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TURF HACKER

Ideas about growing grass

Home

Jason's Productivity Files

TUESDAY, 19 DECEMBER 2017

2017, "Oh the places you'll go"

Every year I wonder if I will run out of things to write about or keep me interested and passionate about my job. While 2017 was one of the most challenging years of my turfgrass career, it was also one of the most rewarding.

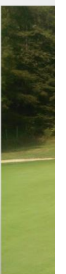
2017 started off badly. One of the worst winters on record left us with half of our greens dead. This wasn't my first time with winter damage so I wasn't too worried. Stressing out wouldn't make the situation any better so I set out ensure that this bad situation would allow me to learn as much as possible about greenkeeping. As this is really the only course I've worked at, it's hard to get a broad experience so I relish the opportunity to learn from these kinds of things.

There are a few visitors that can attest that I was actually a bit excited that my greens were dead. What a great opportunity to get some more bentgrass into these greens!

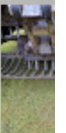
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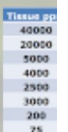
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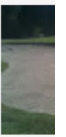


Poa isn't supposed to be this colour.

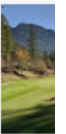
Right from the start I decided to share my experience because I knew it wasn't my fault or a result of my negligence. Eventually reports started to trickle in that the damage was widespread across the region and it had nothing to do with my "rebel" maintenance practices. Even the big budget courses were hit hard.

It wasn't easy to share pictures of the dead greens but I prefer to be open and transparent instead of closed in. I wasn't prepared for all the private messages from other superintendents who thanked me for sharing the carnage as it took some of the pressure off of them knowing that others were dealing with the same issues. There's nothing worse than feeling alone in a bad situation. One of the best parts of twitter is that we can all work through challenging times together.

"I'm afraid that some times
you'll play lonely games too.
Games you can't win
'cause you'll play against you.
All Alone!
Whether you like it or not,
Alone will be something
you'll be quite a lot.
And when you're alone, there's a very good chance
you'll meet things that scare you right out of your pants.
There are some, down the road between hither and yon,
that can scare you so much you won't want to go on.
But on you will go
though the weather be foul.



main
Supe



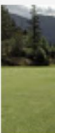
2018



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have



While
sit in.

BLO



On you will go
though your enemies prowl.
On you will go
though the Hakken-Kraks howl.
Onward up many
a frightening creek,
though your arms may get sore
and your sneakers may leak.
On and on you will hike,
And I know you'll hike far
and face up to your problems
whatever they are."

2017 marked the first time that I attended the Golf Industry Show and I was lucky enough to be invited as a seminar speaker as well as doing 3 other presentations! It was so inspiring to meet so many of the people I had interacted with on twitter over the years and to see just how big of a turf conference GIS really was. I was completely blown away by the people I met or who knew who I was.



Audubon Int'l
@AudubonIntl



Full room with people who want to learn about low-impact turf management from [@ct_turf](#) [@PenderSuper](#) and Matthew Crowther. [@GIS_2017](#) [@GCSAA](#)

♡ 17 4:00 PM - Feb 6, 2017

[See Audubon Int'l's other Tweets](#)

I had the honor of having Niels Dokkuma from the Koninklijke Nederlandse Golf Federatie visit me to talk about my efforts to reduce my dependence on traditional pesticides. The Netherlands will have a complete ban on cosmetic pesticides on golf courses in the next few years so they are really doing a lot of research to figure out how they will survive. I really learned a lot from Niels and it was through one of

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his Canadian contacts that I learned about a way to speed the recovery of my putting green damage.



Don't forget to see your grass Doctor every now and then!

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hack
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IPM (
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I've learned a lot about grass in the pub. Here I am learning about how good, and expensive Iceland beer is. Did you know beer was illegal here up until the 80's?

While "networking" at a pub during the Canadian Turf Show I learned about how some courses in Canada pre-germinated their bentgrass to speed recovery in the spring. This proved to be a **great success** and allowed us to open our greens much earlier than we would have if we didn't pre-germinate the seed indoors.

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Ema



Next time, I'll poke more holes for the pre-germinated seed.

I was also offered the opportunity to learn about using **growth potential during a recovery effort**.



Shoveling snow so we could seed the greens. It was a shit spring

Unexpected to me was how knowing what the potential for growth would do for my sanity. It sure is nice to know that it isn't just me that is the reason the grass isn't growing. With a much cooler than normal spring the recovery was delayed but with the tools to measure GP I wasn't searching for answers. **This understanding helped me communicate the issue to my membership.**



Having half of my greens in recovery mode and the other half on regular maintenance mode also offered me the opportunity to learn about the differences between difference maintenance practices had on grass growth for a similar climate.



This learning opportunity continued when the time came to adjust the maintenance practices on the damaged greens from recovery mode to maintenance mode. For some crazy reason this was also the time that I was finally convinced to measure clipping yield on all of my greens and this opened up a crazy new world of manipulating growth on individual greens to try and find consistency.



It was at this same time that I had 1/3 of my staff leave due to affordability issues in the Harbour. This left us extremely short staffed during one of the hottest and driest summers of my career. In a 90 day stretch we had only 7 days where the daytime high didn't go over 30C! With our aging and hardly functioning irrigation system it was a challenge to keep the grass alive to say the least.



