

AMENITY INNOVATION



#02
OCTOBER
ISSUE 2021

MANAGING OUR URBAN ENVIRONMENT

Amenity horticulture is the management of the urban environment, which includes Arboriculture, Turf Culture, Landscape Design and Management. p3

THE IMPORTANCE OF TURFGRASS MICROBIOME

Turfgrass roots and their **microbiome** encompass a wide range of ecological relationships p5

ORIGIN AMENITY SOLUTIONS (OAS)

The new Origin Amenity Solutions Turf Science and Technology Centre can be found at Throws Farm, Dunmow, Essex. p7



**Birmingham Innovation
Wildflowers – Sheldon Country Park**

MIKE HILTON M.HORT(RHS)
DISTRICT PARKS MANAGER,
BIRMINGHAM CITY COUNCIL

MICHAEL FANCE
WAYNE ROPER PH.D., AND
DARRYL RAMOUTAR PH.D.
AQUATROLS

KELLY-MARIE CLACK
TECHNICAL & AGRONOMY
MANAGER FOR ORIGIN AMENITY
SOLUTIONS

INNOVATION IN AMENITY

Welcome to the second edition of Innovation in Amenity in which we seek to put a spotlight on particular research and development related to the amenity sector. The key role of the Amenity Forum is to work with the sector promoting best practice. As such promoting innovation is an important aspect.

Taking an integrated approach to weed, pest and disease management has long been established in the amenity sector. Such an approach is not about considering the merits of any particular practice against others but, for a particular amenity situation, choosing the right combination of methods. In terms of weed, pest and disease management, a key aim is sustainable management, choosing an approach which is effective, economic, safe and also minimises the impact on the environment and carbon footprint. It is not easy to achieve all of these but adopting an integrated planning approach is an essential first step. The Amenity Forum has a set of documents to help in such planning. For further

information, please contact us.

Sustainable management will look at ways of monitoring and setting target thresholds. It will consider tailored approaches to the use of plant protection products, biological controls, physical and mechanical approaches and optimising cultural techniques to minimise problems. Also it involves taking advantage of new research and developments such as genome editing, highlighted in our first edition of Innovation in Amenity.

This second edition of Innovation in Amenity includes three articles looking at different aspects. One highlights the need to understand the soil, how it is composed and how we can manage it to best effect. Another article provides information on a new research facility which has come on stream, giving opportunity to test out new approaches and innovations. The third looks at the management of parks, particularly in an urban situation, and some of the challenges and opportunities.

A definition of innovation is the practical implementation of ideas

that result in the improvement in offering goods or service.

Throughout the years, the amenity sector has shown its ability to innovate and respond and I have no doubt that this will continue. What happens in amenity management impacts upon all of us every day, no more emphasised that in recent COVID times.

We hope that you enjoy your read. We have been delighted with the response thus far. However we welcome further feedback which helps us refine and further improve the publication. Also if you would like to contribute to future editions or have particular ideas on items, do get in touch admin@amenityforum.net. We intend to publish twice per year



Professor John Moverley OBE
*Independent Chairman of
the Amenity Forum*

THE AMENITY STANDARD



What it represents to the public and users of amenity and sports spaces

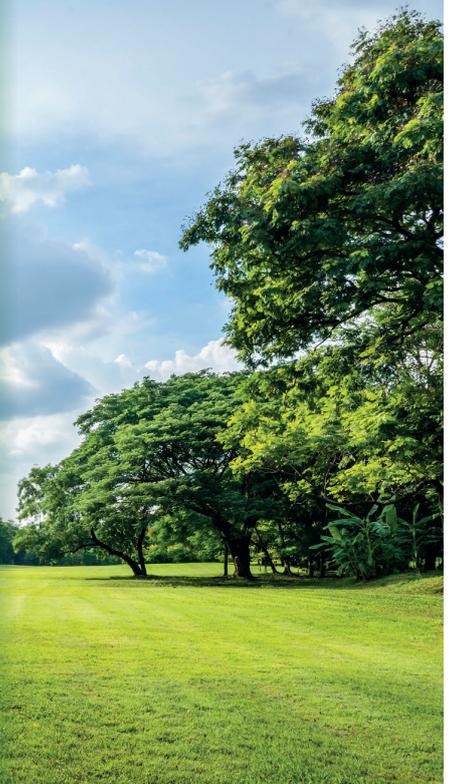
The Amenity Standard is the UK's recognised quality management benchmark, giving assurance that, whoever holds and displays it, is undertaking the maintenance of amenity and sports surfaces, to the highest professional levels, employing best practice methods and meeting all legal requirements seeking to create safe, healthy and sustainable amenity areas fit for purpose.

