

Spray app



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Dr Terry Mabbett on how EU directives on chemical pesticides are continuing to pressurise the sports turf industry

Looking at the onslaughts by the EU on chemical pesticides you could be forgiven for believing that chemical control of insect pests, diseases and weeds is 'drinking in the last chance saloon'. Brussels continues to fire bureaucratic broadsides at a whole raft of industries for which chemical pesticides are traditionally used to manage economically important and environmentally destructive biological agents.

Professional sports turf is a small part of the big pesticide picture and contributes tiny amounts to overall environment loading, but turf suffers disproportionately from what goes on in adjacent areas including arable crop spraying and hard surface applications.

Substantial overlap can occur in the use of specific active ingredients with serious implications for turf.

The consequences of broad acre insecticide treatment of cereal crops and high run off risks from total (non-selective) herbicides application to roads, pavements and industrial hard surfaces can seriously impact on golf courses.

Game changing directives

The turf industry is ahead of the game in pesticide use and regulation, but a clutch of EU directives are now pushing the sports turf industry much faster and further than could have reasonably been projected or imagined just ten years ago. Biocides are increasingly brandished as the only option for long term sustainable protection of professional turf.

However superficially attractive biocontrol products may be, they are already being outstripped and overtaken by chemical pesticides of biological origin.

Classic examples include azoxystrobin - a fungicide first discovered during research on wild mushrooms commonly found in Czech Republic forests - and fludioxonil, a fungicide inspired by a naturally occurring antifungal compound produced by some soil bacteria.

These biological fungicides are potent and highly targeted which means just a fraction of that normally used for more conventional turf fungicides can be used to manage turf diseases.

Biological origins and credentials make them less environmentally intrusive and more readily removed from the soil. With reduced dosage and less persistence comes lower environmental loading.

Enter application

Forty years ago pesticide application was simply a means of getting a dose of chemical from point A (the spray tank) to point B (the plant surface). Accuracy, wastage and contamination were generally not considered and pesticide application to turf was still very much the poor relation of agricultural spraying. Early attempts at controlled droplet application were generally regarded as unwanted assaults on sales volumes and targets.

Today's chemical companies regard sound application as a safeguard for new products, and in a wider context an important factor in sustaining chemical control. Regulators want to know exactly how much pesticide is being placed and where, and how this translates into maximum efficacy from minimum loading (dose) with negligible environmental contamination.

With regard to pesticide application, the turf industry is now 'its own man'. New application techniques are custom designed to suit golf course topography and developed to accommodate the canopy characteristics and control requirements of closely mown turf grass.

These trends are encapsulated in the evolutionary development of the XC nozzle range by Syngenta for reduced drift application to turf over undulating surfaces on golf courses.

A day at Hanbury Manor

I didn't have to travel far to see Syngenta's new XC nozzle range in action at Hanbury Manor Golf Course in Hertfordshire. On a sunny day I met Dr Simon Watson (Technical Manager EAME Turf & Landscape) and Caroline Scott (Marketing Communications Manager EAME Turf & Landscape) from Syngenta, and Stan Power, Golf & Estate Manager at Hanbury Manor. Stan was one of many greenkeepers instrumental in bringing practical spray application problems faced by greenkeepers to Syngenta's attention.

Stan now uses XC Nozzles for the application of fungicide and soluble nutrients to his greens and fairways at Hanbury Manor. He and his team are clearly doing the right thing for their turf in Hertfordshire. Irrespective of best management practice you would expect greens in mid February - when I visited - to look at least a little jaded but these were as pristine and shining as the day itself.



NAsOR - Calling All Greenkeepers

NAsOR (National Amenity Sprayer Operators Register) is a professional register designed for spray operators in the amenity sector. It provides members with Continuing Professional Development (CPD) opportunities to update their skills and to record learning. The scheme is open to anybody who holds a City & Guilds NPTC Safe use of Pesticides Certificate of Competence; a minimum of a PA1 foundation module, plus one or more of the Pesticide Application Modules (PA2-PA13).

Members are required to collect 30 or more CPD points in each three year period to qualify for membership renewal. A wide range of CPD events and courses are approved for NAsOR members and are publicised under the events section of the NAsOR website.

Members are required to:

- Ensure that any equipment is being used in accordance with current legislation.
- Have due regard to any environmental impact.
- Give priority to the health and safety of bystanders and those that use areas being treated.
- Use equipment that provides protection to operators under current health safety and legislation

The benefits of joining City & Guilds NAsOR include:

- Recognition and professional development
- Up-to-date knowledge for more efficient and effective use of pesticides
- Proven skills for professional spray application techniques
- Supporting career development through on-going CPD
- Independent recognition of good operator standards for higher business achievement

To join simply go to www.nasor.org.uk and click on "Join Now" on the banner at the top of the page. Applicants will require an e-mail address and have a qualification in the Safe Use of Pesticides.