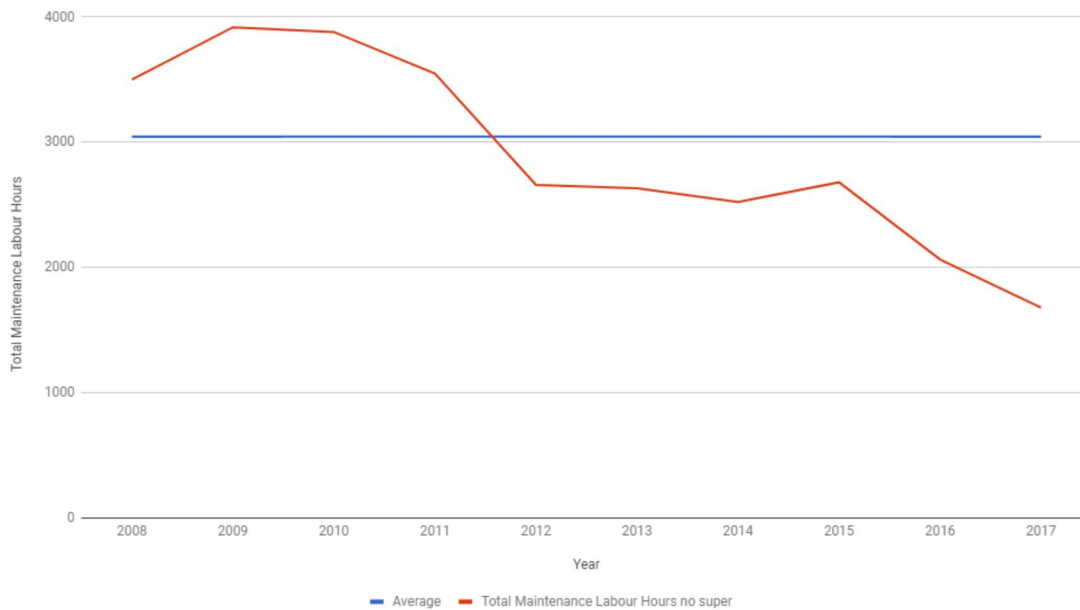
I was very sad to see the hard working and very talented Steve leave for greener pastures elsewhere

With no applicants to replace my departed staff member we were forced to adapt. It's during these times of hardship that I often find that I learn the most. This year I learned what was most important to the golfers and I learned that it's possible to maintain a 9 hole course with only 2 staff and minimal overtime.

At the beginning I said to myself that I will not carry the burden of our staffing issues. This could not end well and will surely result in my burnout (I was on the edge all summer) and bad things. I decided to work as little overtime as possible and to focus on the basics. I learned how to prioritize and how little we actually need to mow. The only overtime that was required was when there were irrigation breaks which unfortunately happened every few days.

The following table summarizes the amount of labor (not including me) that we use to maintain the golf course. Periods of unexpected staff loss are pretty easy to see but during these times I have been able to learn and in the end manage the course with less.

Total Maintenance Labour Hours vs. Year



It's not just managing the course with less, it's re-allocating our precious resources to allow the remaining staff to do the work more efficiently.

In 2012 I lost my long time assistant and my remaining staff had health issues. This allowed me to convince the Board here to get new equipment as most of my time was spent maintaining our old inefficient equipment. The new equipment we got in 2013 allowed us to easily get the job done with 40% less labor. Aside from being more efficient with our work, we were able to improve conditioning on the course as the modern machinery was picked specifically for our course's specific needs instead of just cost and availability like we had done in the past.

In 2016 and 2017 we again had issues finding what I thought was enough staff and this forced me to figure out how to keep the course going with less effort. In the end I learned that I spend too much time keeping our aging irrigation system running and that our horrible fairways costs us a huge amount of time and money to simply mow. I presented my board a proposal to replace our irrigation system and re-grade our fairways for almost no additional costs as we could pay for these projects with the efficiency savings found. I hope that we can start these projects in the coming years.

In the end, the golfers had no clue that it was so difficult to maintain the course which is both good and bad. It's good that it wasn't noticeable to the average golfer but bad that the decision makers also didn't notice and even asked that I do it again next year. I wasn't too pleased with that request and definitely took the opportunity to explain the situation.

This summer was very dry and resulted in the largest evacuation due to wildfire in our Province's history. Again, I reached out on twitter to see if any of the displaced greenkeepers needed a place to stay and work. That next week I had a greenkeeper stop by and offer me his services. I asked his super if he was any good and he came with a glowing reference. That was good enough for me so I sent Scott out to change pins with literally no training and he did a fantastic job. I was able to employ Scott for a few weeks while he was forced to be away from his home and this helped us out immensely. How cool is the turf industry!?



Jason Haines
@PenderSuper



Look who stopped by! @_markberg

♥ 17 5:07 PM - Jul 25, 2017



See Jason Haines's other Tweets



I continued to learn a ton of stuff about clipping yield, grass growth, fertilizer inputs and was opened up to a whole new world that might allow me to cease core aerification forever!

I love that there is so much room for improvement in our industry and hope that I never figure it all out because that sounds boring!



I quit twitter for a day and was overwhelmed with the outpouring of support. This summer was amazing but also incredibly hard for me. The stress of a challenging summer, loss of staff, remnants of critical incident stress from my involvement with SAR, and twitter trolls were talking their toll and for a while I thought that closing everyone out was the best solution. This, of course, wasn't the best idea and I am happy I came back because it is the interaction with all the amazing turf managers on twitter that keeps me going most days when the going gets tough. **I have always been outspoken when it comes to mental health and it's never good to suffer alone.** If you are having a tough time reach out and talk about it.

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October 2017 43



♡ 37 7:13 AM - Oct 24, 2017

31 people are talking about this

You'll come down from the Lurch
with an unpleasant bump.
And the chances are, then,



that you'll be in a Slump.

And when you're in a Slump,
you're not in for much fun.
Un-slumping yourself
is not easily done."

