TURF HACKER

Ideas about growing grass

THURSDAY, 22 FEBRUARY 2018

Simplifying Soil Biology with Clipping Yield

I had a blast speaking in Atlantic Canada last week about fertilizer. Photo: Micah Woods

Soil biology has always been one of those things that confuses the hell out of me. It's a complicated thing and there are plenty of people that will tell you how you can make your soil biology better (whatever that means) but the consistency of results and expense just don't make sense to me. If soil biology was that easy, everyone would do it.

If you ask any turfgrass scientist about soil biology they will probably admit that it plays an important role in plant health but there are very few things that we can specifically do to make positive changes in soil biology as far as science in concerned. Results from products that promise to improve soil biology are mixed and this fact is part of the reason I think that a lot of people don't use these products. I also think that a lot of people use these products because we do appreciate the importance of soil biology and as usual, want to take action to improve it even if we have no clue what the current soil health status currently is. In today's economic climate, we can't afford to guess.

As we continue to learn about the biology in the soil we are finding how big of an impact it can have on plant health which in theory will make our jobs easier. Soil biology is a complicated thing but I have come across a few clues over the years that could help us as superintendents gain some better understanding about this fascinating topic and possibly even give us better tools to control the biology in the soil to help us accomplish our goals. Maybe soil biology is easy after all.

Here's the thing, I'm not a scientist. I'm a practitioner with a keen sense of observation and am always trying to better my understanding of what I do on a daily basis. Here is what I think about soil biology and how we might actually have more control over it than you think.

Dollar spot has taught me a lot about soil biology. It seems that it is worse when soil biology is too low. Here are the clues that brought me to this conclusion.

Rolling reduces dollar spot and also increases soil bacteria populations. A lot of people equate the reduction in disease to the reduction in dew but this wasn't found to be the case. Check out the following video.

What else (besides fungicide) reduces dollar spot?

Nitrogen reduces dollar spot

That's right, nitrogen can make a significant impact on dollar spot populations. Is it the nitrogen, or the soil biology, or both that are resulting in the dollar spot decrease?

There have been studies that show how nitrogen can impact soil biology, check this one out. "An N optimum between 16 and 32 g N m−2 year−1 in microbial biomass and functional diversity exists in the temperate steppe in northern China. Similar N loading thresholds may also occur in other ecosystems, which help to interpret the contrasting observations of microbial responses to N addition."

So we have two practices that make dollar spot less bad, and also affect the biology in the soil.

What about things that make dollar spot worse?

Killing soil microbes makes dollar spot worse

It's obvious that not rolling and applying not enough nitrogen will make dollar spot worse. A few years I came across this article that says "There is evidence that hydrogen dioxide can aggravate a dollar spot outbreak by reducing natural competitors to the Sclerotinia homoeocarpa mycelium."

So an non-selective "organic" pesticide can reduce soil biology and make dollar spot worse. This was also the finding from those who use hydrogen dioxide to reduce organic matter in their soils. More dollar spot following the application. It seems to me that finding the optimum soil biology is very important in controlling dollar spot and it's also obvious to me that we have the tools to do that effectively. Nitrogen fertilizer.

Fast growing grass has less dollar spot

Here's one final observation about dollar spot, soil biology and nitrogen fertilizer. Last summer when I started measuring the clipping yield on individual greens I instantly noticed that the greens with low growth rates had more dollar spot. Low growth rate, low soil nitrogen, low soil biology.

The following picture also shows the impact that nitrogen fertilizer can have on dollar spot as my sprayer doesn't quite reach the full width of my green collars and I was being lazy and not going back to give them adequate fertilizer. This disease then spread to my greens and was the only reason I needed a fungicide to control dollar spot last year.

