

# GROWTH INDUSTRY



**Hugh Tilley examines the field of fertilisers and looks at the developments which have taken place.**

While there are various views on the need for fertiliser on golf courses, particularly on fairways, most greenkeepers accept a need for fertiliser on greens and tees which are regularly mown with clippings boxed off. Greenkeepers are also recognising that more rounds over an extended season require the grass to be kept growing for longer and for it to be strengthened.

There is also an increasing requirement for courses to look good throughout the year. As a result there are several pressures to apply fertilisers, perhaps in increasing amounts, and to increasing areas of the course. There are also differing thoughts over the use of organics, turf conditioners and growth stimulants, and perhaps there is now a realisation that applying the major nutrients without a balance of minor nutrient and trace elements is recipe for disease etc, and, talking to Course Managers, greater use is being made of analysis. Most fertilisers are supplied through a local agent, who also often supplies other services such as soil and tissue analysis. The most usual scenario on most courses appears to be to apply a "complete" fertiliser in the spring and then to top up with nitrogen once or twice later in the season as needed - often using the later

dressings to include other products such as iron and/or a fungicide. The last few years have seen many changes in the manufacturer supplier chain, the golf course and its manager has become more important while agriculture has declined in importance and this change has led to greater importance being attached to meeting the requirements of golf. Other changes have been in the composition of greens, which are the areas which receive most fertiliser, as more and more are built or re-built to USGA Guidelines with under-drains, stone and mainly sand root zones. Composition of the root zone has considerable bearing on fertiliser use. There have also been several critical changes in supplier and manufacturer with changes of name - ICI became Miracle, via Zenica and Fisons became Levington Horticultural while US based Scotts and Mascot, both marketed by UK companies, have made a significant impact on the UK golf course. Miracle is now wholly owned by Scotts, but both will continue to run as two separate operations while it is seen how they marry together.

Few changes in product are envisaged. BASF now market their turf fertilisers through Kings Horticulture. The term "fertiliser" has a precise meaning in law - and analysis of the product must be stated. But as one maker stated the exact method of analysis can vary between US, UK and Europe - thus "like" need not be "alike".

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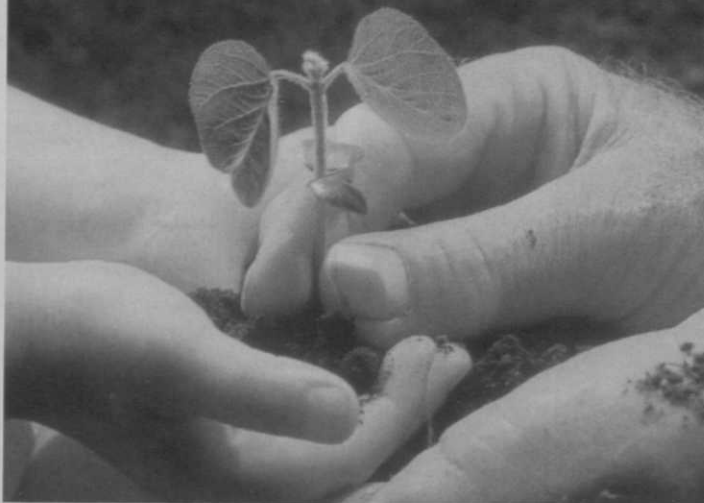
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The main plant nutrients are Nitrogen, Phosphate and Potassium, normally abbreviated to N, P and K after their chemical symbols. In addition many fine turf fertilisers have added iron – Fe – for its ability to induce deeper green into the grass and to help suppress moss, they may also have other elements such as sulphur (S) and Magnesium (Mg) plus trace elements.

Techniques such as resin coating have been proven and from a single exponent (Sierra) there are now several makers offering coated products. Didin (a nitrification inhibitor), IBDU and Methylene Urea (MU), the latter two urea nitrogens, have to be broken down before becoming available to the plant and this is another way in which nitrogen release can be extended and these are well proven for those who want to make their nitrogen uptake extend into the mid-summer period – but not all manufacturers are agreed how effective this is. Resin coating is claimed to be able to extend the release season by up to six months.