I continued to **try new things** and **refine the things that I was already doing**. I continued to find success and also failed a lot too. I might be one of the luckier greenkeepers because failure is always a potential expected outcome and that's ok. This allows me to try new things, maximize learning and minimize stress. I suppose this is probably true for most greenkeepers and perhaps it is more a state of mind rather than fact of life. Maybe our fear of failure is our biggest hurdle as greenkeepers. I don't know but I do know that the most interesting and times of my career have come during the times of failure.

"You have brains in your head.
You have feet in your shoes.
You can steer yourself
any direction you choose.
You're on your own. And you know what you know.
And YOU are the guy who'll decide where to go"

Last winter I wasn't able to take my wife with me to the GIS in Orlando so I promised her that maybe next year I would take her to Europe on a turfgrass talk. If almost by magic that week I received a message from the Irish Golf Course Superintendent Association asking me if I would be interested in talking at their conference in November. I almost instantly said yes and was luckily able to keep my promise to my wife as I took her along with me for the trip!



Geyser in Iceland. It blows every 10 minutes so the timing was tough. Thanks Baddi for the pic!



My wife and I on our first trip together in 10 years. Trim Castle in the background



I finally got to meet Dr. John Dempsey and he's as funny in person as he is on Twitter! Possibly the highest qualified greenkeeper in the world at the oldest course in Ireland!

This trip was an amazing opportunity for me to see a part of the world that I would otherwise never have to chance to see. It really is amazing what the internet can do! When I announced that I was going to Ireland I was contacted by the greenkeepers in Iceland asking if I could stop by on my way home from Ireland. It didn't take long for me to say yes to that! Here's a pro tip, if anyone from the Iceland greenkeepers asks you to come visit, don't say no! WOW.



Bjarni Hannesson and I at the Keilir Golf Club in Iceland.

During my trip to Ireland and Iceland I continued to learn so much about our profession. I really find it fascinating how greenkeepers manage their unique challenges all over the world and hope to be able to have the opportunity to travel and talk with other greenkeepers for years to come! I also really appreciate knowing about growth potential as I travel the world because it really helps me get a good understanding of the challenges that everyone faces. The growth potential is a great way to highlight the challenges that greenkeepers face due to the climate.



Matt Palmer Trust

@mattpalmertrust



@GCSAI15 3km run, walk, talk #MentalHealthAwareness
#TimeToTalk ❤️

♡ 30 4:13 AM - Nov 15, 2017

[See Matt Palmer Trust's other Tweets](#)



I met many people who I had interacted with on twitter and met a lot more people who I can now call friends! The warmth and acceptance showed to me every time I travel is amazing. What a special industry we are a part of!



Edwin Roald
@EdwinRoald



Listening to @PenderSuper at @golfimoso in Iceland this morning.

♡ 26 5:13 AM - Nov 17, 2017

[See Edwin Roald's other Tweets](#)



I never thought my speaking career would last more than 1 season but this Winter I was asked to speak at 8 conferences but unfortunately could only say yes to 5 as I have work and family commitments that come first. I am honored to have the opportunity to travel around and meet so many talented greenkeepers and for the year of 2017, the people were the best part

"KID, YOU'LL MOVE MOUNTAINS!

So...

be your name Buxbaum or Bixby or Bray

or Mordecai Ali Van Allen O'Shea,

You're off the Great Places!

Today is your day!

Your mountain is waiting.

So...get on your way!"

Here's to another year of meeting new and old friends and to constant improvement and expansion of my understanding of what we do as greenkeepers.

Cheers!



If you like my blog and want to support what I do you can support me on [Patreon](#) or [paypal](#). Thanks!

Posted by [Jason Haines](#)

No comments:



THURSDAY, 30 NOVEMBER 2017

Herd Immunity and Disease Spread



Pat O'Brien @pobrienhpgcc · Nov 29, 2017



The look says it all! Untreated all year vs treated. Density still good in untreated- What will the soil nutrient tests say?





Brandon Horvath

@UTTurfPath

Just remember... [#herdimmunity](#)

♡ 5 1:40 AM - Nov 30, 2017

[See Brandon Horvath's other Tweets](#)



This tweet started an interesting discussion on twitter today. It centered around herd immunity and turfgrass disease trials and knock out control plots. For those of you who don't know what herd immunity is check out the following tweet.



Pat Jones @PatJonesTweets · Nov 30, 2017

Replying to @djsoldat and 2 others

Please explain [#herdimmunity](#) to an English major. 🤔



Brandon Horvath

@UTTurfPath

It's where in a herd of vaccinated animals (like us) the unvaccinated don't get disease b/c they're protected by the herd.

♡ 3 9:19 AM - Nov 30, 2017



[See Brandon Horvath's other Tweets](#)



So essentially Pat might have a clean check plot because all the turf surrounding the plot is treated for disease and this prevents the spread of disease onto the check plot. The discussion then goes on to talk about how there might be better value to have fewer large plots vs many smaller plots to try and account for this apparent phenomenon.



Jeff Stauffer @jeffdstauffer · Nov 30, 2017

Replying to @KernsJim and 4 others

Perhaps our 'check plots' need to 1000's square feet to give better assessments. [#expandourlearning](#)



Brandon Horvath

@UTTurfPath

Exactly. [@luke1utk](#) was [@UTturfgrass](#) intern w/Pat this summer and I had him do an independent study on this topic. Jeff, his conclusion was it might be more informative to have fewer, larger checks vs. lots of very small areas.

