

Modern mix herbicides - a match for turf weeds



Dr Terry Mabbett looks at the different herbicides available to tackle those troublesome weeds

Today's range of herbicides keeps managed turf essentially weed free.

Picture courtesy Everris

Turf weeds are a collection of plants covering broad-leaved species and rough grasses and wider in range than anything found in agricultural grassland or specific arable crops. As such greenkeepers require a sufficiently strong and broad spectrum of herbicide activity to eliminate a wide range of 'easy' and 'difficult' weeds from managed turf in the same strike.

Despite such a spectrum of turf weeds, each with its own characteristics, greenkeepers are keeping their greens, tees and fairways substantially weed free using a relatively restricted range of actives.

This is made possible by the highly sophisticated nature of turf herbicide technology.

Commercial products combining the individual strengths of different active ingredients in a single herbicide formulation continue to underpin this market.

With few exceptions, modern turf herbicide products are no longer single active ingredient formulations, but two and three, or even four way products like Bayer Environmental Science's Longbow (2,4-D, MCPA, MCPP-P and dicamba).

Today's turf herbicide market is dynamic with old actives lost and new ones gained to satisfy the increasing demands of turf weed management.

But this is not the whole story because a series of ongoing European Union (EU) directives continue to hit herbicides both directly and indirectly.

Greenkeepers are keeping their greens, tees and fairways substantially weed free using a relatively restricted range of actives - made possible by the highly sophisticated nature of turf herbicide technology

Some actives have been forced from the marketplace on safety and/or environmental grounds.

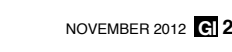
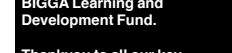
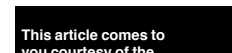
Other perfectly sound active ingredients have been voluntarily withdrawn by the manufacturer because the cost involved in producing the extra data does not add up for this relatively small niche market.

Be that as it may, herbicides lost have been more than compensated for by new actives bringing hitherto

undreamed of benefits for weed control in professional sports turf.

Today's turf herbicide market is like a revolving door but not always 'first in first out'.

Actives with pedigrees amounting to fifty years or more are still being used alongside others that were only designed and developed in the last ten years.



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responses that selectively kill broad-leaved weeds in turf.

Old faithful herbicides

This group of long pedigree herbicides, which includes 2,4-D, MCPA, mecoprop-P (MCP-P), dichlorprop-P (DCPP-P) and dicamba, still provides the 'bread and butter' selective control of broad-leaved weeds exactly seventy years after 2,4-D was first described in 1942.

Dicamba (a benzoic acid - the others are phenoxy-carboxylic acids) is the 'newest' of the group and that herbicide was first described over 50 years ago in 1961.

These actives are no longer used

as stand-alone herbicides but as 2, 3, and even 4-way mixtures each complementing the other to control a wide range of turf weeds.

Herbicide products which combine complementary benefits of the actives which make up this long established group of synthetic auxin herbicides include: Estermone (2,4-D, dicamba); Intrepid 2 (MCPA, DCPP-P, dicamba); Re-act (MCPA, MCP-P, dicamba); Relay Turf (MCPA, MCP-P, dicamba); Super Selective Plus (MCPA, MCP-P, dicamba); T2 Green (MCPA, MCP-P, dicamba); Longbow (2,4-D, MCPA, MCP-P, dicamba).

Overall benefit is summed up by Sheriff Amenity when talking about

ABOVE LEFT: Low drift herbicide with Syngenta Turf Nozzles. Picture courtesy Syngenta

ABOVE RIGHT: Weed control on a misty day. Picture courtesy Bayer Environmental Science

RIGHT: Plantains are among the easier weeds to control in managed turf

its T2 Green herbicide product.

"The combination of these three [complementary] active ingredients gives consistently better results than products based on one.

For example, mecoprop-P gives excellent control of [white] clover, while MCPA controls weeds with deeper [tap] roots such as dandelion and cat's ear."

Dicamba the third herbicide active in T2 Green, and the only active ingredient common to every one of the products listed above is there (albeit at a relatively low concentration due to its much higher activity) for very good reason.

That is to knock out more difficult to control weeds like yarrow, self-heal, mouse-ear chickweed, clovers and trefoils.

