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Protect turf from stress during end of season renovation

At this time of year, end of season renovation is underway, and we speak to Dr Colin Mumford and Dr Richard Rees from Bayer about ensuring speedy turf recovery after aeration

Former head greenkeeper Dr. Colin Mumford gives his perspective on end of season renovation

At this time of year, during end of season renovation on greens, turf stress is a big factor. And so is the risk of disease. The turf needs to be as healthy as possible so that disease threat can be mitigated, especially during late season aeration which forms part of the renovation process.

Bayer technical manager, Dr Colin Mumford, points out that deep aeration and hollow coring, for example, will improve gaseous exchange and enhance microbial activity, which in turn can result in the availability of nutrients and a flush of growth that can make the turf more susceptible to Microdochium patch attack (commonly referred to as Fusarium). If the turf is then smothered in top dressing, it acts as an 'insulator' creating conditions ideal for disease development. The action of aeration and cutting also places the turf under some stress and damages the turfgrass leaves, leaving individual plants exposed to infection.

“There are various approaches to aeration, and there are different machines that perform the job. It’s important to remember that any aeration is better than none, but there are options better suited to particular soil types. With your average machine, even if you operate it on the whole golfing green, by taking into account the number of tines and the spacing between them, you will have only aerated 5% of the green.

“There are other methods available. If you use a rotating blade system or similar, the continuous rotating blades will cut through the surface to achieve 30 – 35% coverage of the surface area of the green. Organic matter is also removed and the grooves left by the machine can be backfilled with a suitable growing media in one smooth operation. So you can operate three processes at one time and you’re aerating a larger surface area, but this is shallow aeration.

“If you have clay dominant soil, you’ll need deeper aeration, and for this you can employ a Verti-Drain type machine. This has large tines that are up to 18 inches in length. They penetrate deeply into the soil, and you can adjust heave levels. Penetrating deeply into the soil when it’s dry with heaving motions will cause fractures and



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fissures in the subsoil which will improve drainage and root growth, and because the roots can penetrate deeper into the soil, they can access previously unavailable nutrients.

“High pressure water also is another form of aeration that can be used, whereby pressurised water is directed into the turf to open up the soil,” says Colin.

Colin advises that when weighing up your approach, it’s important to consider the soil type and what you’re trying to achieve. For sand-dominant soils, shallow aeration might be sufficient, and for heavier clay soils, deeper penetration may be required. “Ideally vary the depth at which you aerate to prevent creating a compaction pan beneath the surface,” he says.

Colin recommends that it’s also important to ensure that you maintain optimum turf health, before, during and after aeration. “If turfgrass health is compromised, and it becomes stressed, it will be more susceptible to disease. And if wet weather conditions set in, the grass can be vulnerable to Microdochium attack. Pro-active fungicide applications, before renovation work starts could minimise the risk of disease outbreak and extensive turf damage.

“Applying Interface before renovation works commence will protect the turfgrass from stress and therefore mitigate disease until plants have recovered from any damage caused through the renovation process and the high risk conditions have receded,” says Colin.

Microdochium patch is a key disease to watch out for, and Colin advises that turf should be examined every day for any indication of the disease. “Turf managers should be looking for early signs of disease, such as patchy discolouration to the turfgrass, and as soon as these are spotted, employing an approach to prevent it taking hold. “Where conditions are conducive to disease, such as straight after turf aeration treatment, leaving turf that shows symptoms of a disease or turf stress for as little as five days to ‘see how it goes’, can result in a rampant outbreak.

“Spraying turf prior to disease symptoms being evident, in other words, preventative treatment, should be based on the environmental conditions, historical disease threat and knowledge of the turf. Curative sprays should take place as soon as any symptoms are visible.



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He notes that where there are budget constraints, preventative treatments are often avoided to save spending money where there is not yet a need. However, Colin says treatment programmes must be based on a combination of weather information, visual assessments and knowledge of the playing surfaces' reaction to certain environmental conditions.

“If it’s left until the disease takes hold of the turf, an eradicated treatment will be necessary. This is more likely to lead to scarring which, during the winter and early spring months, will take longer to grow out.”