♡ 4 1:01 PM - Nov 30, 2017

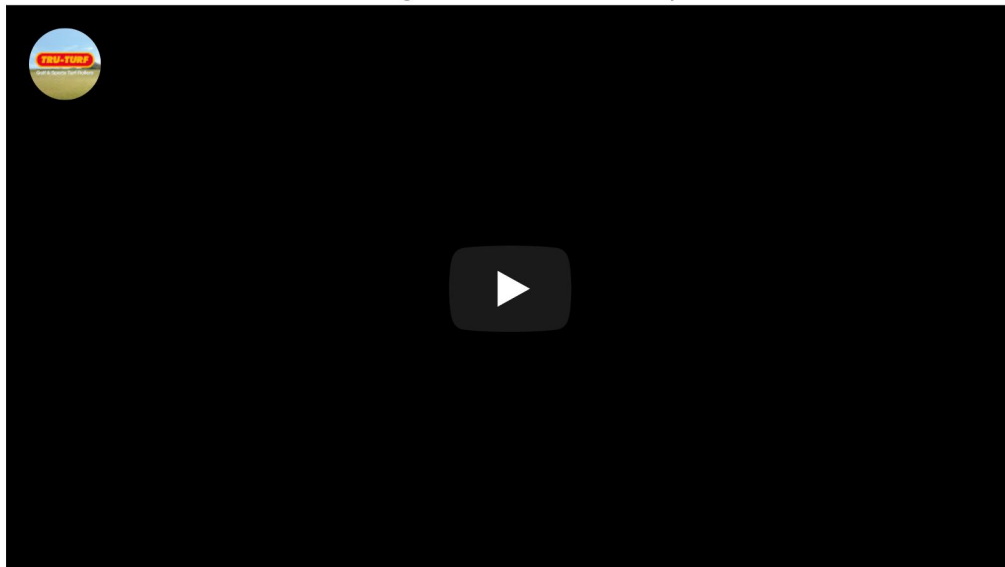


[See Brandon Horvath's other Tweets](#)



This first occurred to me way back when I first started blogging and noticed how **disease was spread by mowers**. It's sort of the opposite of herd immunity but goes along with the same idea. If we have a plot treatment that is surrounded by diseased turf, it might not matter how effective the treatment is if it is constantly being hit with artificially high amounts of disease.

I was attending a conference seminar from Thom Nikolai about rolling and much to my surprise he shared **some of my observations about moss and traffic** in his presentation. He also shared his now well known observations on how rolling could reduce dollar spot incidence.



In his study (like most disease studies) the plots of rolled, rolled twice, and not rolled were all directly adjacent to each other. I wondered how the plots were mowed so after the talk I approached him and asked him. He informed me that the plots were mowed in multiple directions and would go from one plot to another. Hmmmm.



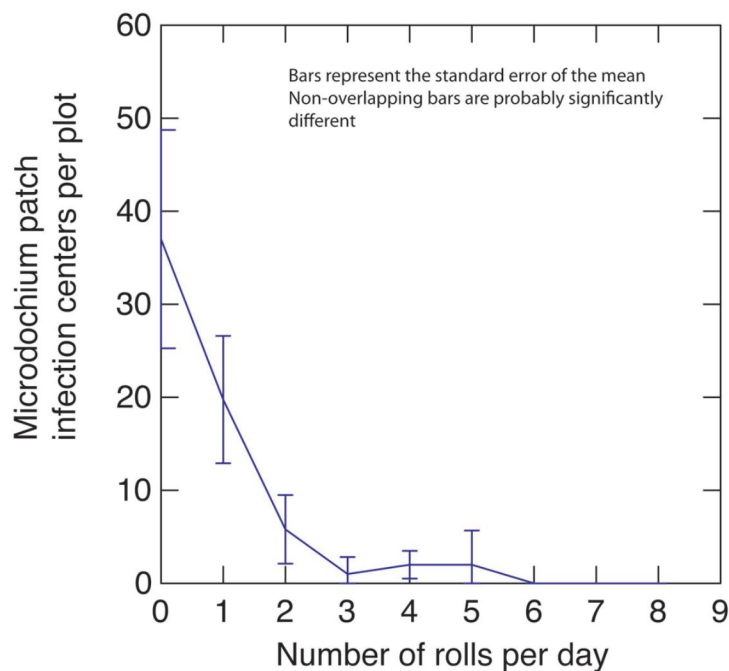
I called him an asshole for spreading disease in his study so he bought me a beer.

I wondered if that he would have had even more significant findings if mowing had been more carefully done to prevent spreading of disease from one plot to another.

I wonder the same thing about a lot of disease control studies. Is the intense inoculum on the control plots being spread to the adjacent plots making their results seem less significant. If you applied the plot to an entire green and didn't have that intense disease pressure directly beside the plot would it be so bad?

I think this is why a lot of turf managers claim great success with certain practices but when scientist go to test it out it proves to be less effective than previously claimed. Generally superintendents apply their practices to the entire course or putting green which will eliminate the super bad control plot areas that are the source of the bad disease.

This happened with me when I first made my observations on rolling and fusarium. Initially there was no significant difference in the findings from Oregon State but eventually their findings showed a minor improvement with rolled plots vs unrolled plots. My small trial had a very significant difference.



In some trials this isn't a problem because the plants are protected by products that work independently from the plant to fight disease. In other circumstances the way we control disease is less independent and requires the host plant to do the work or certain cultural practices to do the control. Basically we are preventing the infection by maintaining a healthy plant or desirable growing conditions but this doesn't mean that if the disease is spread all over with mowers that the disease won't infect the plant.

