Facts about FERTILISER

DAVID LAWSON takes a practical look at nutrients for your golf course

It is worth remembering that all soils contain some plant nutrients. Even a rootzone comprised of sand contains potassium and magnesium with possibly some phosphate. However, the actual amounts of nutrients held within the soil 'reserves' are governed primarily by the proportions of organic matter and clay minerals present. The soil organic matter, in particular, holds a store of nitrogen, sulphur and phosphorus which with time is released to the turf through the activity of micro-organisms. The higher the soil's temperature and moisture contents, the greater the rate of nutrient release. For this reason there is normally a flush of turf growth in the autumn when the soil is warm and wet.

In the indigenous soils of the golf course fairway the organic matter supplies adequate amounts of nitrogen and other nutrients for turf growth. These organic nutrient reserves are continually replenished from leaf clippings and dead roots, which break down to form soil humus. In addition, the turfgrass and soil receive nitrogen dissolved in rainwater. Although the actual amount will vary from region to region, the total amount of nitrogen supplied annually in rainfall is between 3 and 4 grams per square metre. This is equivalent to the amount of fertiliser nitrogen applied in an average fertiliser dressing. Clay material in fairway soils will also hold short-term reserves of nutrients.

Therefore, most fairways do not require any fertiliser on a regular basis. However, badly worn approaches and walk-off areas will benefit from an annual application of nitrogen fertiliser. A convenient way of doing this is to apply a slow release fertiliser in the spring. Resin coated fertilisers are particularly effective as they will support even growth right through the growing season from one spring application.

Nitrogen

It is on the tees and greens where fertiliser application is essential. By far the most important fertiliser nutrient for turf is nitrogen, which has to be applied to close mown turf in order to allow the grass to recover from wear and tear. The reserves of nitrogen within the soil or from top dressing materials and rainfall are not adequate, particularly as nitrogen is being removed in clippings.

The most severely nitrogen depleted situation is the sand-only rootzone. Trials at the STRI have shown that for fescue/bent turf 25 g/m² of nitrogen (N) should be applied each year. Using normal, soluble fertilisers this will require at least seven separate dressings each year, as no single dressing should exceed 4 g/m² of nitrogen. On rootzones constructed from sand-soil mixes the organic soil nitrogen has been so diluted that again a relatively high input of fertiliser nitrogen is required: about 20 g/m² of N per annum. This would be applied within a minimum of five dressings where soluble fertilisers are used.

Because of the low 'background' nitrogen content of these free-draining sandy constructions, it is often necessary to extend the fertiliser programme at either end of the main growing season. This allows the turf to recover from wear during the winter months. ➡ 37

Facts about FERTILISER

35 ➡ On these rootzones it is perfectly acceptable to use traditional soluble fertiliser products based on ammonium sulphate. The inclusion of organic nitrogen in spring and early summer is also worthwhile, but it is important not to rely on organic products for the main source of nitrogen as severe disease problems can occur. Sand-texture rootzones do quickly become very acidic, so to counteract this less acidifying fertiliser materials can be used. Liquid nitrogen fertilisers normally contain urea-nitrogen, which is only half as acidifying as ammonium sulphate. In addition, these liquid products are a convenient way of applying small amounts of nitrogen at either end of the main growing season. These liquid products vary dramatically in the amounts of nitrogen which they contain and it is often difficult to ascertain how much is being applied with one application. Advice on this can be obtained from the STRI.

Slow release nitrogen fertilisers have been developed largely to reduce the number of fertiliser applications and to 'even out' the pattern of growth. Such advantages would be seen most obviously on high sand content rootzones. However, care should be taken in their use on golf greens. Materials which work through their low solubility (IBDU and ureaform) do not have the same ability to discourage annual meadow-grass establishment as ordinary soluble products containing ammonium sulphate. The long-term effects on turf quality from application of coated, controlled release fertilisers has not, as yet, been investigated.

On golf courses where greens or tees are constructed from loam soil there may be such a substantial amount of nitrogen released from organic matter that the annual fertiliser nitrogen requirement is as low as 8 g/m² of N. This would be supplied within two fertiliser dressings. However, the annual rate should normally be between 12 and 16 g/m² of N. An ammonium sulphate-based fertiliser programme is appropriate and any excessive acidity produced can be counteracted by applying top dressing materials with a neutral pH value.

Phosphate

Many golf greens contain more than adequate concentrations of soil phosphate for fine turf as a result of the application of phosphate fertilisers regularly over many years. Chemical analysis of the soil will show whether or not this is the case. Many of the newer, free-draining sandy rootzones do not contain such high phosphate concentrations and where soil tests indicate very low amounts, a phosphate fertiliser should be applied to prevent deficiency. An application of around 2 g/m² (as phosphorus pentoxide) can be applied in spring within a mini-granular fertiliser. Alternatively straight super phosphate can be applied at 10 g/m². Such application rates will prevent deficiency without causing an excessive accumulation of phosphate in the rootzone. The presence of a low soil phosphate concentration should not be ignored as it may lead to severe die- ➡ 39

Facts about FERTILISER

37 ➡ back in close mown fine turf.

Potassium

Potassium is known to aid in the drought tolerance of turfgrasses and there is also some evidence that it aids disease resistance. Again, it is sensible to ensure that there is an adequate concentration in the rootzone. If there is a requirement for potassium then between 6 to 15 g/m² (as potassium oxide) should be applied in a year. The higher end of the range is applicable for very sandy rootzones and this is divided into three dressings each of 5 g/m² of pottasium oxide. For loam soils a single dressing in the spring of 6 g/m² of potassium oxide would be adequate. The potassium can be provided from micro-granular turf fertilisers or as straight potassium sulphate.

Magnesium and micronutrients

Only on very high sand content rootzones is there any need to be concerned about the levels of magnesium and micronutrients available to fine turf. Even here, visible symptoms of deficiency are not commonly encountered. However, it is possible that very low plant concentrations of magnesium or micronutrients will lead to some impairment in growth. At present there is simply not enough information on this. Therefore, where rootzone chemical analysis reveals low concentrations of magnesium or micronutrients it is a sensible precaution in the spring to apply a magnesium or micronutrient (trace element) containing fertiliser. Many proprietary fertiliser products now contain magnesium and an annual application equivalent to 2 g/m² of magnesium oxide will be adequate. Alternatively Kieserite applied at 7 g/m² or Epsom salts at 12 g/m² will supply sufficient magnesium for the turf.

A number of fine turf fertilisers contain a micronutrient content, but there are also available concentrated micro-nutrient fertilisers for use in horticulture and agriculture. Advice should be sought before using such products on fine turf.

Fertiliser products

There are many new fertiliser products coming onto the market – liquids, microgranules, organics and slow release. It is often difficult, from the label, to know what is actually in the bag or container and what their long-term effect on the turf will be. If there is any uncertainty then get in touch with STRI.

The author, David Lawson, B.Sc. Ph.D., is a soil chemist with the STRI.