

From Lab to Links

Scott MacCallum talks with Dr Alan Gange about the work that he and his students are carrying out at Royal Holloway College

Finding a link between the hard running fairways and firm greens of a well maintained golf course and the microscopes, test tubes and lab coats of a university research laboratory may at first seem a tall order but a visit to Royal Holloway, University of London, brings it all together and into sharp focus just how important the academic work currently being carried out could prove to be for Course Managers in the next few years.

The students of the Biological Science Department, under the tutorage of Dr Alan Gange, are currently investigating among others the biological control of *Poa annua* and finding ways of turf becoming more resistant to *Fusarium*.

There, I knew that would attract your attention!

"Our big project is looking at the biological control of *Poa annua* using beneficial fungi in the roots (known as mycorrhizas) and trying to find a way which we can slowly reduce the amount of *Poa* in a golf green," revealed Alan, as we sat in his office in what must be one of the most impressive buildings in the country, just a stone's throw from The Wentworth Club.

"We're also looking at the beneficial fungi which exist in the foliage of plants known as endophytes and Paul Stevens, our Masters student, is looking at these fungi. Increasing their abundance in sports turf which would make grass much more disease and pest resistant," he explained.

Indeed Stevens, a turf professional who has taken time out to complete his Masters Degree, has been looking for golf courses which haven't been sprayed in recent times so he can use evidence collected from them in his work.

The project which launched Alan into golf course research was into the conservation potential of heathland on courses, which was part funded by the R&A, and Alan still has undergraduates researching into the subject.

The relevance of the work of Alan and his students will become ever more important as chemicals are lost to the increasingly tight legislation the fine turf industry is now working within.



▲ Dr Alan Gange.



▲ Laboratory observation of leaf subduction by *Tipula* larva.

"I won't ever suggest that we are going to see the end of chemicals on sports turf. I don't actually think you can grow sports turf in this country without the use of some chemicals, but by the same token I don't believe that in 10 years time greenkeepers will have the number of chemicals they have at their disposal now. I think they'll have one or two. However, it is fair to say that the natural remedy will be the only sustainable method in the future," said Alan.

Having such a limited arsenal of chemicals will in itself have knock on problems with pests and diseases able to build up resistance to the smaller choice of chemicals available whereas before, if a chemical was losing its effectiveness, it was relatively simple to change to one with a slightly different chemical make-up.

"I'm not sure if greenkeepers realise just how many chemicals are going to disappear so there's a lot riding on our research," he warned.

