Bombus rudrearius (also main photograpjh)

Bombus humilis

- The Grove Golf Club
- Pyecombe Golf Club
- Luffness Golf Club
- South Essex Golf Club
- Bonnyton Golf Club
- Royal Tarlair Golf Club

The range of work is diverse. At one club, this work may involve simply recognising the plight of our pollinators and getting members to tie in with the need to leave areas of grassland, whilst at another bee houses are being erected and considerable effort is being given to creating flower rich grasslands.

So how does a club get started? Simple - call STRI and discuss the range of opportunities that are available. Identify areas of grassland that can be set aside and managed to optimise pollinator interest.

A management programme will be required highlighting management techniques including the sowing of appropriate wild flowers if needed. It will be essential that the flowers present provide a nectar or pollen source throughout three of the seasons.

Ensure good overwintering habitat which is essential if species are to fully utilise the habitats present. Dead wood including log piles, fallen wood scattered on the ground and ariel wood are essential - not only for overwintering - but those specialist invertebrates that live in dead wood which are important in pollinating our flowers and grasses.

John O'Gaunt are well underway with the pollinator conservation work and are so advanced they are using the seed heads collected from the first established areas to develop new areas of grassland around the course.

Do not rely on even neat and attractive areas - tall herbs including umbelifers and species of labiate in out of play areas should be encouraged. This may appear untidy to some but nature is not always tidy; these areas are often vital and will support species that are dependent upon them.

Communication is likely to become a main part of the programme and can take many forms. North Foreland are using beer mats in the bar printed with the Operation Pollinator logo; this is a great way of getting members and visitors aware and involved. Some clubs such as the London Club and Minchinhampton have installed signage alongside grassland areas which in turn have been specially developed next to public rights of way. This is a great way to get ramblers aware of the positive conservation work being implemented on the courses.

I would like to thank all of the golf clubs for entering, I am confident that working together we can all make a positive contribution to the conservation of our countryside and all that is in it.

There are probably many clubs just starting out perhaps feeling that they haven't done enough but as I have found on visiting these clubs that they are doing far more than they think. They would not only prove worthy contenders of this new, prestigious award, but by joining in they become part of a growing network of similar like-minded clubs.

about the author

As STRI's Head of Ecology and Environment, Bob Taylor is one of the most experienced ecologists working within golf. Over the last 20 or more years he has developed a number of innovative and bespoke management techniques that are now routinely used in the running of golf courses.

