

The logo for STRI (Soil Tillage Research Institute) is located in the top left corner. It consists of the letters "STRI" in a white, bold, sans-serif font, set against a dark green rectangular background. To the right of the text, there are several thin, white, curved lines that suggest grass blades or soil texture.

STRI

Greenmount Golf Club

Advisory Report on the Golf Course

Report Date: Monday 22nd August 2016
Consultant: Emma Beggs



Greenmount Golf Club

Date of Visit:	22 nd August 2016
Visit Objective:	To assess course condition with particular emphasis on greens and provide advice on appropriate turf management
Present:	Mr Sidney Launders – Chairman of Green Committee Mr Stephen Whitehead – Competitions Secretary Mr Wayne Meadowcroft – Head Greenkeeper Mrs Emma Beggs – Turfgrass Agronomist, STRI
Weather:	The visit was carried out during a morning of heavy rain following three days of rain.

Headlines

- Winter weather 2015/16 saw unprecedented rainfall levels causing saturated ground conditions and areas of flooding across the region. Here at Greenmount the course, including main greens, remained in play when turf surfaces were susceptible to damage from play, trolley and buggy access. Course closure and temporary green use was limited. The greens in particular came into spring in a weakened condition and it has taken significant time and effort to re-establish surface quality.
- This year weather conditions have remained unfavourable and recent wet weather patterns have again highlighted how vulnerable this course is from rainfall. The greenkeeping programme must therefore take advantage of every modern technique and machine to optimise surface drainage and shorten the time it takes for greens to recover and dry out once rainfall stops.
- Whilst there has been significant investment in the greenkeeping complex and machinery since my last visit in 2010 the Club are still missing fundamental items of equipment that are necessary to get the best from the greens particularly in terms of surface drainage. A repaired Weidenmann Terraspikes and a new tractor are needed for work now - before summer ends.
- Beneath all greens there is a significant build-up of thatch or organic matter and this is acting rather like a sponge, holding water in the surface and upper profile resulting in soft, disease susceptible and waterlogged surfaces following rain. This needs to be tackled.
- There is little benefit in installing any further drains until this surface thatch has been physically removed and ameliorated through top dressing. Unless water can move through the profile and into drains surfaces will stay wet.

Key Actions

- It is critical to repair the Verti-drain and purchase a suitable tractor in the coming days to allow Verti-draining, hollow coring and solid tining to be completed on greens over the coming weeks and months when soils are dry.
- Invest in a modern spinner top dresser to allow a more effective top dressing programme to be started.
- Employ pure sand for all greens top dressing from now on. Aim to apply 80 tonnes between spring and late summer through light monthly applications. This is double current rates.
- Thatch reduction in the upper 100 mm of the greens profiles will be key to progress. It is likely to take 3-4 years of a more intensive greens maintenance programme to make significant improvements.
- Continue with summer fairway Verti-draining to optimise fairway drainage and water movement into installed drains.
- Introduce a robust and rigorous winter course policy to protect the course from damage caused by trolleys and buggies when ground conditions are unsuitable. To be successful this policy should be embraced by the membership with decisions made by the Head Greenkeeper working in tandem with the Green Committee.

Photo Observations and Comments



Figure 1: The 3rd Green has had full grass cover re-established since spring, this is difficult to do when mowing heights are low and a green is in play. Wayne and his team have done really well considering how much grass cover had been lost.



Figure 2: This is the 3rd green in April with extensive loss of grass cover as a result of continually saturated ground conditions over winter.



Figure 3: The 3rd green remains weak and here fusarium patch disease activity was evident beneath the surface water.



Figure 4: Already efforts are being put into preparing temporary putting greens for when they are needed in winter 2016/17.



Figure 5: The visit was carried out during a period of heavy rain and the amount of surface water was quite incredible. The aim needs to be to optimise surface drainage so that once rain stops the course and putting surfaces dry down as quickly as possible.



Figure 6: The 4th teeing platform would benefit from releveling as a part of the winter project work.

