



In his latest article which features a quiz offering CPD Credits, Henry Bechelet explores soil sampling techniques

Sampling technique

Everris are specialists in plant nutrition and nutrient delivery technologies. We draw from a proud heritage of fertiliser production from Fisons then Levingtons, ICI then Zeneca, before merging into Scotts Professional and then becoming Everris.

Over the years we have produced and continue to produce high quality fertilisers specifically formulated to deliver nutrient for the production of high quality turf throughout the year. We have always invested heavily in research and development to support our recommendations and drive our innovations. We try to lead from the front.

We also understand the importance of our products being used correctly and invest in training our staff to the very highest industry standards (FACTS and BASIS). We work hard to ensure that our customers understand our products and know how to get the very

best out of them. When making recommendations for fertiliser programmes, we have traditionally used soil analysis results as a start of the process.

Generally, we use soil sample analysis to provide meaningful information about the chemical and nutrient status of the soil to help with the creation of fertiliser programmes. We need to know the soil pH because it influences nutrient availability and grass type suitability.

The cation exchange capacity (CEC) of the soil is important because it affects nutrient retention and could influence the choice of fertiliser type, the quantity applied and release pattern.

Electrical Conductivity (or salinity) can have a big impact on the condition and health of turf. We also need to know the availability of the major nutrients P, K, Ca and Mg to see if they are at sufficient levels to sustain turf health.

Micro nutrient analysis may also be undertaken in response to deficiency/toxicity problems.

So, there are a number of tests that are essential to help us put together a good nutrition programme.

But before we can even think about the results, we need to make sure that the sampling is carried correctly. Careless soil sampling can be the greatest single source of error when formulating fertiliser programmes.

This is because the way in which we take the samples can radically affect the results and so it is important that we get the sampling right to be able to focus the nutrition programme properly.

The key considerations are:

- Taking a representative sample
- Sampling from the right depth
- Do we include thatch?
- Timing of sampling
- Frequency of sampling

about the author



Henry Bechelet

After working in the turf and amenity sector for over 20 years, Henry joined STRI as a trainee agronomist. He then became Northern Technical Sales Representative for a fertiliser supplier. He rejoined STRI in 2000 as an agronomist, and since has been a writer, and a speaker.



Soil Sampler

Firstly, you will need a round metal corer that is capable of retrieving enough sample from the required depth without causing too much surface disruption. This would commonly be a 15mm diameter corer 15-20cm in length. Suitable stainless steel samplers are widely available, but some work better than others, so choose carefully.

Sampling pattern

You must employ a sampling pattern that is able to produce a good representative sample. Our aim is to obtain a composite nutrient value to represent each area. In general, we form a representative sample from 20 cores, which are then mixed together to form the sample for analysis. The sampling pattern should be drawn up by creating 20 sub-areas (i.e. an imaginary grid) from which the samples are taken from a random position within each area. The sampling pattern should not be oriented in straight lines because the results may be biased by treatment affects (such as fertiliser applications, maintenance operations etc.)

Depth of sampling

It is critically important to be accurate and consistent with our depth of sampling. Nutrient levels vary significantly through the depth of the profile, so altering the depth of sampling might appear to give significant changes in nutrient levels when no change has actually occurred. Generally, we sample the zone from which the roots draw nutrients (generally 2.5 – 10mm). It is good practice to carve guideline notches into the soil augur to ensure consistency of sampling depth.

Splitting samples

You may wish to split the cores to analyse the soil status taken from different depths. Sometimes significant differences within the profile need to be identified rather than absorbed into a bulked up composite sample.

For instance, in sand-based constructions the properties of the upper soil profile might vary significantly from the rootzone (pH especially) to potentially cause problems, which is something we would need to know.

Alternatively, soil-based greens that have been heavily amended with sand top dressing, might display a reduced nutrient holding capability in the upper soil profile compared to lower down, which we need to understand. Again, if you are intending to analyse trends within the profile over time, you will need to be consistent with your depth of sampling.

Remove the thatch?

It is generally recommended to remove thatch from samples before testing. Organic matter usually increases the nutrient levels because it can contain significant amounts of the nutrients required to support plant growth. At the moment I find it better to split the samples at around 25mm then analyse the upper portion for pH, P, K and organic matter (LOI) with more comprehensive testing lower down. This can be very helpful in understanding the dynamics of the situation and also putting a more meaningful number on the organic matter content.

