of work.

Where? A current I-9 form is available from the US Citizenship and Immigration Services website at http://www.uscis.gov/sites/default/files/files/form/i-9.pdf. Download a new copy each time you hire a new employee to ensure you always use

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Form I-9 Compliance

the most current version. Keep a copy of the I-9 form for each employee for 3 years after the date the employee is hired or 1 year after the employee leaves, whichever is longer.

Why? Hiring an unauthorized person can result in serious consequences. One of the simplest and best defenses to this claim is to show I-9 compliance. Under federal law, "knowingly hiring" an unauthorized alien results in criminal and civil penalties. For the first offense, civil penalties range from $275 to $2,200 per violation. If the government finds a pattern of practice or violations by an employer, criminal fines can be levied of up to $16,000 per violation and/or up to 6 months imprisonment. Having proper I-9 compliance and document retention is excellent evidence on the employer's behalf that he or she did not "knowingly" hire an unauthorized alien.

How? The I-9 form is made up of three sections. The employee completes Section 1 and the employer completes Section 2. Section 3 is necessary only when dealing with re-verification or re-hires.

Section 1 asks the employee for basic information such as name, address, and work authorization status.

Section 2 asks the employer to examine the documents provided by the employee to ensure that they *reasonably appear* to be genuine and related to the employee. It is understood that employers are not documentation experts and are only held to a reasonable, good faith standard. For example, if a man who is 5 feet 3 inches tall, 150 pounds, with brown hair presents a drivers' license for someone who is 6 feet tall, 240 pounds, and blonde, a reasonable person would be expected to know this document is not related to the employee.

As noted, the employee must present certain documentation to the employer to prove both his or her identity and authorization to work in the United States.

There are three categories of documents (labeled A, B, and C) that the employee may choose from in order to satisfy the I-9 requirements. The employee may select which documents he or she wishes to present; it is illegal for an employer to require any particular document from an employee or to require multiple documents in any given category. A full list of permitted documents is included on the I-9 form.

- **Category A** documents prove both the employee's identity and work authorization. If an employee provides a Category A document, he or she need not provide any Category B or C documents. Category A documents include, but are not limited to a US passport, permanent resident card, alien registration receipt card, or employment authorization document containing a photograph.
- **Category B** documents establish the employee's identity, but not work authorization. In light of this, employees providing a Category B document must also provide a Category C document. Category B documents include, but are not limited to a driver's license, government-

(Continued on Page 17)

Surviving Catastrophe – The Smart Way

(Continued from Page 11)

The same can be true for land used for hunting. Be sure you check with you agent to know what is and is not covered and look into the need for this specialized insurance.

I've Got Insurance. What Next?

Record keeping is the next big requirement. There cannot be too much detail. You should keep an ongoing inventory of everything on your premises that might be lost in a disaster. Records should include when, where and for how much you purchased the item. Besides product name and description, serial numbers should be retained for all larger equipment. You will also need to, at least annually, update the depreciated value or book value. You should also have a column to record and update the replacement value. What you paid for an item and what you would have to pay to replace it are probably two entirely different figures. The replacement value will also change depending on market conditions.

Part of Central Turf Farms in Wharton, TX, looked like this last August after Hurricane Harvey. Photo by Keith Wittig

Make sure that you know at what value you are purchasing coverage. Replacement value coverage is going to cost more but may be what you need. Again, your accountant and insurance agent can help in those decisions. Know the details of co-insurance clauses and how they affect your coverage and potential out-of-pocket costs.

You can use spread sheets or software programs for your record keeping. The important thing is to record and update everything on a regular basis. When you buy something, record it. When you sell something, record it. When you retire a piece of equipment, record it. If you make a modification to a building or equipment that increases its value or lengthens its life-span, note that in your records. Note where things are kept. Is this piece of equipment stored in a particular building? Is it carried on a truck? Where is the truck kept onsite? When is the truck usually off-site? How are property values changing in your area? Make sure that you keep copies of these records off-site, physically or computerized in virtual storage (in the cloud). Detailed records that burn up in a fire will do you no good.

Likewise, a computer that crashes or is destroyed in a disaster with no backup off-site leaves you with nothing. Regularly photograph equipment, buildings and grounds. These photos can visually show conditions and where things were at that point in time. Clean and maintain equipment properly. If you do, it will last longer and be of more value. If you don't, and an adjuster sees dirty or broken equipment, he or she might, consciously or subconsciously, devalue lost equipment based on that. If you have retired equipment, or damaged equipment waiting for repair, and you have an incident you should point that out to an adjuster.