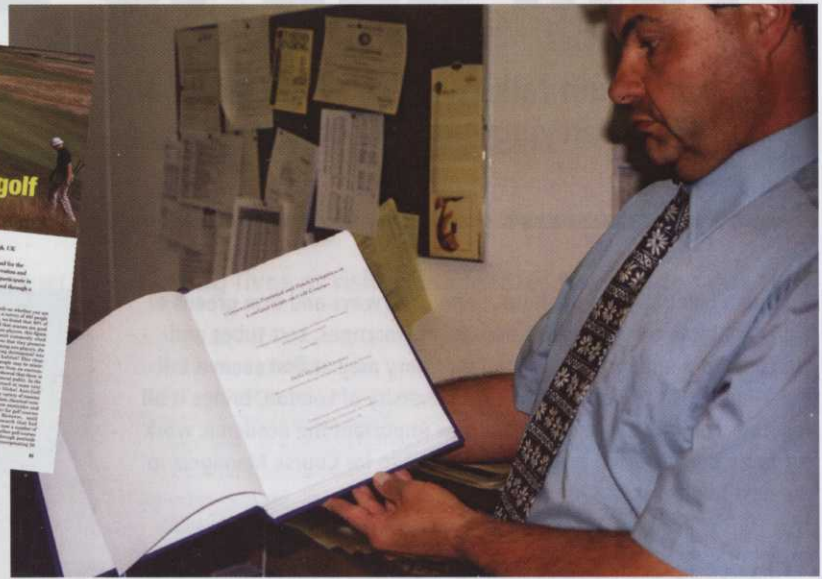
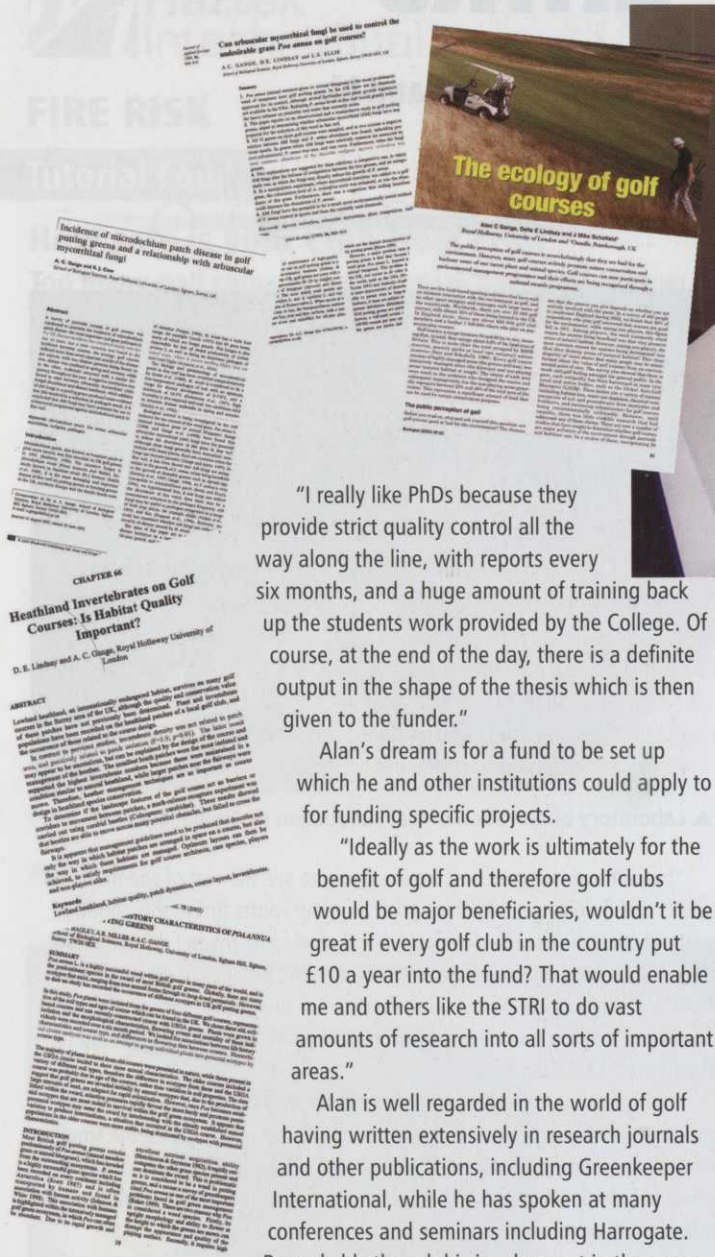
Despite the almost universal agreement that there is a lot of work to be done in view of the move towards a reduction in chemicals, Alan finds golf singularly apathetic when it comes to funding research into alternatives.

"It really does depress me just how hard it is to get funding and I'd certainly like to see a better funding system for golf course research and believe the industry is in desperate need of it. I look enviously across the pond at the way universities are funded by the industry and organisations such as the USGA, but over here companies within the industry, who don't think twice at spending vast sums of money in other areas or on advertising their products, balk at the thought of investing relatively small sums on potentially vital research projects."

The lack of funding has certainly curtailed much of the work that Alan and his team of talented students wish to undertake.

"We've been trying to do studies looking into the diversity of the golf course but getting funding has been virtually impossible. Other than the R&A funding the heathland project, and some other notable exceptions, we've had to fund everything else ourselves."

Alan points out that financing a doctoral (PhD) student to undertake research is an extremely cost effective way for a company to obtain valuable information.



▲ Dr Gange and his published work.

"I really like PhDs because they provide strict quality control all the way along the line, with reports every six months, and a huge amount of training back up the students work provided by the College. Of course, at the end of the day, there is a definite output in the shape of the thesis which is then given to the funder."

Alan's dream is for a fund to be set up which he and other institutions could apply to for funding specific projects.

"Ideally as the work is ultimately for the benefit of golf and therefore golf clubs wouldn't it be great if every golf club in the country put £10 a year into the fund? That would enable me and others like the STRI to do vast amounts of research into all sorts of important areas."

Alan is well regarded in the world of golf having written extensively in research journals and other publications, including Greenkeeper International, while he has spoken at many conferences and seminars including Harrogate. Remarkably though his involvement in the game came about pretty much by chance.

"I was interested in mycorrhizal fungi in the soil and how they affected the diversity of natural communities of grass land and in order to do that I was using a fungicide – Rovral – to try to reduce the diversity of fungi. I was also interested in subterranean insects and how they could affect the diversity too.

"I wanted to set up lab trials of insects and fungi but couldn't find any insects. I was moaning about this to a friend in the pub when he suggested I go to a local golf club."

