

ROOT KNOT NEMATODE INFECTION OF CREEPING BENTGRASS GREENS

Dr Kate Entwistle becomes Miss Marple as she tries to solve a nematode mystery



Characteristic 'knots' on *Agrostis stolonifera* roots caused by the *Meloidogyne* sp. nematode

While visiting golf courses across the UK and Ireland during the summer of 1997, Mark Hunt, of Headland Amenity, became aware of a number of courses that all showed unusual patches of yellowing turf across the surface of the putting greens. The affected greens did not show any loss of sward cover or any detrimental effect on the playing quality of the sward but the visual effect was quite dramatic due to the extent of the patch development across each green and the speed at which the problem had apparently developed on the new surfaces.

It was not until the following year when more courses were identified as showing the same symptoms, that Mark realised all of the affected courses had creeping bentgrass greens above a USGA rootzone construction. The symptoms were the same on all courses; patches of yellowed turf approximately 30 cm diameter, developing from around April/May and persisting until November each year. The patches returned to the affected greens each year and developed equally on all greens, regardless of local environmental conditions. Several turf samples were sent off to a laboratory in the UK to identify the cause of the yellowing and in each case the analysis result came back as *Rhizoctonia* (no species identification). The symptoms certainly resembled those of the documented disease, Yellow Patch (caused by *R. cerealis*) and so, with the analysis results in hand, fungicide applications were made to control the disease. The fungicide treatments, although different between courses, showed no effect on the disease expression. During 1999, the problem showed again and although further analyses continued to confirm the cause as a *Rhizoctonia* fungus, no single, multiple or combination of fungicide applications, put down at any rate, showed any effect in reducing or controlling the disease.

During November 2000, Mark approached me to see if I would be interested in working with him in trying to solve the mystery of this apparent turf disease. I was eager to help and curious about this potential 'new' pathogenic fungus that apparently did not respond to any fungicide treatments. Although the symptoms were not showing on any course at that time of the year, Mark had photographs and information that I was able to take a look at in order to get an idea of the type of fungi that may be involved with this problem. I had considered the possibility that one of four possible types of fungi may be associated with the symptoms and my

reasons for and arguments against each, were as follows:

The symptoms of these patches as expressed on the turf surface distinctly resembled yellow patch, a known turfgrass disease caused by the fungus *Rhizoctonia cerealis*. During 1997 and 1999, 15 separate turf samples had been sent to a diagnostics laboratory in the UK for identification of the cause of the disease and in all cases, the result given was a *Rhizoctonia* sp. However, I didn't understand how this could be yellow patch because the pathogen would normally cause damage to cool-season turfgrass over the winter and spring – not from spring to winter, through the relative heat of the summer months. One other nagging doubt that I had about this being related to a *Rhizoctonia* sp. was that the symptoms, once they showed in April, remained unchanged throughout the year. Diseases caused by a *Rhizoctonia* sp. would be more than likely to enlarge at some point as the fungus grew outwards but this was never seen to be the case – not on any green or on any course affected. In addition, if it were a fungal disease, why should it appear on the places on the same greens, year after year? If it were a fungal disease, this was very unusual symptom development.

I had also considered some type of superficial basidiomycete to be the cause of these symptoms, but this did not feel quite right either as a possible diagnosis. Although these fungi do cause development of yellowed turf, they are not commonly seen on seeded greens but are more likely to show on recently turfed areas. In addition, it would be more likely that only some of the greens would be affected, those in which the local environmental conditions were conducive to basidiomycete development. But this problem was appearing equally on all greens. In addition, the presence of superficial fairy ring fungi would almost always be identifiable by the development of surface mycelium and/or a characteristic musty smell. Neither of these symptoms had been associated with any patch on any green on any course.

One further consideration was that the roots were being colonised by a pathogen similar to, if not the same as, the one responsible for take-all patch disease. It is well known that take-all patch is a common disease of bentgrasses and so if a similar type fungus was affecting the roots of these plants, it could cause patch symptoms on the turf surface. However, if this were the case, these type of fungi (of which there are quite a few!) would be easily recognisable and should have been obvious to the diagnostic laboratory in the UK that had seen 15 samples of turf already. Surely it would have been detected on one of them? A gut feeling told me that this type of root infection may not be the cause – as with the *Rhizoctonia* sp. idea, if this was the cause, you would expect there to be variation in the size of the patches and in their growth between years. Neither appeared to be the case.

