LEFT: With shelter comes shade across the turf

BELOW: Smaller stature trees like the maples shown here are a popular choice

of popular amenity trees. Common lime (Tilia x vulgaris) is a major culprit along with aspen (Populus tremula) and to a lesser extent common alder (Alnus glutinosa) and wild cherry (Prunus avium). Several exotic species, such as false acacia (Robinia pseudoacacia) and tree of heaven, (Ailanthus altissima) are notorious for suckering and should be avoided at all costs even though attractive trees.

Suckers can spring up a good distance from the tree increasing as the old tree 'fades away' and continuing to appear for many years after a tree is nominally dead. Not only are they unsightly and disruptive to turf but cause even more damage when attempts are made to physically remove them. The only effective way to eradicate sucker growth, without causing massive turf damage, is to use dedicated stump killers which contain systemically acting total herbicides used to kill woody species).

'Biggest sucker' in the tree world is the English elm (Ulmus procera) neutered by Dutch elm disease in the 1970's. Its suckers still appear forty years later where large elms once stood.

Continual production of suckers from fragments of root tissue left behind when trees were felled has allowed the English elm to remain as an integral part of hedgerows, and as 'poles' growing up to around 8 metres high until scythed down by Dutch elm disease carried and spread by bark beetles.

Greenkeepers faced with large trees causing damage to turf are essentially 'between a rock and a hard place'. No option is ideal and all essentially last ditch responses.

- **First is radical and severe pruning of the canopy then waiting for the root system to react and retreat accordingly**
- **Dig a trench between the tree and the at risk turf to sever the feeder roots.**
- **Fell the tree and deal with the stump in a way that causes least disruption and damage to surrounding turf.**

Best option is prevention rather than control. If a tree species has the growth and development potential to subvert turf with its root system or shade out turf under the canopy then don't plant it in the first place.

Aerial impact of trees on turf

Aerial impact of trees is easier to assess and deal with because you can actually see what is going on. Trees may be planted to provide shelter especially on exposed golf courses, but with shelter comes shade, lower light levels reaching the turf and reduced air circulation with higher humidity and more prolonged surface wetness.

Water stress in turf caused by tree roots is well known but large spreading and dense canopied trees also add to water stress by filtering out falling rain. Turf grasses as a group do not respond well to shade and overall effect is to compromise growth rate, turf strength and grass colour. Shade reduces grass root length and density thereby decreasing tolerance to traffic wear and tear.

Experienced greenkeepers will tell you that morning sunshine is essential for turfgrass health and quality and which is difficult to achieve and maintain without it.

Lombardy poplars are tall but narrow and therefore have minimal shading impact

Shade and soil water imbalances brought about in turf by trees bring a range of 'biological baggage' not normally seen in on well drained sites and soils. This may include growth of moss, algae and a number of moisture loving broad leaved weeds, as well as a heightened threat of turf disease such as Fusarium patch (Microdochium nivale).

Greenkeepers need to think long and hard before planting trees around greens and tees. If shelter is the prime reason then evergreens and especially conifers including pines, firs and spruces are the obvious choice to provide shelter in winter (as well as summer), when clearly it is most needed. On upland courses with poor acid soil these conifers may be the only realistic tree planting option, but year round foliage and shelter means year round shade and higher humidity. This may prove critically damaging during mild and moist spring and autumn seasons when Fusarium patch and other moisture loving diseases are most active.

Deciduous trees in full leaf for summer months only, when light and temperature are highest, may prove positive but when effects of leaf fall are factored in a different problems may arise. Fallen leaves encourage surface-feeding and casting earthworms and aggravate problems with thatch.

Fallen leaves with a high tannin content are especially damaging because they will persist throughout winter and beyond without measurable decomposition. Such leaves include pedunculate oak (Quercus robur) and sessile oak (Quercus petraea) and beech (Fagus

sylvatica) although pear (Pyrus sp) is the worst offender.

Better to go for trees like ash and lime with leaves that decompose and disappear quickly after fall. As a general rule best choices for turf sensitive situations are native species small in stature. Avoid species with spines and prickles such as hawthorn (Craetagus sp), blackthorn (Prunus spinosa) and holly (Ilex sp). Gorse is popular for shelter around greens on highland golf courses but tends to raise humidity levels as well as being particularly unpleasant to tangle with.

