



cially at higher water volumes. This has been bad news for the efficacy of fungicide products, particularly contacts. However, the advent of air induction nozzles, that incorporate tiny air bubbles within each droplet that act as 'shock-absorbers', helps the larger drops land gently on the leaf and spread to give good coverage, rather than bouncing off. Good product formulation, with the correct blend of surfactants and adjuvants, ensures good coverage of the leaf and minimal run-off.

Water volume

We also know that foliar fungicides can perform equally well, if not better, when applied at a water volume of 200 l/ha, compared to 600 or 800 l/ha traditionally used in some situations. This could further enhance the potential of new air-induction nozzles and make them an especially good option for foliar fungicide and PGR applications.

One further benefit of reducing water volume is that it saves time and you can get around the course

quicker to minimise disruption to players. If you could do all your greens on one tank fill, for example, that might save an hour and enable you to finish before the course gets busy. For spraying larger fairways and rough areas it could make a significant difference.

Faster application also means products can be applied closer to the optimum time, ensuring you can achieve the best possible results. Trials have shown the ideal time for most fungicide applications is after there has been a high risk of disease pathogens landing on the leaf, but before spores have germinated and penetrated the surface to cause any damage. The Greencast forecasting system gives valuable guidance of risk, but you may only have a few hours to act, so timeliness of application is important.

However, you do need to remember that for fungicide applications of Heritage or Headway aimed at soil level pathogens, such as Take All or Fairy Ring, water volumes do need to be kept up to get good spray penetration to the target.



Nozzle research

Syngenta is currently undertaking trials at the STRI, along with greenkeepers and turf managers, to evaluate and assess turf specific designs and recommendations for new nozzle options. The initial research has highlighted potential for two specific nozzle choices, one for foliar fungicides, herbicides and PGRs aiming at retention on the leaf, and a second for fungicides targeted at the base of the plant and soil surface. Coupled with the selection of the appropriate water volumes and application at the optimum time, turf managers could further improve disease control and turf quality in the future.

Horses (and Tennis) for Courses



Mark Harvey and Dave Langheim have their busiest time of the year now, and not because of golf. **Scott MacCallum** visited them just before it all kicked off



June sees two of the world's great sporting events take place within 12 miles of each other in and around London, but while The Derby will see visitors casting their eyes over expensive thoroughbreds and Wimbledon has tennis supporters willing Andy Murray to become the first British men's single's Champion since Fred Perry, two people will spend their time, eyes skywards, praying for sunny, dry weather.

Mark Harvey, Head Greenkeeper at Epsom Golf Club, and Dave Langheim, Course Manager at

Wimbledon Park Golf Club, both see their golf courses play a huge role in these two iconic sporting occasions.

The two courses are each no more than a road's width away from Epsom Downs and The All England Club respectively and are closed for the duration of the events to become home to car parks, hospitality facilities, police compounds and, until this year, a fully fledged fun fair. As you might imagine they do leave the odd blemish to the turf.

"The Derby, which is always run on the first Saturday in June, affects at least 10 of our holes and means our course is closed for two

days," said Mark, who maintains Epsom with a staff of four including himself.

"Some of the lesser race meetings, and we have around 13 race days a year, cause the closure or certain holes for an afternoon," he added.

It does lead to the odd occasion when race day visitors have driven to the course but enjoyed themselves a little too much and taken a taxi home.

"On occasion we have cars left on the course which are collected the following morning. They drive off a little embarrassed when they realise the car park is also a golf course."

MAIN: Epsom Downs Racecourse on the horizon of Epsom Golf Club

INSET FAR LEFT: Bird's eye view of the golf course, showing parked cars and the fairground



Mark, who has been at the club for 18 years, tries to keep his fairways as fertile as possible in the run up to the The Derby and prays that it stays dry, often in vain.

This year for the first time the traditional fun fair won't be on the golf course but in the past Mark has always found the fair people very good to work with.

"Many of them have come for years and we know them well so when it's been wet and they haven't had anywhere to head off to we were quite happy for them to stay put for a couple of days until things dried out."

The greens are all fenced off and the police put down trackway for their compound, but Mark still has quite a bit of damage to put right when he gets his golf course back again.

Once the new Derby winner has been anointed and is relishing the

rest of his life at stud, Mark and an official from the racecourse will carry out a full inspection to see what damage has been done.

"We have a good relationship and the Racecourse do, when requested, send assistance to help with the clear-up. Among the damage that The Derby generates is, obviously, compaction, diesel spills, grass dying off under the metal roadways that are installed, irrigation pipes being holed by fence posts while loose nuts, bolts, nails and screws turn up for a long time after.