Many nutrients do not bond to sand – thus N and K in particular may be leached out, nor may there be any nitrification bacteria to breakdown urea into nitrate for uptake by the plant – thus the form of N become critical for sand based greens. Mark Hunt, of Scotts, admitted that their range was particularly geared to this type of green. Of course the whole idea of slow release is to save time and labour (on application) as well as levelling out the growth curve. Drought in the last seasons has only partly affected grass growth on greens because many courses now have irrigation removing lack of water as a controlling factor allowing nutrient to be utilised. High summer temperatures increase bacterial activity and so increase the rate of nitrification. On non-irrigated fairways differing thinking may be needed, although perhaps fertiliser can be used to promote drought resistance – with longer stronger root growth which can pick-up soil moisture better. Special fertiliser formulations are available for the turf market with both liquid and solids on offer, however a past ploy on most courses has been to use a mini-granule in early season to put on all the year's potassium (K) and phosphate (P) with enough nitrogen (N) to get the grass growing,

however increasingly the use of a mixture of nitrogen sources within the fertiliser is resulting in products with higher levels being available. Typically these products will have three types of N – with immediate, medium and slow release properties.

Despite the best endeavours of scientists to produce ever slower release nitrogens, nitrogen usually has to be supplemented in the summer when the plant can use it, however warm autumns and some mild weather in winter has allowed some nitrogen to be used out of season. Potassium (potash) – K – is also leached from sand and so can be deficient and as a result additional fertilisers are being added to most ranges to give the knowledgeable greenkeeper a suitable product to apply. Experience in agriculture and horticulture has shown that a surfeit of K can cause other nutritional problems, and a lock-up of other elements – but there is no suggestion that this is occurring with golf greens. Both the potassium and phosphate elements tend towards giving the plant greater resilience to wear and disease, while nitrogen is known to promote softer more disease prone growth, but in truth having the elements available in the right proportions must be the best answer to healthy turf. Other important 'minor' elements are magnesium and sulphur, the former often available as a specific element of the fertilisers, however there are many other elements needed by healthy turf, particu-

larly close mown turf which is verti-cut, scarified and has the clippings removed. Several manufacturers now include seaweed extract, "hoof and horn" or other organic ingredients in their product to broaden the spectrum of nutrient provision as well as to help carry the major nutrient. This belief – that organic compounds are good – is also promoted by the many suppliers of turf conditioners and growth stimulants and although seldom proved by analytical science has a lot of adherents amongst greenkeepers. Other particular concerns for the greenkeeper are take-up of fertiliser by the mower, hence the preference for micro or mini-granules apart from blunting the blades, fertiliser is corrosive, nor is there any sense in removing an expensive product with the clippings even though it may help them rot down! Most clubs with irrigation will run a watering programme specifically set to wash the fertiliser off the leaf and into the ground – and many suppliers actually suggest this course of action.

Several manufacturers stress that their products are true compounds rather than blends – blends being cheaper and easier to produce because they are simply a mix of the required 'straight' ingredients. The contention is that such mixes can separate and cease to be homogeneous, so producing variable results on the ground – these worries are voiced strongly by suppliers of compounds. In contrast the supplier

of blends is able to state that there is little evidence of this on the ground and that he can mix a product which will more exactly match the customer's requirements. One supplier added that he takes care to ensure that all granules are within a close size tolerance so that they have similar spread characteristics. Chelation is another science blinding word relating to fertiliser – in theory chelating means that the nutrients are 'buffered' so that they are less likely to bond to soil or other elements so becoming 'locked-up' and unavailable to the plant.

Liquid fertilisers have a number of adherents, and in particular N can be effective as a foliar feed. As a general rule liquids are less concentrated but more readily available thus they have a definite place in agronomy.

Several suppliers of organic compounds augment their products with the major nutrients in order to provide a total feed – and to meet greenkeepers' requirements, few greenkeepers subscribe to the muck and mystery theory that if it is organic and includes 'everything' it must be good for the grass.

Just what is the correct level and analysis of the major nutrients which should be applied is far too complex a matter to discuss here – it should be a matter of soil analysis and discussion between greenkeeper and supplier. There are a wide variety of differing compounds on the market offering an almost infinite range of differing ratios of N, P and K, perhaps with Fe, S and/or Mg. so the greenkeeper can take his pick. Many head greenkeepers and course managers have very decided opinions of what their course needs, and greater education has allowed them to base these views on science. Unfortunately for the greenkeeper, plant and soil science is extremely complex and subject to an infinite range of variables and conditions, ask any agronomist – so that what works well one year, in one soil, in one management may not produce the same results the next year or consistently. Nevertheless the main objective of most greenkeepers is to keep the grass looking healthy and growing so that it can be cut. Perhaps the greater truth is that grass growth really enables turf to be kept at its pristine best – and that this is the nub of the greenkeeping art.