This summer I again had issues with dollar spot on a few greens. It became apparent after months of no fungicide treatment (**something I have always done to try and learn about the disease**) that the dollar spot was spreading from my collars onto the green edges and then throughout the putting green. My original plan was to give the greens enough nitrogen to outgrow the disease.



Paul Koch

@uwpaul



Plot on left receives 0.6 lbs biweekly N, plot on right receives 0.4...no fungicide on either. Pretty sharp cutoff!

♡ 94 8:38 AM - Sep 15, 2016

💬 42 people are talking about this



I hypothesized that we probably didn't need as much as was shown in the above tweet because again, we didn't have disease spreading from adjacent control plots.

I was wrong. I had an uncontrolled plot on all my greens, the collars that I wasn't managing the disease on because it never really resulted in full on dead grass. This was a big mistake.



Dollar spot spread from collar to green

The above picture shows how the disease was spreading from the collar onto the green. The collar wasn't sprayed with my weekly nitrogen applications because it was just out of the width of my booms and I thought it was no big deal. I have often thought of the gps sprayers as overkill but here is a great example of how they could benefit my simple operation. Of course, there are also much simpler solutions to this issue.

So the collars didn't get enough nitrogen to keep the dollar spot at bay. I also wasn't collecting clippings on my tees collars and approaches which were all cut with the same mower. So the cutting units would be covered in infected clippings which would fall off all over the place. As we were cutting the green collars the infected clippings that we were mowing would blow into the air and onto the greens where they would infect the greens. From there it would be spread by my greens mower to result in disease that was worse than what I had deemed as acceptable.

For the most part if you would have had 4'x4' plots on these bad greens you would find that my higher nitrogen and rolling regime was working to control dollar spot. But overall, there was just too much disease.



Guess where my sprayer boom reaches?

While my attempt to manage dollar spot without fungicides last summer failed I feel that I was very close to success and this observation might help me find success next year.

What I need to do differently next year is treat my collars the same as my greens. I need to give them the same fertilizer treatments and collect the clippings to prevent disease spread.

So while it's not the same as herd immunity it is a similar story. Before we had miracle pesticides and immunizations for disease, we would isolate and try and prevent the spread of disease. If we need to manage turf disease without the use of traditional pesticides I think we need to take the same approach and try and prevent disease across the entire managed turf area and treat the individual cases to prevent them from spreading further to otherwise healthy plants.

While a preventative fungicide application can prevent all of this from happening, if you have restrictions to their use, or just want to save some money this might be useful to know about.



Disease spread.....again

If you like my blog and want to support what I do you can support me on [Patreon](#) or [paypal](#). Thanks!

Posted by [Jason Haines](#)

No comments:



Labels: [Disease Spread](#), [Dollar Spot](#), [Pesticides](#)

FRIDAY, 24 NOVEMBER 2017

[The evolution of precision fertilizer application.](#)



Edwin Roald
@EdwinRoald



Listening to @PenderSuper at @golfimoso in Iceland this morning.

♡ 26 5:13 AM - Nov 17, 2017

[See Edwin Roald's other Tweets](#)



I recently returned from an amazing trip to Ireland and Iceland. There's nothing that teaches me more about greenkeeping than going to see other greenkeepers and learn how they grow grass. This trip was no exception and in my discussions with other seriously deep thinking greenkeepers it got me thinking about how the way I fertilize my grass has changed over the years and helped me understand that basically what I have been doing is trying to reduce the amount of guesswork and luck and resources required to grow good grass.

For the most part my experience with fertilizing grass has gone like this;

1. Guess at how much fertilizer to apply based on generalized guidelines,
2. Adjust rates based on observations
3. Guess again....

For the most part we are guessing because fertilizing grass is extremely difficult compared to other crops. Unlike agriculture, we do not want maximum yield. We want optimum yield which means growing the grass just enough to keep up with wear and tear and not too much to reduce mowing requirements. This is something that first became clear to me when I read Micah Wood's incredible book **A Short Grammar of Greenkeeping**.

The following picture shows general recommendations for different turf areas from my college fertilizer class.

Determine Dates of N Application for Cool Season Grasses in the Prairies of Western Canada		The rates are in kgs/100 m ² .								
Area	N level	May	Jun	Jul	Aug	Sep	(dormant) Late fall			
Parks, roughs, fairways	Low	.25	.12-.25	.12	.25	.12	--			
Parks, fairways	Med	.25	.25	.25	.25	.25	--			
Parks, fairways, greens	Med (fall)	--	.25	.25	.25	.25	.25			
Greens	Med-High	.35-.5	.35	.25	.35-.5	.25	--			
Greens	High	.5	.5	.35	.5	.25	--			
Greens	Spoon feed	.25	spoon feed			.25	+/-			

		The rates are in lbs/1000 ft ² .								
Area	N level	May	Jun	Jul	Aug	Sep	(dormant) Late fall			
Parks, roughs, fairways	Low	.5	.25-.5	.25	.5	.25	--			
Parks, fairways	Med	.5	.5	.5	.5	.5	--			
Parks, fairways, greens	Med (fall)	--	.5	.5	.5	.5	.5			
Greens	Med-High	.75-1	.75	.5	.75-1	.5	--			
Greens	High	1.0	1.0	.75	1.0	.5	--			
Greens	Spoon feed	.5	spoon feed			.5	+/-			

1st Method: Generalized monthly/annual rates

The rates roughly follow the classic growth characteristic of cool season turf. You know the one. Growth spikes in the Spring and Fall with dips in growth in the Summer and Winter. I would set annual rates based off of research that would show various annual nitrogen rates and how they impacted diseases such as fusarium.