Microdochium patch is first noticed when the turf manager sees small brown and yellow patches, and the turf looks greasy or watery, and feels slimy to the touch. These small patches enlarge rapidly, joining up, and large areas of grass die back.

“Sward composition is important here, if you have predominantly Annual Meadow Grass, the chances are you will be seeing more die back. With a Fescue or Bent mix, there may not be quite the same issue.

“What’s important to remember is that members want 100 per cent grass cover that looks attractive and plays well. More importantly, any disease can cause a dip in the canopy due to the turf dying back, which on a green can mean a poorer putting surface and can affect the roll of the ball. The majority of golf courses, for example, are heavily dependent on green fees, so attracting and keeping players, who appreciate the good surface, is vital.

“My advice is to monitor the turf, but also to keep an eye on the long-range weather forecast and act accordingly,” says Colin. “Turf managers can’t afford not to pay this attention - the weather forecast dictates so many things and is an essential tool in any maintenance routine.”

He urges managers to keep surfaces as dry as possible this autumn, understanding that disease thrives in damp and wet conditions. Remove the dew from the grass leaves, daily or even several times a day, if the weather is misty or foggy.

Turf should be examined daily for any sign of disease, and action taken straight away if anything is spotted. “Early control is key,” he says. “The sooner action is taken, the less likelihood of scarring on the surface.”



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Interface from Bayer is designed to be a turf manager's core rotational product. "The beauty of this fungicide is that it can be used to address almost any eventuality. It has label recommendations for the control of six different turf diseases so its flexibility is tremendous.

"The combination of the two active ingredients in Interface - iprodione and trifloxystrobin - covers two different fungicide chemical classes, and therefore offers control at any stage of the disease's development.

According to Colin, Interface offers a new standard in turf protection and is proving to be an exciting addition to the Bayer turf treatment portfolio. Colin adds, "The majority of fungicides only have one mode of action, while Interface is a dual action fungicide - this also means that it can also reduce the potential for disease resistance to occur."

Turf manager checklist:

- Look at turf daily and be ready to take immediate action as soon as any disease threat is spotted;
- Use the long range weather forecast as a key management tool;
- Use prevention rather than cure when you plan your integrated disease management programme;
- Keep turf on playing surfaces as dry as possible – especially during misty and foggy periods.

Colin adds that the industry is now reviewing and assessing how weather data can be used more effectively, enabling individuals to make more informed decisions. "With all the technical advances today, there is a greater awareness of risk factors. Bayer has a dedicated team of experts on hand, and the 'Turf Solutions' team are always available to discuss any issues surrounding successful turf management at any time of year.

The team has knowledge of the playing surfaces, and can advise on a planned, integrated, approach so that managers are in a strong position for effective and efficient integrated disease control during any season.

R&D focus on Fast aeration recovery

We speak to Richard Rees, R&D Fellow for professional turf for Bayer in the USA about some recent trial work that shows applying fungicides with Stressgard Formulation Technology can help speed up turf recovery after aeration. Aeration holes all over the green can irritate golfers, but they're a crucial part of golf course renovation, with long-term turf grass health benefits.



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“After continual wear over the summer months, from golfers and machinery, the ground is compacted and the air pockets on which the roots depend can be crushed,” says Richard Rees.

According to Richard, aeration achieves a number of important objectives. It relieves soil compaction, it improves gaseous exchange, provides a method to improve the drainage characteristics of the soil, and it reduces or prevents the accumulation of excess thatch.

And, just as crucial to turfgrass health is recovery after the aeration process. Recovery needs to happen as fast as possible.

According to Richard quick recovery after aeration is just as important as the immediate aeration benefits.

“Whether it be punching and filling, or leaving the holes open, the turf has to grow back around those aeration holes and put on new roots.

“In the USA we’ve conducted studies into measures to speed up turfgrass recovery after aeration. We’ve found that fungicides containing Stressgard Formulation Technology, such as Interface, help to protect the weakened turf that gets damaged around the edges of holes, where mechanical damage is done. It also aids in the recovery of the root tissue, and the closing of the aerial parts of the plant or turf to close the holes up.

