

NEW PRODUCTS

Harrogate Week

A TRIMSTAR IS BORN

With an operating hand/arm vibration level of just 2.39m/s^2 , the new Hustler TrimStar hydrostatic walk behind mower has been launched by UK importer Allen Power Equipment.

To support this low vibration figure, the TrimStar is fitted with the H Bar self-centring steering system, which lowers operator fatigue, often attributed to commercial mowers with the older style pistol grip steering systems. Speed forward, reverse, brake and turns are all controlled with the easy to learn, easy to operate H-Bar Plus Steering, which now comes with cruise control for added efficiency.

When it comes to cutting, the TrimStar is fitted with a 36" side discharge mower, with optional mulching kit to reduce cuttings injecting them back into the turf to retain moisture and return vital nutrients back to the soil. The range of cutting heights is adjusted by a positive and robust pin-type adjustment set at four corners of the deck.

For further information Tel: 08456 750730.



BUILD YOUR ESTEEM



Vitax, in conjunction with Dow Agrosciences, unveiled Esteem at Harrogate Week, their most effective selective herbicide to date.

Aimed primarily at golf course fairways, the product has shown outstanding control during trials on all major difficult weeds such as clover, dandelions, daisies, plantains and creeping thistle. Rain fast in an hour, and with an application rate of just three litres per hectare, Esteem's efficiency means less chemical used to powerful effect. The product is available in eco friendly two litre PET plastic bottles.

For further information Tel: 01530 510060.

UNDER THE MICROSCOPE

Headland has introduced the first mini microscope for widespread use by Turf Professionals.

Just three inches high by three inches wide the new IPM Scope runs off a computer, either PC or laptop, and sends digital images straight to the screen. With magnification rates from 40x to 140x the instrument combines power with portability, and combined with a laptop can be used in the field. Once viewed, magnified material can be frozen, stored, emailed or printed in the usual way.

For further information Tel: 01223 597834; Web: www.headlandamenity.co.uk.



MASCOT GROWS

Rigby Taylor has introduced numerous new products into its Mascot range. Green Spread is a completely BSI PAS 100 accredited, non peat, high quality compost produced from recycled green and woody plant materials. It has a high and measurable level of quality and consistency, offering the user a guaranteed standard of excellence batch after batch.

Mascot Magnet Rapide is a chelated liquid iron producing a prolonged and rapid enhancement of turf colour. Magnet Rapide also contains an enhanced leaf penetrant system which helps the iron move rapidly into the plant where it can have maximum effect. This results in a rapid green up (within 12 hours of application) and with long lasting effects (up to 6 weeks from one application).

Mascot Guardian is a range of high quality mini granular fertilisers for use on golf and bowling greens, tennis courts, ornamental lawns and sportsfield areas. Not only do Guardian fertilisers provide traditional nutrients, but they also contain amino acids which will help the turf to withstand the rigours of stress, and an Enhanced Root Developer (ERD) for improving root establishment and development.

For further information Tel: 0800 424 919; Web: www.rigbytaylor.com.

VARY THAT SEED

Sisis has introduced a new version of their Variseeder. This compact seeder is designed for use on golf greens, tees and approaches and can be used with any tractor with 3 point linkage and can be adapted to fit most trucksters.

The Variseeder 1300 has a wider working width and a simpler, more accurate method of selecting the seeding rates. It utilises a studded roller, specially cast, with seeding rate being variable and is simple and accurate to set by single lever. An Ultra Fine seeding roller is available for sowing pure bents. A transparent cover is fitted for seed level visibility.

Surface disturbance is minimal so overseeding can be carried out without taking the ground out of play. The Variseeder 1300 offers a fast work rate and low maintenance with few wearing parts.

For further information Tel: 01625 503030; Web: www.sisis.com.



UNIVERSAL MAINTENANCE

Making its Harrogate Week debut was Wiedenmann's new Super 500, a multi purpose turf maintenance machine that can be used as a scarifier, flail mower or turf sweeper depending on the attachments employed.

The fully floating heads with 1.6 metre working widths, be it brush, slitter or flail attachment, ensure a clean, even pass over undulating ground and the powerful, high performance vacuum collects cuttings and other debris and deposits them into a 2,500 litre hopper.

The 2.1 metre high dump facility on the CHD model allows for easy tipping into bins and trailers and is an optional extra on the basic sweeping model.