Utilize the expertise of your insurance company(s) and agent in developing your record keeping process. Also use their knowledge in developing policies and programs to mitigate loss. What safety features can you implement? What should you include in employee manuals or training to reduce or avoid loss? What kind of contact lists should be maintained? Who is responsible for maintaining them? Who must have constant access to them? Regularly inspect areas to make sure policies and processes are handled correctly. If you don't do it yourself, make sure those

(See PREPLANNING, Page 16)

Air Quality and Turfgrass

"Just one acre of grass can absorb hundreds of pounds of fossil-fuel created sulfur dioxide in a single year."

In recent years progress seems to have been made in improving our air quality. But the levels of nitrogen oxide, sulfur dioxide and particulate matter in our atmosphere, primarily from the burning of carbon based fuels, are still a major concern.

Plants absorb these gaseous pollutants into their leaves and break them down, thereby cleaning the air. An acre of flourishing growth will absorb hundreds of pounds of sulfur dioxide during a year.

Grass also takes in carbon dioxide, hydrogen fluoride and peroxyacetyl nitrate ² the worst group of atmospheric pollutants.

Grasses in the United States also trap an estimated 12 million tons of dust and dirt released annually into the atmosphere.

This dust, dirt and even smoke are trapped in part by the grass leaves, where it is washed into the soil system by water condensed on the leaves and rainfall. Grassed areas significantly lower the levels of atmospheric dust and pollutants.

NOTE: Survey data was collected by the Maryland Agricultural Statistics Service which also tabulated the results and wrote the findings.

This information provided by The Lawn Institute – www.TheLawnInstitute.org

Erosion Control

Soil erosion is one of the most pressing environmental problems facing the world today.

In the U.S. alone, nearly 6 billion tons of soil wash or blow away each year, a figure exceeding the amount of erosion experienced during the devastating "Dust Bowl" years of the 1930's. Soil erosion in the U.S. costs between $6 and $16 billion a year.

Turfgrass is the best defense against soil erosion.

Grass binds the soil more effectively than any other plant. The reason is that each grass plant has an extensive root system. Up to 90% of the weight of a grass plant is in its roots. A single grass plant grown under ideal conditions has over 300 miles of roots.

Healthy turf areas absorb rainfall 6 times more effectively than a wheat field and 4 times better than a hay field.

A thick healthy lawn reduces runoff to next to nothing. No wonder newly excavated earth is so quickly replanted in turfgrass.

NOTE: Survey data was collected by the Maryland Agricultural Statistics Service which also tabulated the results and wrote the findings.

This information provided by The Lawn Institute – www.TheLawnInstitute.org

Preplanning For The Next Disaster

(Continued from Page 14)

responsible for specific areas are doing so regularly and documenting and reporting it. You might want to work with a neighboring business, sod producer or otherwise. Take turns looking at each other's operations and offer suggestions. We tend to overlook things we see on a regular basis. A fresh set of eyes will see things otherwise missed.

Preparing for a Predicted Disaster

Sometimes there is advance warning for weather disasters. Hurricanes cover a wide area and their movements are now quite predictable. You have time to take certain precautions to mitigate some of the damage. If you are in an area where hurricanes might occur, have a detailed plan on what should be done, in what order, to protect your property as much as possible. Identify who is responsible for what and have drills often enough to assure that all are aware of what they need to do. Have contingency plans if any individuals aren't in the area when a warning is issued. Remember that property can be repaired or replaced. You and your people are much more important. Keep that in mind as you develop your plans and make sure everyone understands what risks they should not take. People safety comes first. Tornados are also somewhat predictable. There is usually a warning, but the path of the actual tornado is usually fairly narrow and not as easily predicted. If you are in an area where tornados might occur, have a clear plan for protection and/or evacuation. Tornado drills might be imperative as each tornado season approaches. Remember though, they can occur even when not "in season." Floods also may be predictable. If you are in a flood prone area, it is important to have a plan in place in case one is imminent. (See the sidebar: Dealing with a Flood.)

Disaster Strikes. Now What?

