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## How to stop the grass growing from under your feet

### Longhand account.

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# NEMATODES THE UNSEEN TERROR

programmes can be devised and economic losses avoided. Thresholds for the number of nematodes that grass species can support before symptoms appear are available in the USA. However, it should be borne in mind that we need more evidence of the pathogenic importance of some nematode species in the UK. Thresholds for action have to be treated with caution; the effect of different species varies according to environmental conditions and on the tolerance or resistance of the host species. In addition, the total number and types of plant-parasitic nematodes present in turf may have more influence on growth and on the prevalence of disease than the presence of one particular pathogenic species. Associations between nematodes and other plant pathogens are also being investigated by CSL.

There are no chemical control measures available for turf in the UK, emphasising the need for management programmes. Frequent observations are important to introduce measures before the problem gets too serious. Infested turf should be treated as if it has a reduced root system, as the nematodes interfere with water and nutrient uptake due to their physical presence and the death of surrounding root tissue. Therefore, we need to reduce stress to the plants as much as possible. Ensure that the turf does not dry and the grass die from drought when, with a normal root system, it would not have

been affected. Fertilisers also need to be applied frequently and in smaller doses to allow the grass to take up available nutrients, but prevent the loss of excess nutrients that the grass plant cannot absorb. Mowing height should be increased to reduce the stress to the plants.

Various biological control agents, including plant extracts, are being investigated for the control of nematodes worldwide. Some work in the USA has shown that seaweed extract can significantly reduce the infection of roots of tomato plants by juvenile *Meloidogyne incognita* and *M. javanica*. This reduction was shown to be caused by certain chemicals in the extract called betaines. Although the effect of extract will vary with nematode species, it is possible that seaweed extract may help improve grass recovery by reducing further attack by the nematodes. There is also interest in nematode trapping fungi that 'catch' nematodes and eat them, other parasitic fungi and bacteria, and the use of predatory and parasitic nematodes, but research is required to establish whether these types of biological control could be adapted for easy application and effectively control nematodes that parasitise turf.

We also clearly need more research to determine the extent to which nematodes parasitise our turf. We must determine the efficacy of possible control measures on each nematode species individually to be able to devise effective control measures for mixed

populations. The interaction of other nematode species and external environmental conditions may affect control and so efficacy needs to be established in the field. It is possible that grass species vary in their susceptibility to the different nematode species. Therefore, we need to establish any grass species that can withstand higher populations of nematodes. These could then be oversown on areas with known nematode problems.

So! If your turf struggles to recover after winter or seems to always be 'off-colour' without any definite reason, or doesn't seem to respond to your loving care, it may be that parasitic nematodes are the problem and a more detailed look at the roots and soil may be required. However, until further research is done, new turf should always be tested routinely to ensure it is not infested with known pathogenic species and you should develop a management programme just in case.

Dr. Ruth Mann is the Turfgrass and Plant Pathologist at STRI. Ruth and the rest of the STRI team can be contacted on 01274 565131; e-mail [info@stri.co.uk](mailto:info@stri.co.uk); or visit our website [www.stri.co.uk](http://www.stri.co.uk)

Sue Hockland is manager of the Invertebrate Identification Team at CSL, and specialises in nematology. For more details of their services and address details visit their web-site at [www.csldiagnostics.gov.uk](http://www.csldiagnostics.gov.uk) or contact the Customer Services Manager, Don Walker, at [diagnosis@csl.gov.uk](mailto:diagnosis@csl.gov.uk) (tel: +44 (0) 1904 462324, fax: +44 (0) 1904 462147)

Fig 3: Patchy appearance of a ryegrass ley attacked by stubby-root nematodes (*Trichodorus* spp.). Better growth is visible in the consolidated tractor wheelings (courtesy of CSL)



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**MM**

Andy Law passes on some excellent advice on what to look for when choosing bunker sand

# SHIFTING SANDS



Bunker sand selection, while not the most dynamic topic at most dinner parties in the suburbs, is quite often the main topic of conversation between golfers at the 19th!

This is the reason that if you have the much envied role of selecting the right sand, or even reducing the candidates down to the last three like the "Pop Idol" final, you must be equipped to make the right choice.

Like anything we undertake in life, replacing bunker sand should be 90% preparation followed by 10% perspiration. This approach should prevent the 100% aggravation should you make the wrong choice!