Other options include rear lights; a floating rear axle which allows the Super 500 to follow undulating terrain more easily; a front roller to help reduce the chances of scalping and in cab remote control to allow the operator to change the three operating functions head unit lift and lower, hopper lift and hopper tip.

For further information Tel: 0141 8143366; Web: www.wiedenmann.co.uk.



NEW ELECTRIC UTILITY VEHICLE

Extra comfort and convenience are provided by John Deere's new TE Gator utility vehicle, which is the latest addition to the T (for Traditional) Series range and replaces the existing E Gator electric model.

Powered by a whisper-quiet electric motor, the TE Gator offers a clean, durable and efficient option for a variety of amenity, turf and golf course applications, where users are concerned about noise levels and exhaust emissions in the workplace.

Featuring improved operator comfort with more legroom, adjustable seats, front-end storage and a cupholder, this latest model now has a forward, neutral, reverse switch on the dashboard, instead of the previous floor-mounted gearstick. There is also a new option of four-post ROPS or cab protection.

This four wheel, two seater electric utility vehicle has a top speed of 15.5mph and offers the same advantages as the established petrol and diesel Gator models: low ground pressure to help prevent ground compaction; a wide wheelbase and low centre of gravity for stability; simple, smooth and reliable operation; and easy access to all service points for convenient maintenance.

For further information Tel: 01949 860491; Web: www.johndeere.co.uk.



RIDE ON FRONT

New from Kubota at Harrogate Week 2006 was be two high performance Diesel out front ride-on rotary mowers designed for day-long commercial mowing operations. Kubota's new F80 Series comprises the F2880 and F3680 models, rated at 28hp and 36hp respectively.

Apart from delivering more power than the machines they replace, the new mowers feature enhanced operator comfort, more durable cutter decks and a 25 per cent improvement in lift capacity, enabling them to deal comfortably with the most demanding commercial mowing applications. In common with their predecessors, the F80 Series out front mowers are powered by Kubota's E-TVCS water-cooled diesel engines, renowned for their low levels of noise, exhaust emissions and fuel consumption, making them among the quietest and most cost-effective machines in their class.

For further information Tel: 0800 0231111; Web: www.kubota.co.uk.



DO THE MATHS

New formulations launched at Harrogate Week 2006 for Johnsons included Rye Green and J5. The latter provides year round colour and is very hardwearing under close mown conditions, ideal for golf tees, fairways and driving ranges. Rye Green is a choice for the renovation of extremely worn greens, incorporating a top rated turf type Perennial Ryegrass, which provides excellent recovery and hardwearing qualities.

Also available from the Johnsons portfolio is Villa, a new Velvet Bent, promising to set new standards in green's quality. With double the shoot density of a traditional Agrostis and improved colour and fineness of leaf, the new cultivar is worth finding out more about.

For further information Tel: 01386 791102.

HOLLAND ON INCREASE

The latest additions to the New Holland line-up are the TC31D-A and TC35D-A, which have 31hp and 35hp capacities respectively, and further enhance the breadth of New Holland's TCD-A range.

To minimise weight and the risk of compaction, New Holland has used the same chassis as is used on the existing 27hp TC27D-A. This gives more power without any significant weight increase. New tyre options are also offered for the optimum tractor footprint. Both models have 4-wheel drive and can be fitted with New Holland's SuperSteer front axle, giving an unrivalled 76° of turn angle.

New Holland's aim to design tractors for the 21st century is reflected by the modern styling throughout the TCD-A range. Their curvaceous panels look good and are highly practical, such as the sloping engine hood, whose narrow profile gives excellent all-round visibility.

For further information visit www.newholland.com.



BERNHARD GOES DOUBLE

Bernhard and Company, manufacturer's of Express Dual and Anglemaster grinders, announced two new products at Harrogate Week.

The Express Dual Blade Thinning Attachment is a new accessory ideal for those golf courses that want to do an annual relief grind without compromising the legendary speed and ease of use of Express Dual. The Attachment allows for a relief grind to be carried out on the Express Dual without taking up any additional workspace. Blade thinning attachment is mounted to the lift table and is easily positioned to allow for normal loading and unloading of mowers while still permitting normal use of the lift table.

The new and improved Rotamaster 4000 has a clamp mechanism and fast aligning jig bars. Blade mounting is now easier and faster than ever before, delivering significant benefits in overall cycle time. Rotamaster ensures both ends of the blade are sharpened equally with the precision only an automated machine can deliver, so your rotary blades have a superior edge with consistent balance for a better quality of cut, resulting in longer lasting blades and better looking grass.

