

What Is Plant Health?

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Much time was spent lately discussing plant health and focusing agronomic programs on promoting plant health. This is an interesting discussion because I ask myself what plant health actually is. For some, it seems to mean spraying a cytokinin or a pigment for others it's a more holistic approach. Lets take a step back and try to remember what a plant actually needs to survive: light, food, air and water. Periodically a plant protectant of some sort is required as well. Before thinking about next season, try to reflect on this past summer and ask yourself did you provide the basic necessities for the plant.

Light:

Regardless of what is said about shade tolerance, most of the grasses we grow on golf courses need light. Of course I would say that data is the best way to evaluate the quantity of light your putting surfaces are getting, but it is very true. Now Spectrum Technologies has developed portable light meters and have also had an article published in GCM (Mark Leslie, September 2012) on how much light is needed. Most of the article focuses on providing ultra-dwarf bermudagrass with the appropriate amount of light, but the work can be applied to annual bluegrass/creeping bentgrass putting greens. Once again I would suggest collecting data on problem putting greens and compare that to non-problematic putting greens. This will give you an excellent idea on what might be causing issues on the problem greens. At the very least these meters may help you remove inadequate light as a means of poor plant health.

Air:

Airflow is of utmost importance for

maintaining healthy turf on putting surfaces. Why? Air movement across putting surfaces can cool the surface by 5 to 7 degrees, which is why fans are a great idea for putting greens that are in secluded, sheltered areas. Moreover as air moves across the plant surface it facilitates transpiration because it moves the water molecules out of the sub-stomatal cavities. Remember that stomates are essential to cooling the plant surface without transpiration the plant cannot cool itself. I think the most important tool to evaluate airflow or surface temperatures is a thermometer.

An infrared thermometer would work, but so would an old fashion soil thermometer. If there is a green that is struggling and you suspect airflow is the major reason then start collecting data documenting temperature differences between putting greens with excellent airflow to those that have poor airflow. I know this may

not convince golfers to remove trees or conduct some minor renovations, but at least now you have data to show them when they ask why this one particular green is struggling.

Roots need air as well. Roots are dependent on the shoots for carbohydrates and to burn the carbs oxygen is needed. To facilitate air movement, venting is needed as well as light and frequent topdressing. Both of these practices will also likely reduce soil temperatures and promote root survival.

To my knowledge, I have not seen research documenting temperatures in response to topdressing and venting practices. Yet I suspect topdressing and venting help reduce soil temperatures temporarily especially at night. Plus I saw a presentation from Dr. Roch Gaussoin from Nebraska show data that topdressing is the most effective method to reduce organic matter!



Fans like this one at Farmlinks Golf Club are needed to increase airflow on secluded putting greens.

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Pigments:

Adding a pigment to your spray program WILL not cool the surface. I know there are many claims about these products cooling surface temperatures, but every researcher I've seen reports higher temperatures. This makes sense because these products are designed to coat the leaf and protect them from UV-B radiation. I am by no means saying that pigments are not a vital part of a program, but use them for what they are designed to do—protect against UV radiation NOT heat! UV radiation can destroy membranes and proteins that are crucial for photosynthesis. I recently saw a presentation by Bert McCarty at Clemson University, talk about TurfScreen and other pigments. He found that canopy temperatures were 2 to 4 degrees higher when compared to non-treated controls. Furthermore, he found Zn levels in or on the tissue to be incredibly high with TurfScreen applications. The implication of this is still unknown, but a recent thesis in Auburn showed that high rates of Zn could be used to control *Poa annua*. I guess you can see that I am

skeptical of this product, but I usually am when a product hits the market with very little research behind it. I would still be very cautious when using TurfScreen especially on mixed stands of *Poa annua* and creeping bentgrass. My usual suggestion is to try it first prior to implementing it in your own program.

That being said I do think protecting against UV radiation can be important. Bayer has sponsored much of the research regarding UV protection with their StressGard formulation technology. Dr. Bingru Huang at Rutgers has demonstrated better quality, better root survival and more root mass when using StressGard technology in Signature. I know this is not for everyone, but it might be something to consider if summer stress has been problematic. I was a big skeptic of this technology, but I saw the effects first hand when I was a PhD student at NCSU— it does work! However, it is still important to select fungicides carefully because the phosphonate fungicides or phosphites have limited control spectrums. Yet mixing in other fungicides can be an excellent program for putting

greens.

Food and Water:

These are Doug's babies so I defer to him to speak about managing these, but I hate to hear about chest beating with regard to these to vital plant health items. Plants need nitrogen and increasing N rates does not slow down green speeds when the grass is regulated, rolled and mowed at the heights currently used for cool-season turf. I know golfers are fooled by color because they equate off color with fast, but that can be a recipe for disaster. The same is true for water, but again Doug is way more qualified to speak on these. However, the minimalist approach makes me think of a wrestler trying to make weight. They might wear a rubber suit, not eat or drink and what can happen? They get sick, or worse die. Why do we ask our plants to endure the same stress? Consistent applications of fertilizer and water seem like an ideal way to manage turf, yet so many like to withhold these vital components to plant health. ✓

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