Selecting and planting trees

Trees planted in turf should tick the following boxes:

- **Small in stature**
- **Non-suckering**
- **Deciduous or evergreen depending on situation**
- **Fallen leaves of deciduous species to decompose quickly**
- **No prickles, thorns or spines**

Types of trees commonly seen on well-established golf courses show how greenkeepers know from experience those which can add to the course without impacting negatively on turf. Commonly seen trees include the smaller native species like field maple (Acer campestre), mountain ash (Sorbus aucuparia) and whitebeam (Sorbus aria), as well as exotics like red maple (Acer rubrum) and red Japanese maple (Acer palmatum atropurpureum). Ash and lime are popular but are usually as smaller stature types like Tilia cordata (small leaved lime) and ornamental ash species. Very tall trees are normally avoided but one exception is Lombardy poplar (Populus nigra var.italica).

Trees shoot straight up tall and narrow to give correspondingly slim shade with minimal impact on turf.

Using larger container-grown and root ball planting material, including 'standards', or smaller bare-rooted trees as 'whips' or 'feathers' is very much a 'horses for courses' choice. Larger container grown and root ball trees will establish more or less straightaway and reach the required size in a much shorter space of time. However, they are more expensive, require more disruptive planting methods and secure staking and tying adding further to costs.

Even when afforded with protection and growth encouragement from tree shelters small trees take much longer to establish and reach an adequate size. On the plus side they are cheaper to buy (and replace if they fail), cause less disruption and damage to turf at planting do not generally require staking and tying.

All newly planted trees require good routine care and maintenance including weed control, fertiliser application and of course watering especially during summer. Tree guards of appropriate height are required if the course is home to bark gnawing and foliage browsing wild mammals like rabbits and deer.

BELOW: Felling may be the last resort if trees get too big for their location

Meeting dual needs of turf and trees

Routine course maintenance, including fertilizer application, chemical weed control, irrigation and grass cutting, is when need to satisfy dual requirements of turf and trees becomes abundantly clear.

Turf fertilizer regimes are clearly inappropriate for trees in composition and dosage, while fertilizer regimes recommended for trees may scorch the turf around the base of the tree. This can be avoided by using slow release formulations.

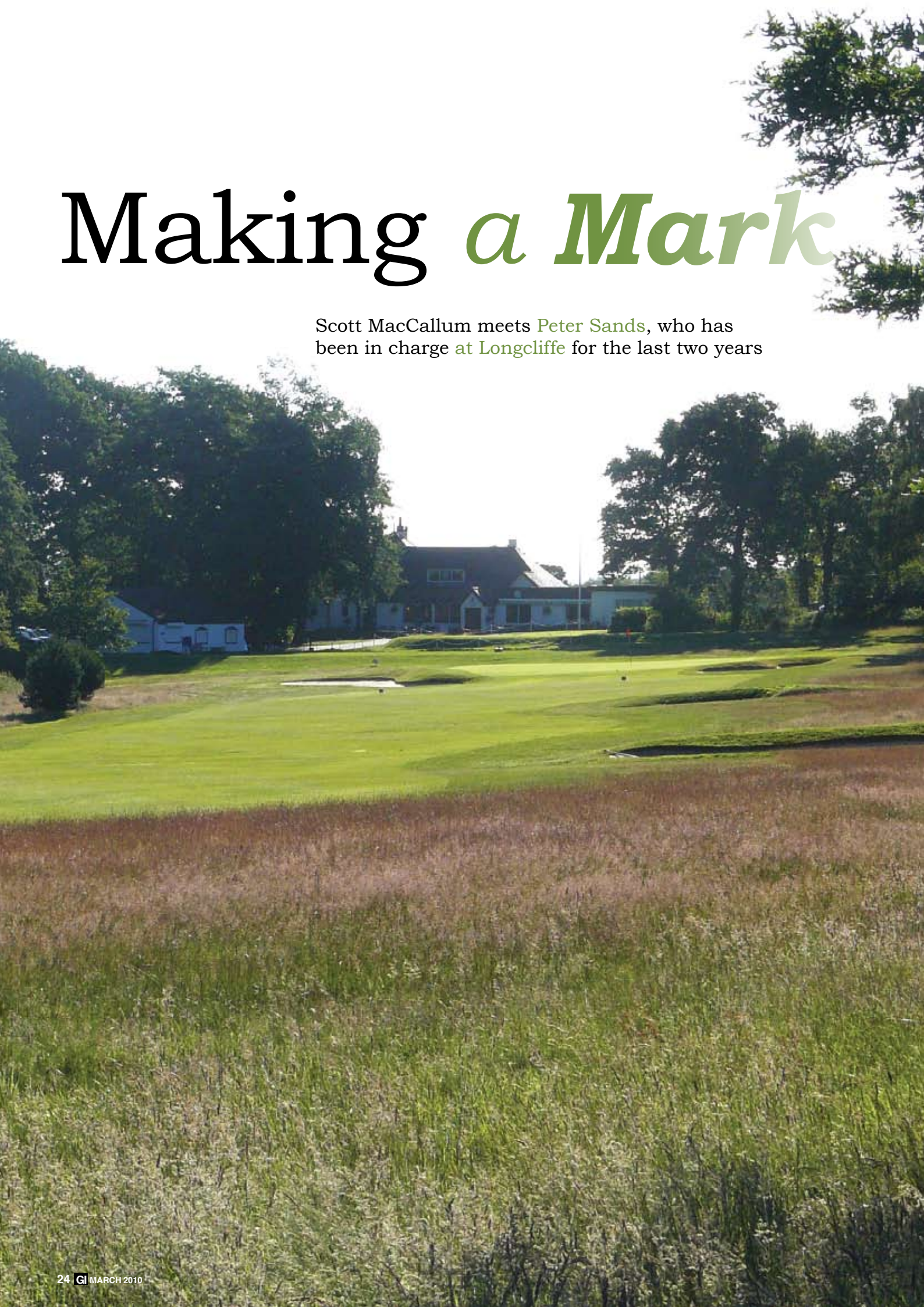
Type and level of irrigation used on shallow rooted turf grass in summer is inappropriate for trees. Water will evaporate from the topmost layer of soil before it can reach deeper seated tree roots, while standing water may build up around the base of the tree causing physiological damage and encouraging disease. Newly-planted and establishing young trees must be watered regularly. Well established and mature trees are unlikely to require irrigation except during really severe drought. Trees tend to benefit from fewer high volume well targeted applications of water.