Such spaces include public and private gardens, parks, transport

networks, sports grounds, golf courses and our urban green spaces including streets and pavements.

Those displaying the Standard will be adopting a fully integrated approach making use of all options available to produce the most effective outcome.

So watch out for the Standard and if you are using organisations to undertake such work, make sure they hold the Standard.



MANAGING OUR URBAN ENVIRONMENT

Mike Hinton looks at the importance of green spaces in our urban areas and how innovation is already impacting on management approaches

Amenity horticulture is the management of the urban environment, which includes Arboriculture, Turf Culture, Landscape Design and Management. There are some people who see the industry as quite simplistic and do not realise the technical advances over the last 100 years. Without amenity horticulture cities with vast amounts of bricks, concrete and stone are left unsoftened without the green environment.

In the early 20th Century, historic homes, parks and gardens were managed in very labour-intensive environments and people learnt their trade on the job. After World War 2 this changed dramatically when there was a major initiative to get people involved in land management. In 1953, Birmingham City Council opened the School of Horticulture and recruited 25 to 30 trainees each year, and this continued with partnerships with Pershore College of Horticulture and more locally Bourneville College until 2011.

The importance of nutrition

In the 1950's people worked on a localised basis making their own fertiliser formulae for feeding turf on golf courses, football pitches, retaining seeds from valued plants, and

propagating perennials in their own gardens and then taking them to work to plant in the parks and gardens etc. One of the major turning points in the 1950's was the development of John Innes composts which included seed, potting composts Nos 1,2 and 3 and provided mixes to produce high quality plants.

However, in the 1960's this changed again with the introduction of peat composts which had specific NPK ratios to produce more controlled growth in crops and improved plant quality. In the 1970's many plants for example Geraniums, Heliotrope and other seasonal bedding plants were grown from cuttings, but now are grown from seed, improving plant quality, shorter growing periods, and improved pest and disease resistance to ensure that floral designs are of the highest quality and economic to produce.

Plant breeding

Over the last few years improved plant breeding techniques such as genetically modified plants and advances such as micro propagation now provide growers and ultimately the public with an excellent range of plants for their gardens which are launched at major flower shows like



the RHS Chelsea Flower Show.

As a result of the research into day length control, difficult to grow plants like poinsettias have been grown at different times of the year particularly for shows like the RHS Chelsea Flower Show and these have enabled growers to get high marks in the RHS Judging criteria 'Scale of Endeavour' which is very challenging to the growers.

Maintaining amenity spaces

In the 1970's, 80's and 90's amenity areas were maintained using a very clinical approach in terms of quality designs and maintenance. Traditional gardening techniques and the use of pesticides help to achieve these very high standards.

Grassland turf management is one of the areas in the industry where there is a high level of technology which is symbolised by football pitches which now remain green all season without being muddy at the height of the playing period. This is due to improved pitch design, grass species which can be blended with other grasses to provide exemplary playing conditions and also appear in excellent condition throughout the season.

In addition to the grass, other improvements have been made to fertilisers, top dressing and most importantly mowing equipment which now utilises high levels of technology. This innovation has impacted greatly in amenity horticulture and is

instrumental in maintaining grass in the urban environment in such good condition if managed correctly.

Taking an integrated approach

Over the last 18 months, arising from the pandemic, people have become more aware of the Urban Environment and the effects of maintaining it to a very high clinical standard. The massive increase in use of parks is testimony to that. We now need to focus on a more integrated approach to management with budgets reviewed more frequently, more voluntary involvement, reduction in maintenance regimes and more focus on training in amenity horticulture in terms of cultural and biological techniques and using pesticides even more intelligently and accepting economic levels of weed control rather than removing all weeds from flower and shrub beds.

The gardens of the future and hard landscape features will be designed to avoid trapping detritus, need less cultivation, more sustainable

groundcover plants, and we will be purchasing better quality plants that establish quickly to suppress weeds. This will be essential to our approach in future. In addition there is a need to focus on timing, forking/hoeing weeds in flower bed before they flower and drop seed, so they will encourage better plant growth, together with increased plant density and the use of organic/synthetic mulches to suppress weed growth.

