Mark Hunt gives some useful advice when it comes to planning your greens fertiliser regime

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Seldom a year goes past without the introduction of new products or new concepts in fertilisation for the sports-turf market. For greenkeepers and Course Managers, the choice is bewildering. Can these products really provide the improvements they seek or are they just fads, - here today, gone tomorrow?

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To begin to answer this question, we must first look at the basic principles that underpin the usage of fertilisers on golf courses and the factors that need to be taken into account.

If I was starting at a new course and was looking to put together a greens fertiliser regime for the coming season, these are some (but not all) of the details I would consider in order to 'shape' my thinking;

- Size and design of greens and associated wear patterns
- Construction and rootzone characteristics. Are all greens the same? (Unlikely), are there a mixture of types/ages of greens?
- Thatch levels, any signs of anaerobic conditions, drainage and percolation characteristics.
- Grass species present, sward density, root development.
- Soil nutrient levels, pH, nutrient retention, etc
- Planned events, aeration, tournaments, etc
- Machinery, labour and budget availability

These points all have a bearing on the amount of nutrient required in any one year. For example, smaller greens with less pin positions tend to concentrate wear and place more stress on the sward.

If fertility is lacking, the sward density may suffer, allowing encroachment of undesirable grasses and weeds, so it follows that these types of green will require more nutrient than larger ones.

Similarly, rootzone characteristics dictate nutrient demands. Take for example a modern USGA specification green with a high percentage sand-based rootzone - This has low nutrient retention and over the growing season, will need a higher fertiliser input, compared to a soil based green.

In addition, such greens will also require a higher nutrient input from September to March. During mild spells of winter weather, the sand warms up, initiating growth, which

There are many different types of fertiliser available for many different uses and application methods

requires nutrition, but because there is little holding capacity in the rootzone - nutrients have to be supplied. To ignore this simple fact on this type of construction is a quick route to a weak sward,- consistently thinning out over the winter, prone to disease (because it is under stress) and one which takes longer to regain strength and density the following spring.

On soil-based greens, nutrient retention is better, due to their higher organic matter content and during mild spells of weather, retained nutrients are made available to the plant. That is not to say that soil-based greens do not require autumn/winter fertiliser, but just a lower level.

Fertiliser applications made may vary in the type of product used (liquid, soluble or granular), its nutrient make-up (Quick release, slow-release or a combination) and the application rate.

Types of product

Fertilisers come in three main forms - solid, soluble or liquid.

Solid fertilisers include granular, prilled and powdered products and are usually applied through a pedestrian spreader.

Soluble fertilisers normally consist of water-soluble powder or prilled products, which are dissolved in a spray tank and then applied to the turf.

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Nutrient sources

Fertilisers are normally made up of different combinations and ratio's of major nutrients, usually nitrogen, phosphorus and potassium (but not necessarily all three). However, it is not unusual to see magnesium and iron as part of an analysis and sometimes, minor nutrients (trace elements). The major nutrients can be derived from different sources, for instance nitrogen in a conventional (quick-release) fertiliser may be derived from sulphate of ammonia, ammonium nitrate or urea, or a combination of some or all of these.

The source of the nutrient will influence how the fertiliser 'works', that is to say, how quickly it is available to the plant, how long it will last, it's effect on pH, it's potential to scorch and so on.

Analysis isn't everything

Just looking at the analysis of a fertiliser tells us little about what to expect when we apply it. Take the following example. I have two bags of fertiliser, they both have the same analysis on the label - 8+0+0. This tells me that 8% of the bag contents is nitrogen, - but what does it tell me about how the products will work? The answer is nothing. If I look further, I see product A states that the nitrogen is derived from sulphate of ammonia, whereas the product B is derived from urea.

Sulphate of ammonia provides nitrogen that is immediately available to the plant and so works even if soil tem-

peratures are low (hence it's inclusion in many autumn/winter and spring starter formulations). It acidifies the surface of turf, but has a high scorch risk. Urea on the other hand, requires bacterial activity for the conversion of nitrogen to plant available forms. This in turn requires good soil temperatures and moisture levels.