Situation regarding surface 'cover' on the soil immediately around trunks of large mature trees is complex and vexed. Turf grass cover close to large trees is difficult to maintain because broad leaved weeds will readily invade an take over. Mulching material (e.g. bark or gravel) or mulch structures such as mats that eliminate all growth, turf or weeds, may be used. Downside is disruption of fertilizer application and uptake by trees, which means leaving the soil bare and controlling broad leaved weeds as they appear. But weeds are a year round problem even in winter when fast growing ephemerals (flower most of the year) like chickweed, speedwells, shepherd's purse and red dead nettle quickly colonise bare ground. Best, most satisfying and neatest option is to persevere with shade tolerant turf grasses.

Careless use of mowers or strimmers around trees inflicts bark damage, leaving unsightly scars and paving the way for entry of bark infecting pathogenic fungi and bacteria. Likewise any use of herbicides around trees must be conducted with care, using shrouded (covered) applicators dedicated to this task. Herbicides used to control broad-leaved weeds under trees will invariably be 'total' in action which means any turf grass will also be killed.

Making *a Mark*

Scott MacCallum meets Peter Sands, who has been in charge at Longcliffe for the last two years



Longcliffe Golf Club has long been regarded as one of the best in the east midlands and when the job of Course Manager was advertised in Greenkeeper International in 2008 it was an attractive proposition to a number of experienced greenkeepers

The man who got the job was Peter Sands, who had been Deputy Course Manager at West Hill Golf Club, in Surrey, and since taking up the reins two years ago he has brought his own stamp to what was already an excellent golf course.

Peter arrived on the retiral of Walter Cole, who had been an institution at Longcliffe for 46 years and been responsible for nurturing the careers of many young greenkeepers who went on to become Course Managers, while, at the same time, producing a fine course. It was never going to be easy for Peter to make his mark quickly.

But that's exactly what he did.

Having come from the Home Counties, where courses were kept on main greens and tees wherever possible Peter saw no reason to change his thinking just because he happened to have moved 130 miles north.

"The very first thing I did was to get rid of the winter greens and winter tee mats," said Peter, who started work in February 2008.

"I'd come from a course which never had winter greens and not seen any real damage done by frost. If the greens were so bad that damage would be done the whole course would be shut," explained Peter.

"I still get questions from members about it now and I reassure them that it's ok to play on frosted greens. The only time there might be a problem would be like recently, after the snow, and the sudden thaw with movement on top. All the time that it is hard it's not going to cause any damage that wouldn't be irreparable in the spring."