Managing weeds

Technically a weed is a plant growing in the wrong place, but today there are major issues with Invasive Plants such as Japanese Knotweed, Himalayan Balsam, and Giant Hogweed to name a few. In the past they would be controlled using herbicides. Indeed the use of glyphosate products remain essential to this task. This is in particular because these are the only herbicides that can be used near water for the treatment of Japanese Knotweed. Innovation is bringing



Aphalara itadora

other alternatives such as biological controls for example the Psyllid, and Himalayan Balsam Rust Fungus, but these need to be related to the DNA of the Plant/Rust.



Bowling Green Grass Cutting



RHS Chelsea Flower Show 2014



Sustainable Planting



RHS Chelsea Flower Show 2012

The future

Looking forward, the amenity industry will be using more autonomous mowing equipment and mowers like the Husqvarna's new concept mower might change the image of grass cutting forever. Powered by a fully electric and rechargeable lithium phosphate battery, the mower does not pollute the environment like the current petrol engines. In addition, plant development is moving rapidly with many new varieties having improved flowering, higher growth rate and improved pest and disease resistance such the new varieties of dahlias. There will also be more use of wildflowers to encourage birds, butterflies and bees and will have a massive impact both environmentally and aesthetically.

The control of weeds will see increased use of Integrated Weed Control Plans which identify specific weeds and treatments so that any land manager can look after the areas and not have to rely totally on local knowledge, although I firmly believe that this will still be important to land managers of the future. Again from a pest control prospective, we need to use Integrated Pest Control Plans, monitor our plants sources, and be aware of diseases like *Xylella fastidiosa* that could be brought here from abroad and have a devastating impact on our plants in this country. We also need to rely on Pest Risk Analysts led by the Chief Pest Health Officer at DEFRA who scan the world looking for new and emerging threats and establish how they can be controlled.

With these massive technical leaps in technology, the need to encourage young people to enter the industry is vital. We must by make them aware of the technical challenges and what a profession amenity horticulture is like, and not just letting people think of it as gardening which anyone can do. Recruiting people into our great industry is a high priority. These will be the people to grasp innovation and change and maintain and develop our green urban environments fit for purpose.

Mike Hinton M.Hort(RHS)
District Parks Manager,
Birmingham City Council



THE IMPORTANCE OF TURFGRASS MICROBIOME

Sustainability to Research and Development

Michael Fance,

Wayne Roper Ph.D., and Darryl Ramoutar Ph.D. Aquatrols

Managing the physical (texture, porosity, structure, bulk density), chemical (pH and cation exchange capacity), and biological (roots and microorganisms) properties of the turfgrass rootzone is key to providing superior playing surfaces. Academic literature is inundated with research papers aimed at discerning physical and chemical characteristics of the turf **rhizosphere** (*soil surrounding plant roots where chemical and microbiological interactions affect nutrient exchange*), but little has been done to understand the effects of inputs on the rootzone microbial community, a key biological component. The turf rhizosphere contains a diverse combination of microorganisms that play critical roles in supporting plant health, and this assemblage is referred to as the microbiome. Within the rhizosphere, interactions between turfgrass roots and their **microbiome** encompass a wide range of ecological relationships, but in a beneficial sense, microbes may help turf persist under biotic and abiotic stresses by stimulating plant nutrient uptake, stress tolerance, and pathogenic defence.

Sustainable turfgrass management

is challenging because intensive cultivation practices are required to produce aesthetic landscapes. These practices include programmatic nutrition/fertilizer, pesticide, and moisture/wetting agent application regimes; however, given the increasing recognition of healthy soils as crucial to the propagation of sustainable turfgrass, it is imperative to develop inputs that align with the promotion of beneficial microbial communities. A rigorous turfgrass management program that enhances healthy soil is more likely to boost plant resilience and produce appealing golf greens. Manufacturers of turfgrass inputs should demonstrate through research that their products are not only efficacious, but also favourable to beneficial components of the turfgrass **phytobiome** (*the turf environment and the surrounding community of organisms*). The R&A has defined a sustainable golf course as one "in harmony with the conservation of its natural environment under economically sound and socially responsible management;" and at Aquatrols we are taking steps to ensure that our products support beneficial

microbiomes as well as healthy soils.