For further information Tel: 01788 811600.



TO THE MAXX

Primo Maxx is the new liquid growth regular developed by Syngenta and brought to the UK turf market by Scotts. It's designed for use on all forms of turf, from fine golf greens, to tees, fairways, semi rough and rough areas. It can also be used on sports pitches and coarser landscaping applications.

Trials have been carried out at 25 golf and sports sites in the UK which have proven the product makes turf stronger, healthier, more resistant to drought, more vigorous at lower cutting heights and better able to survive in stressful conditions. In addition, a tighter, denser surface can be achieved, providing superior fairways and faster, more uniform putting surfaces.

Primo Maxx makes turf stronger by increasing both root and lateral shoot growth. It works by blocking the production of gibberellic acid late in the cycle, which effectively limits cell elongation.

For further information Tel: 0871 2205353;
Web: www.scottspromaxx.co.uk.

STRI UNITE WITH RANSOMES

The Sports Turf Research Institute (STRI) has launched 'Sustainable Golf Course Management' a combined DVD and CD Rom package to stimulate awareness of the ecological and environmental impact of golf in today's society. The production of both items has been sponsored by Ransomes Jacobsen, the Ipswich based turf equipment manufacturer.

The DVD is a television quality, 30 minute presentation showing the positive side of the golf industry and is aimed at players, the general public and those in the golf sector to raise awareness of the importance of golf courses within the landscape. It will also give recognition to the ecological and environmental management practices that are taking place on golf courses throughout the UK.

The DVD features a series of interviews with proprietors, course managers, greenkeepers and golf officials with contributions from other related organisations including English Nature, Committed to Green Foundation, STRI, Scottish Golf Environment Group and BIGGA.

The hour long CD Rom takes an in depth look at specific ecological management issues and provides practical advice and guidance to operators and managers of golf courses. Best practice is at the heart of the content which comprises interviews with greenkeepers who have tackled and solved specific eco and enviro related problems.

For further information Tel: 01274 565131.



TORO IN THE SAND

Called the Sand Pro 5040 and 3040, they join Toro's existing 2020 model and are fitted with a powerful 18hp Briggs & Stratton engine. They also feature a three wheel series/parallel drive system for optimum traction when working in all types and sizes of bunkers, including those with steep faces and uneven contours.

The Sand Pro 5040 has a 7.5in ground clearance and the Sand Pro 3040 a 6in.

Many of the attachments for the Sand Pros are new, whereas others have been redesigned to make them easier to attach and remove. For bunker repair and maintenance, there is a selection of rugged attachments such as a spring rake, tooth rake, spikers of various widths, a manual or hydraulic blade, a variety of mats, a finish grader and leveling bar. They are designed to minimise manual work and produce the finest landscapes and bunkers.

For further information Tel: 01480 226800.

NEW ARTICULATORS CUT A DASH

Lastec introduced a new version of its out-front mowing deck, the Articulator 425EF, at Harrogate Week. The new model is a 2.4 metre wide, fully articulating rotary deck, offered with specially engineered kits to be mounted on six major brands of traction unit. Three independent decks follow ground contours to provide the effect of four small push mowers. Cut height is easily adjustable from 2.5cm to 12cm.

Also making its debut was the 3372 Articulator Turbo Diesel with grass collection facility and a striper-roller. The 3372 is a three-deck machine with 72" cutting width, designed to provide superior manoeuvrability and cut quality to conventional mid-mount and out-front units.

For further information Tel: 01622 812103.



More New Products
from Harrogate Week
next month

TALKING HEADS Special

Compiled by Gareth Jones

1

How was Harrogate Week 2006 for you?



Name: Bretton King
Position: Managing Director
Company: Ecosolve Limited
Location: Wiltshire
Exhibition Stand: M3

It's been a good week. We have had a good diverse customer base call in. We have had new people visit us and old clients. The most positive aspect is the amount of international visitors we have seen again this year. The number of quality leads builds year on year.



Name: Colin Gregory
Position: Sales Manager, UK and Ireland
Company: Massey Ferguson (AGCO)
Location: Coventry
Exhibition Stand: M11

Harrogate Week has gone very well. It's having the customers, the target audience in one concentrated place that makes it so good. It's been highly busy for us, so we are not complaining at all.