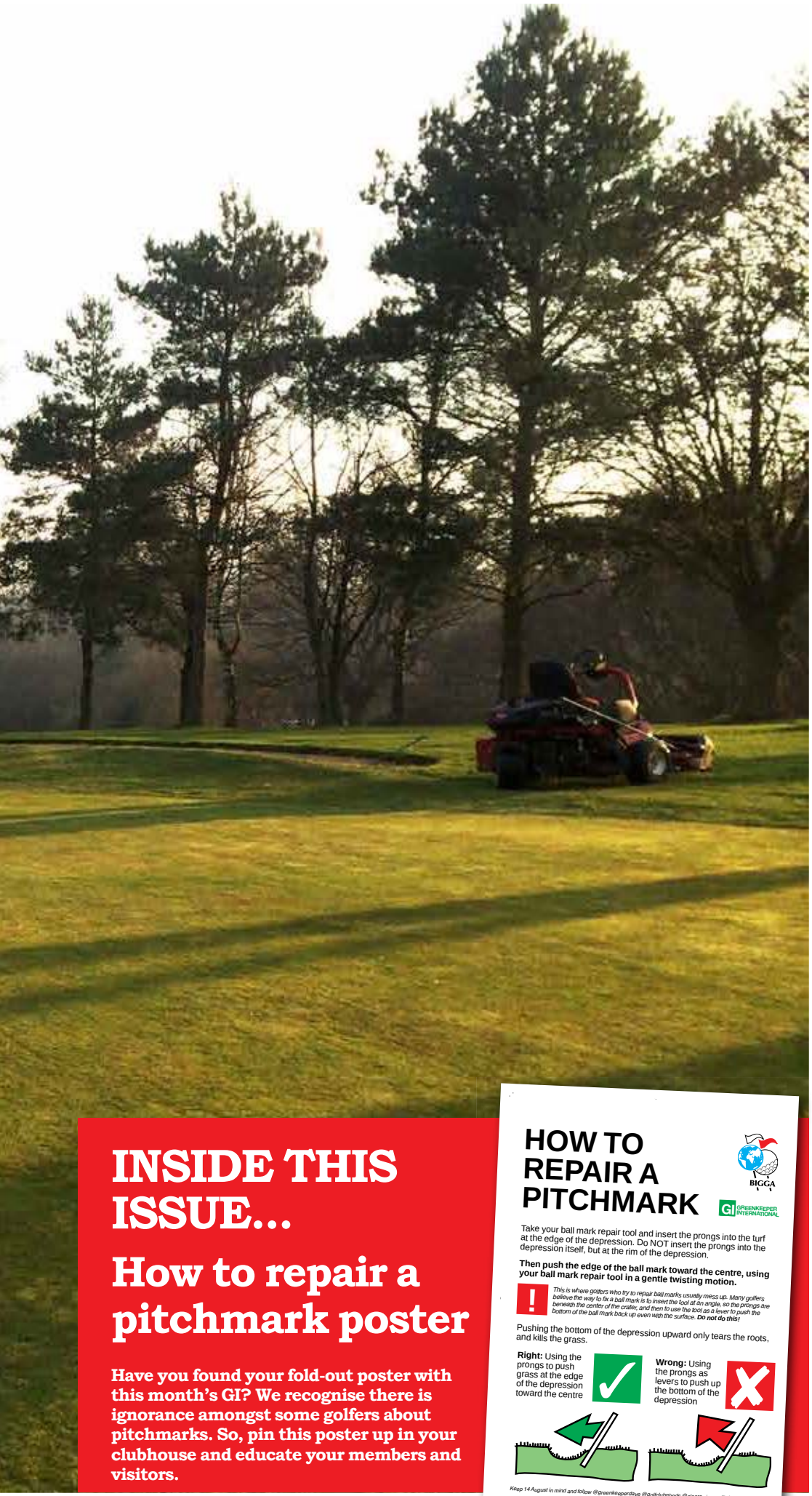
Bob's work takes him all over the UK and Europe. He sees major opportunities for environmental, biodiversity, and conservation improvement, and for golf to take the lead as positive custodian of the landscape.

Operation Pollinator Awards

The Operation Pollinator Awards is open to all UK and Ireland clubs implementing the Operation Pollinator programme. Operation Pollinator guidelines and advice has been developed specifically for golf courses in conjunction with STRI and is available through Syngenta. Please do your part by registering your interest with Syngenta caroline.carroll@syngenta.com or with me at STRI bob.taylor@stri.co.uk. We will notify you when the application form for 2014 is available. Award entries are judged by STRI.

Pitched battle?

The issue of pitchmarks is always contentious. Here Ben Dollery (left), a BIGGA member and Senior Greenkeeper at West Chiltington Golf Club, discusses the topic and promotes 'National Repair Your Pitchmark Day



INSIDE THIS ISSUE...

How to repair a pitchmark poster

Have you found your fold-out poster with this month's GI? We recognise there is ignorance amongst some golfers about pitchmarks. So, pin this poster up in your clubhouse and educate your members and visitors.

It's time to help greenkeepers win the battle against pitchmarks. Here are the often reported statistics about them:

"A pitchmark repaired within 10 minutes of being created will fully recover within three days. A poorly repaired pitchmark or one left for a day before being repaired will take over a week to heal.

"On average the number of ball marks made on greens by a golfer per round is eight. Assuming only 130 rounds are played daily on your course, your greens receive 1040 impressions daily, 31,000 per month or more than 374,400 per year."

In recent years the issue of pitchmarks – always prominent in the turf management industry - has become and even hotter topic. Social media now has a big part to play as many greenkeepers use it to show off their courses or gain advice from fellow turf experts as well as keeping members and golfers informed. Recently a growing number of greenkeepers and golf clubs have been tweeting pictures of unrepaired pitchmarks on their greens and venting the frustration that goes with them.

Some golfers must wonder why pitchmarks are so frustrating. Greenkeepers strive to provide fast and true greens and unrepaired pitchmarks make the greens bumpy and patchy as well as taking up valuable time repairing.

My interest in the topic was heightened after seeing a Twitter conversation last year between Dave Collins (@greenkeeperdave) and Julie Vesely (@golfclubnbeds). They were discussing pitchmarks when they came up with promoting the idea of 'National Repair Your Pitchmark Day" and set a date for 14 August 2013. The day was a great success, many golf clubs got involved as well as a few celebrities - South African cricketer and keen golfer AB de Villiers and Bradford City FC. Hundreds of other social media users retweeted the event.