Photo Observations and Comments (continued)



Figure 7: The 4th green suffered extensive turf dieback which is not yet fully recovered. Following recent turf doctor plugging areas should fill in.



Figure 8: Thatch build up was evident beneath every green and was almost identical even beneath the sandier USGA style constructions as seen here beneath the 7th green.



Figure 9: The 8th green was awash as seen here. The surrounding land sheds water onto this particular green.



Figure 10: Beneath the 8th green distinct stagnant thatch was evident. This needs to be physically cored out and the upper profile diluted with pure sand top dressing.



Figure 11: The 9th green supported full grass cover however recent rainfall had saturated the soil profile beneath, holes were full of water.



Figure 12: Turf dieback at the back of the 15th was caused by sprayer contamination. It is recommended that the Club buy a powered pedestrian walkover sprayer immediately to allow effective fungicide applications to be made with a dedicated unit. Knapsack spraying is not acceptable.

Recommendations

Machinery

- There are key items of greenkeeping equipment that Wayne requires if he is to be able to do his job effectively. These include the following and it is hoped that these can be purchased as soon as possible. There is work that must be done before summer ends if the drainage condition of the greens is to be optimised ahead of winter.
 - Repair the existing Weidenmann Terraspikes immediately to allow a critical summer Verti-drain treatment, and an additional hollow coring to be fitted in before the end of September.
 - Purchase a suitable modern tractor immediately to allow the above machine to be used.
 - Invest in a modern spinner top dresser. The aim should be to have a machine here to follow up the recommended Verti-draining and hollow coring this September. Consider modern units such as the Propass and Dakota. A spinner top dresser is a key piece of the jigsaw in terms of tackling the thatch issue.
 - Immediately invest in a pedestrian powered walkover sprayer for greens use. This needs to be on site ready for the application of a preventative fungicide in mid to late September this year.
 - Purchase one or ideally two high quality pedestrian hand mowers to allow hand mowing throughout winter and at other times when surfaces are soft. This would reduce turf stress and damage as compared to continual triple mowing year round.
 - Trial a powered mechanised brush system such as the Sweep'N'Fill to aid top dressing integration following coring and Verti-draining work. These machines are very effective and allow increased amounts of top dressing to be worked into soil profiles. This would be a very useful addition to the thatch reduction programme.
 - Continue to adopt the machinery replacement programme now in place. It is important that modern equipment is used to optimise turf quality, course presentation and available labour with minimum downtime particularly for frontline mowing machines.

Greens Thatch Reduction Programme

- Reducing organic matter or thatch levels will produce greens that are firmer, drier, faster and in better year round condition.
- Hollow core all greens again before the end of September this year under dry ground conditions whilst growth remains strong.
- Verti-drain all greens before the end of September this year under dry soil conditions using the 10 mm diameter solid tines with slight heave. Again this needs to be done when growth remains strong to aid recovery.
- Start using pure sand for all top dressing, sourced either through Whitemoss or Bathgates. Employ a medium particle size sports sand. Moving to pure sand will over time result in greens that are drier and under periods of extended dry weather more susceptible to drought stress. Hence in the years to come make sure that there is a reliable irrigation system as well as a proactive wetting agent programme in place.
- Aim to apply in the region of 85-90 tonnes of pure sand across the 11 greens during the course of a growing season. Aim to make monthly applications between April and September immediately following some form of surface aeration treatment. If not coring, then slim solid tine.
- Aim to hollow core the greens on 3-4 separate occasions in 2017.

- Verti-drain a minimum of once with slight heave next year when soils are really dry to depth, usually in mid-summer.
- If insufficient progress is made with the more frequent hollow coring and changes to the top dressing consideration could be given to using the Graden Sand Injection unit. This is a more aggressive thatch reduction process however would need to be completed by an outside contractor and is expensive due to the cost of the kiln dried sand that has to be used. We can discuss this in the future.

