



Sports Turf Update

A new column providing the latest news from STRI's Research Team

Soil organic matter ...friend or foe?

Welcome to STRI's Research column. My objective with this column is to highlight current research issues and to stimulate discussion on a wide variety of scientific topics relating to the management of the playing surfaces around the golf course.

I thought I'd open with an old chestnut, yet still a very current and problematic issue; soil organic matter accumulation in golf greens. This is still one of the top three issues commonly encountered when visiting golf courses and discussing the playing qualities of putting surfaces.

As a soil scientist, I can appreciate the importance of organic matter within the soil profile. It is a key component of a soil and plays a vital role in the recycling of nutrients. Organic matter provides an important habitat for a huge variety of the soil micro-flora and fauna. A large number of these little bugs and beasties are involved with breaking down the organic matter, thereby releasing nutrients that can be taken up by plants. As a result, organic matter plays a very important role in promoting a healthy soil and therefore a healthy growing environment.

However, from a putting surface performance point of view we know that organic matter tends to hold onto water and, if present in too great a concentration, can lead to soft and spongy greens. Conversely, when these same greens dry out they tend to become too firm and run the risk of becoming hydrophobic. Rehydrating dry organic matter can be very difficult indeed! Consequently, greens that contain excessive organic matter will tend to be less consistent through the year, particularly under changeable weather conditions. If this

wasn't bad enough, there is a correlation between greens with excessive organic matter content and incidence of turfgrass diseases.

Coming back to my title, is organic matter a friend or enemy? Well it looks like it can be a bit of both (a bit of a cop out I know!). We need to maintain a certain amount of organic matter to stimulate soil microorganisms and thereby maintain soil health. Where it is present in too great a concentration there can be significant detrimental impacts on the playability of putting surfaces.

How do we know where the optimum organic matter balance lies? Well, perhaps we need to visit how we measure it. The most common method employed by soil laboratories is to measure the total amount of organic material by loss on ignition. This may sound complicated but it is relatively straight forward. You take a known weight of dry soil, burn off the organic matter and the loss in weight gives you the proportion of your soil that was organic. These data, when measured at different depths down a soil profile, can provide a potent tool to establish not only if you have a problem, but also where it is located. If we can measure the amount of organic matter in golf greens, we can then evaluate how effective our maintenance programme is at controlling its decomposition or accumulation.

As is often the way with science, when you answer one question others pop up that challenge our current understanding. A lot of effort has been focussed on understanding how much organic matter is too much, but as we start to understand more about the relationship between organic matter and surface performance it is becoming clear that we need to know more about the nature of



organic matter itself. What are the key types of organic matter? Do they all behave in the same way and have similar effects? To give one example, it is becoming increasingly clear that there are differences in the composition of organic matter formed under different grass types and that these differences might directly affect the degree to which organic matter influences surface performance. We need a better scientific understanding of the characteristics of different types of organic matter (cellulose dominant, lignin dominant or well humified material). It is imperative that we have scientific evidence on how these different forms of organic matter directly and indirectly affect, not only surface performance, but also soil and turf health.

This is where I think we need to focus some of our research effort as an industry. If we can better understand the complex inter-relationships between the composition of organic matter, soil organisms and playing quality, we will be in a better position to evaluate the effectiveness of our golf green maintenance programmes. I hope this has provided a little food for thought.



Dr Christian Spring BSc (Hons),
PhD, Soil Scientist
STRI