No matter how well you plan, if a disaster strikes it is going to affect you and your business. How you proceed from the point of the strike forward can have a tremendous effect on how well a major investment, your business, survives. The first step is to make sure that all people are safe. If there have been any injuries make sure the individuals receive all necessary care. Call 911 if any help is needed. Next check on and care for any pets or other living creatures. After that, do whatever is necessary to secure the property. Close off any access that you can. You don't need curious onlookers getting in the way. Then start taking pictures. Document as much of the damage as possible. Video can give a better overview of any damage.

Still photography can provide more detail but remember that stills can be captured from video if needed. Next call your insurance company or agent. Your preplanning should provide a good idea of what cleanup steps you can take immediately and what should be left for an adjuster to look at first. Waiting for an adjuster is not an excuse to allow more damage to occur because proper protection or security steps were not taken. Before you start the cleanup make certain that everyone is aware of all safety precautions and that they are followed.

Make sure everyone working has the proper personal protection equipment (PPE). This could include, but not be limited to: gloves, masks, boots, bug spray, hard hats and other necessary protective clothing. As you implement the plan you had prepared in case disaster should strike, stick to it as rigidly as possible. At the same time look for opportunities to deviate from the plan in ways you hadn't previously thought of to make the actual job easier, to save some expenses, or otherwise provide a better outcome to a bad situation. Keep detailed records of the time spent on each aspect of the process. Keep records of costs of any extra or specialized equipment that needs to be brought in for the cleanup. Keep track of purchases of supplies for the cleanup. Continue to take photographs. Keep track of items that have been destroyed or damaged beyond repair.

If items are repairable, retain records of those costs. If you properly kept an ongoing inventory of equipment and supplies, update those inventory records to reflect those changes. If your onsite records have been damaged, obtain your backup records and continue to back them up offsite as you update everything. As bad as everything might be, continue to look for bright spots. Be thankful for all that were not hurt or that injuries were not any worse. Look for opportunities for improvement in your planning going forward. What are the opportunities for changes in your building design, operations, or other aspects that can now be improved upon as you turn this disaster around for a better tomorrow? You probably won't find the silver lining in the clouds if you don't look for it.

(Continued from Page 13)

issued identification card, voter's registration card, US military card, or school ID card with photograph.

- **Category C** documents establish work authorization, but do not verify the employee's identity. An employee presenting a Category C document must also provide a Category B document. Category C documents include, but are not limited to a Social Security account number card, certification of birth abroad issued by the Department of State, original or certified copy of a birth certificate, or employment authorization document from the Department of Homeland Security.

If the employee provides documentation that does not reasonably appear to be genuine or to relate to the employee, the employer should reject the documents and request other documents to satisfy Form I-9. The employer may not request certain documents (such as a passport); it is the employee who may chose which documents he or she will provide so long as they satisfy the I-9 requirements. If the employee fails to provide the required I-9 documents, which appear to be genuine and related to the employee, the employer should terminate his or her employment.

More Information

The Handbook for Employers: Instructions for Completing Form I-9, prepared by USCIS is available online at http://www.uscis.gov/sites/default/files/files/form/m-274.pdf.

A webinar that explains the I-9 verification process is available at https://vimeo.com/131480716.

Department of Homeland Security "Form I-9 Instructions" is available at http://www.jobs.irs.gov/downloads/scheduler/I-9EmploymentEligibility Verification.pdf.

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New

HELPFUL HINTS FROM THE LAWN INSTITUTE
SOIL pH: THE MASTER VARIABLE

Soils are the foundation of terrestrial plant life, and almost everything that plants need to survive and thrive can be obtained from them. They are complex systems that provide physical, chemical, and biological support for plant growth. Of all the processes and factors affecting soil health, few are as intertwined with them all as soil pH. Soil pH, often referred to as the master variable, is one of the most commonly measured soil characteristics at soil testing labs throughout the world. It is defined as -log [H+], or a measure of hydrogen ion activity in soil solution and impacts almost every aspect of growing healthy turfgrass. It can affect nutrient availability and balance, nutrient toxicity, microbial populations, and even herbicide or insecticide performance.