I didn't know it at the time, but this method of generalized fertilization caused all sorts of issues. Excess disease, thatch production, fuel consumption, mowing requirements, clipping management, labor needs the list goes on and on. But without really looking inward at what I was doing and why I was doing it this method of fertilizing grass seemed like a good way to go. After all, everyone core aerates right?

It's kind of funny looking back but one of the most important qualities of mower selection for me used to be clipping dispersal. We used to have huge issues with excessive clippings when we fertilized this way.

Fertilizing this way wasn't all bad. For the most part I was still able to maintain good quality playing surfaces. The grass was green and there were few bare spots.

I think this is also the way most turf managers still fertilize their grass. It isn't bad and I would bet that some of the best managers out there can fertilize with way with extreme precision for their respective courses. I'm not that good though so I need more help.

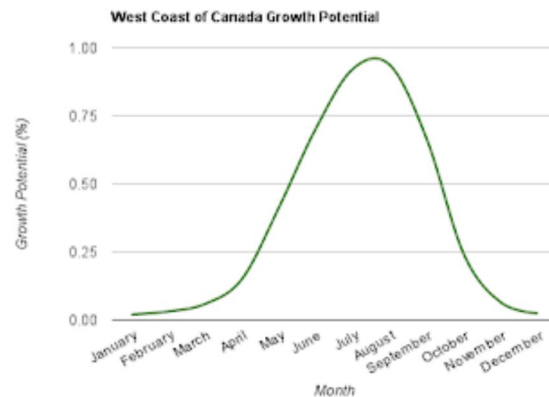
As I get older and learn more about what I'm actually trying to do as a turfgrass manager I have found that most of our issues at turf managers come from generalizations. We grow grass outdoors and our plants are influenced significantly by the environment that they grow in so any broad recommendation has no place in our industry in my opinion. The trouble is is that making recommendations for each

individual climate would be cost prohibitive so we are stuck with generalizations to help us make our decisions.

2nd Method: Growth Potential and MLSN

This method of determining fertilizer rates was a game changer to me. It showed nitrogen rates that were specific to my climate and this made sense to me. We didn't get super hot weather that limited the growth of our poa (at the time) greens in the summer and for the most part the grass grew very little if at all in the winter.

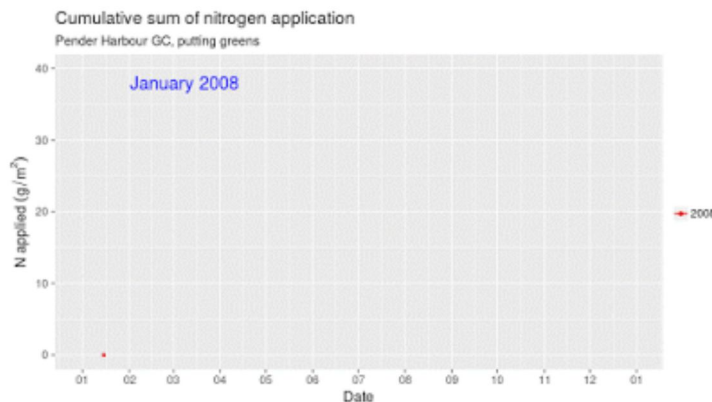
The MLSN also helped me only apply what was needed and helped me use up the nutrients that were already in my soils. I often wondered about the impacts of excessive nutrients and MLSN offered me a way to try and minimize any excessive nutrients in my soils.



Growth Potential was a game changer for me

This growth predicting formula helped me more accurately time my nitrogen applications and made a big impact on my operation.

Aside from allowing me to cut my nitrogen rates in half without compromising turf quality, I have seen reductions in turf diseases, thatch, required mowing, fuel use and labor. It might seem obvious but the rate at which your grass grows has a huge impacts on how expensive it is to maintain. I also started to noticed more bentgrass on my greens and I wonder if improved nitrogen timing removed the advantage from the poa. I was reminded of the differing nitrogen requirements between poa and bentgrass during a [presentation in Ireland by Agnar Kvalbein from STERF about precision fertilisation](#). Poa likes more nitrogen than bentgrass so applying more nitrogen will result in more growth of the poa than bentgrass thus giving poa the advantage. Applying significant amounts of nitrogen in the Spring and Fall like I used to with the 1st method described in this post definitely gave the advantage to poa.



The trouble with this though, is that it is still essentially a generalization and doesn't take into account the actual growth conditions that are occurring because again, there are so many variables that go into grass growth.

3rd Method: Growth Potential Adjusted Observations

I then started adjusting rates based on observations. If I noticed that the weather coming up was conducive to producing a growth surge I would hold off on the recommended nitrogen rates. This offered some improvement but for the most part it was still relying too much on my judgement and honestly there's no way I can guess how much nitrogen is needed without making measurements of some kind.

I was measuring clipping yield at the time but it wasn't in a meaningful enough way. Sure I could adjust my fertilizer rates to try and keep growth controlled but it just wasn't accurate enough for my needs.

How accurate are my needs? I want to maximize the conditions of my course and maximize the profit. To do this I need to identify areas where we are guessing or where we can improve the precision of our actions. With a booming economy we can afford to guess. When things get tight, we need to stop guessing. When the economy for golf improves, those how guess less, will make more money. I don't need to tell you that if you don't make money, you won't be growing grass for very long....

So many of our cultural practices are required to manage the result of the guesswork that for the most part, we are forced to live with but I wonder if we can reduce the guesswork to the lowest level possible, if we can reduce the need for remedial cultural practices?



Can we reliably eliminate the need for pulling a core?