Time of year

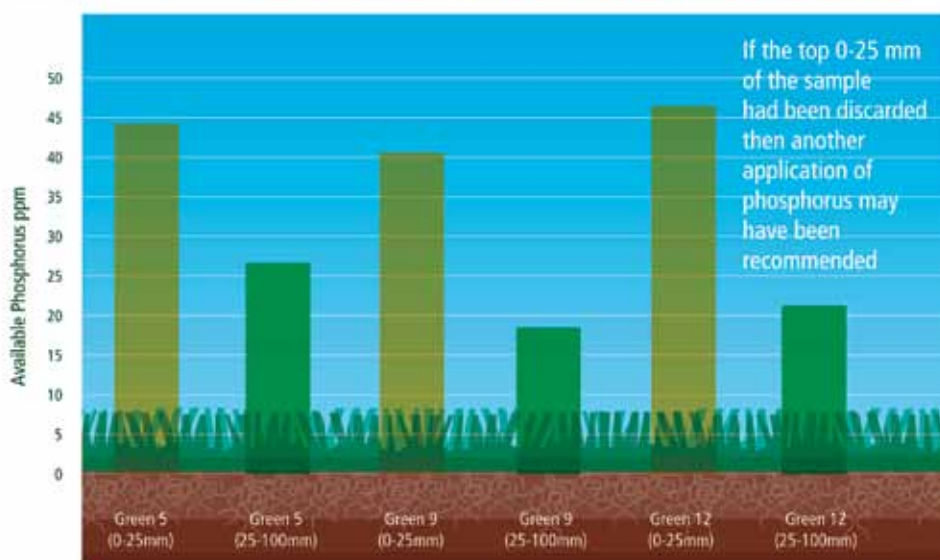
Timing of sampling time is also important if you want to make year-on-year comparisons. The soil pH as well as the available P and K can vary throughout the year, so sampling timing can affect the results. Again, you need to be consistent with your timings to be able to draw out meaningful trends.

Frequency of testing

The frequency of testing would be dependent on the potential for rapid and significant changes in soil status to occur. In new sand-based constructions the pH can drop rapidly if there is a low CEC, which could cause problems of nutrient lock up or general turf stress.

More regular monitoring during the early weeks and months of new establishments can help us understand the situation and guide the fertiliser programme properly.

Example Golf Course: The affect of soil sample depth on available Phosphorus



Clean and orderly

Above all, the samples should be collected carefully and cleanly without external contamination before being amalgamated and mixed in a non-metallic container prior to bagging up and labelling.

Most laboratories provide kits and offer guidance on how best to take samples and the amount of sample required to carry out the various tests.

Conclusion

Soil analysis provides us with vital information to help us formulate our nutrition programmes.

We must, however, be extremely strict with the sampling method if the results are to be trusted.

The rules of soil sampling are:

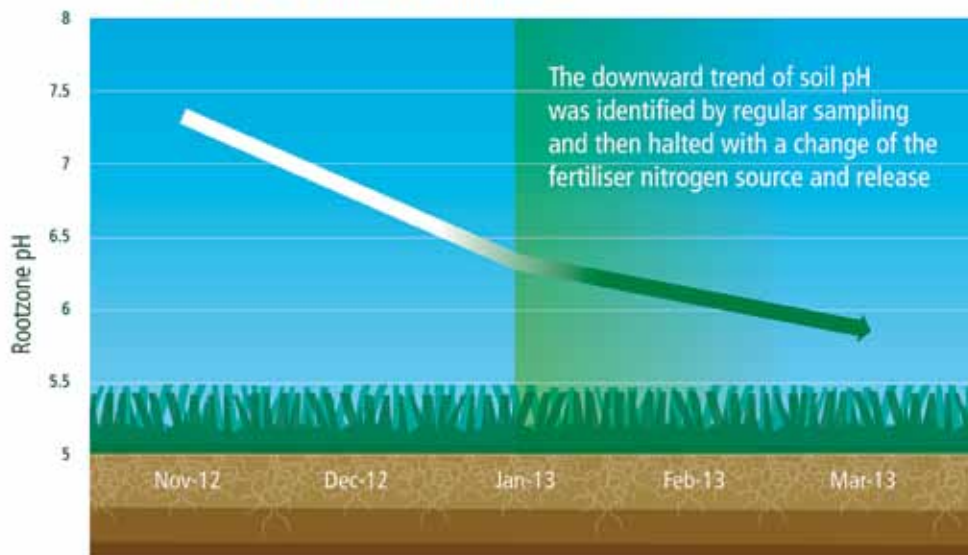
- Take 20 core samples from the selected area using an imaginary grid pattern with randomization within the grid squares
- Sample to the depth of root activity (25mm-100mm generally)
- Split the samples if needed to understand profile differences
- Be consistent in your sampling methods to allow ongoing comparisons
- Mix the samples cleanly before bagging up and sending away
- Label the samples clearly

This way you will produce a set of results that you can work with. There is little point in using results or comparing different results obtained from careless sampling.

This is one of those areas that we just need to get right. Interpreting the results is something else we need to discuss.



Example: Rapid downward trend of rootzone pH in 0-50mm of a new sand based construction



CPD Questions

- 1. What sampling pattern should we employ?**
 - a. Simple grid pattern
 - b. Straight lines
 - c. Randomised in a grid pattern
- 2. How many samples should you take from each area to achieve a representative sample?**
 - a. 1-5
 - b. 5-10
 - c. 20
- 3. What depth should you take samples from?**
 - a. The zone of root activity
 - b. 0-100mm
 - c. 100-150mm
- 4. Should we include or discard the thatch?**
 - a. Include
 - b. Discard
 - c. Analyse both
- 5. What time of year is best to take samples?**
 - a. Spring-summer
 - b. Autumn-winter
 - c. It is most important to be consistent with the time of year.
- 6. How frequently do we need to take samples?**
 - a. Depends on the situation
 - b. Annually
 - c. Monthly
- 7. How do we create the final sample for analysis?**
 - a. Just put the cores into the bag and send them off
 - b. Retrieve the required portion of the sample and mix thoroughly before bagging up
 - c. Who cares?

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Quiz: svy.mk/1hkMQpI