Martyn Jones switches on his calculator and explains how to work out nutrient requirements of turfgrasses and application rates of fertilisers.

A myriad of products is now available that claim to enhance the growth and health of turfgrasses and many are given names and descriptions that suggest that they are something other than a form of nutrient supply. Turf tonics, soil conditioners, organic dressings, biostimulants, seaweed derivatives, bio-conditioners, growth enhancers and biological disease suppressants are just a few of the terms given to some of them.

Some such products can contain appreciable quantities of plant nutrients; in some cases, as much as 5% or more of nitrogen. Often, nitrogen is added to products to stimulate an obvious turfgrass response and convince the greenkeeper that it is beneficial. Acknowledge ‘lawn sand’ or ammonium sulphate in the general term fertiliser. Experienced and knowledgeable greenkeepers know that a nutrient source is still a fertiliser by any other name. When offered a product, it is prudent to ask for a nutrient analysis and copies of independent research data that may substantiate or disprove any claim. Expensive ‘secret recipes’ should be dismissed. Things that seem too good to be true usually are.

UNDERSTANDING WHAT IT SAYS ON THE BAG

Having determined if a product is a fertiliser or whether it is totally unrelated to nutrient provision, there are a number of other points to appreciate before we can calculate the amount required. This is assuming that you want control of the fertiliser programme and that you don’t just accept the recommended application rates as they appear on the bag.

The first stage of understanding fertiliser calculations is to understand some of the terminology associated with fertiliser materials.
CALCULATION 2 - CALCULATING THE AMOUNT OF FERTILISER TO APPLY

A second more useful type of calculation is used to determine how much fertiliser needs to be applied to a particular area to supply the grasses with a certain amount of the nutrients.

How much of a 20:5:15 fertiliser product would have to be applied to 500 sq. metres of green to supply the grasses with 150 Kg of N per hectare (10,000 sq. metres) per annum?

Note that 150 Kg per hectare per annum can also be expressed as 150 Kg h^{-1} yr^{-1}.

The application rate of 150 Kg per Hectare of N is already known, therefore:

\[
\text{150} \times \frac{100}{10000} \times 500 = 37.5 \text{ Kg of fertiliser is required for the 500 sq. metres}
\]

37.5 Kg of the fertiliser product will supply 500 metres\(^2\) of green with N at the rate of 150 Kg h^{-1} yr^{-1}. This quantity will, of course, be applied to the green in a number of increments during the year.

Calculating the quantity of P and K that the fertiliser product applies may also be required to determine a fertiliser programme. In these cases, the following additional calculations are made.

37.5 Kg of the 20:5:15 fertiliser product will also supply the 500 metres\(^2\) with:

\[
37.5 \text{ Kg} \times \frac{5}{100} \times \frac{44}{100} = 0.825 \text{ Kg P}
\]

\[
37.5 \text{ Kg} \times \frac{15}{100} \times \frac{83}{100} = 4.669 \text{ Kg K}
\]

These figures will equate to application rates per hectare of:

\[
0.825 \times \frac{10000}{500} = 16.5 \text{ Kg per hectare P (16.5 Kg h^{-1} P)}
\]

\[
4.669 \times \frac{10000}{500} = 93.38 \text{ Kg per hectare K (93.38 Kg h^{-1} K)}
\]

Therefore, 37.5 Kg of the fertiliser product will supply the 500 metres\(^2\) of green with Nitrogen (N) at the rate of 150 Kg h^{-1} -1. This quantity will, of course, be applied to the green in a number of increments during the year.

Calculating the quantity of P and K that the fertiliser product applies may also be required to determine a fertiliser programme. In these cases, the following additional calculations are made.

37.5 Kg of the 20:5:15 fertiliser product will also supply the 500 metres\(^2\) with:

\[
37.5 \text{ Kg} \times \frac{5}{100} \times \frac{44}{100} = 0.825 \text{ Kg P}
\]

\[
37.5 \text{ Kg} \times \frac{15}{100} \times \frac{83}{100} = 4.669 \text{ Kg K}
\]

These figures will equate to application rates per hectare of:

\[
0.825 \times \frac{10000}{500} = 16.5 \text{ Kg per hectare P (16.5 Kg h^{-1} P)}
\]

\[
4.669 \times \frac{10000}{500} = 93.38 \text{ Kg per hectare K (93.38 Kg h^{-1} K)}
\]

Therefore, 37.5 Kg of the fertiliser product will supply the 500 metres\(^2\) of green with Nitrogen (N) at the rate of 150 Kg h^{-1}. Phosphorus (P) at the rate of 16.5 Kg h^{-1} and Potassium (K) at the rate of 93.38 Kg h^{-1}.

If a nutrient application rate of 150 Kg h^{-1} N, 40 Kg h^{-1} P and 120 Kg h^{-1} K is desired, a further 23.5 Kg h^{-1} P and 26.62 Kg h^{-1} K are required from other fertiliser sources.

In the case of P, if Triple Superphosphate (48% P2O5) is to be the P source:

\[
23.5 \text{ Kg h^{-1}} \times \frac{100}{48} \times \frac{83}{44} \times \frac{10000}{20} = 5.56 \text{ Kg of triple superphosphate will need to be applied to the 500 m2 to satisfy the additional P requirement}
\]
Accurate application of nutrients helps produce high quality surfaces

In the case of K, if Potassium sulphate (50% K2O) is to be the K source:

\[
26.62 \text{ Kg h}^{-1} \times 100 \times 100 \times \frac{500}{10000} = 3.21 \text{ Kg of Potassium sulphate will need to be applied to the 500 m}^2 \text{ to satisfy the additional K requirement.}
\]

To summarise the example, if 500 m² of green is to be fertilised at a desired rate of 150 Kg h⁻¹ N, 40 Kg h⁻¹ P and 120 Kg h⁻¹ K with a 20:5:15 fertiliser product as the principal source of nutrients, 37.5 Kg of the product would need to be applied to satisfy the nitrogen (N) requirement.

In addition, further dressings of 5.56 Kg of Triple Superphosphate and 3.21 Kg of Potassium sulphate would be required to satisfy the overall phosphorus (P) and potassium (K) requirements.

So, the next time you are contemplating using fertilisers or other products on any area of your golf course, be sure that you know exactly what you are using and that you are applying the quantity of nutrients that you want.

Remember, you can't take it off once you have applied it. By then, the damage may have already been done.

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