Application hurdles on golf courses

Nozzle technology and how it affects droplet size, trajectory and impaction is not the easiest thing to understand but Simon succinctly reduced the situation to several core issues requiring resolution and engineering solutions. He said: "Syngenta was faced with resolving a number of practical spraying issues sometimes unique to the amenity sector and the golf course landscape and environment in particular."

Standard flat fan nozzles are designed to produce overlapping even coverage at 50cm from the ground, but that is not a constant option on golf courses especially around greens. "We don't have the luxury of spraying over the uniformly flat surface of a Norfolk wheat field" says Stan, adding how greenkeepers are often faced with variable gradients and undulating ground with recurring reductions in nozzle height to just 30cm from turf surfaces.

Loss of pattering means undulating turf receives spray in peaks with accompanying overdosing directly underneath nozzles and gaps with under-dosing between nozzles. "We told Syngenta how this

was a big issue for greenkeepers" said Stan. "It was always obvious, especially following the application of 'colouring up' nutrients like iron with their high visual effect. Equivalent problems in overdosing and underdosing with fungicides may not have been so obvious, but effect and consequences related to efficacy and environmental loading are even more important."

The nozzle brief

Syngenta's task was to design and develop novel nozzle technology which could maintain pattering at different nozzle heights over undulating ground while simultaneously minimising the proportion of small diameter high drift potential droplets. It all sounds relatively easy but as Simon pointed out droplet size, momentum, trajectory and overall effect on turf target impaction is very much a double edged sword requiring rationalisation before resolution.

Small droplets are retained well on narrow acute angled leaf surfaces typical of close mown turf but lack the mass and momentum to penetrate the layer of still air which surrounds all plant surfaces. Penetration and impaction problems for small droplets are accentuated

about the author



Dr Terry Mabbett

Dr Terry Mabbett is a disease, pest and weed control specialist with forty years international experience covering research, advisory and journalism. His current fields of focus are professional turf and alien insect pests and pathogens of Britain's native and naturalised trees.

on ultra-low profile turf grass surfaces because there is nowhere for the layer of air to be displaced to. Net result is poor impaction of small spray droplets already prone to drift.

Water is invariably nearby in most areas of spraying but golf courses are especially well endowed and equipped with water features. Water features – ponds, lakes, streams and ditches – have always been incorporated to maximum effect during golf course design and layout and were boosted during the mid-nineties when the 'American Design' (Jack Nicklaus course) came to the UK and Ireland in an increasingly big way. For instance, man-made lakes were placed close to greens to make courses that much harder to play. Net overall result is golf course spraying never being far away from water and all the implications related to LERAP and buffer zones. LERAP considerations must take into account dry ditches as well as all currently flowing and standing water with its integral aquatic life and water margin plants.

So the larger higher momentum droplets, with good on target trajectory and reduced susceptibility to drift, are the answer, but there is yet another 'catch-22' situation

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here. Due to correspondingly large contact angles created with leaf surfaces impacting large droplets have a tendency to roll off, while inherent high momentum means they may shatter on impact that could reduce retention on the leaf target.

However, as Simon points out these situations can be recovered to some extent when using new age protectant fungicides like fludioxonil. "Grass foliage continues to be the prime target for this protectant fungicide", he says, "but it will also destroy the spores of thatch inhabiting fungi causing turf diseases such as Fusarium patch and anthracnose, so any fungicide falling through the net is not wasted."

XC Technology uses a novel elliptical shaped nozzle orifice and wide droplet pattern to ensure effective coverage with variable nozzle height above the ground and accommodates air induction technology. As the spray liquid passes through the nozzle chamber, air is sucked in through holes to create the so called 'Venturi' effect which incorporates a tiny volume of air into each spray droplet.

Air incorporation gives more consistently sized droplets with a well maintained trajectory on target, and an air 'cushion' effect that lowers contact angle, reduces

roll off and helps to prevent these large droplets shattering on impact.

Practical benefits

Spraying water from a static boom on the car park's hard surface, and following up with spray liquid collection in measuring cylinders under each nozzle, Simon Watson demonstrated how in uniformity, accuracy and patterning the XC nozzle range does exactly what it says on the label. Stan Power then took his Toro 5700 sprayer over some of the undulating ground around the greens at Hanbury Manor so we could see the system in action.

So what are the practical benefits? Use of Syngenta's XC reduced drift nozzle technology widens the window of spray opportunity. Caroline Scott who manages Syngenta's Greencast system calculates that greenkeepers using XC Nozzles will have four extra days per month to spray.