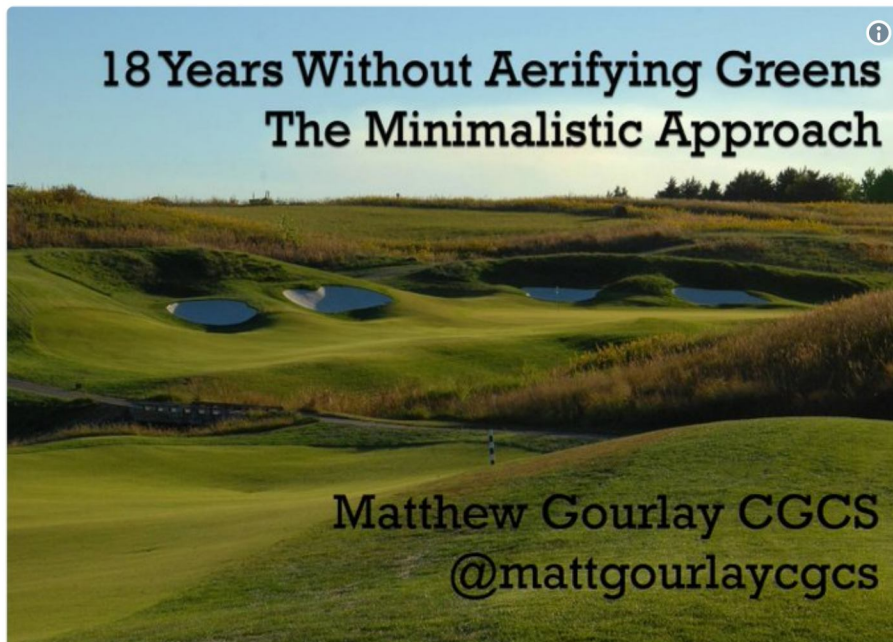
As of today I am still required to do remedial practices such as aerification and topdressing to dilute and remove excessive organic matter. Why is there excessive organic matter? If we guess at fertilizing we get excessive organic matter if we want to produce grass that grows fast enough to tolerate the wear and tear of golfer traffic and maintenance. If we don't apply enough fertilizer, we get very little if any organic matter production in the soil but the turf quality also suffers. So in theory, we should be able to find the spot where we are neither producing excessive organic matter or not producing enough organic matter. So how can we reduce the need for guessing on how much nitrogen to apply?

4th Method: Matching Nitrogen Applied to Nitrogen Removed

It took me **embarrassingly long to finally be persuaded to measure clipping yield on individual putting greens using a unit of measurement that had meaning**. All of a sudden I had a way to calculate how much nitrogen I was removing from my greens thanks to the **teachings of Micah Woods**. When I compared this to how much nitrogen I applied I could see if there was any difference.

To me this is so new that I have no clue how it will all work out or be worthwhile but I have **heard anecdotal evidence** that getting away with no core aerification is possible I just hadn't figured out how to

do it for myself yet. I do think that what I am about to describe might be the closest yet that I have got to reducing the guesswork of fertilizing my grass.



Matthew Gourlay CGCS
@mattgourlaycgcs



I was asked to present this topic to the Heartland Green Industry Expo Common Ground Education Conference on December 19.
[#Excited @HAGCSA](#)

♡ 18 9:46 AM - Nov 4, 2017

[See Matthew Gourlay CGCS's other Tweets](#)



So how does this all work?

If you multiply the total Liters of clippings/100m² by 0.63 for bentgrass you get the approximate dry mass of the clippings in g/m². From this we can calculate the approximate amount of nitrogen removed from the system because 4% of the mass of dried turf clippings is nitrogen.

So I compared how much nitrogen I had removed through clipping harvest to how much nitrogen I applied to each green.

Hole	1	2	3	4	5	6	7	8	9	LP	UP
Area (m ²)	280	312	291	326	289.7	350.8	310	375.3	445.5	200	195
total N removed (g/m ²)	4.89	5.58	5.48	4.93	5.25	4.88	5.10	4.33	4.53	5.08	2.98
N applied June 16-Sept 15	4.76	2.25	2.25	2.71	2.25	4.73	3.38	5.06	4.63	2.47	5.86
Difference	-0.13	-3.33	-3.23	-2.22	-3.00	-0.15	-1.72	0.73	0.10	-2.61	2.88

If you look at the numbers in blue you will notice that for the most part they are pretty consistent. This is

the amount of nitrogen removed per square meter from my greens since Jun 16 when I started measuring clipping volume from each specific green.

If you then look at the row directly beneath that you will notice that the amount of fertilizer applied varies greatly. This row is the amount of fertilizer applied. As soon as I was aware of the differences in growth rates on my greens I wanted to take action and I did by applying different fertilizer rates to each specific green. How I did that is a topic for a blog post on it's own but it really isn't that difficult. Essentially I am comparing the theoretical growth potential N requirements to actual harvest and splitting the difference as long as it results in **desirable growth rates for my disease** and **playability management needs**. Simple eh? haha.

Start Date	10/16/2017							
End Date	10/22/2017							
Average Temp	6	Target Green	7					
Maximum N use per month	2.25	Target harvest	0.03658064516					
Growth Potential N Use g	0.02							
Hole	Area m^2	Total Yield L/100m^2/wk	N Removed from mowing (g/m^2)	GP vs actual N use g	GP/yield nitrogen use comparison	Fert Rate	1x rate area	1.5x rate area
1	280	0.80	0.02	0.00	1.09	1xGP	280.0	
2	312	1.20	0.03	0.01	0.73	no fert		
3	291	1.03	0.03	0.00	0.85	no fert		
4	326	1.84	0.05	0.02	0.48	no fert		
5	289.7	1.04	0.03	0.00	0.84	no fert		
6	350.8	1.71	0.04	0.02	0.51	no fert		
7	310	1.45	0.04	0.01	0.60	no fert		
8	375.3	1.40	0.04	0.01	0.63	no fert		
9	445.5	0.67	0.02	-0.01	1.30	1.5 GP	445.5	445.50
UP	200	0.75	0.02	0.00	1.17	1xGP	200.0	
LP	195	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	Average	#N/A	#N/A	#N/A		total	#N/A	#N/A

A look at my highly experimental way of determining how my N to apply. It takes actual yield, optimal yield, and differences between each green into account to give fertilizer rate recommendations for each individual green. So far it seems to be working.