Name: Hugh Frost
Position: UK Technical Manager
Company: Novozymes Biologicals
Location: Warwickshire
Exhibition Stand: A29

The Show has been very exciting and extremely busy. There is a renewed interest in biologicals and that has been highlighted with the interest on our Stand. So we have been very busy over the three days of the Exhibition. It's been good as a varying range of people have been able to come up and give their thoughts on biologicals to us.



Name: Karl Barowsky
Position: Proprietor
Company: Classic Teak
Location: Hartlepool
Exhibition Stand: Q71

Overall, very, very good. We have had some good positive leads. Tuesday and Wednesday were very busy and very good. Thursday was slightly quieter. We provide for the entire leisure industry, golf courses being a major area, and the Show has allowed us to meet many people within this area over the week.



Name: Nick Gray
Position: Business Development Manager
Company: Bathgate Leisure
Location: Cheshire
Exhibition Stand: C31

Very good, as we have had regular enquiries throughout the week. The second day was extremely busy - with a lot of profitable enquiries, which we hope will develop into orders. Thursday has been the busiest final day we have ever had. So it's all good news as far as we are concerned.



Name: Paul Davies
Position: National Account Manager
Company: Ifor Williams Trailers
Location: Denbighshire
Exhibition Stand: B38

This is the second time we have attended this Exhibition. We have had both present and new customers on the Stand and it has been very busy. We went to the Hire Show in London in 2005 instead of here and after that we decided that Harrogate is where we actually see the end user rather than the hire companies.



Name: Robert Clive
Position: Director
Company: 360 Golf
Location: Surrey
Exhibition Stand: Q35

We are very pleased with the Exhibition. It is our first time here in the form of 360 Golf. Previously we were here under the banner Barrefield Golf and Barrefield Construction. The Show is evolving in the right way and from our point of view it has been a very worthwhile event.

2

How does 2006 compare to previous years at Harrogate or other Exhibitions in general?

Every year we find that people from Europe do come to this Show. We are the sole distributor to the UK, Europe and the Middle East, so it is important we see those international customers. We are witnessing more of them coming in, with more former eastern block countries visiting. So the visitor field is spreading further. That's a good sign.

Compared to other Exhibitions this is better as it gives you the targeted audience you need and want. The interesting thing this year is that there are more non-golfing customers going through the doors. Football clubs, local authorities, that sort of thing are visiting this Show, which automatically increases our customer base.

This has been my first year here, but Novozymes' third. Compared to other Shows this one has been very focused. It has been thorough in the coverage of some of the vital aspects of the industry. It's been very open and relaxed. It's very educated orientated and that's been very good for learning about the industry, which helps our customers.

This is our first year at Harrogate Week, but we do some other shows. Here some of the leads we have generated have been very positive. So I would say I'm very happy with what I've seen of this Show at present.

It's a lot, lot busier. We've had many new enquiries this year. We don't expect to come here and get a full order book, however we get a load of enquiries that often develop into orders down the line. This is what we want and the point of the Exhibition really.

Being much busier is the main difference, it has been much more successful. We've got people here not just buying for golf clubs, but many other areas too, which is great. We've even had horsebox trailer brochures taken away, which we didn't think would happen. The customer base is clearly wider this year.

Personally this is my first time at Harrogate. It is difficult to make comparisons with other Exhibitions as we go to a number of different Shows with different target audiences. But for what this Show is we are happy with the way it's panned out for us.

3

Harrogate Week provides unrivalled face-to-face contact with targeted clients, how important is this to a business?

You can only explain a certain amount in a brochure, but when clients come here they see the machines and develop a greater understanding of it. Plus if you have a client who has used the machine before, you can introduce them to a new client. This Show allows these meetings to happen, not just during the Exhibition hours, but at night too.

100%. You get different types of people walking along the Exhibition halls. All browse around, but some will just quietly pick up the brochure and go, while others will come up and talk to you. Both ways work well - as they have seen the product and have the details - you can then make sales on the back of that.

This is extremely important. One to one contact is everything. People will buy over the Internet and over the phone, but only after they have met the people they are actually dealing with. Human beings have to meet human beings and this Show does just that.

There is no substitute for actually sitting down with and talking to the people in the street. It's a people world and a people industry - people deal with people. No amount of direct mail or phone calls beats actually meeting and talking to people. Plus they can actually see and feel the quality of the product. It's crucial.