The move has been warmly welcomed by the club, not least by the pro shop, because societies, who'd previously not book in the winter months because they knew Longcliffe played on temporary greens and tees, are returning and there is more revenue coming in.

Peter's success at interview could be traced to having identified similar issues to those of the experts the club had commissioned.

Ex-Woodhall Spa Course Manager and consultant, Peter Wisbey, sat on the Interview Panel and had views on a number of issues which matched those of the successful candidate, while Peter (Sands) ideas on bunkering also matched those of another specialist, who had looked at the course..

Prior to visiting Longcliffe the club had engaged architect, Simon

Gidman, to write a report and had identified the bunkering as something that needed to be improved.

"I was asked what I thought of the course and said that I thought it was great but that the bunkering could be improved upon," said Peter, whose aim is to get the course into the Top 100 in the country.

"A lot of the bunkers were now in the wrong place and many were in need of a complete refurb and the club asked me how we should go about doing the work – how many phases etc."

John Griesley was appointed to carry out the work and following discussions with Peter they decided on a three phase strategy with those holes where the improvements would be most dramatic coming first."

That involved six holes and 16 bunkers, 12 of them brand new, and most of them fairway and the work, which took around eight weeks, was carried out in February and March of last year. The second phase, involving another six holes with more refurbishment work, was carried out in October of last year.

"The third phase has still to be fully agreed but we will hopefully also look at the 7th and 9th greens which are divided by only a ridge. It is one of the things that Longcliffe is known for but from a greenkeeping perspective it is tricky because there are so few pin placements on each green while health and safety is also an issue. I've looked at it and we can pull the 7th green back by about 30 yards and do the same with the tee so we wouldn't lose any yardage on the hole. It would make the two holes more separate," said Peter, who has also reintroduced rough the course.

"The course had been cut wall to wall but I've brought in some rough and some carries, which hasn't been fully appreciated by some of the lady members."

One particularly prominent lady golfer who is a regular at the club is European Tour pro, and rising star, Melissa Reid, who uses Longcliffe's practicc facilities.

Since arriving he has also spent a lot of time examining the soil he had inherited and has worked closely with Aitkens and Scotts to improve the balance.

"I did some soil testing and put a fertiliser programme together. It just needed an extra boost as it was lacking some nutrient while I also introduced regular hollow-coring which was only done very occasionally previously," said Peter, who revealed that the Ph had ranged from 5.5 to 6.7.

Having seen the benefits of Primo Maxx at West Hill Peter introduced it to his greens at Longcliffe.

"In the first three months of using it I found the sward definitely thickening up while I also noticed fewer grass clippings and the percentage of bents increasing," he explained, while adding that he is planning to use Rescue in the rough to reduce the Yorkshire Fog.

He has been working to reduce the budget and has made significant savings by replacing some of the old machinery while was racking up hefty repairs costs each year.

"The first thing I bought was a Toro Pro Core but I mainly brought in Jacobsen. I'm a Jac person as I find I get value for money.

Peter spent 18 years at West Hill, 10 as Deputy working under Terry Huntley and latterly Iain Morrison, who was particularly encouraging when it came to Peter's professional development.

"Ian pushed me to start by Higher National Certificate and made me believe that I could be a Course Manager. I did day release at Merrist Wood and when I moved here I spoke with the College and they were more than happy for me to email them my work and go down once a month rather than every week.

Having gained the confidence to look for a Course Managership Peter spotted the Longcliffe job advertised in the magazine and immediately thought that being a heathland course and coming from a heathland course it would be worth applying. Two interviews later and the job was his.

Prior to starting he travelled north and held a half hour interview with each of the team to get to know strengths and weaknesses and explain some of ideas about moving forward.

"It helped to break the ice and made the actual start date less

Heights of Cut

Greens
3 mil summer
5 mil winter
Fairways
13 mil
Tees and Surrounds
12 mil

The current ridge between the 7th and 9th greens

intimidating for everyone concerned," he said.

He has an excellent relationship with this year's Longcliffe Captain, who also happens to be BIGGA Past Chairman, Richard Baker, who in his current role as Assessor for Brooksby College, assesses some of the Longcliffe staff.

"It is nice to know that someone who knows the job – and who was on the green staff her for a while – and understands the frustrations of being a Captain is in the role. He has been very supportive."

All in all Peter has thoroughly enjoyed the experience of being in charge and admits that he has achieved more in his first two years than he had anticipated

"Such progress was only possible because they are such a good bunch of guys here who work extremely hard."