Soil wetting agents are comprised of polymers that make it easier for water to infiltrate and distribute evenly throughout the rhizosphere, directly interacting with the microbiome. These chemistries are found in many commercial products, and are non-hazardous to humans, but their effect on microbiome health is not well studied. Aquatrols has augmented its field development process to include microbiome safety as an important factor when testing new product formulations, and is committed to ensuring that wetting agents for turf are not detrimental to soil health. The microbiome includes diverse microscopic invertebrates, bacteria, fungi, actinomycetes, yeasts, algae and protozoa for which developing methods to ensure their safety could be costly, complex and time consuming. To overcome this challenge, Aquatrols has recruited university researchers in the UK and the US to develop microbial markers of healthy soils, with the goal of establishing high-throughput methods that could be integrated into a stage and gate commercial development process.

Today, Aquatrols conducts microbiological research both in the laboratory and field. Laboratory research is straightforward and includes evaluating different wetting agent polymer classes for toxicity against cultures of well-known soil microbes sourced from the United States Department of Agriculture. Thus far, we have not seen wetting agent toxicity at the typical field use rates against ubiquitous soil microbes (*i.e.*, *Bacillus* and *Pseudomonas* species). Field research has proven to be more complex and multifaceted, and method development experiments have been conducted at the Sports Turf Research Institute (STRI) with the close consultations of Dr. Christian Spring and Dr. Mark Pawlett of Cranfield University. In this case, the STRI makes wetting agent applications in field trials during a growing season, and after each application, soil samples from these plots are sent to Cranfield University for microbial analysis using a method called phospholipid fatty acid (PLFA) analysis. Phospholipid fatty acids act as living organism biomarkers that

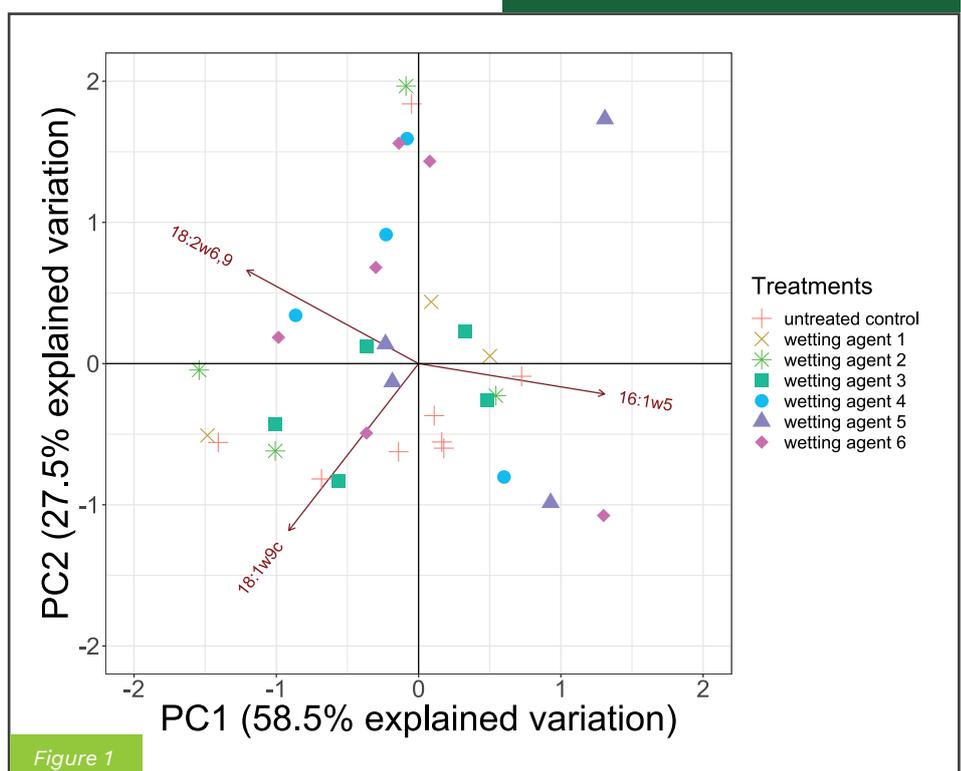
can be used to determine microbial type and abundance in the soil. Any shift in microbial populations because of wetting agent application can be measured from soil samples using PLFA analysis. To date, wetting agent chemistries currently found in the Aquatrols portfolio do not affect the microbiome at effective moisture retention rates. As new formulations are developed, we will continue to evaluate their effects on crucial rhizosphere inhabiting organisms.

As previously stated, the effect of golf course management practices on the turfgrass microbiome has not been extensively investigated, so Aquatrols will continue to build a network of university researchers who share our interest in maintaining a sustainable golf course phytobiome, and collectively develop methods to ensure that soil health is part of the company's research and development processes. To maximize turfgrass health, the modern turfgrass manager must not only consider the above ground playing surface, but also the microbiome, and management practices should align with sustaining microbial activity belowground. Likewise, it is imperative that industry providers evaluate the compatibility of their inputs to both the turfgrass stand and its associated microbiome.