"Cylinder mowers are a big no-no for a while afterwards and on one hole, the 9th, we play preferred lies through the green," said Mark, who also said that he lost some rough on one hole near the racecourse as it was mown short to allow more car parking.

However, there is an upside to having to close in the height of the

"The Club members are happy to know that they play a part in what is the most famous horse race in the world"

season as the course benefits from no play for a short while.

While the course is out of commission Mark and his team can work on his fenced off greens. Hollow coring, solid tining and overseeding in June gives some superb results and Mark is rightly proud of the quality of his greens.

"I don't think you would find many greens, on an inland course in this country, with the amount of bent and fescue grasses we have," he said.

Epsom members join knowing that The Derby has a big impact on the Club. All the main competitions – annual pro-am, Captain's Day etc - are held prior to June. The Club members are happy to know that they play a part in what is the most famous horse race in the world.

Mark, who admits to no interest in racing and a dislike of horses, is pleased to look after a club with

ABOVE: Views of Epsom Downs; and Mark Harvey, Head Greenkeeper at Epsom Golf Club, pictured near the damaged turf on the course



such a famous name and cope with whatever it throws at him.

Epsom is still getting itself back to normal when, two weeks later, Wimbledon swings into action and Dave Langheim sees his lovely 5,500 yard Wimbledon Park course - which is laid out around the Capability Brown-designed Wimbledon Lake - transformed.

"We have something in the region of 10-12,000 cars parked on the course during the Championships, with a public car park on the back nine and the members and players' guest car parks on the other side of the course along with the hospitality units, Sky, CNN and Capital Radio. The 12th and 13th holes are left empty as evacuation points for everyone at the tennis in the event of an emergency," explained Dave, who took over as Course Manager just before last year's Championships.

Preparations start as early as April when Dave meets with the All England Club and the AA, who do all the fencing and roping off of the course, to discuss preparations then, two weeks before the start, the framework for all the tents are brought in across the fairways over a portable roadway.

"At this stage we are still open for play and the security guards monitor the golf and control the traffic, including the 40 tonne trucks," said Dave.

"The week before the start of the Championships is when everything really happens and the golf course comes to a very slow halt. We shut down on the weekend before the Monday start and reopen the weekend after the tennis finishes. Basically it takes two weeks to set up and one week to break down," he explained.

Like Epsom, Dave, and his team of eight guys and a mechanic, make the most of the non-golf time.

"We are very busy during the three weeks. We sand Graden all greens and tees, it's a fantastic time to do it. I use Richard Gooding and his team from Machines Direct. This year we will be using the seed attachment to the Graden, we use 60 tonnes of 35mm sand that is dry kilned. While this is taking place during the first week of the Championships M J Abbotts will be here to redesign and Sportscrete the bunkers on the 17th. We have plans to Sportscrete all the bunkers in the future," revealed Dave.

The work is made easier for the Wimbledon team because, for security reasons, every car must be taken off the course at the end of each day. This allows them to keep on top of some of the cutting, although with the car parks open at 6.30am each day, and visitors keen to take advantage of the tickets that



MAIN ABOVE: The new Centre Court looms over the golf course
INSET ABOVE: The tracks can be seen all year round
BELOW: The golf course is immaculately maintained





“The Wimbledon factor doesn’t give the club license to spend money recklessly”

ment being played at Wimbledon, it will see the course closed twice within a few months and all the work doubled!

The All England Club ensures that Wimbledon Park Golf Club is recompensed for the use of the facilities each year, which ensures that the contents of Dave’s Maintenance Facility would do justice to some much larger golf clubs.

“The Wimbledon factor doesn’t give the club license to spend money recklessly, each department has a strict budget, but we do know we can make plans for the golf club and be confident that they will happen. For instance the five year plan includes a new irrigation system and fairway drainage improvements,” said Dave, who added that he is working closely with the local council to improve the water quality in the lake with the long term aim of using the top three inches for irrigation.

Don’t go worrying about the Wimbledon Park members and their lack of golf in June and July – they don’t miss out for the three weeks that their course is out of commission.

“There is an open evening at the club and members are invited to choose where they wish to play from a list of clubs which includes the likes of Hankley Common, Coombe

ABOVE: Wimbledon Fortnight transforms Wimbledon Park Golf Club

INSET LEFT: The Greenkeeping Team with Dave Langheim back right

are available to the public, are not slow to arrive. The often televised lines of queuing tennis fans snake along two of the holes.

Compaction is again one of the biggest problems and it is not unknown for the large articulated lorries to get stuck if they fall off the trackway.