We treat the Show as a development for our business. We send out fliers, make calls, brochures, etc, but when people come to this Show they come to us rather than us going to them, so it makes a big difference. It doesn't stop when the Show does - it goes into the evening. Meeting new clients is basic to our business.

It gives us positive feedback. Seeing the end user allows us to take on board any improvements we need to make. They get to see the products, while we can ask them what needs changing on them to make the equipment even better for our clients.

Absolutely vital. Our business evolves around getting to know the client and knowing their needs. As a company we need to develop a client's trust, particularly on the consultancy side. They are relying on our integrity as well as our knowledge, so we have to have a close relationship with them. This Exhibition allows us to do that.

4

Is there anything that the organisers could modify or add to make the Exhibition even more successful?

Our concerns are the same as BIGGA's - what happens if the big players disappear? Is the Show still secure? The Exhibition is the main stay of BIGGA. We need BIGGA to be strong, so the Show continues - because if it doesn't we as a company have nowhere to go. Harrogate Week is as important to us as it is to BIGGA.

As far as we are concerned we are very happy with how Harrogate Week has gone. This Show is more customer orientated than many others, so is great for us. Thursday is always the quietest day - maybe it should just be two days.

Other Exhibitions use a scanning system where you have a light pen on your Stand. Instead of giving out and receiving business cards, you scan their badge. In turn this goes to a computer and provides you with the contact details of everyone who has visited your Stand during the show. You can then follow up your leads and that would be very useful here.

Well you always want more visitors no matter how many come. But in principal I'd say no. It's a well laid out Show, with lots of people milling around and we've had useful enquiries. So in general no, I think they have it reasonably spot on.

I'm sure the organisers are aware that they have to keep changing and adding things to attract the people. Quite often there is something new that visitors haven't seen before, so the turf professionals have to keep coming in order to keep up to date and the organisers most continue that.

I don't think so. Everything has gone well, so I have no complaints. It's just good to be here promoting our products. We have a vital target audience at Harrogate Week.

As a company we offer management consultancy as well as golf course construction. We would have liked to have seen more secretaries, green chairman, managers and committee people here. So we haven't met too many people from that area, but on the construction side we have made many interesting leads.

5

Do you have any particular memories that stick in the mind or funny stories from Harrogate Week 2006?

What sticks out is the quality of people and the leads we have had, plus the number of international people here. The British base is crucial to us, but you have to look to the future and building the international field is vital to us and this Show helps that.

I have no funny or embarrassing stories - honestly.

Having a range of nationalities here is great, but the odd language barrier or misunderstanding can take place. There's been a few times I've been having a conversion with an international visitor and we have been on completely different tracks due to the different use of certain words.

Nothing that I've been privy to as yet, but it always comes out the woodwork afterwards. By and large it has just been a good Show and I can't say more than that. It's been new ground for us, we haven't been here before, but will certainly look at coming back next year.

Not many I want to repeat in Greenkeeper International for fear of incriminating people. But it has just been a very good week. The Education side is important for the industry as a whole, not just greenkeepers, but for the people who exhibit too. Harrogate is a very friendly town and the time at night has been well spent helping our business develop.

The week has just gone so fast because it has been so busy. Harrogate is a nice town and a great place to hold the Show. Here you can meet and entertain clients and colleagues on the night, as everyone is based in the town.

Many, but I couldn't tell you. In general it's been a very good week. We have had a lot of fun and are looking forward to coming back.

Why, When and How

Simon Barnaby advises on nutritional input for fine turf management.

In recent years, I believe there has been a shift towards a more 'naturalistic' approach to managing turf - especially on golf courses - with a backlash against the 'green is God' attitude. However, this type of approach does not mean there is a need to sacrifice healthy turf and good quality playing conditions. In fact many would argue that this approach is essential to achieve this aim.

WHY DO WE NEED TO APPLY FERTILISER AT ALL?

- To supply essential nutrients for growth.
- To encourage healthy turf and aid recovery.
- To replace nutrients removed (clippings).
- To encourage uniform surface conditions.
- To enhance turf appearance.
- To balance soil nutrients.

WHAT IS MINIMAL INPUT?

The term 'minimal nutrient input' is regularly seen in agronomic reports or articles on turf management - but what does that actually mean? It doesn't necessarily mean a small or low amount of nutrient inputs.