The R&A has defined a sustainable golf course as one “in harmony with the conservation of its natural environment under economically sound and socially responsible management;”

Figure legends

Figure 1. A principal component analysis (PCA) of phospholipid fatty acid (PLFA) analysis of fungal DNA extracted from soil collected from the top 20 cm of soil on a USGA specification golf green 2 days after application of wetting agents. PC1 (x-axis) is the first combination of variables that explains most variation in the data and PC2 (y-axis) explains the second largest amount of variation. The closer two points are along both axes, the more similar they are in fungal activity when the soil sample was collected. Vectors starting at the origin indicate the strength of the association that different points have with the fungal PLFA marker associated with the vector. This data is courtesy of the Pawlett Lab, Cranfield University.





ORIGIN AMENITY SOLUTIONS (OAS)

Turf Science and Technology Centre

Kelly-Marie Clack,
Technical & Agronomy Manager for Origin Amenity Solutions



The new Origin Amenity Solutions Turf Science and Technology Centre can be found at Throws Farm, Dunmow, Essex. The facility allows for research, fine and sports turf trials plus the provision for education with meeting rooms and conference rooms, enabling 150 delegates to convene to discuss all things amenity. Outside, the centre has USGA constructed fine turf trials area with a poa/bent surface grown in from cores, a native soil ryegrass area and a large amenity grass area. Around the site there is a wide range of surfaces from hard through to permeable to test new innovations. The fine turf and sport turf areas are divided into quarters with each plot being irrigated separately by a Rainbird irrigation system. This enables the site to run different irrigation regimes. In addition, there is a large greenhouse fitted out with full grow lighting for conducting pot trials all year round. OAS also has a standalone laboratory on site. The plot area is an open site, with prevailing easterly winds, replicating the microclimate for large proportion of the amenity sector.

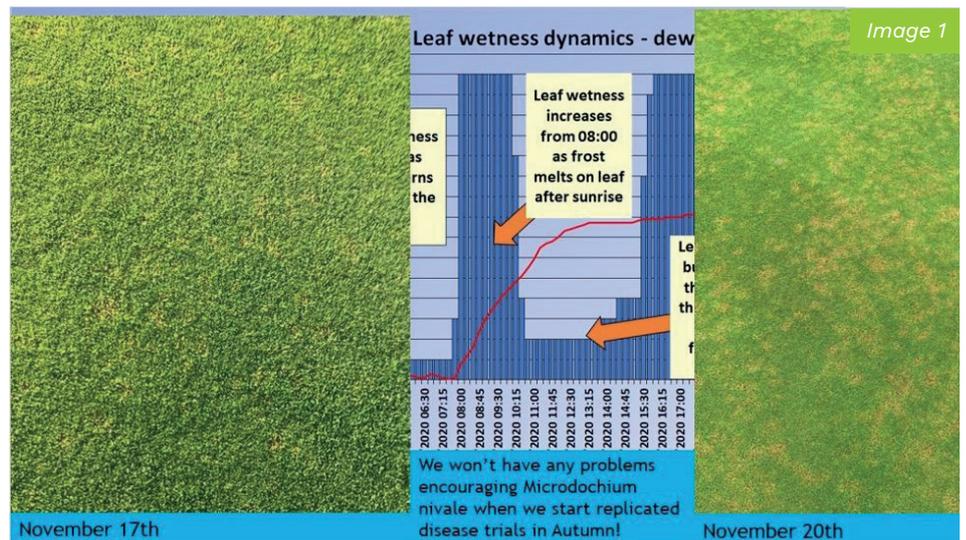
Many changes have occurred in the amenity sector over the last decade, including legislation and climatic changes, of which I am sure