“The only damage we had last year was to some of our irrigation boxes when a 40 tonner decided to drive over them and we always have grass dying off underneath the trackway. When they go that

turf is shredded off and relaid,” said Dave.

On the Monday and Tuesday after the Championships the All England Club provides 30 to 40 people to assist with the clear up while Wimbledon Park uses contractors to do the restoration work.

“We use Golf Links, who have done our work for a number of years. Basically I order the turf and the Rootzone and get everything ready for them when Dave Walker and his guys arrive,” said Dave, who is waiting for 2012 when, with the Olympic Games tennis tourna-



Hill, Walton Heath and Effingham. They can play up to six times on these courses over the three week period and it's all covered as part of their membership of Wimbledon Park," explained Dave.

As Course Manager Dave has a security pass to the Championships and thoroughly enjoys his involvement during the fortnight.

"I love it. The buzz here is fantastic with the hospitality guests being chauffeured back and forward to the Centre Court in Club Cars that look like Rolls Royces, Johnny Vaughan and Denise Van Outen did their Capital Radio shows from a bus on one of the fairways, we also cut a tennis court out on one of our tees for Tim Henman and Amanda Holden to do a Robinson promotion. It is all going on.

"People don't realise that they are on a golf course and what a lovely golf course it is," he said.

Both Dave and Mark have high points in their year that don't involve golf but in their own way, and with the levels of resource they have available to them, they ensure that their courses are at their best for their members.

When you watch The Derby and Wimbledon this year have a thought for the work that two fine greenkeeping teams have done, and continue to do.

ABOVE and BELOW RIGHT: Wimbledon Park Golf Club in it's healthier state

RIGHT: More damage from tracks



"Johnny Vaughan and Denise Van Outen did their Capital Radio shows from a bus on one of the fairways!"



The Unseen Irrigation System

Adrian Handbury offers some excellent advice to ensure the irrigation pipes that go into your golf course measure up

Do you recognise the following scenario?

After years of telling the management committee that the irrigation system is not cost effective and providing the figures to prove that repair costs are a five figure sum annually, it has been decided that something must be done.

The Course Manager spends hours consulting with the Green Committee and Secretary on one side and the internet and manufacturers' brochures on the other. Too much information has been gathered, so the Club narrows it down to quotes from three different irrigation contractors. However, the prices differed by 200%, so the services of an irrigation consultant are procured. The consultant dismissed all the quotes, designed a system and invited five further contractors to submit a tender for a bill of quantities. This has generated five quotes, each with three different manufacturers. Presentations are made to the committee/club, and then finally, with, recommendations from the Course Manager and Consultant, a contractor and a branded product are chosen.

So the moment has finally arrived, the decision has been made and the contract signed. A start date is agreed, and materials begin to arrive on site. Two articulated lorry loads of pipe pull onto site, and this is unloaded behind the sheds. Five huge reels of cable in lurid colours are placed in the shed (you know how valuable copper is at the moment!). Three pallets of Brand X sprinklers and valves are put in the shed for safe-keeping. So we have the origins of a superb new Brand X irrigation system.

Or do we?

Do we know what the average breakdown of the irrigation system materials can be?

As we can see from table (inset), the greatest material input is the one which will probably be the one to which the client has the least knowledge of, or control of, within the specification.

What is actually known about this commodity apart from it is nowadays usually 'poly' (polyethylene) rather than u-PVC (unplasticised polyvinylchloride)?

What questions should the Course Manager or committee be asking about this important com-



BREAKDOWN OF THE IRRIGATION SYSTEM MATERIALS

• Pipe	33%
• Rotors	30%
• Control	12%
• Pump Set	9%
• Cable	8%
• Valve Assemblies	5%
• Water Storage	3%

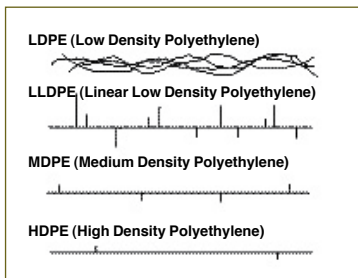
(Breakdown based upon breakdown of average components used in an 18 hole greens, tees and fairways installation)

modity, which will soon disappear under the course and hopefully never be seen again?

The most common material that is used today is polyethylene (PE) which is often known as 'blue pipe' by the greenkeeping fraternity. However, the product, polyethylene, is a manufactured hydrocarbon which may be manufactured into many different products which include drink bottles, carrier bags or water pipes.

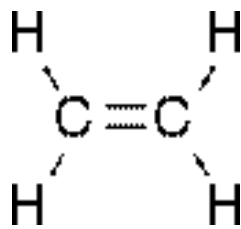
The expected lifetime of the irrigation system is at least 15 years, and so it is imperative that the correct grade of polyethylene is used in the pipe which is used for the pipe in the irrigation system.