The minimal amount of nutrient input is the lowest amount possible to create healthy turf and good playing conditions. The difficult part is working out what that minimal amount is to achieve this aim. The person best placed to answer this question is the turf manager.

We know that there are a number of essential nutrients (16 in some text books, less in others) that the grass plant must have in order to survive. These are split into two main groups - macronutrients are the ones needed in the greatest quantities, and micronutrients are needed in varying lower amounts.

MACRO	MICRO
Nitrogen	Iron
Potassium	Zinc
Phosphate	Copper
Calcium	Manganese
Magnesium	Molybdenum
Sulphur	Chlorine
	Boron
	Sodium
	Silicon

WHAT IS THE MINIMAL AMOUNT?

Essential nutrients are all as important as each other; it's just that some are needed in far greater quantities than others. It is also true that many of the essential trace elements are already present in soil rootzones in large enough quantities. However, if you are considering sand construction rootzones, then micro as well as higher amounts of macro nutrients may have to be applied.

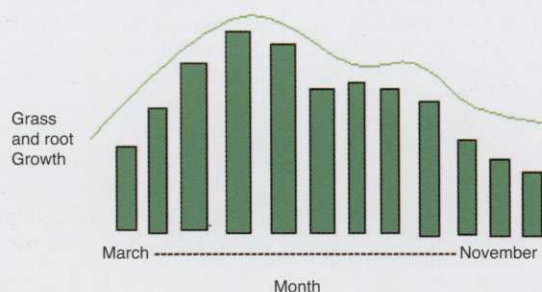
Typical recommendations for nutrient (N) input for golf greens are as follows:

- New USGA green construction - 200 - 250kg/N/Ha/Yr
- Older USGA green construction - 140 - 180kg/N/Ha/Yr
- Soil based green - 80 - 150kg/N/Ha/Yr

When to apply – a guide

Match nutrient timing with growth peak

(Application times vary depending on location and weather conditions)



When considering other essential nutrient inputs, the usual NPK ratios are something like 4:1:3 - 3:1:2. Although there are always influencing factors, for example timing. An autumn application may have an analysis such as 2:0:2 - 2:0:3 - 2:1:3 (or no nutrient at all). However, there are obviously a number of factors that need to be considered before specific nutrient input advice can be given. These include:

- Sward species composition
- Rootzone/soil type and construction
- Climatic conditions
- Maintenance level - budgets
- Timing
- Turf manager's objectives

The last point (turf manager's objectives) is a crucial factor - all of the others are fairly standard pieces of information that allow a decision to be taken or advice to be given. Even as long ago as 1920s, experts recognised this fact:

"A common mistake in turf management is to imagine that because one form of treatment benefits one course, that it will necessarily benefit another," stated Dr. A. Mackenzie, in 1920.

The turf manager's objectives may be as simple as maintaining current sward conditions, although he may want to embark on a new maintenance regime that attempts to eradicate *Poa annua* and increase bent grass. These two different objectives may/should influence the type and amount of nutrient inputs for that particular turf area.

HOW DO YOU KNOW HOW MUCH TO APPLY?

Soil/tissue/sap analysis can help the turf manager to make up his own mind. Fertiliser programmes are only really ever a guideline. When you are working in a natural environment it is inevitable that natural factors will affect the amount of nutrient needed, for example rainfall, irrigation, temperature, sunlight etc.

One of the buzzwords at the moment is to 'balance' soil nutrients and this is a very important part of nutrient input management. Too much of one nutrient can restrict the uptake of other nutrients (e.g. Potassium and Magnesium).

Another influential factor is pH. Excessively low or high pHs can influence nutrient availability, and this can sometimes be overlooked when it comes to formulating fertiliser programmes.

Having discussed the above, the bottom line is: 'if it isn't broke, don't fix it'. It's an old adage but one well worth remembering. I see a lot of soil analysis that can appear as if there should be problems with the turf, and that vast amounts of nutrient are needed to rectify deficiencies. But the actual turf surfaces are very good.

In this situation the advice is to keep doing what you're doing. Soil analysis really only comes into its own when there is a problem with the turf, or it's generally not performing as well as possible and you want to make sure it's got all the nutrients it needs to achieve your aims.

WHY IS IT BAD TO APPLY TOO MUCH NUTRIENT?

- Waste of money - product and labour.
- Detrimental to turf health.
- Soft growth susceptible to wear, reduced root growth.
- Encourages turf disease.
- Poor playing conditions.
- Environmental implications.