The reason I had such variable growth rates this summer was that I was pushing growth of my 5 winter damaged greens until the **beginning of June when recovery was complete**.



Once recovery was complete I had greens that were growing much faster than the greens that weren't damaged but it was hard to tell without measuring.

The bottom row of the table shows the difference between nitrogen applied vs nitrogen removed on each green. A negative number means that I am using nitrogen already contained in the soil and a positive number means that I am adding additional nitrogen to the soil that isn't being harvested through clippings.

You might also notice that greens 2,3,4,5, and 7 all received very little nitrogen during this time but also had some of the highest growth rates. This is because of the excess nitrogen applied during the spring. It might also be because of the excess mineralization of nitrogen from organic matter from all the poa that died the previous winter. Either way, I was aware of the excess growth and was able to adapt my practices to achieve consistent playing conditions and maybe use up some of that excess soil N no matter where it came from.

What I find especially interesting is that on greens that weren't damaged, the amount of nitrogen harvested is almost exactly the same as the amount of nitrogen applied.

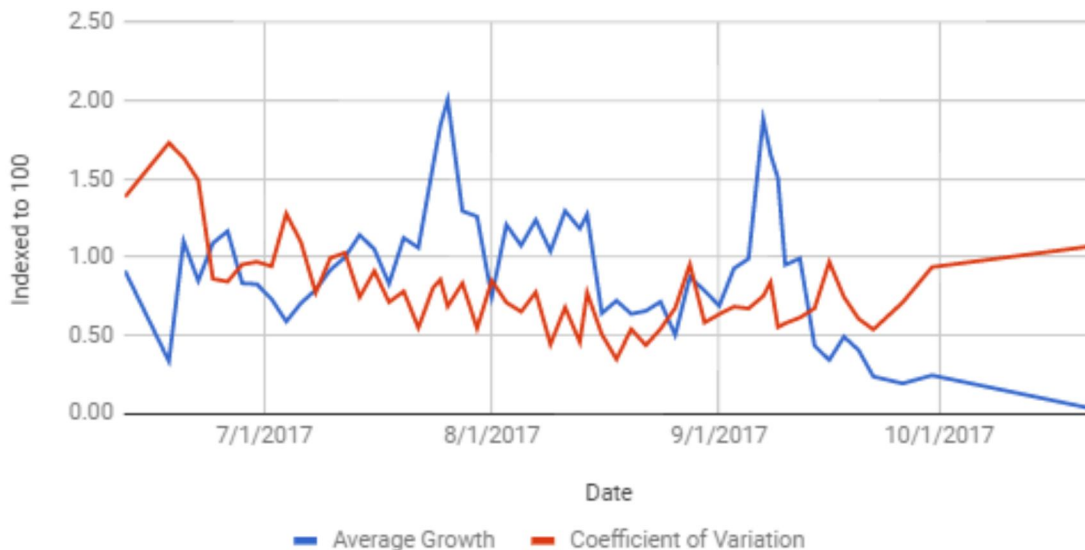
With the exception of my 8th and upper practice green the undamaged greens all had a difference less than $\pm 0.15\text{g/m}^2$.

As for the 8th and upper practice greens I think there is something else going on as I couldn't get them to grow as fast as I would like. They are both the newest greens on the course and could suffer from too low organic matter. They are also both almost purely bentgrass where my other greens all have some poa still left on them.

My lower practice green had high growth despite low N inputs. Maybe high soil OM from unrelated reasons as it wasn't damaged last winter. It is my shadiest green and they do say that shady grass

needs less nitrogen so who knows?

Indexed to 100/Average Growth and Indexed to 100/Coefficient of Variation



Being aware of huge jumps in growth caused my n release from soil (spikes in blue line) OM might help us reduce excessive fertilizer applications.

Back to precision fertilizer.

The very similar numbers that I got from nitrogen applied vs nitrogen harvested on my undamaged greens tells me that it's possible to find a balance that might be able to allow me to eliminate the need for organic matter management. Of course I will need to confirm this with OM tests next spring.

The similar growth rates on greens that had excess spring fertilizer and OM also tells me that I can get consistent growth despite no added fertilizer if we are aware of the growth differences and add fertilizer accordingly.

In the past few years I have consistently applied much more fertilizer than I harvested but I also wasn't measuring and applying fertilizer based off of growth with this precision.

In 2016 I harvested 5.6g N/m² but applied 12.3g N/m². So either I was seeing a lot of nitrogen losses, had bad measurement (I was only measuring clippings from 2 greens instead of all of them) or was building excess organic matter in the soil because I wasn't taking organic matter mineralization of nitrogen into account like I was this year.

I am excited about trying out some new things next year to see how to best implement the strategy of precision fertilizer application and will share what I learn over the next year or two. Now let's hope with winter is kind to my grass and I can focus on optimizing things instead of recovering things!

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Posted by **Jason Haines**

No comments:



Labels: **clipping yield**, **fertilizer**, **Growth Potential**, **MLSN**

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