The only other type of fungi that readily came to mind as having any possible involvement in the yellow patch development, was a *Pythium* species. These fungi can colonise the roots of turfgrasses and cause a yellowing of the plant due to their impairment of water and nutrient movement through the plant. Again, these fungi, if present, would leave characteristic spores in the roots that would be easily identified by any diagnostician! These fungi rely on free water for movement, but only on one green out of all of the courses affected was there any evidence of patch development being associated with water movement across the green. And if a *Pythium* sp. was infecting the roots, why should all greens be affected and why would the patches be so large and not vary in size or location from year to year?

Discussions had now led me along many avenues but, in all cases, had resulted in a dead end. For one reason or another I had come to the conclusion that none of the fungi that I had thought MAY be involved with these symptom expressions, could be. The only way to be sure of what was present was to wait for the symptoms to show and take a look at a sample.

In 2001, I collected some turf samples from an affected course in the UK. The Course Manager offered a little more information on the problem



general view of the yellow patches on a creeping bentgrass sward (photo courtesy of Headland Amenity Limited)

and his comments were found to echo those of all the other Course Managers in the UK and Ireland. The symptoms start to show on all greens on the same day, usually following torrential rain. Regardless of which fungicide active ingredient had been applied, alone or in combination, at recommended rate or otherwise, no reduction in the severity of symptom expression was identified on any green, on any course. Although all of my potential theories on the likely cause of the symptoms could be dismissed for one reason or another on the facts as presented by the Course Managers, it was this realisation that the problem did not respond to any fungicide treatment, that made me start to seriously doubt any direct fungal involvement with the patches.

I analysed the samples from the affected course in my laboratory and found that in all cases, there was no *Rhizoctonia* sp., no superficial fairy rings, no 'take-all patch'-like fungal or *Pythium* sp. root infections, but that all were affected with a root knot nematode (*Meloidogyne* sp.). The samples taken from unaffected areas of turf did not show the root knots. Although the cause of the symptoms appeared to be quite obvious from the samples, I was unsure as to whether nematodes could cause such discrete patch symptoms. I contacted Dr Roger Cook, Nematologist at IGER, Aberystwyth, and asked if he would confirm these nematodes as *Meloidogyne* sp. and also, identify the species for us. He came back with the news that they were root knot nematodes on the affected turf and that in his opinion, they were a new species that had not previously been described. He also confirmed that of all the different plant pathogenic nematodes known, *Meloidogyne* sp. were able to cause patch type symptoms, rather than diffuse areas of affected turf that are generally associated with nematode infections.

When it was announced that we believed these yellow patches were caused by this nematode, there was considerable doubt expressed by many in the Industry. The symptoms looked so much like yellow patch (*R. cerealis*) that it was still believed to be a fungal disease – even though many of those doubting the diagnosis had not seen the problem first hand nor had any analysis done on samples from affected areas.

Since Mark had spent four years working with Course Managers trying to determine what was happening on their greens, Headland Amenity decided to fund independent research at IGER to prove one way or another whether these nematodes were indeed causing this problem. The results of this research will be the basis of the next article about these yellow patches.

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REVIEW 2003

...Success yet again!

Every year we at BIGGA set ourselves a challenge of producing a better Harrogate week than the year before. As you can imagine, given that by common consent each year so far we have succeeded, it means that it becomes an increasingly difficult task. However, we do believe we have done it again.

This year we had the added attraction of the ClubHouse Show for the first time. With over 40 exhibitors, and a steady flow of visitors over the three days to Hall D, ClubHouse had a pleasing debut and from these solid foundations it will be expected to expand and develop over the next few years.

Measuring success is also not easy. We pride ourselves on producing a "feel good" show, but that isn't really quantifiable. What we need is for people to say they have taken more orders than before and for more people to attend in record numbers and take time to see the entire show.