You don't make observations like this with preventative pest control strategies

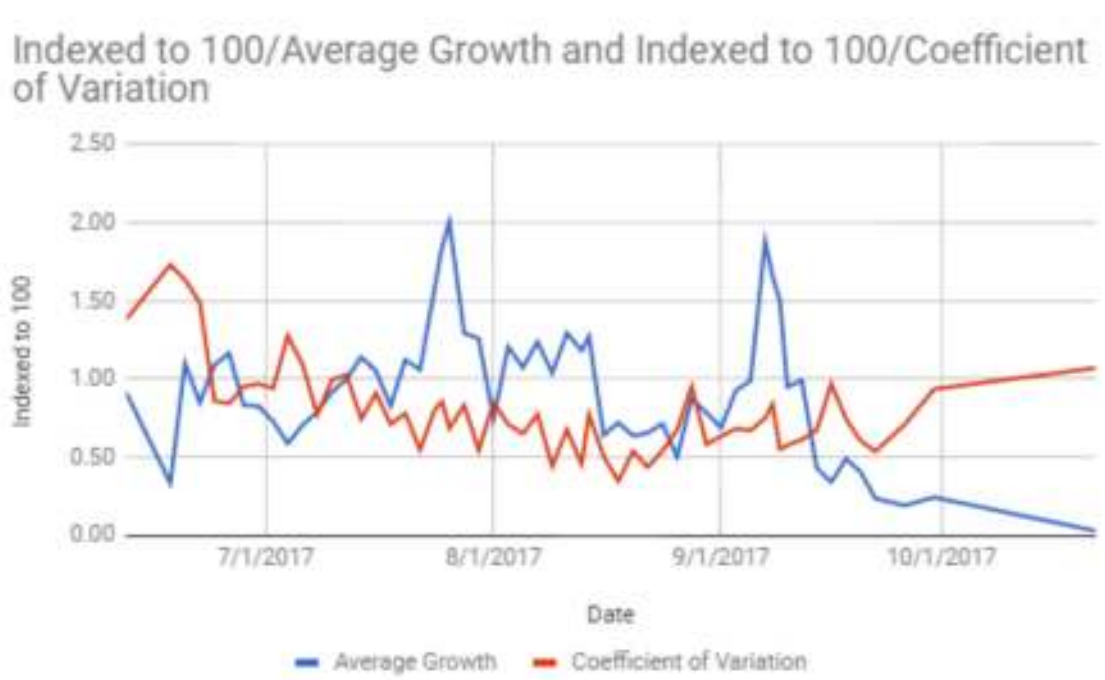
I also found this article especially interesting where it says that the guys at the Vineyard Club grow the grass quickly in the summer to fill in the disease spots. I think it might have more to do with increasing the soil biology than filling in the voids but who really knows.

Fast growing grass has more fusarium

I observe the complete opposite thing for a disease like Microdochium nivale. It appears to me that too much nitrogen will make the disease worse.

Again, I first noticed this when we had wildly varying growth rates this spring due to recovering from winter damage and I noticed that those greens that were growing too quickly had more disease. I'm starting to really notice a trend here, most of these observations were instantly made when I started measuring growth rates on my greens.....

Guess when fusarium first showed up last fall based on the following table of growth rates?



In early September we had a huge surge in observed growth rates and this was also the same time that fusarium showed up. It wasn't because of nitrogen we had added as fertilizer, but because of a mineralization event that was releasing nutrients from the soil. How do I know this? Well I can't say for sure but as I hadn't applied any nitrogen fertilizer for the month leading up to this event, I'm pretty sure the sudden increase in plant available nitrogen came from a source other than fertilizer.

So to me the clues would suggest that soil biology plays an important role in disease severity.

This is the reason that so many people use compost teas and other bio stimulants. To hopefully improve the soil and reduce disease and other plant health issues. Well here's the thing. Nitrogen fertilizer is also a fantastic bio-stimulant. Think about it. It stimulates the plant to grow. It's also incredibly inexpensive especially when urea is the source.

If adding urea fertilizer was the solution we would all be doing it so I think there is something more and the hint for what that is comes from the observation I made about fusarium.