Course Manager, Peter Sands

Longcliffe Club Captain

Richard Barker was BIGGA Chairman in 2002 and in January he became the fifth Barker to hold the position of Captain of Longcliffe Golf Club – his father and grandfather and two grandmothers. His father and grandfather have also been Club Presidents.

Richard drove into office, together with the Lady Captain, in suitably elegant attire on January 1, having arrived in a Bentley.

"It was a super occasion and I was delighted that my tee shot was fairly decent," said the 5 handicapper.

Richard has deliberately not got involved with the course management side of the club but has nothing but praise for the direction the club is going in.

"Since Pete was appointed the club has disbanded the Green Committee and been replaced by a Green Liaison Officer. As a former Course Manager who had 10 Chairman of Green in 13 and a half years I think this is a very good move."

He does see some similarities between his Club Captaincy and his BIGGA Chairmanship.

"You are a figurehead at both. With BIGGA it is not your role to make changes – you are there as the figurehead for the Association for that year, and it's the same at the golf club. I'm not here to plant trees or fill in bunkers, I'm here to support the members and be a figurehead for the golf club," he explained.

Getting the basics right

Laurence Pithie MG looks at what is required to ensure your course is as good as it can be

During the last two decades, advances in turf technology have been considerable along with those in equipment, irrigation systems, tools and products.

This has enabled Course Managers to maintain and present courses at a level much higher than in the past, but only when the basic fundamentals of turfgrass management have been followed.

It is important to remember that these new technologies are there to help, they are not a substitute. Golfer expectations have also increased, largely as a result of improved playing conditions and standards of presentation.

However, due to the economic woes that have affected the industry and beyond, Course Managers are now challenged with providing the same quality but often with lower levels of resource, namely labour, equipment and materials. No-one likes to see standards fall and the key is not necessarily to work harder and for longer hours but to work smarter. There is a need to understand the key challenges faced when determining work programmes and implementing basic practices. It is all about maintaining a balance between sound agronomics verses playability.

From the Course Manager's perspective, creating a good growing environment is fundamental to the other aspects which include a healthy soil, stress free turf, sound cultural practices, adequate resources and the customer's understanding. Golfers' priorities are more likely to be firm and fast greens, all year round playability, minimal disruption to play, minimal penal rough and good course definition and presentation. The other major part of this 'balancing' act is budget constraints, therefore all the more reason to get the basics in place and use new technologies to help achieve the desired objectives.

So what are the key fundamentals in turfgrass management? They can be split into four distinct areas, namely;

- Growing Environment
- Nutrient Supply
- Water Management
- Mowing

Growing Environment

The practice of good greenkeeping is to work with the existing environ-

An open environment, ideal for healthy turf

MAIN ABOVE: Foliar feed and marker dye application

INSET ABOVE: Mowing green with brush attachment produces a finer cut quality

INSET LEFT: Light but regular top dressing is essential for thatch control

ment, not against it. Environmental aspects include sunlight, air movement, soil type, grass species and natural vegetation.

The three basic requirements for plant life are air, light and water and it is well documented that grass is a sun loving plant. Grass also accounts for 20% of all plant life on earth. Sunlight enables the turf to photosynthesise and develop energy for growth.

When turf is in deep shade, grasses have smaller leaves and less density which increases their susceptibility to wear, disease and other stresses, therefore a key requirement is to reduce shade as much as possible.

An open environment with good air movement is another critical factor since this helps to dry and cool the surface and reduces the level of humidity, which is a key factor in reducing the risk of disease attack. This, in turn, helps to reduce fungicide costs.

Since trees always win when competing for sunlight, water and nutrients, every effort needs to be made to limit their effect on and around the greens and to maximise air movement.

Soil types are diverse and will vary from course to course, ranging from clay to sand and possibly even landfill. Sandy soils dry out faster and can succumb to high heat stress and increased root damage, whereas clay soils have poor permeability, are slow to drain and easily compactable. Each needs to be managed differently but to achieve a common goal for healthy growth.

Grasses too are likely to be diverse. Each species present in a given sward is there because the environmental factors favour it to be so. If the desire is to change to a more sustainable species then it is the environment that needs to change in order for those grasses to out compete those currently present.

Fescues, for example, will not flourish when fertility levels are high and drainage is poor. Therefore when contemplating any change to the more desirable species, a thorough understanding of what is involved is required and that means good planning, good communication and a fair degree of patience and understanding.

Nutrient Supply

Plants require turf nutrients to promote healthy growth, being split into two categories of Macronutrients & Micronutrients.