So if I was looking for a product to apply as a spring starter to give me a good response, after coring maybe, I would use product A. However, if I was looking for a summer product to give gentle growth and less flush, I would choose product B.

Potassium Source

It's not just the source of nitrogen that can affect how a fertiliser works and how it should be used.

Potassium in fertilisers can come from one of three main sources - potassium sulphate, potassium chloride or potassium nitrate, and each have specific characteristics. Potassium chloride is often used in fertilisers because it is readily available and cheap, but it possesses a high scorch risk compared to potassium sulphate. Thus, two fertilisers of identical analysis may have widely different scorch risks because of the potassium source utilised. Fertilisers derived from potassium nitrate are usually sulphur-free and contain nearly 50% oxygen as part of their analysis - both of these features are especially useful when dealing with anaerobic (Oxygen-lacking) rootzone's.

The take-home message is that rather than just looking at the analysis of the fertiliser, one should also look at the sources of nutrient it is derived from to get an idea of how it works.

Longer term Fertilisers

Some products release their nutrients over longer periods. These would include slow release, controlled release and organic fertilisers. They can rely on soil temperature, moisture, as well as bacterial activity (or all three) to regu-

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Different types of Potassium Nitrate Fertiliser

1. Coated (controlled release) for fine turf
2. Mini prill fir fine turf
3. Coated (controlled release) for coarse turf
4. Water soluble fertiliser
5. Standard prill for coarse turf

late the release of nutrients over a given period of time. Such products can provide clear benefits, including the saving of time and labour, avoidance of growth flushes and low scorch potential.

Again, it is important to understand how the particular product works, i.e. what factors it depends upon for its release, how long it works for, etc, before making a product selection.

Coated or controlled release fertilisers are one such group providing long term nutrition and have become widely used over the last 12 years on tees, approaches, fairways - and latterly greens as part of a 'base feeding' fertiliser regime. Resin or polymer coated products release their nutrients through a semi-permeable coating, governed by soil temperature.

As temperatures rise, more nutrient is released into the rootzone, closely following the requirements of the grass plant. Release of nutrients are unaffected by increased moisture levels, making such products ideal for use in wet conditions. Other coated fertilisers such as (poly) sulphur coated ureas (PSCU/SCU) depend upon temperature as well as other factors such as soil moisture levels and microbial activity for nutrient release.

Base Feeding - A new approach

The concept of base feeding is relatively new on fine turf, but is becoming accepted as a different way of applying fertiliser, with particular relevance to high sand content rootzones. In this scenario, a controlled release minigranular fertiliser is applied in the spring and autumn, at renovation time, to provide a long-term base feed of nutrients. (Some products feature controlled release potassium in addition to nitrogen). These applications provide a base of nutrients for the season, upon which supplementary applications, in the form of light rate granular, water-soluble or liquid fertilisers, can be made.

Advantages of base-feeding include;

- Granular applications can be confined to the times of year, when they interfere less with the playing surface (cutting heights are higher and the cutting frequency is less).
- Supplementary fertiliser applications can be made in the form and at the rate the plant requires for that particular part of the season, thereby maintaining control.
- The controlled release of nutrients ensures a gentle supply to the plant, in line with it's requirements, because both the grass plant and fertiliser are dependent on soil temperature for growth and release respectively
- Continuous nutrient availability avoids 'peaks and troughs' associated with other fertiliser regimes, providing more consistent growth and more efficient fertilisation.
- Excessive rainfall will not effect the release, minimising the risk of leaching, ensuring excess nutrients are not lost. Fertilisation on golf courses is dependent on a wide range of factors, not least, the weather.

Knowing about the different types of fertiliser, their nutrient forms and release characteristics and applying this knowledge to get the best results is a key part of modern day greenkeeping.

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