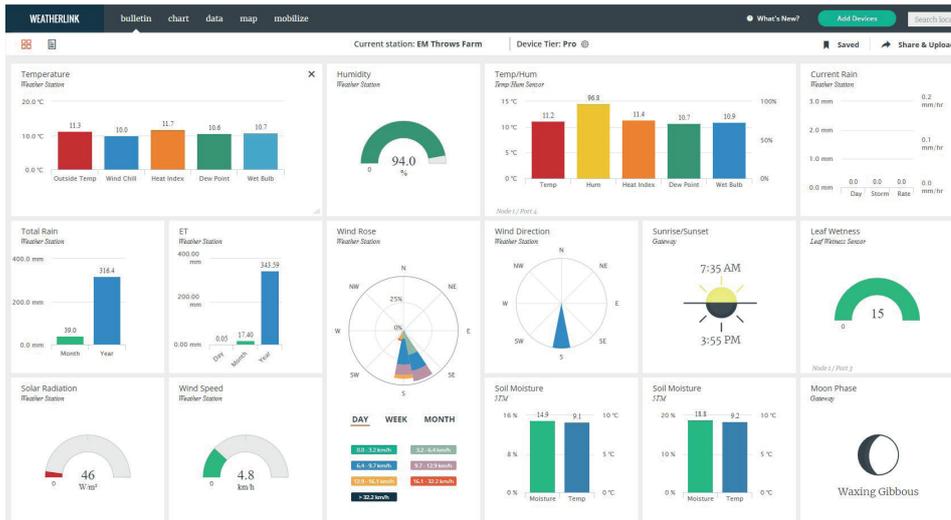
there are more to come. That is the rationale behind the Turf Science and Technology Centre. OAS will be working in collaboration with industry partners to provide scientific data and innovative concepts to amenity turf management. This will be led by climatic, and legislation changes and most importantly the people behind amenity management.....YOU!

Image 1
Microdochium nivale outbreak at Throws as temperature in November remains above freezing and leaf

wetness is high.

Data collection is critical at the Technology Centre with a Davis weather station, POGO and Soil Scout, soil sensors placed in the fine turf and the native soil areas. These technologies enable the R&D Director and Trials Manager to monitor the health of the turf and soil as well as monitoring disease pressures and environmental factors that may induce these outbreaks. The outcome is to offer integrated turf management (ITM) approaches to pesticide and nutrient applications.

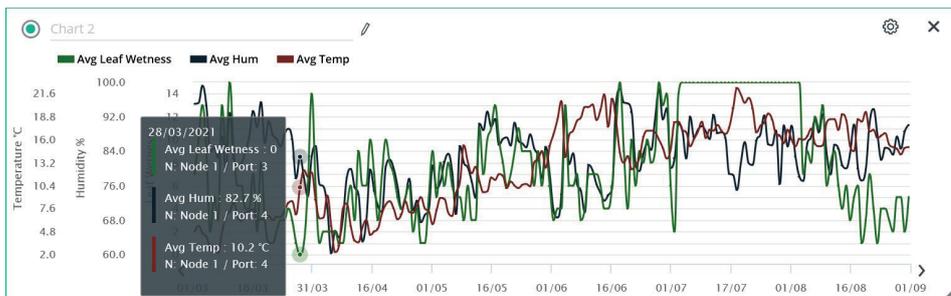




David Weather Station dashboard graphic



Soil Scout dashboard graphic



Davis and Soil Scout dashboard provides the ability to graph data to identify trends.

Research will be carried out using replicated, randomised plot designs to produce sound scientific data. The subjectivity of collecting turf quality and disease percentage data will be removed by utilising a light box, combined with a bespoke digital image analysis programme. OAS wish to provide the industry with “independent” information about all the products that are applied; good or bad. Performance data collection is also included; after all, clients want surfaces that look perfect and expect outstanding performance.

The testing of new technologies

such as drainage systems and robotic mowers and carrying out research to optimise plant and soil health will also take place. The Technology Centre brings together all the technologies needed to collect robust data and to understand the stresses that influence turf and soil health. This information will be analysed and shared with the amenity sector to provide sustainable turf management strategies and therefore future-proofing our industry.

The industry is fully aware that a lack of understanding can have a huge impact on the amenity sector.

OAS will be using this site to educate regulators in conjunction with organisations such as Amenity Forum. In addition to this the Centre’s facility can look at alternative approaches to weed management including efficacy and cost implications. New approaches to vegetation management can be investigated and information on how to best utilise these technologies can be communicated to governing bodies, councils, facilitation businesses and contractors.

The OAS Turf Science & Technology Centre is a major industry investment and one that will bring great benefits. The results open up the opportunity to be proactive, identify trends and react accordingly. It will also enable those that work in the amenity sector to stay ahead of the game as legislation changes and new directives come into place.



www.amenityforum.co.uk
01926 650 391
admin@amenityforum.net



www.getbritainmoving.uk
admin@amenityforum.net



www.theamenitystandard.co.uk
admin@amenityforum.net

AmenityForumUK

@AmenityForum