The former include Nitrogen, Phosphate and Potassium, followed by Sulphur, Calcium and Magnesium whereas the latter include less well known elements such as Boron, Iron and Manganese but in minute quantities. Individual plant needs will vary depending upon grass species, soil type, mowing height & so on. Turf, just like humans require a balanced diet,

ABOVE: Hand watering dry areas to ensure even coverage

ABOVE: Overseeding to enhance sward quality Royal Porthcawl.

therefore knowing what is in the root-zone from analysing soil is an important factor.

Plant nutrition is all about supplying the plant with relative proportions and ratios relative to individual needs. A lack of nutrition leads to poor turf health and a lack of vigour and density of the sward. Moss, dollar spot and anthracnose can also become more prevalent where low fertility exists.

Over-feeding can be even more harmful to turf, leading to a build-up of organic matter and thatch. This has a direct and negative impact on surface quality, reduced surface drainage, shallower rooting and an increased risk of varying turf diseases.

A feeding programme based on foliar or liquid feeds and tank mixes is more effective and less expensive, using a variety of products and amendments such as seaweed extracts and humic acids.

There is no set feeding programme or amount of each nutrient to be applied since there are too many mitigating factors. Recommended amounts of NPK to be applied should act only as a guide and in line with both soil analysis and desired objectives. It is an old saying that grass does not grow on an analysis sheet but it is also foolish to ignore the facts.

Water Management

This relates mainly to irrigation and drainage; namely the supply and removal of water to and from the playing surface. Aerification can be added to this, since this essential cultural practice helps with the internal movement of water as well as other agronomic benefits. Water is an essential component of photosynthesis along with oxygen and sunlight.

It is used for the absorption and transportation of plant nutrients and also acts as a cooling agent by regulating temperature. Water also maintains leaves in a turgid state and if depleted then turf wilt occurs. At least 25mm is lost through evapo-transpiration when conditions become hot and dry and this amount of loss needs to be replaced by irrigation to maintain good turf health.

During prolonged spells of dry weather, good water management requires a 'hands-on' approach which means applying water by hand held hose to the dry spots, ridges and shoulders of the green. Although turf performs better when drier conditions prevail, the turf should not be put under extreme stress which can weaken the turf and lead to other agronomic problems such as dry patch. However, over-watering is a cardinal sin and results in the air space within the soil becoming filled with water, leading to a decline in root growth. Other problems such as softer surfaces, algae and thatch are then likely to follow.

Good drainage is essential for all year round playability and wear tolerance. Healthy turf cannot survive in a waterlogged soil therefore the quick and efficient movement of water through the soil and into a permeable layer or drainage system is paramount to providing good growing conditions.

This also favours the more desirable grasses which in turn leads to better playing conditions and a lower maintenance requirement. Most if not all soils can be drained and on those where higher amounts of silt and clay are present, a variety of drainage practices will be required in order to improve permeability.

Mowing

The three basic considerations for mowing are the type of mower used, sharpness of reels & blades and the height of cut being used. In principle, the lower the height of cut, the more stress that is placed on the turf since the plant has less surface area to photosynthesise, produce energy and store carbohydrates.

The shorter the plant becomes then the greater the level of input of nutrients, water and management practices that are required. It is, as stated previously, a balance between mowing height, golfer expectations and plant health. For greens mowing, key considerations are labour requirement, time and cost.

The type of grass species present and the policy objectives will also have a bearing on mowing height. Other practices such as grooming, brushing rolling and top dressing will all have a part to play in addition to mowing and it is imperative that mechanical stress such as scalping is avoided.

Much emphasis has been placed on greens speed and a faster putting speed is now judged by many as a mark of quality. However, it is trueness and smoothness that are the most important factors and a more realistic mowing height will result in less stress on the turf.

Summary

Getting the basics right include creating a healthy growing environment both around the playing surfaces and in the soil below.

It is also about implementing a balanced feeding program, ensuring good drainage and irrigating for the benefit of the turf. Sound cultural practices of aerification and top dressing are additional to operating realistic mowing heights and frequencies of cut.

These fundamental practices need to be at the cornerstone of course policy and that modern turf technologies are there to assist in maintaining then golf course.

about the author

Laurence was the first greenkeeper to attain BIGGA's Master Greenkeeper Certificate in 1991 and is also a recipient of both Greenkeeper and Groundsman of the Year in 1984 and 1988 respectively. He has served the industry for 39 years, working at numerous courses throughout the UK

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