So what did the day involve? Apart from the massive campaign on Twitter, and at their golf courses, some greenkeepers gave out pitchmark repairers at their clubs and explained the importance of these to golfers going out that day. Another day is planned for 14 August this year to hopefully raise even more awareness. Here at West Chiltington, which is a parkland course in West Sussex, we will be putting up posters around the club and will be maximising exposure on Twitter, Facebook and our website

to get people talking about it.

'National Repair Your Pitchmark Day' is all about raising awareness. It is about reinstating etiquette back into golf in an educational and fun way, rather than being patronising. Last year's event helped by getting people talking about the issue, and if only a handful of golfers improve their etiquette it's a start. They should hopefully pass this on to their playing partners and any new golfers to give them some ownership of the courses they play.

We need to get golfers thinking about the care of the course as part of their game. For some it is in-built but for others it simply isn't, though most would tell you they tend and repair greens incessantly if you asked them!

This was certainly confirmed when we asked the members at West Chiltington, to fill out a short, anonymous questionnaire featuring just three questions based on pitchmarks. 188 members replied…

1 Do you repair your Pitchmarks? Unsurprisingly, 99% said yes!

2 Would you repair a pitchmark made by someone else? Again, unsurprisingly, 94% said yes

3 How often do you repair Pitchmarks? 56% said they repaired pitchmarks 80-100% of the time, with 36% claiming they repaired them every time. Just 10% said they repaired them 0-10% of the time.

The aim is to get golfers in the frame of mind where repairing pitchmarks is as important to them as holing out or filling in their scorecard after every hole. It is an old line trotted out by greenkeepers, but one of the things we try to impress upon our members and visitors is that we are not the only stewards of the course and that we all play a part in its presentation and standards.

Often this is a difficult message to convey especially to our more cynical customers.

If we can all teach one new golfer how to repair a pitchmark then that's hundreds of golfers who will help us out in the future.

A good way to get golfers on board is to provide free repairers or stock some of the huge variety carrying a logo, ones that members can display with pride.

A close relationship between golfers and greenkeepers is vital for understanding the problem and working together to improve the course.

Getting captains on board will help to get the message across if they mention it in their regular speeches, and after recent meetings we have arranged pitchmark repair social events.

At West Chiltington we are constantly encouraged to speak with members to improve relationships and understanding both ways. We regularly meet with the different sections and speak at their AGMs as well as answering questions they have about our latest project whilst out on the course. Not everyone reads the latest newsletter on the website so face to face communication with golfers is still very important, in fact in my opinion it can't be beaten.

We have our own Twitter account @westchiltgreens to keep members informed of daily work we carry out and to publish pictures of the course as well as information on pitchmarks, bunker raking and all types of course management. We hope that by involving the members and through giving them a sense of ownership, pitchmark repairs and other small acts will become a regular part of their game.

ABOVE: Pitch mark with repairer tool and LEFT: double pitchmark shot in winter (both at West Chiltington Golf Club)

Is genetic modification an avenue to turf grass improvement?

This month Dr Terry Mabbett looks at the possibilities genetically modified turfgrass could offer the turf manager – and the potential downsides

Conventional plant breeding continues to advance grass varieties with genetic traits for enhanced plant performance in managed turf grass but genetic modification (GM) could steal a march.

Access to and use of genetic material in conventional grass plant breed is limited to DNA (genes) within the genus (e.g. Agrostis) and perhaps within the wider grass family (Graminae) depending on the level of genetic compatibility and hybridization with other genera. With GM 'the world becomes an oyster' in the quest for DNA for insertion into the grass genome using a technique called 'gene transfer'. GM puts genetics into a whole new arena by opening up new avenues for scientists to explore and exploit using an apparently infinite spectrum of DNA.

Genes can now be accessed from literally anywhere and everywhere, from rats to roses, and inserted into grass genomes for phenotypic expression of new desired traits. Difference between the standard and modified genotypes is miniscule and is separated by a single gene. But the new phenotype will be completely different with an ability to overcome the pinpointed problem (for example a specific pest or disease or environmental conditions), whichever was the specific target factor for genetic modification.