Starting at the very beginning and the initial question. What is a bunker and why do the architects, in their wisdom, draw them on their course designs?

A bunker, in terms of a golf course, is a man-made hazard which is normally strategically placed on a line between tee and green. The aim of the bunker is to make the golfer think about where they will place their shots to ascertain the shortest and safest route from tee to green.

Before we start to ring round the vast list of bunker sand suppliers some thought should first go to the positioning of the existing bunkers.

1. How long ago were the bunkers last refurbished?
2. Does the bunker still come into play on the hole?
3. Is the shape and size of the bunker still useable?
4. Can the surrounds be maintained easily and safely?
5. What was wrong with the last sand selected?

Questions two and three should maybe be approached with the assistance of the club professional or, better still, the clubs preferred golf course architect.

The modern game has added length to all of our games, well with the exception of my own that is, so quite often the bunker that came into play 20 years ago is driven over by even mid range handicap golfers.

Treat the project to replace the bunker sand as an opportunity to review the bunkers themselves and to ease any difficult or even dangerous bunker surround areas to make your greens staff safer.

Changing all the bunkers on a typical 18 hole course will probably involve around 75 to 90 of them and quite often this will amount to between 600 and 1000 tonne of

# SHIFTING SANDS



The BRTMA is a collaboration of experience and expertise in the manufacture of Rootzone and Top Dressings. Member companies have committed themselves to supplying top quality materials only after they have been subjected to standardised, quality control tests. The appointment of STRI as the testing house for the Association in June last year underlines the desire of member companies to improve standards within the industry and differentiate between 'quality' products and others.

The same testing procedures will apply to all members and thus one firm's products will be directly comparable with another's. Top quality will mean the best for a given application. For far too long materials which are inappropriate for the purpose have been bought and used, the yardstick being one of price alone.

BRTMA members are also working towards the preparation of guidelines for the proper handling and installation of materials to achieve best performance. They hope to work with architects, agronomists and contractors to establish standards, which will benefit everyone in the industry. Founder members of the BRTMA are:

Bailey's of Norfolk  
Banks Amenity Products  
Bathgate Silica Sand  
Boughton Loam  
John Bourne & Co  
Prestige Sports Surfaces  
Roffey Ltd  
Rufford Soil Technology  
Stewart & Co Seedsmen  
Whitemoss Amenities

For further information visit the Association website at [www.brtma.com](http://www.brtma.com)

sand. Of course this amount has to first of all be removed before being replaced and therefore you could be moving up to 2000 tonnes of material.

Do you have the staff to cover renovating the bunkers and continuing the day to day running of the course?

Perhaps you need to involve a contractor. The first call in this case should be to the British Association of Golf Course Constructors (BAGCC). All member companies have had their work and companies vetted to ensure they meet a very high standard.

Back to the definition of a bunker, a man-made hazard which lies between tee and green. A hazard yes but one which must be clearly visible from the tee to give the player an opportunity to play the hole and avoid the trap.

Clearly our first priority then in considering which sand goes forward to our grand final should be colour. A bunker sand should be light in colour although not to the extent that we need to wear sunglasses to play the hole.

Our next criteria should be shape, both of the bunker faces and of the sand we are going to select.

Most inland bunkers have shallow faces and gentle slopes on the face from the bunker. The sand is then normally placed in the base and also up the face to just short of the lip of the bunker.

Here is a trick you can try at home. Take a dozen marbles and try to stack them in columns and rows at the top of a 1 in 10 hill. The hill has of course to have a smoothed surface like the subsoil in a prepared bunker. Bet you your next year's subscription to BIG-GA you can't do it.

To be able to retain sand on any slope the sand shape must be at least sub-angular. This is one of the most



common faults in sand selection. We get the colour right and particle size perfectly aligned to that in our root zone, and forget to check the particle shape.

To summarise our selection categories so far:

1. Colour - Light clearly visible
2. Shape - Sub Angular to Angular

The final criteria should be particle size, however some thought should go into location of the sand and long term availability of the material.