Greenkeepers get maximum versatility from these 'mix and match' synthetic auxin based products by observing different rates and applications recommended by the manufacturer, depending on the spectrum of weed species presented.

One of the most explicit sets of recommendations is provided by Rigby Taylor for their Super Selective Plus herbicide product:

- Lower application rate, one treatment per season: cat's ear, greater plantain, hoary plantain, lesser plantain, ribwort plantain, sea plantain
- Lower application rate, two

Herbicide products featured

Product (ingredients in the formulation as g/l (gram/litre)) - Source

Cabadex (Fluroxypyr 100, florasulam 2.5) - *Headland Amenity*

Crossbar (2,4-D 285, dicamba 52.5, fluroxypyr 105) - *Rigby Taylor*

Esteem (2,4-D 150, MCPA 175, clopyralid 35) - *Vitax*

Estermone (2,4-D 200, dicamba 35) - *Vitax*

Greenor (MCPA 200, clopyralid 20, fluroxypyr 40) - *Rigby Taylor*

Intrepid 2 (MCPA 166.5, DCPP-P 166.5, dicamba 20.8) - *Everris*

Longbow (2,4-D 70, MCPA 70, MCP-P 42, dicamba 20) - *Bayer Environmental Science*

Praxys (clopyralid 80, fluroxypyr 144, florasulam 2.5) - *Everris and Sheriff Amenity*

Re-act (MCPA 256.25, MCP-P 237.5, dicamba 31.25) - *Everris*

Relay Turf (MCPA 200, MCP-P 200, dicamba 25) - *Headland Amenity*

Rescue (pinoxaden 45, cloquintocet-mexyl 11.25) - *Syngenta and Everris*

Spearhead (MCPA 300, clopyralid 20, diflufenican 15.9) - *Bayer Environmental Science*

Super Selective Plus (MCPA 256.5, MCP-P 237.5, dicamba 31.25) - *Rigby Taylor*

Swiftsure (2,4-D 285, dicamba 52.5, fluroxypyr 105) - *Sheriff Amenity*

Trafalgar (fluroxypyr 100, florasulam 2.5) - *Sheriff Amenity*

T2 Green (MCPA 256.25, MCP-P 237.5, dicamba 31.25) - *Sheriff Amenity*



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treatments per season: those above plus creeping buttercup, common daisy and dandelion

• **Higher application rate, one treatment per season: those above plus bird's foot trefoil, white clover, mouse-ear chickweed, black medick, selfheal, lesser trefoil (for which a repeat application may be necessary)**

• **Higher application rate, two treatments per season: all those listed above plus yarrow and pearlwort.**

Newer herbicide arrivals

The contribution of herbicides, showing a synthetic auxin type mode of action to turf weed management did not stop there.

Two 'new' actives (clopyralid and fluroxypur), more sophisticated and potent and with variations in chemistry on the 'same basic synthetic auxin theme', were added.

These pyridinecarboxylic acids were first described in 1975 (clopyralid) and 1983 (fluroxypur).

Clopyralid is absorbed by the leaves and roots, with translocation both acropetally (in the direction of the shoot's tip) and basipetally (towards the roots) and accumulates in the meristematic tissue.

Fluroxypur is applied as

BOTTOM: Self Heal one of managed turf's die hard weeds

BELOW: Slender speedwell arguably UK turf's worst weed.

Picture courtesy of Everris

fluroxypur-meptyl (an ester), which after predominately foliar uptake is hydrolysed into the parent acid (the herbically active form) for rapid translocation to other parts of the weed plant.

Thus a new generation of turf herbicide products was born by mixing and matching from the expanded range of synthetic auxin actives then available.

Such products include: Esteem (2,4-D, MCPA, clopyralid); Swiftsure (2,4-D, dicamba, fluroxypur); Crossbar (2,4-D, dicamba, fluroxypur); Greenor (MCPA, clopyralid, fluroxypur).

This additional range of products increases the strength of selective hit on broad leaved weeds in general, as well as making it that much easier to kill the most resilient weed species like selfheal, yarrow and the clovers/trefoils.

Most important single benefit was bringing slender speedwell into the 'weed killing arena'.

When Bayer Environmental Science ran their annual 'Worst Turf Weed' survey amongst greenkeepers at Saltex, slender speedwell would invariably come out as 'the worst weed of managed turf'.