Having no interest in the game whatsoever, Alan thumbed through the local phone book and the first club he came to was The Berkshire so he called up, got through to then Course Manager, Bob Moreton, and asked him if he had chafer grubs.

"At the time I didn't know that it was such a rude question to ask a greenkeeper but Bob, being the bloke he is, said 'Yes, millions of them, come and help yourself'. He couldn't believe his luck that this idiot was wanting to dig up his grubs and take them away!

"I began chatting to Bob about greenkeeping and discovered that he was applying Rovral to the greens to control Fusarium and I told him I'd been using it for years to control beneficial fungi in the soil. Bob then wondered what affect it was having on his greens and whether beneficial

fungi might exist in a golf green. I said I'd no idea but that I could find out.

"That was in the early 90s and ever since we've been using The Berkshire as a natural laboratory to obtain chafer grubs, leatherjackets and beneficial fungi, so we didn't have to spend time culturing them in the lab here," said Alan.

He admits that until then his perception of golf had been quote "awful" and that he was one of those who felt it was more bad than good when it came to protecting the environment.

"Walking The Berkshire looking for chafer grubs enabled me to see that most of the golf course isn't really playing areas at all but natural habitat. I was astonished because I'd been teaching students about heathland ecology and why heathlands are rare and why the amount of heathland had diminished over the years. But the old surveys by English Nature in this area never included golf course land.

Now Alan is a real convert and even runs a survey among his prospective students and their parents on their perceptions of the game. It turns out that if they play golf they believe a course is good for the environment and if they don't they say it's bad. Almost a perfect mirror image and therein lays the problem.

"I ask people if a lovely course like Sunningdale didn't exist what would it be? The answer is concrete. If Sunningdale or Wentworth were closed tomorrow and the land went up for sale a developer would buy it and it would become a housing estate."

Holloway College itself is an amazing building and the story behind it is even more amazing. Thomas Holloway made a fortune, a fortune which



▲ Students at work in the lab.

would equate to around £500 million at today's rates, from patented medicines in the 1880s which the College's chemistry department discovered, but which had no medicinal value whatsoever!

Having made this fortune he put a letter in *The Times* asking for advice on how to spend £250 million. In the end he took the advice of his wife and built a university for the education of young ladies, which was opened by Queen Victoria. Royal Holloway remained an all female college until the late 1960s.

"It is now ranked in the top 10 universities in Britain while the Biological Science Department, which boasts around 300 students, is rated as world class," said Alan proudly.

He is equally keen to dismiss the notion that much of what goes on in his department is of no practical value.

"It is all applied research. I talk to greenkeepers and ask them if what we are doing is of use to them. If it isn't then we won't do it. I could do a whole lot of what I think is really interesting but it would be a waste of time if it is not going to benefit the industry."

So the link between golf course maintenance and the hallowed portals of universities like Royal Holloway College is probably closer than you think and the work that they are carrying out might just make your lives a great deal easier in future.

Students

Donald McGregor is in his fourth and final year and when we spoke was writing up his thesis, which is on soil aeration and looking at the effect of it on microbial populations within the soil, the research is sponsored by Redexim Charterhouse.

"I have gone into it with a completely open mind, and obviously we



▲ A student at work



▲ From left to right, Dr Lynn Whitfield, Paul Stevens and Donald McGregor, whose research will benefit golf courses in the future.

can't influence the outcome, but the results are not always what one might expect. I will certainly get some interesting data, but it will also create more questions and open the door to more research," said Donald.

Dr Lynn Whitfield is working on Mycorrhizas in sports turf specifically trying to develop a mycorrhizal fungus which will combat *Poa annua*.

"I have been working on the project for two years, based on the work Alan has been doing for several years now. It is going very well at the moment," said Lynn, whose work is funded by the Leverhulme Trust, which funds projects which fall outside the remit of Government Research Councils.

Steven Ixer-Pitfield is in the early stages of his work, studying how mycorrhizas affect the growth of three grass species, including *Poa annua*, to see if he can achieve increased growth of the desirable grasses, to fight the *Poa*.

"I'm really pleased I got this project and I'm now going to start a Masters course with Dr Gange after I finish this work," said Steven.

Paul Stevens is a turfgrass professional who has worked in the UK and abroad before enrolling at Royal Holloway. He is looking to find endophytes which might combat *Fusarium*.

"I believe that new build golf clubs should be able to manage their nutrients properly and thus reduce the amount of fungicides and pesticides," explained Paul, who is looking to move back into greenkeeping once his work has been completed.



▲ Royal Holloway College – a view from the courtyard and a view from the air.