Well, we have reports of people doing record business over the three days while the attendance figures also produced new records. Adding up the figures for those who attended each day we reach the staggering figure of 10,359, well up on the 8,629 figure we achieved when the show first went to its three day format last year. Within those figures were 5,693 individuals, again up on the previous year's total of 5,201. This highlights just how many of those visitors remain at Harrogate for more than one day which is encouraging for those Exhibitors who worry that visitors won't be able to get round every Hall in just a one day.



COUNTDOWN TO 2004...

Neil Thomas reports on a year round operation...

So the 15th BTME has come and gone as well as the first ClubHouse exhibition. New records have been set for both show visits and visitor attendance. This must be encouraging for both trade and the profession after a most difficult year with the economic downturn hitting hard at both the industry and golf clubs generally. While the 'Harrogate week' remains a major event in the golfing calendar with its very special atmosphere and invigorating effect, we in BIGGA remain conscious of the need to keep moving forward and to meet the challenges posed in these turbulent times if the success of the exhibitions is to be both maintained and strengthened.



Within BIGGA, we now work on a 12 month rolling plan such is the size and scope of the Harrogate operation, taking in a comprehensive education and training programme as well as the two exhibitions. Yet there are still those who believe we employ an agency to come in and do it for us. The truth is that the whole week in all its aspects is organised and run through our headquarters operation at BIGGA HOUSE. Herein lies one major reason for our success - we stand or fall on our own efforts.

As I write immediately after the event, we are busy analysing the statistics and feedback from the show. The Steering Committee, represented by 16 companies, is being consulted. Members of our Board of Management will have visited the exhibition stands and will be reporting back on the outcome of their visits. By the end of February we will be able to take stock of the 2003 exhibitions and, having validated the feedback, this will be of great assistance in our planning for 2004.

On the education and training front, accessing the BIGGA website will provide excellent information on the views of our members as to what worked and what did not with the education programmes, while surveys undertaken during the week will also provide vital planning information for 2004.

By mid-March our BTME/ClubHouse Staff Working Party will be setting the parameters for next year's event. At the end of that month we will have already reached the final date for this year's exhibitors to confirm their bookings for 2004 before stand bookings are opened up on a first come first served basis.

Early summer and the education and training programmes are taking

shape. Much consideration is given to the choice of Keynote Speaker, a session that has proved most successful in recent years. Debra Veal was outstanding this time around, so much achieved at so young an age. Not to be underestimated is the choice of Banquet entertainment. The social highlight of BIGGA's year demands a high standard. This year the Counterfeit Stones seem to have met with universal acclaim.

As we move into autumn the pressure is mounting. The halls are filling fast and speakers from around the world are being chased for CVs and photographs. Liaison with Harrogate International Centre on a daily basis is crucial while the bookings from delegates are pouring into BIGGA HOUSE. The details of various BIGGA functions during the week are set out and circulated and VIP invitations issued. The first two weeks of January see it all coming together and finally the logistics of moving the BIGGA HOUSE operation, staff and materials, to Harrogate for a week are debated and decided.

Before you know it, another year has passed and the Sunday sees the start of 'Harrogate week' with the BIGGA staff bright eyed and raring to go!

I hope that I have been able to paint just a small picture of the background and planning of a much anticipated event. Each year we look to learn and innovate for the future. We believe our partnership with the industry is vital for ongoing success. We also firmly believe at BIGGA HOUSE that each year we must improve on what has gone before and with that in mind we will set our sights on 2004 being bigger and better than ever.



Gold and Silver Key Supporters



Outgoing Chairman, Richard Barker, helps George Brown into his blazer following the AGM



"What a cracking exhibition. A truly superb launching pad for our new range of STAR TINES and MICRO-STAR (TM) TINES. Greenkeepers certainly know what they want and used our TINE selector to choose. 24 new account orders and 22 potential European Distributors speaks volumes! Well done!"
 Stuart Booth, Allied Turf-Tech



"Very good attendance from overseas visitors. A lot of interest from new customers. Excellent show and good value for money."
 Derek Cooper, Garfitts



"We've had the best BTME yet since we've been attending over the last 10 years, with the special interest of 2003 being in the new SandMaster."
 Gary Mumby, Director, BLEC

LAUNCH OF CAREERS CD

A new information pack for those interested in a career in golf course management and greenkeeping was launched at the Show.