At that time few herbicide products would claim unfettered control of *Veronica filiformis*, but today slender speedwell control is claimed by a range of herbicide products based on a mix and match of synthetic auxin actives.

These include Crossbar, Greenor and Swiftsure with the common denominator for slender speedwell control appearing to be the inclusion of fluroxypur in the formulation.

An undisputed quick end for virtually all broad-leaved weeds in turf including the 'die-hards' like slender speedwell came with the introduction of additional actives with completely different modes of action.

Florasulam, a triazolopyrimidine herbicide which inhibits the synthesis of several specific essential amino acids, is twinned with fluroxypur in Cabadex (Headland Amenity) and Trafalgar (Sheriff Amenity), and features in a three way combination (florasulam, fluroxypur, clopyralid) as the herbicide Praxys from Everris and Sheriff Amenity.

Diflufenican, a pyridinecarboximide herbicide which blocks biosynthesis of carotenoid pigment in the cells, is combined with MCPA and clopyralid in Spearhead and similarly fails to 'spare the rod' for 'die hard weeds' like slender speedwell, self-heal, clovers, trefoils and

mouse-ear chickweed (common mouse-ear), providing operators use the higher of two application rates recommended by the manufacturer (Bayer Environmental Science).

Entry and movement

Vast majority of herbicide actives used for selective broad leaf weed control are systemically acting chemicals, entering plants via the foliage and/or roots and subsequently moving in the xylem and/or phloem to the respective sites of action, which in the case of synthetic auxins is the meristematic region (growing point) of the shoot.

Dual entry via roots and foliage and fast translocation within either the xylem or phloem tissue is a distinct advantage, whether via a single active or through the combined effect of two or more actives within a single herbicide product.

The apparent key advantage possessed by products which 'twin' fluroxypur and florasulam is having two potent actives with diverging modes of action.

However, fluroxypur with a predominantly foliar uptake and fast translocation, and combined with dual root and foliar absorption of florasulam, which is translocated in both xylem and phloem tissues, adds extra 'power to a products' elbow'.

'Rescue' from rough grasses

Professional sports turf comprises a select group of fine grasses.

Rough grasses, and even those like ryegrass which is valued in amenity grassland, are as out of place as are broad-leaved plants.

Rough grasses and their control in professional turf can prove difficult.

The offending plants are more difficult to spot and because rough grasses will be competing with fine turf grasses in the same way for the same resources.

Any herbicide used against rough grass species in managed turf must be highly selective to prevent any damage to fine turf grasses.

One herbicide has come to the rescue. Aptly named 'Rescue' from Syngenta which combines pinoxaden and cloquintocet-mexyl is recommended for the selective removal of ryegrass from across the golf course, including greens, tees, fairways and approaches.

The combined active force in Rescue targets specific enzymes responsible for cell division, stopping the growth of susceptible rough grass plants with rapid onset of leaf die back.