### So what is the ideal particle size for a bunker sand?

Naturally links course are different from inland courses and the particle size recommendations for

### USGA recommendations

Fraction	Size (mm)	USGA root zone mixture	Bunker sand
Gravel	2 - 4	≤ 3%	≤ 3%
Very coarse sand	1 - 2	≤ 10%	≤ 7%
		<small>Total gravel plus very coarse sand</small>	
Coarse sand	0.5 - 1.0	≥ 60%	≥ 65%
Medium sand	0.25 - 0.5		
Fine sand	0.15 - 0.25	≤ 20%	≤ 25%
Very fine sand	0.05 - 0.15	≤ 5%	
Silt	0.002 - 0.05	≤ 5%	≤ 3%
Clay	<0.002	≤ 3%	
Total very fine sand, silt, clay	<0.10	≤ 10%	



the bunker sand is dramatically different. I am going to cover the USGA recommendations that cover inland golf courses, however I will briefly touch on sand selection for links bunkers also.

The particle sizes you will see are virtually the same as for a USGA root zone sand. The critical difference is in the shape of the sand and that the fine sand criterion works better when it is nearer to 20% in bunker sand and nearer to 15% in root zones.

This particle size will give very high hydraulic properties which if the bunkers are properly drained, should keep the sands moist and never waterlogged.

Ideally the sand should interlock and consolidate without becoming "solid" and compacted. This will prevent the "poached egg" effect when the ball plugs leaving barely a quarter of the ball above the surface of the sand.

Sands for links courses are quite often a rounded particle in the medium fine fraction, ie the majority of particles fall between 0.150 and 0.5mm.

Hydraulic properties are relatively low, however, when you consider that the bunkers are often over two feet deep. This ensures good

drainage from the surface of the bunker.

Links bunkers are normally Pot shaped where the sand is placed only in the bottom of the bunker and for this reason the round sand particles work well.

Links sands tend to compact rather than consolidate and it is this firming up which prevents the poached egg effect in these type of bunkers. To summarise:

#### Bunker Sand Selection Criteria for Inland Golf Courses

1. Colour Light, Clearly Visible
2. Shape Sub Angular to Angular
3. Particle Size 0.150mm to 1mm

Finally, when you are drawing up your shortlist of suppliers I would urge you to look up the member companies of the British Root Zone and Topdressing Manufacturers Association (BRTMA). These companies ensure you get a premium product which is guaranteed to meet your specification and which will be available for years to come.

Andy Law is Managing Director of Whitemoss Amenities Ltd. Tel 01270 886266




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Paul Edleston of Fishwick Hall Golf Club has been using the new Multi-Brush for a month now and says: "Being situated besides the River Ribble, we tend to get heavy dew in the mornings so its mid afternoon before we could get a good quality cut on the fairways. Now we brush all the fairways and rough each morning. It only takes us an hour and a half to two hours and then we can start mowing 10 minutes later. I've been doing it for a month now and I can honestly say I don't think we've left any clumps of clippings anywhere on the course."

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## GreenTek

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**Robert Reynolds Golf Course Superintendent of Denarau Golf Course on Fiji was on the island when a coup occurred two years ago. He talks about this and working life.**

# WHAT A COUP!



Above: Rob Reynolds (left) with two time Australian Open Champion, Aaron Baddeley who played a tournament at the course

It was a tough job but someone had to take it ... Tropical Island Paradise ... jewel of the South Pacific ... The beautiful Denarau Island course was beckoning. Little did I realise what was around the corner on May 19, 2000 and what impact the political upheaval would have and the challenges it would create.

First, let's set the picture ... the Denarau Island golf course is a 6570m-resort course. It was designed by Ichi Motohashi, who is the President of one of Japan's largest golf design and construction companies.

The development of the course took place on a low lying mangrove swamp in 1990. Over two million cubic metres of fill was used to elevate the site and 8500 fully grown trees and shrubs were transplanted. The course has T328 greens and T419 fairways and some pretty astounding bunkers designed in the shape of sea animals, so when viewed while flying into Fiji you see octopus, sea shells, sea weed, a giant foot and other greenkeeper's delights!

Denarau Island Resort is a fully integrated resort complex with three five star Sheraton resorts, an American resort Worldmark by Trendwest giving a total of over 900 rooms on the complex. In addition there is a marina complex, residential developments and future resort development sites. Two major resorts are also planned for Denarau island, a 300 room Novotel and a 454 room Hilton resort. With these additional resorts and other planned expansion, the total number of rooms should approach 2000 with-

in three years. To cope with this increase, an additional golf course is already being planned.

Our operation has a staff of 43. This is largely an unskilled workforce of labourers, with limited knowledge of English, complimented with plumbers, mechanics, operators and electricians. The equipment is Toro based and is a combination of both old and new machines, which is adequate to achieve good standards.

