



Greenkeeping by numbers

Joe Buckley, First Assistant Greenkeeper at Queenwood Golf Club, discusses GDD, phenology and how science can help turf managers even during record breaking wet winters

Years of research and the development of technology has resulted in modern day greenkeeping relying more and more on science and numbers. Some see this as a negative, suggesting that the true art of greenkeeping is being forgotten and that the modern day head man needs to be more of a scientist than a greenkeeper.

While this is true to a certain extent, I don't see it as a bad thing. The many facts and figures that can

be found help us in doing our jobs and achieving the expectations that seem to be raised year after year.

Specific targets should be established when planning maintenance and renovations with clear objectives put in place and communicated to golfers and committee members well in advance. Online research and developments in modern day techniques now provide us with various data and methods of testing which help in the planning of the aforementioned renovations.

I have always been a firm believer in the saying 'what gets measured, gets managed' and having statistics at hand not only gives a base to work from and track progress, it gives peace of mind that what you are doing is right. It also helps when confronted by the pro, greens chairman or a member having a bad round of golf because you have something tangible to present them with. Being able to add facts and statistics to a response when criticised about conditions makes for a more compelling and believ-



able argument than a descriptive analysis on the subject.

Various studies detail the desired levels of organic matter for different styles of greens and the drop off in water infiltration if thatch levels move outside of this sweet spot. Research shows that a sand/soil based green has an infiltration rate of 90mm/hr when organic matter content at 0-40mm is around 5%.

When thatch levels increase to 8% at the same depth the infiltration rate drops off drastically to just 20mm/ha, highlighting the

importance of getting renovations right. Loss On Ignition (LOI) testing is now used to measure organic matter content accurately giving these percentages at various different depths down the profile.

This is a far more accurate way to measure thatch content rather than using a ruler which can vary greatly depending on whether the sample is wet or dry.

It is recommended that a green currently in the target zone of 5-7% organic matter should aim to impact 15-20% total surface



A sand injection system

area every year through thatch removal processes. Research into various thatch removal practices now provides us with a guide as to which affect different percentages of surface area.

An increasingly popular technique in recent years involves carrying out two processes during the same maintenance window.

The rationale here is that the greens are already being disturbed, machinery is already out of the shed and, while the recovery time isn't drastically increased, the amount

of thatch which can be removed at one time is.

Choosing the right topdressing cannot be achieved accurately without first knowing the properties of your soil profile. Soil sample testing will detail particle size distribution and it is vital that anything incorporated into the existing profile is of a similar composition. Again the importance of selecting the correct topdressing is essential as the effects of not doing so can lead to irreversible problems.

Once a suitable topdressing has been selected, a desired volume for the year should be established dependent on individual course specifics and objectives.

This number can then be targeted and individual applications can be scheduled and communicated. Light frequent applications of as little as 0.5kg/m² are preferable where possible to encourage quicker incorporation into the profile and reduce disruption.

Another key aspect of spring renovations is the feed that usually follows the aerification and topdressing process.

There are various factors involved in deciding the total amount of N-P-K required for a certain area of the golf course, but soil and tissue testing can help greatly, highlighting any potential shortfalls that could inhibit successful growth and giving a base number to work from.

These tests can be pivotal when planning a successful nutritional programme and, while these tests do cost money, their value can far exceed the initial outlay and in most cases save money and a lot of headaches in the long run.

A further area which can be used to help plan and predict various aspects of greenkeeping is phenology.

Phenology is the study of periodic biological happenings in relation to three main climatic conditions: sunlight, temperature and precipitation, from which both plants and animals take their cue.

An aspect of phenology is the Growing Degree Day (GDD) model which has been developed and is now something that is becoming more and more prevalent in predicting and planning various different aspects of greenkeeping. GDD are a measure of heat accumulation used to predict plant and animal development rates such as the date that an insect will hatch or a plant will bloom.

GDD are calculated by adding the daily maximum and daily minimum temperatures, dividing



by 2 and then subtracting a base temperature (usually 10 °C). As an equation: **GDD = ((max temp + min temp) / 2) - base temp.**

For example, if the max temperature was 25C and the minimum 9C, the equation would be:

GDD = ((25 + 9) / 2) - 10. GDD = 7

The GDD units are a running accumulation throughout the year and can be used to accurately measure what stage of the growing

season it is rather than relying on the increasingly varied calendar days.

This can be extremely helpful in planning timely pesticide applications or determining spray intervals for foliar applications ensuring the best possible results. Whilst there is some research into this model, GDD can vary from site to site so field testing is advised to get the best results.

With the abnormally wet winter we've had, where high winds and rainfall have been record breaking, not everything can be done by the book.

Whilst science should play a major role in the planning and decision process, it is also important not to get lost in numbers. The old saying 'you can't teach experience' is particularly true and skills such as good judgement and a well-trained eye are equally as important as any figures and come from years of practicing the art.

Contact Joe Buckley via email: joe.buckley@queenwood.co.uk