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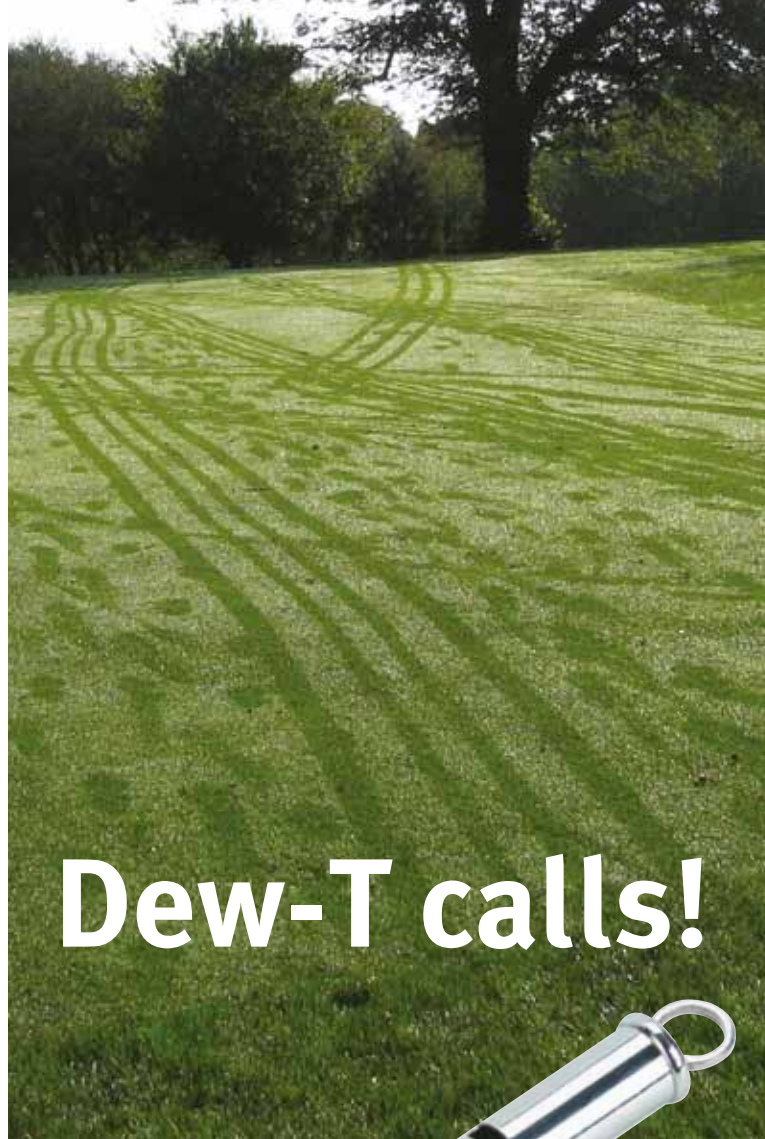
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“We have to be ecology, biology and botany experts, mechanics, weather forecasters and more...the list is endless”

A day in the life

Steve Castle heads to Lymm Golf Club for a greenkeeping crash course

Stuart Yarwood looks on with a mixture of pity and vague concern as I struggle with my latest task during a typical day in the life of a greenkeeper.

I've spent my morning haphazardly aerating greens and moving pin positions and now I'm failing to remove the tines from a tining machine. Stuart tells me that he'd appreciate it if I completed this challenge sometime before Christmas.

Perhaps he's already regretting his invitation for me to muck in at the Club – which I eagerly accepted. It's absolutely crucial for me to appreciate the daily difficulties faced by greenkeepers across the UK – particularly as I'm not from a greenkeeping background.

And as the day unfolds we battle torrential rain while investigating problems with drainage on parts of the course – something which hundreds of greenkeepers have had to contend with during the washout summer.

I arrive for my 'shift' woefully underprepared wearing just a polo shirt and thin jacket. Stuart looks at me disapprovingly – not for the last time – and grabs a more suitable coat for the inclement conditions to come before taking me out onto the greens and explaining some of his theories behind greenkeeping.

"One of the things many people, and I daresay many members, don't understand is it's such a wide ranging role. We have to get away from the traditional image of someone just mowing the grass. We have to be public relations experts within our teams and across the golf club.

"We have to be ecology, biology and botany experts, mechanics, weather forecasters and more...the list is endless."

He enthusiastically grabs a handful of soil.

"There are billions of life forms in this, so much activity. They help clean up and aerate the soil, recycle nutrients, and decompose organic matter. "The way I look at it is I've

got billions of greenkeepers here, all helping me out - all I have to do is look after them. It's a little community, an ecosystem and as such needs to be grown, nourished and nurtured."

Stuart is a founder member of the 'Gingerbread men' – a group committed to raising the profile of environmentally sustainable golf course management. They have stimulated intense debate in the industry, which explains their name – they are used to getting their heads bitten off.

He's the first to admit that not everyone agrees with his opinions on greenkeeping, or his methods, but he'll defend them to the hilt. He's incredibly passionate about the industry and undoubtedly has a talent for explaining highly complex matters to the uninitiated such as myself.

Stuart then guides me through solid tine aeration. I mark the greenside sprinklers then attempt to use the Toro Procore 648 pedes-



FACTFILE

Name: Stuart Yarwood
Born: Knutsford, 15 July 1975
Marital Status: Married to Paula with two children
Handicap: 11
Hobbies: Motor sport, caravanning, performing rubbish magic tricks
Favourite Sport: British Touring Cars



trian aerator machine, guiding it warily across the green under the watchful eye of greenkeeper Robert Cooper. Stuart and his team aerate the course between 30 and 40 times a year, at different times and at all manner of different depths.