Funded jointly, by the BIGGA Education and Development Fund, the Greenkeepers Training Committee and the Golf Course Superintendents Association of Ireland, the information is available on CD ROM and/or DVD.

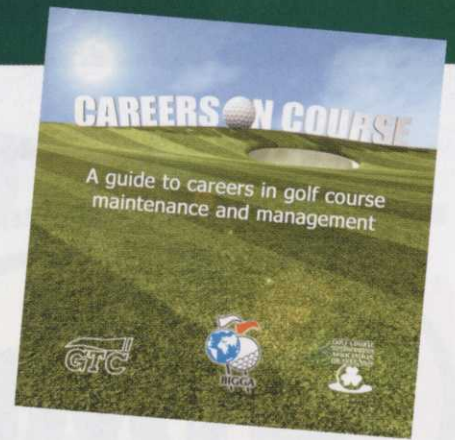
The CD ROM contains a 12 minute video, narrated by Peter Alliss, which shows the work of greenkeepers, information on qualifications, information on training providers and examples of career progression. The DVD includes an additional greenkeeper master class.

The pack will be distributed to all careers offices and training providers in the United Kingdom and Ireland. Other interested bodies may request a pack from BIGGA, the GTC or the GCSAI.

"The industry has been waiting for a careers information pack for some

time. The CD ROM/DVD should appeal to the target audience of school leavers and spread the word about careers in greenkeeping," said BIGGA Education and Training Manager, Ken Richardson.

David Golding, the GTC's Education Director, added, "The new career CD and DVD promotes Greenkeeping as an excellent profession to join and with education and training opportunities for persons at all levels I hope that the career advisors will help our sector to recruit Greenkeepers, some of whom will become the Course Managers of the future."



The Bernhard's Scholarship Reception. Hosted by Stephen Bernhard, the Wednesday evening occasion gave the 10 latest recipients of the Scholarship the opportunity to meet up and get to know their American hosts when they travel to Atlanta for the GCSAA Conference and Show



John Deere's Pieter Nel speaks during the National Education Conference Dinner



A popular visitor to the Show was Kim Macfie, the recently retired Sales and Marketing Director of Hayter, who was a guest at the dinner he used to host and, received a gift from all his former dealers



Conference dinner speaker John Stirling regaled some tales from his lifetime in golf



One of the most popular Sessions in the Education Conference was on Organisational Politics delivered by David Bancroft-Turner

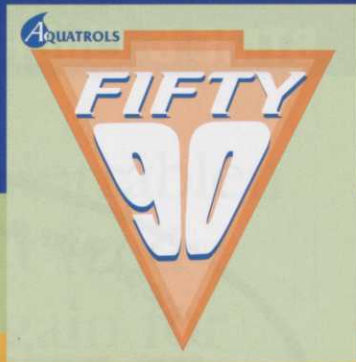


Keynote Speaker, Debra Veal MBE talks about her amazing journey



The Golf Course Design Workshop with Howard Swan and Simon Gidman saw the creative juices flowing

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"It has been the best attended show for a number of years. There has been good appreciation of the Rovral Green name change to Chipco Green. The earlier opening times prevented queues forming at the Hall entrances prior to the show. There was a better quality of visitors due to BIGGA's direct marketing. Will be exhibiting again in 2004."

John Hall, Bayer Environmental Science



"We have never taken so many orders at an exhibition! It is the best show I have ever experienced. We took 13 orders for machines and a great deal of product interest was expressed from European visitors, in particular the new 3696M Machine."

John Millen, Lastec



"Staggered and stunned at the amount of visitors to the Tenax stand - we were bowled over by the number of leads generated. When a show is like this, it makes it all worthwhile."

Paul Munday, Tenax UK Limited



"BTME 2003 has been a huge success for Headland Amenity. More people than ever before visited the stand, and we were able to talk to a greater number of potential new customers than at previous shows. It proved to be the ideal launchpad for our new TriCure Wetting Agent Pellets which generated a high level of interest from greenkeepers and groundsmen alike. Interestingly, we have seen much interest in new fertiliser technologies and customers have spent more time discussing the technical aspects of nutritional programmes as well as seeking value."