MAIN LEFT: The risk of 'alien' genes escaping from managed turf and into the wider environment is reduced by the continual close mowing that prevents flowering, unlike cocksfoot (Dactylis glomerata) seen flowering here in uncut rough

ABOVE:Turf grasses genetically modified for high salt tolerance would be of interest to coastal golf courses (Picture courtesy Kenny Liddell)

BELOW: Scientists and regulators would have to be sure that GM grass did not impact on associated butterflies and moths

Potential upsides and downsides of GM turf grass

Universal potential benefits of genetic modification appear as wide as the gene bank in the broader plant and animal world. Grass plant resistance to specific insect pests and plant pathogens such as chafer grubs and Microdochium nivale (Fusarium patch disease) immediately springs to mind.

Design and development of grass genetically modified for non-allergenic pollen is well advanced. Australian researchers have genetically modified perennial ryegrass (Lolium perenne) and Italian ryegrass (Lolium multiflorum) which do not trigger an allergenic response (hay fever) in humans. Though clearly not applicable to grasses used on tees and greens, where regular low-cut mowing removes the ability of grass plants to flower, this GM avenue could prove interesting for grasses used to seed rough areas.

With increasing interest in bee-friendly areas where the rough grass species are as important as the wild flower seed selection in securing 'bee friendliness' of the sward composition and therefore high pollination levels, genetic modification of rough grass species could be of interest.

It all sounds easy and the mechanics of genetic modification certainly are for appropriately qualified scientists with state of the art instrumentation at their fingertips. The real and sometimes seemingly insurmountable problems arise from public perceptions of GM fuelled by hyped up media coverage and scare stories about 'Frankenstein foods'. This has helped to build a strong anti-GM lobby with a large measure of public support.

Perhaps surprisingly first attempts at GM now around three decades old were targeted at food crops including wheat and maize as food crops and soya bean for animal feed. This appears to have been the initial undoing of GM in Europe. GM came in for an extraordinarily bad press especially in the

UK. Virtually no attempt had been made to carry the public along and get them on board. I can remember attending conferences on biotechnology in the early 1980's including GM where the only journalists were scientists from research publications and other 'learned' journals. The net result was blanket public distrust for GM in all its forms including grasses used in sports and amenity turf.

But many fears expressed about genetic modification of food crop plants, including members of the grass family – wheat, rice and maize - simply do not apply to sports turf because no human being is going to eat the genetically modified biomass. The only animals likely to do so are insect pests like chafer grubs. small wild mammals like rabbits and wild geese grazing greens and tees in spring for that early 'bite'.

However, there are factors presenting real or perceived environmental problems whether the GM plants are grown for human food and animal feed or used as a component of living sports surfaces. Primary factor is the escape of GM pollen into the wider plant environment with subsequent introduction of 'alien' genes into wild plants. Traits which are beneficial and safe in turf grasses could create serious problems in the natural environment. This will become clearer in the following case study featuring Agrostis stolonifera as the first grass species to be genetically modified for a specific application in managed turf.

The great GM grass escape

The first work on genetic modification of a turf grass started around the year 2000 and produced a GM Agrostis stolonifera (creeping bentgrass) resistant to glyphosate, a systemically acting total herbicide which normally kills all green plants whether they are broadleaved weeds or turf grasses.

It did not receive general public attention until 2006 when the press, including New Scientist magazine, reported how scientists had found this GM trait in the wild.

The grass had been designed and developed for easy-to-manage pure swards on golf courses but had escaped its managed turf niche and moved into the wild up to 3.8 km from where it was being trialled in the north western US state of Oregon, and before securing full USDA (United States Department of Agriculture) approval. Nine GM 'absconder' plants were identified. GM material had apparently escaped and established through pollination of non-GM plants and germination of the hybrid seed thus produced.

ABOVE: Any change in pesticide usage from using GM turf grass clearly cannot be allowed to impact on the wider golf course environment and especially aquatic components

Critics of the whole GM concept pointed to the perennial nature of Agrostis stolonifera claiming its persistence year after year actually poses more scope for escape, establishment and spread than for agricultural crops like maize (an annual 'grass' albeit a very large one) which is replanted as seed every year.

Others referred to numerous close relatives of A. stolonifera, like A. capillaris (colonial or browntop bentgrass), A. canina (velvet bentgrass), A. castellana (Highland bentgrass) and other truly wild bentgrasses with which it can hybridise and exchange the gene for glyphosate resistance. Research findings at the time reported hybridisation between creeping bentgrass (A. stolonifera) and other Agrostis species at frequencies of six hybrids thousand.

Others were concerned because the gene conferring glyphosate