What follows is a brief synopsis of the trials and tribulations I've experienced as result of the upheaval on 19 May on management and practice issues.

During the political crisis, the whole of Fiji experienced power cuts for three months. Denarau negotiated a deal with the Fiji Electricity Authority offering to use the resort's generators regularly and in return the FEA would attempt to supply uninterrupted power to the island. Of course power is essential to greenkeeping operations. We irrigate our course with the assistance of a site pro 8000 Satellite system - a computerised system - No power ... No computers ... No pumps! Irrigation failures became the norm. My team had a full time job in this tropical climate keeping water on the course. Pumps constantly dropped out; there were communication breakdowns and mainline breaks due to water hammer. Power became so erratic one of our plumbers slept each evening in the pump house!

The trade sanctions from Australia and New Zealand also impacted on our operations. All spares and chemicals are purchased overseas. Telephone communications were difficult as international lines were not reliable. Internet services were slow and unreliable and you need power to run the computer and the fax!

During this period, overseas suppliers were wary of supplying products to Fiji. This resulted in difficulties in obtaining products which were supplied from overseas and when supplies were successfully ordered, invariably long delays occurred. We purchase products such as fertiliser by the container load. We normally ship 21 tonnes at a time from Australia. As a



result of supply difficulties and budget reviews, we were forced to overhaul our fertiliser and spray programmes in terms of quantity

At times, it is even difficult obtaining supplies from local suppliers in Fiji. This was exacerbated during the crisis when on occasion we even experienced difficulty getting products from the local hardware store.

This time of year with its mild tropical climate dry period, Fiji is normally at its peak tourist season where we can expect over 150 golfers a day on the course. With the down turn in business and favourable weather conditions, it provided the perfect opportunity to initiate maintenance that would never normally be considered at this time of year. I've created a focus on labour intensive jobs rather than money intensive work. This ensured full employment within our staff and allowed us to stay within budget restrictions. Impeccable hand grooming has become my middle name! We are hand weeding bunkers greens tees and profiles. Leaves and bunkers are hand raked and cart paths and roads are swept with large palm fronds. Diseases and pests are for the most part being tolerated. Swarms of minor birds feast regularly on lawn grubs.

We are finding the diseases and pests during this dry season are rarely severe enough to impact on course "playability". We are monitoring them and where appropriate letting them and run their course.

Staff moral has been a major issue throughout the crisis. We have a staff of both indigenous Fijians and Indo Fijians. Normally, there is minimum if any racial tensions in the work place but the political ramifications of the coup had the potential to cause tensions. This has to be constantly monitored. With large layoffs in other parts of the tourism industry, staff



Above: Climbing a palm tree the easy way

Below: The Demarau greenkeeping Team of 43







A jewel of the South Pacific

immediately became concerned about their jobs. We had to constantly re-assure staff that their jobs would be secure.

To this date with plenty of budget juggling all permanent staff are still employed.

As a result of the downturn, we were asked to reduce the maintenance costs for the golf course. There was a large number of meetings where our budgets were scrutinised on a regular basis. The challenge was to affect savings without impacting on the quality of the course. Much hype has been made about "smart sanctions", I refer to our cost cutting as "smart savings".

On a more personal note there was the safety of my wife, Erica, and our two young children (four and one) to consider. On May 19, after collecting my son from the International School which had just been closed, Erica and the kids were evacuated from our home which was approximately 20 minutes from Denarau Island called VotEAU Levu. In a time frame of approximately an hour and a half, Erica with our house-girl Neli and some members of my staff sent out in trucks to assist, packed the entire contents of our house into whatever they could lay our hands on and moved it to Denarau. Evening curfews became the norm, supermarket shelves were fast emptying, and airport closures were imminent, restricting our movement in and out of the country. We faced some hard decisions and on the evening military control of the country was announced my family left the country enabling me to focus on the job at hand without concern for their safety.



Above: The high profile airport security  
Below: "Impeccable handgrooming has become my middle name"



Normal life in Fiji apart from political upheaval is full of challenges. Prior to May, we built a new house on Denarau Island to live in. If you have ever had any experience haggling over the price of a bula shirt in Suva or Nadi then you will know the wonderful challenge of having to haggle over the price of every nut, bolt and washer on the whole project. This is similar to the daily occurrence when purchasing locally for the golf course maintenance supplies.