The scale for soil pH ranges from 0 to 14 with 7 being neutral. Any values below 7 are considered acidic (H+ donors), while values above 7 are considered alkaline (H+ acceptors). One of the most important things about soil pH that is often overlooked is the fact that this scale is logarithmic. As a result, a pH of 6 is not 1 unit more acidic than a pH of 7 but in fact it is 10 times more acidic than a pH of 7. Similarly, a soil pH of 5 is 100 times more acidic, a soil pH of 4 is 1,000 times more acidic, and so on. This is important to recognize because drastic changes in pH such as this can have a negative impact on turfgrass health. Most turfgrasses perform best in a soil pH of 6.5 to 7. As soils become more acidic, cations such as Mn (Manganese) and Al (Aluminum) can become toxic, and as they become more alkaline, cations including Ca (Calcium), Mg (Magnesium), K (Potassium),

(See SOIL IQ, Page 14)

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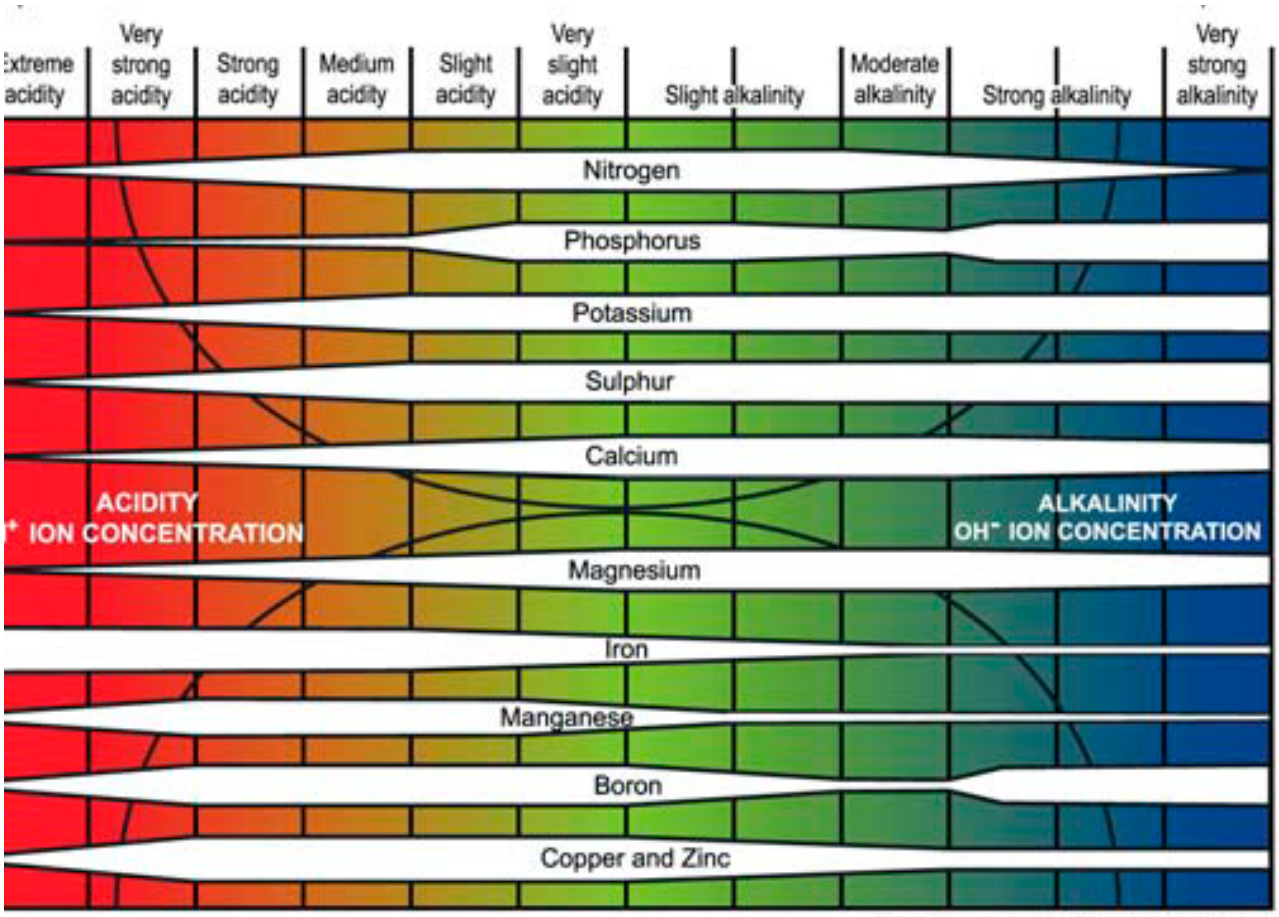
What's Your Soil IQ?