As I survey my questionable handiwork I realise that I'd been more than a little wayward. But despite my complete inability to walk in a straight line while guiding a machine, and needing a couple of attempts at changing the 17th hole, I feel cautiously optimistic. I don't appear to have wrecked the course – or if I have, Stuart's too polite to say.

The afternoon would be spent investigating drainage issues on a specific part of the course, which seemed a reasonable request particularly in the autumn sun which had broken through.

But the weather then reverted to type and I experienced the reality of the outdoor lifestyle of the greenkeeper.

Together with two of Stuart's colleagues I began to dig a drainage ditch on the side of the first fairway – however we were quickly swamped by an absolute deluge.

I soon envied a passing group of golfers who were able to seek shelter while we plugged away, digging the ditch down to the level of the drain underneath the fairway to hopefully dispose of the excess water. Just when it seemed all our efforts were in vain the water began to drain away – a real breakthrough and a reward for a soaking afternoon of hard graft.

As we worked I had a crucial

opportunity to listen to the views of Stuart's colleagues on BIGGA, its communication with its members, the way forward and listen to some of their suggestions.

After a well-earned cuppa, Stuart took me on a tour of the course – which intriguingly, is two diverse courses in one. The top eight holes close to the famous Manchester Ship Canal are heath-like, while the rest are classic parkland.

Indeed, the canal and the course are inextricably linked as Stuart explained. The company in charge of constructing the canal owned the land either side of it, and used part of this area for dumping the soil from the digging of the waterway. This explains why holes three to ten are elevated.

As he gazed out across the canal – a fine view he's become accustomed to since joining Lymm in 2000 - Stuart's thoughts returned to greenkeeping as a whole.

"BIGGA's goal should be to empower the greenkeeper. Training and education are absolutely paramount and while it's improving, even more needs to be done.

"Today's been hugely beneficial for me and my colleagues to show someone from HQ exactly what we do, how we do it and why we do it."

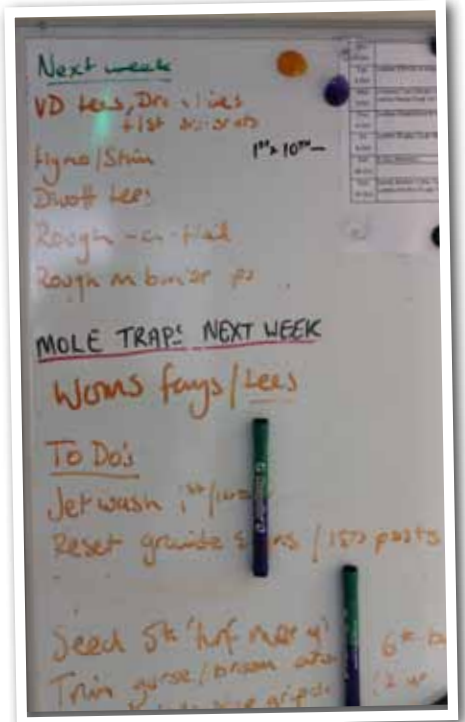
I couldn't agree more. It's been exhausting – and above all, wet – but I've learnt an enormous amount from Stuart and his colleagues, not only about the industry but also their views on BIGGA, and the challenges we all face.