One thing I've learnt through the past four months is the importance of working with a team I can trust. This position has presented some absolutely unique experiences. You could call this a bonding experience I'd go so far as to call it a hell of an experience.

And it's not over... The Fijian people together with the ex-patriot community are working hard to restore normality in this beautiful country and I'm proud to be a part of the team.

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# POA ANNUA FRIEND OR FOE?

Every greenkeeper in the British Isles has come across poa annua at some stage of their career. They all have very different opinions about it and almost all have very different ways of dealing with it ... or maybe even eliminating or controlling it.

I was always led to believe that poa annua was the pest of all fine turf grasses. All through my college years the subject had always arisen in the classroom.

Sometimes it was the tutors revealing their opinions, or simply we greenkeepers expressing our own views between ourselves.

My own views on poa annua vary, as I know that it can be a pest to all we greenkeepers due to the rapid way in which it can take over from some fine turf grasses that don't have the same stubborn and substantial growing pattern that poa annua itself has. I also know that it can be controlled and managed well enough so that it

can perform closely with some species of fine turf grasses.

Due to the climatic conditions in this country poa annua can have a varied look throughout the season. In late springtime it has a lush green colour which can lead to it being mistaken for a species of bent grass. In summer time it will start to flower and seedheads will appear on the golf greens. The obvious effect this can have on the golf greens is made quite clear to we greenkeepers, by the every-day golfers who pay their annual fees and expect absolute perfection. The lovely lush green and smooth putting surfaces of the springtime are now, bumpy and inconsistent and fingers are pointed towards the greenkeepers. The paying customers ie members are wanting to know why in the summer the greens seem to be rolling worse than in the spring.

When autumn and winter approaches the effects of poa annua

change once again, towards the end of the autumn the last of the seedheads disappear and again the greens are smooth, but not for long as the leaves are now the problem. Golfers find leaves equally as difficult to putt over as they do the bumpy seedheads.

We begin to wonder if we can ever please these 365 day a year, SKY TV watching Masters Syndrome golfers, who expect us to deliver perfectly manicured smooth rolling putting surfaces all year round, just like the Augusta venue.

Due to all the global warming we now have longer cutting seasons. This doesn't stop what will happen every winter to the poa annua grass - discoloration.

Yellowing of the grass isn't aesthetically pleasing to the eye and it can lead to more pressure from the golfing members who probably don't know their Lolium Perenne from their Ralph Lauren, but still they decide to voice opinions as to what they would do with this problem grass species in the same situation.

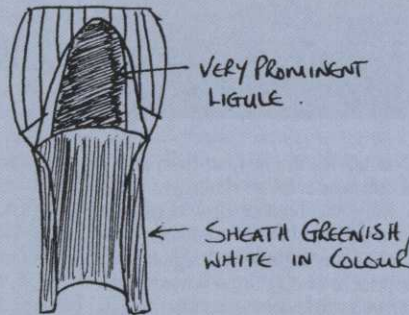
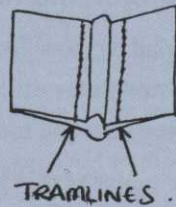
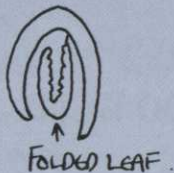
I realise that all of these problems with poa annua (the pest) are very annoying, but I also have some strong feelings towards accepting this type of grass as part of a greenkeeper's every day species that has to be worked with. If managed and worked in the correct way then most of these problems can be controlled.

A good management programme is essential on poa annua to help in keeping the putting surfaces pleasing to everyone.

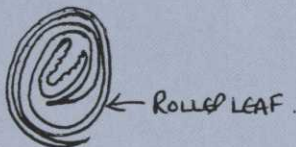
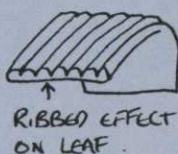
My own plans would consist of a regular aeration programme to relieve any compaction that might influence this type of grass, also a scarifying programme, along with controlled verti-cutting and grooming as this will help reduce the spread of the poa annua and also remove its seedheads along the way. A balanced feeding, top-dressing, brushing, rolling and watering programme is also essential as this helps the poa annua to keep its colour and appearance of fine turf grass species.

If, along with these specified programmes, you over-seed using a good blend of fescue and bent you would find that your amount of poa

## POA ANNUA



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