(Continued from Page 18)

and Na (Sodium) can be more dominant. As these changes occur, not only can elemental toxicity become a concern, but so too can elemental deficiency.

For example, N (Nitrogen), P (Phosphorus), K, Mg, and S (Sulfur) all can become deficient in acidic soils, while Fe (Iron), Mn, P, and B (Boron) are examples of nutrients that can be deficient in alkaline soils. Mineralization of organically bound nitrogen and phosphorus can also be affected by soil pH in that the soil microorganisms involved in these processes are limited in acidic soils. As a result, turfgrasses may not be able to take advantage of these nutrients, thus requiring increased fertilization. So, what do we do when soil pH is too low or high? Limestone can effectively raise the pH of acidic soils and is often applied in pelletized form. Sources include calcitic limestone and dolomitic limestone, with the latter containing magnesium in addition to calcium. Inversely, to lower the pH of alkaline soils, applications of sulfur and/or acidifying nitrogen fertilizers such as ammonium sulfate can often be effective. It is important to note that soils have a high buffering capacity, which is their resistance to chemical change. This is good in the sense that soils resist immediate changes from rainfall or irrigation but is bad in that acidic or alkaline soils may often take months or even years to adjust. The master variable of soil pH is one of the most important factors impacting turfgrass health and should always be monitored routinely as part of turfgrass management programs.



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USDA Announces April Prices

Input Price Trends

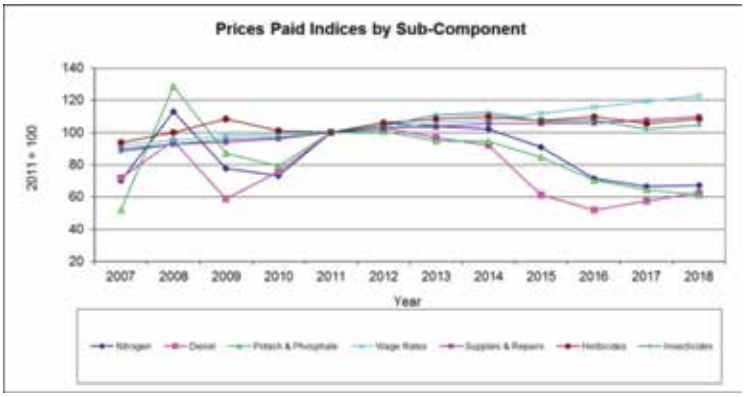
by **DR. MARK WALLER**
Extension Economist
Texas A&M AgriLife Extension

The prices paid by farmers indices by sub-component shown in the graph below represent nationwide average annual prices of inputs purchased by farmers and ranchers to produce agricultural commodities. As can be seen, on an average annual basis, price indices for nitrogen, diesel, wages, supplies & repairs, herbicides and insecticides have moved higher, and potash and phosphate moved lower.

On a monthly basis, mid-April (the most recently available data) monthly input prices were mixed relative to the previous month (March). Diesel and supplies & repairs prices increased +3.6%, and +0.4% respectively from the previous month. Nitrogen, potash & phosphate, wage rates, herbicides, and insecticides prices decreased -0.6%, -0.5%, -2.5%, -0.7%, and -0.7%, respectively, from March to April 2018. Relative to last year (April 2017), Diesel, wage rates, and supplies & repairs increased +9.8%, +3.7%, +2.1% respectively. Nitrogen, potash & phosphate, herbicide, and insecticide prices were down -8.6%, -13.3%, -1.5%, and -2.2% respectively, relative to last year (April 2017).

Stronger oil prices, a tighter labor market, and an anticipation of possible inflation may be influencing some increasing prices. However, low farm profits in general will likely help keep input prices in a sideways to slightly higher pattern, barring any supply-side changes.

The average price when multiplied by quantity purchased should equal total producer expenditures for the item. The prices paid data are obtained from establishments that sell goods and services to farmers and ranchers. Annually, about 8,500 firms are randomly selected from lists by type of item sold with an average response rate in the range of 75-80 percent. Firms are asked to report the price for the specified item "most commonly bought by farmers" or that was the "volume seller."



Source: National Agricultural Statistics Service, Agricultural Statistics Board, U.S. Department of Agriculture. Agricultural Prices. Accessed June 7, 2018. Web available at http://quickstats.nass.usda.gov.

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