Stressgard Formulation Technology enhances the ability of the turf fungicide Interface to deliver turf health benefits by augmenting plant physiology, and this is key to its ability to speed up the recovery of turf after aeration, to ensure a healthy sward going forward.

“It’s important to speed up recovery because it means the turf will be healthier in the longer term, but it also helps to prevent a disease coming in,” says Richard.

US trials showed that turf density after aeration on Creeping Bentgrass treated with fungicides containing Stressgard Formulation Technology was consistently better when tested over a period of three months.

“‘Cool season’ turf varieties you have in the UK, such as Bentgrass and Fescues, can be sensitive to stress, and this makes the plants susceptible to disease because the grass is too weak to fight it off. When the sward is stressed or injured, and can’t use the instant light or is under pressure due to drought or lower moisture levels, a lot of



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damaging oxygen particles that are incompletely used in the plant become highly reactive against plant cell membranes and this leads to the breakdown of chlorophyll as the membranes leak," explains Richard.

If chlorophyll is broken down in the mature plant it's bad news but, if it's during establishment, it's particularly bad, as it means the plant doesn't have a fighting chance of survival.

"Protecting the chlorophyll is so important in grass establishment, right after aeration, because it's not in high levels within the plant at this stage. If chlorophyll is not functioning within the chloroplast, the whole principle on which the plant is able to grow is compromised, and fast regeneration won't happen," says Richard.

The plant health needs protecting, and this defence can be achieved by applying Interface, the new-generation turf fungicide from Bayer that incorporates the unique combination of Stressgard Formulation Technology.

"By applying the product, we can stop the oxidative stress to begin with because it blocks off some of the high energy light that's so damaging. And the active ingredients act like antioxidants in the plant, and this helps to regulate the enzymes which help prevent plant membrane damage," says Richard.

Essentially fungicides with Stressgard Formulation Technology are formulated to protect against plant stress, to promote plant health, and this is because we know how important mitigating plant stress is to help it combat disease threats. Interface fungicide contains a combination of the active ingredients iprodione and trifloxystrobin, and co-formulants that perform specifically in unique turf stress conditions. Trifloxystrobin can be used to assist in stress reduction on turfgrass because it reduces oxidative stress in plants, resulting in increased tolerance to UV light, and it's been proven to improve turf quality under drought stress conditions.

StressGard Formulation Technology with 15 years of dedicated research

Stressgard Formulation Technology has been developed over 15 years of dedicated research and development. Specifically designed for turf, it's been fine-tuned to upgrade the performance of fungicides, providing superior disease control and visibly healthier turf.

As a broad spectrum fungicide, Interface offers turf professionals control measures against the six main turf diseases. And, as well as its treatment of key diseases, it also helps enhance turf quality.



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Richard Rees, R&D Fellow for professional turf for Bayer in the USA, has been involved with the development of fungicides with Stressgard Formulation Technology since the early 1990's. "It's based on some interesting technology coming out of the work we did in the 90's," he says. "We found that if you applied a particular type of pigment in combination with an active ingredient, you got a result, in terms of turf health, that was over and above any benefits you got from any individual components applied."

"You have a very strong colour enhancement that comes from two things:

- 1) Initially, in a short time-frame of between three and five days, the colour enhancement comes from the pigment in the product;
- 2) Then within 12 – 14 days, the pigment actually maximizes the plants ability to improve the colour itself, because it boosts its own natural chlorophyll pigment.

The pigment in the product also allows for selective radiation management, because it filters out UV light and high energy wavelengths (blue light) that are excessive (in the region of 400 – 500 nanometers), but it doesn't filter out any of the beneficial red light.

Ultimately, fungicides with Stressgard Formulation Technology help reduce oxidative stress, which is very much related to the damage that excessive light can do.

On 16 and 17 September, at the STRI the Bayer Turf Solutions team will be presenting on 'safeguarding turf health.' Trial plots include a wear trial replicating the stress a golf green is placed under from golfers and their footwear illustrating how Interface with Stressgard Formulation Technology assist the turf to cope with this stress.