With the enhanced droplet size distribution and superior coverage provided by the XC nozzle system Stan has reduced spray volume from 500 L/ha down to 250 L/ha (300 L/ha average). "This means I can spray 3.2 ha using the full 1100 L tank whereas before I could

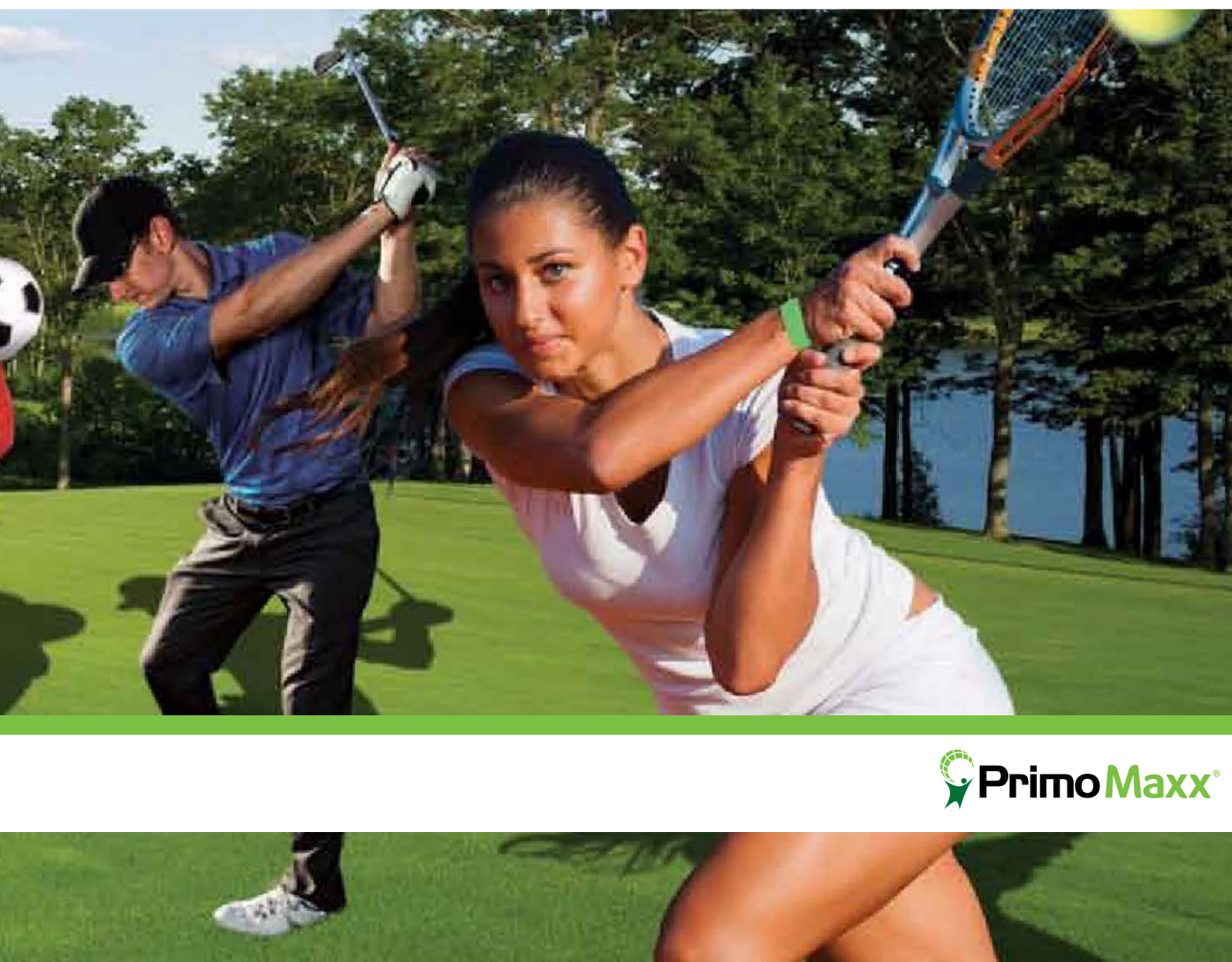
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only manage 2 ha. It provides much more flexibility and can prove critical when allowing me to carry out a task in 2 hours instead of 4.

"This might not seem a lot but is a real blessing when we are under pressure during pre-match periods."

"The flexibility afforded by XC nozzles also extends into what kind of foliar feed I can apply", said Stan, "by allowing me to spray when conditions are most favourable for fast and efficient nutrient uptake by leaf surfaces or simply because it is more convenient."

Last but not least is the LERAP consideration which allows for measures to reduce buffer zones around water courses and features. Nozzle technology is one of them.



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