Andy Russell, Sales & Marketing Director, Headland Amenity Ltd



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JOHN DEERE Team Championship

Goes ahead for second year...

Following the successful involvement of Great Britain and Ireland in the 2002 John Deere World Team Championship golf tournament, John Deere chose the Show to announce that its participation is to continue in 2003.

Now in its 17th year, the Team Championship will follow a similar format to last year. John Deere dealers organise their own qualifying tournament for local golf clubs, operating within the Team Championship's own rules and regulations. Each team of four entered at this stage must include a senior member of the club's greenkeeping team, two members of the board or committee, and the club's head or assistant professional.

The winners of these regional qualifiers will go through to either the GB or Ireland national final, where the teams will be joined by the local dealer representative.

The two winning teams from the 2002 GB and Ireland national finals recently travelled to Scottsdale, Arizona, for the 2002 world finals. Brokenhurst Manor Golf Club from the New Forest and Milltown Golf Club from Dublin, victorious at the national finals held at The De Vere Belfry in August, were among 34 teams from seven nations, all competing for the world title on one of the most famous courses in America - Grayhawk Golf Club.

"The championship's success in GB and Ireland has exceeded all expectation in its first year. Altogether 27 dealers took part in qualifying



The John Deere Team Championship

tournaments with a total of 450 teams participating," says Pieter Nel, John Deere Limited's Commercial & Consumer Equipment Division Manager.

"The chance to go to the world final in Arizona is a big draw and the championship also provides a great opportunity to spend time with existing and potential customers in an informal atmosphere.

"The 2003 details are yet to be finalised but one thing is for sure - two teams, one from GB and one from Ireland, will be travelling to the USA in November to take part in the world final, and the chance to be crowned John Deere World Team Champions 2003."

John Deere Limited will again make a donation of £25 for every British and Irish team entered, to support the educational activities of BIGGA and GCSAI.

BIGGA used the £9,300 it received to support the National Education Conference during Harrogate Week.

MASTER GREENKEEPER CERTIFICATE



The latest Master Greenkeeper is Huw Morgan, Course Manager at the Wildernesse Club, in Sevenoaks, Kent.

There are now 33 BIGGA Master Greenkeepers in the World, two in Germany, 11 in the United States and now 20 in the United Kingdom.

A native of South Wales, Huw joined the Master Greenkeeper Scheme in 1999 and quickly achieved Stage 1 from a combination of experience, formal qualifications and Continuing Development. He moved onto Stage 2, the Assessment of Golf Course Operation in October 2000 and passed the Stage 3 Examination in March of 2002.

Huw was presented with his Master Greenkeeper jacket and plaque by the President of BIGGA, Sir Michael Bonallack and BIGGA Chairman Richard Barker, at a ceremony at BTME/ClubHouse 2003.

Among his other achievements Huw was the 2001 Toro Excellence in Greenkeeping Award winner.

BTLIA

The BTLIA presented four members with the prestigious BTLIA Certificate of Merit.

The Certificate of Merit is both highly prized and highly regarded because it is a performance award based entirely upon feedback from the customers. Through the analysis of questionnaires completed by these customers and using a set formula, attainment marks are given for each contracting member. These are then used to produce a performance mark and those companies reaching the high mark of 85% are awarded the Certificate.

The companies that have been awarded the Certificate of Merit for 2002 are: -

- Irrigation Control Limited
- MJ Abbott limited
- SJS Irrigation
- TIS [Scotland] Ltd.



Harrogate increasingly attracts influential people from the world of golf and this year was no exception. Kyle Phillips, (left) the architect who designed Kings Barns, in St Andrews, and Southern Gailes, near Ayr, attended the show to discuss his latest project The Grove, near London. Kyle who is pictured with Nigel Wyatt, of MJ Abbotts, who are constructing the course, expressed himself well impressed with the Show and promised to be back.



John Nicholson of John Nicholson Associates with Ken Brown, Mark James and Paul Jenkins, Course Manager of Lilley Brook GC