ABOVE: Replacement fairway irrigation installed by mole-plough at Carnoustie Links



The structures of the various grades are made up as shown.

These lines represent the make-up of the internal structure of the different types of PE. The LDPE is made up of random strands of the hydro-carbon which are loosely connected. This makes for a very



The bonded hydrocarbon molecule polyethylene

flexible but relatively weak pipe – usually suitable for pressure applications up to 4 bar. As the density of the PE increases, the strands of the compound become more linear and tightly woven which increases the strength of the pipe. The denser the material becomes, the greater the wall strength. This also means that the wall thickness can be reduced so that the flow through the pipe can be greater.

The simplest breakdown of the pipes types specified for irrigation systems are MDPE (Medium Density Polyethylene) and HDPE (High Density Polyethylene). When PE was first used in irrigation systems it was manufactured from relatively

low grade material, and was usually black. The colour black was specified for two reasons

1. It was more cost effective as there were no particular standards required for irrigation

2. Drinking (potable) water is carried in blue pipe which should carry a kite-mark to show conformity to regulations

Nowadays there is a greater variation of pipe colours available:

Black - often using recycled or reground plastic in its manufacture.

Blue - usually thicker walled MDPE for drinking water use.

Black with Blue Stripes – usually thinner wall HDPE; use as above.



Black with Green Stripe – HDPE specifically designed for irrigation use and to be installed by mole-plough.

As PE pipe became more common for irrigation systems, and also more contracts were consultant led, it became usual to find standards for pipe to meet in order to be deemed suitable for a pressurised irrigation mainline. As the irrigation industry is too small to demand its own standards, these were borrowed from the drinking water industry. These standards are designed to cover the requirements of all of the water authorities for both the installation of the pipe and also the quality of water that reaches the end customer. They cover the colour of the pipe, and the effect of sunlight on it. The long-term stress-crack resistance and some also cover the pipe's suitability for welding.

The requirements that are most prevalent for the greenkeeping market are primarily longevity of the pipe which includes the joints and associated fittings, and the ability to withstand the rigours of installation by mole-plough. This is a quality which is especially important in soils with high adhesion properties, and also in stony ground.

The former is due to the pipe being gripped by the resistance of the soil which may cause the pipe to be stretched. The latter may inflict scores in the pipe as it is pulled into

the ground and so compromise the wall strength.

So how do we determine how strong the pipe is? As with many other industries, the watchword can be traceability. Any reputable supplier should be able to provide provenance of the pipe which would include the maintenance of a sample of the raw material for 10 years. Any pipe which is manufactured to the European standard EN12201 will have this provision. If at all possible, the pipe should be available with a proof of performance such as a written warranty. In addition, if the pipe is manufactured with a green stripe then this will be manufactured with catalysers which will improve the pipe performance for mole-ploughing.

Replacement fairway irrigation installed by mole-plough at Carnoustie Links.

If at all possible, the pipe should be available with a proof of performance such as a written warranty. The pipe should also be confirmed as having a suitable pressure rating. If the installation is to be on a relatively flat course then a 10bar pipe will be more than sufficient as approved pipe (manufactured to EN12201) will have a high safety margin. If there is undulation across the course in excess of +/- 15m then a higher pressure rating should be used.

One final word of caution when a new irrigation system is installed.

“It may be prudent to think ahead in these litigious times and ensure that the pipe is marked so that it may not be mistaken for mains drinking water”

Occasionally it is decided to install drinking fountains around the course for the refreshment of golfers. If the plans have not been maintained for irrigation mains supply then it may be possible that pipes are found which are not known if they are for irrigation or mains drinking water. If the pipe found is either blue or black with a blue stripe then it may be assumed that this is for potable water and connected to the drinking water supply.

This may not be the best assumption to make, especially if the irrigation system draws water from a borehole, reservoir or possibly grey water supply. Even a mains water supply to an irrigation system will have a great volume of water sitting in the pipes – especially if there is a wet year and the system is not used for prolonged periods. It may be prudent to think ahead in these litigious times and ensure that the pipe is marked so that it may not be mistaken for mains drinking water.

In conclusion, there is more to the largest component of an irrigation system than just being a bit of 'poly' pipe. We have generally left the days when pipe is glued together on the Monday and pulled in on the Tuesday, and so lush green patches every 6m down the rough are not as common. But a client should arm themselves with as much reassuring material as possible to get the best system available.

ABOVE: The end result – do not touch for 50 years!