Within the next five to 10 years it's possible that nutritional/fertiliser input will become as regulated as chemical input. In agriculture, this has already started with the introduction of Nitrate Vulnerable Zones (NVZs), which place restrictions on timing, types and amounts of fertiliser that can be applied.

Environmental damage caused to watercourses through nutrient pollution is one of the biggest concerns of authorities today. If too much nutrient is applied, excess Nitrate and Phosphate in watercourses can cause Eutrophication leading to decreased diversity, increased weeds, etc. Scotts research has shown that when applied correctly, leaching risks are minimal on golf course turf.

WHY IS IT BAD TO APPLY TOO LITTLE NUTRIENT?

- Waste of money - product and labour.
- Detrimental to turf health.
- Poor playing conditions.
- Poor or slow growth susceptible to wear.
- Encourages turf disease.

When we consider turf health, one of the things we are taught early in our careers is that too much nitrogen, especially at the wrong time of year (e.g. late autumn), can encourage soft, lush growth which can cause turf disease - especially fusarium patch (*Microdochium nivale*). This is true, but it is also true to say that too little nutrient at certain times of the year can also encourage disease. Research has shown that certain trace element deficiencies (e.g. manganese) in sand construction greens can influence the occurrence of Take All Patch (*Gaeumanomyces graminis*) disease.

Experts, such as Dr. Ruth Mann, STRI, and Dr. Entwistle, Turf Disease Centre, agree that UK and Eire are seeing more unusual diseases and pests over the last few years and well-known diseases, such as Anthracnose (*Coletotrichum graminicola*), appear to be on the increase.

Anthracnose is a disease that attacks grass plants when they are under stress, so any factor that causes stress to the plant will increase the likelihood of disease attack. Anthracnose mainly affects *Poa annua* in UK and Eire (basal rot, not foliar). If this disease is increasing, it would indicate that *Poa annua* is under stress.

One theory could be that with changing climatic conditions we are seeing more grass growth going into the winter months. If there isn't enough nutrient for the turf to grow in a healthy way, this may be putting a stress on the turf resulting in disease attack, especially in autumn and spring. This is a tricky situation to deal with, because if you apply more nutrients in the autumn you will run the risk of encouraging Fusarium patch disease.

HOW SHOULD NUTRIENT BE DELIVERED?

There are lots of different ways to feed turf - it's really a case of what works best for you in your particular situation. Options include liquids, water solubles, conventional granulars, slow release, controlled release, etc. Liquid and foliar applications are becoming more popular as they can be easily tank mixed and give the turf manager flexibility with inputs and allow maximum control of growth. Granular products are still seen as the main approach to apply nutrient by many turf managers.

The main points to look for when using granular products are:

- Rapid breakdown
- Consistent spread pattern
- Granule uniformity/Particle distribution
- Homogenous granule
- Good longevity
- Ease of application/handling
- Performance
- Value for money
- Proven through research

The last point is particularly important.





OTHER 'MACRO' NUTRIENTS

Oxygen, carbon and hydrogen are macronutrients obtained from air and water, and they are the building blocks for grass plant growth. These three essential nutrients, when combined in the presence of chlorophyll and light through the process of photosynthesis, form carbohydrates - the sugars used to provide plant growth.

Plants are therefore not obtaining food directly from the soil mineral nutrients. These nutrients are just the raw materials used to manufacture food via photosynthesis. While it is well known that low oxygen levels will have a detrimental effect on turf health, recent research from Gange (2004) suggests that low carbon levels in golf green turf may also be responsible for poor turf health.

CONCLUSION

I have always maintained that the most important nutrient is oxygen. Much effort can go into trying to get the perfect balance of nutrient, irrigation, Integrated Pest Management (IPM) and chemical inputs, although without oxygen none of the above really matters. No other inputs can work effectively without a healthy, free-draining rootzone that can support a thriving soil microflora population. Therefore to summarise:

- Keep turf maintenance as simple as possible.
- All essential nutrients are as important as each other, just some are needed in greater quantities than others.
- Use soil, tissue, water analysis occasionally to ascertain current nutrient status - especially useful as a diagnostic tool.
- Practice some form of IPM, including considering use of proven bio products as part of the overall maintenance programme.
- Consider effects of irrigation inputs.
- Don't forget - oxygen is the most important essential nutrient.

Simon Barnaby is from Scotts. The company can be contacted on 01473 830492.



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