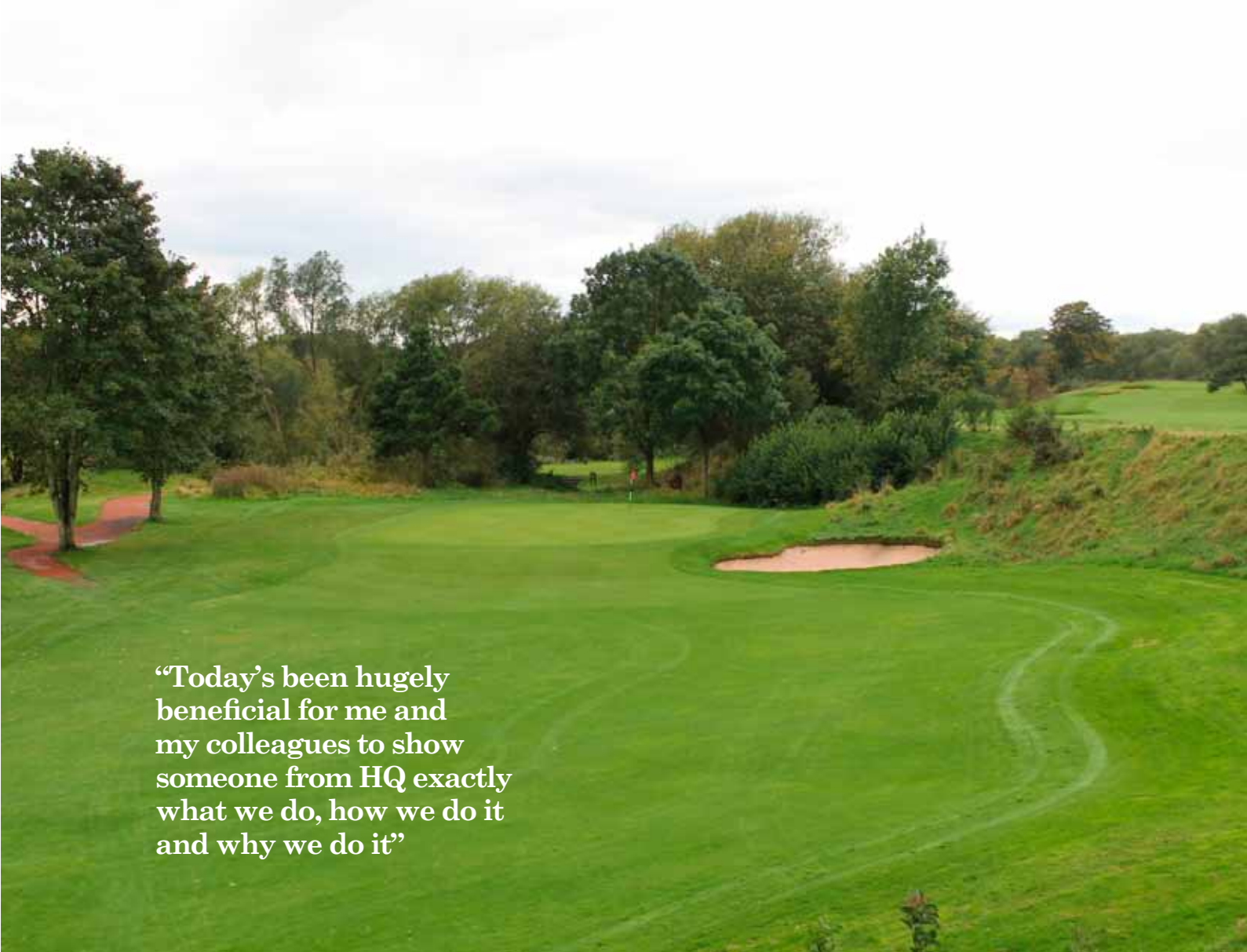
Whether I'll ever be invited back to work on the course again is another story...



INSET ABOVE: Steve Castle digging in!

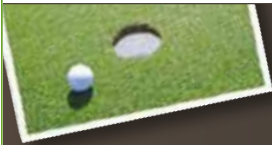
RIGHT PAGE BOTTOM: The team at Lymm: David Whitby, Robert Cooper, Ian Taylor, Stuart Yarwood. Missing is Alan Gerrard (who refused to have his photo taken!)





“Today’s been hugely beneficial for me and my colleagues to show someone from HQ exactly what we do, how we do it and why we do it”





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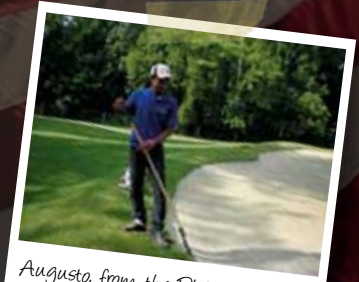
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I think the knowledge and experience gained in the exchange program will help me a lot professionally and will help me to be an excellent leader in my future career.



Augusta, from the Philippines, 2011



Roderick, from Moldova, 2011

In the time I have been here, I have learned different irrigation techniques, various soil conservation methods, different methods of fertilizer application, and equipment maintenance and operation. I believe I will be able to get a good job in this field when I return home.



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