I don't give a damn about how much nitrogen is applied. That is only one factor that will influence plant growth or the biology in the soil. There are other things that influence growth that are completely out of our control . The key thing is to be aware of them and to do that we can easily measure clipping yield.

Clipping yield allows you to quantify the sum of all things that go into making a plant grow in a way that is easy to measure and understand. This then allows us to use the tools we have available to keep the growth rates within tolerable limits to accomplish the goals we have for our property whether it is optimum playability or optimum soil health.

We can get a good idea of what the ideal growth rates are by comparing them to the growth potential model from Pace Turf. Just because we can grow grass quickly in the spring and fall doesn't mean that we should under normal circumstances.

In my discussions with Micah Woods last week we both feel that the simple act of measuring clipping

yield will completely revolutionize the turfgrass management industry. It's too easy. It's so simple. It tells you so much. As Micah says in his book "A Short Grammar of Greenkeeping", "greenkeeping is managing the growth rate of the grass to create the desired playing surface for golf." As I continue to learn more about turfgrass growth rates I couldn't agree more.

Managing the growth rate is key. Photo: Joe Gulotti

I have made a tool that will make it easy for you to measure clipping yield for yourself. Click here to get it for free.

In conclusion I think that the act of spraying a potpourri of soil microbes into our soil is one of the most arrogant things we do as superintendents. How on earth do we know what we are adding and if it will positively impact our soil? Why don't we let the soil do the work for us, understand what impacts the soil biology positively (nitrogen fertilizer) and what impacts it negatively and use this and the understanding the clipping yield can offer us to make better decisions to manage our soil biology better. By the way, this is exactly what they are finding with the human microbiome project. Don't add the microbes, feed the microbes with good food. In our case, nitrogen seems to be a pretty good and affordable food. Too much or too little and we run into problems. We need to know what the appropriate amount is and from there we can make better management decisions.

It's hard to get a good answer from scientists about soil biology and how we can effectively use it. I think that's because it's so complex but I think that clipping yield might be our tool to best understand what is happening in the soil. All we need to do is grow the grass at the appropriate rate with the tools we have available and let the soil do the rest.

There's still a lot to learn on this subject so please, if you have any observations let me know in the comments or send me an email.

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Posted by Jason Haines No comments:

Labels: biology, clipping yield, Turf disease

FRIDAY, 2 FEBRUARY 2018

Automatically Updating Hargraves ETo, Pace Turf Growth Potential, and Smith Kerns Dollar Spot Model Google Spreadsheet

Last week I decided to learn to code so that I could pull weather data off the internet and into my spreadsheets. This would allow my weather related models to update by themselves without me having to intervene. I have enough stuff to do than worry about updating weather data manually when computer can do it for me.

After some trial and error I was able to pull past weather data and a 7 day forecast for any location on earth into my spreadsheet and analyze it to calculate evapotranspiration, growth potential and the dollar spot potential.

The spreadsheet can be found on the following link;

https://docs.google.com/spreadsheets/d/1WYICvWKBySCNHL6Q3G9Oqd3XGw3stvlLzzKucLRW0mo/edit?usp=sharing

Follow the directions carefully and please, do not request to edit this file. **Simply go to File -> Make a copy** and you will have your very own version to edit. Further instructions are on the spreadsheet.

Having this data at your fingertips makes decision making easier. You can see how much water your grass might use, what the disease pressure is, and how optimal the conditions are for growth.

I have also been working on a Heads Up Display (HUD) to display all the information that I gather so that it is front and center to help me make decisions.

That's one of the biggest advantages of google sheets. You can share the workload with adding data into the sheets with forms or automatically with scripts and instantly analyze that data in useful ways that can help you make better decisions based on the facts.

If you are interested in making a HUD for yourself I highly recommend learning how the =importrange()

function in google sheets works so that you can pull data from any of your spreadsheets into one place easily and in real time.

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: Google docs, Growth Potential, irrigation, Turf disease

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