Fusarium Patch Disease Management

- I understand that fusarium patch disease activity has caused widespread damage and scaring in recent autumns across greens. This is not surprising in view of thatch levels and surface waterlogging. One of the most damaging problems is that resultant scars persist well into spring the following year – waiting for strong growth for the recovery of surface smoothness.
- This September apply a strobilurin turf fungicide preventatively well ahead of the change in weather which marks typical fusarium activity. Continue to alternate active ingredients each time spraying is completed. This September look to apply Insignia, Headway, Eland, Dedicate, Interface or similar in a preventative manner. Clubs that adopt this approach tend to see significantly lower levels of disease and any outbreak tends to be far less aggressive. A new walkover powered sprayer will be needed to make these and future fungicide applications.
- Also have in stock one of the combined fungicide products such as Instrata, Interface or Fusion to ensure swift control of disease in changeable growing conditions. For rapid control in mid-winter when growth is slow/non-existent have an application of Chipco Green available.
- Throughout winter make monthly applications of a good quality iron product to harden off turf, help suppress disease activity and improve presentation.
- Reducing thatch levels will over time produce greens that are less susceptible to this turfgrass disease.

Winter Course Policy

- I have included a technical note on winter play and appropriate policies to consider. Should we experience another wet winter it is recommended that a more proactive approach is taken to protect the course from undue damage when soils are wet and turf surfaces vulnerable to damage. Whilst the damage may not be immediately visible it tends to result in turf weakening and slow recovery the following spring. The Green Committee and Wayne should work together to ensure it includes appropriate guidance in respect of trolley and buggy bans when required alongside use of temporary winter greens to transfer play away from vulnerable greens and approach areas as necessary.

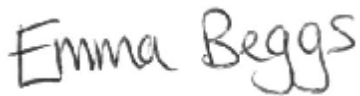
Tees

- I would support plans to relevel the 4th tee as a part of the winter programme. Please find a technical insert covering tee rebuilding at the back of this report for additional information.

Fairways

- The twice yearly fairway Verti-drain treatment has supported good improvements. I would support the suggestion to continue with the summer aeration treatment annually but suspend the second autumn treatment. The best improvements come when soils are dry to depth so timing is critical.
- Significant investment in fairway drainage has been made, annual Verti-draining will help to make sure that soils are draining and surface water can more quickly move to installed pipework.

Signed

A handwritten signature in black ink that reads 'Emma Beggs'.

EMMA BEGGS, B.Sc. (Hons), MBPR
Turfgrass Agronomist

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Technical Note

WINTER PLAY

The aim of turf management is to keep play on the main greens for as near 12 months in the year as possible. With milder winters becoming the 'norm' the demand for year-round golf has increased together with the need of many clubs to 'keep members happy' faced with the difficult economic environment currently being endured. However, this need to maximise winter play must be matched with the drainage qualities, soil type, aspect and elevation of the greens in question as well as prevailing weather conditions, particularly as milder winters also tend to be much wetter.

An indication of the type of damage arising from play under adverse conditions is given below and, whilst appreciating that golfers expect winter play, these requirements must be kept in perspective. Most competitive golf and important fixtures take place outside the winter period. Winter golf is normally less competitive and if the little inconvenience caused by playing to temporary greens of a satisfactory standard is accepted, when necessary, then the putting surfaces of the main greens are better preserved for when they are required and expected to be at their best.

WET CONDITIONS

In persistently wet conditions, the soil around the pin is likely to become severely compacted. Fine particles of silt and clay can migrate to the surface, resulting in soil-stained patches round pin positions and other well trafficked routes. All of these effects weaken the turf and impede surface drainage.

In essence, the aim of greens management should be to develop firm and dry surfaces to minimise the effects of wet weather. A sound aeration programme will help minimise ill effects on drainage and the sward. In addition,

hole changes should be frequent to avoid regular concentration of foot traffic to the same spot, use being made of the outer regions of the greens as far as possible, although keeping towards the front in very wet spells.

FROSTY CONDITIONS

Damage caused by play during frosty weather falls into two main categories:

- When frozen, plant tissues are easily bruised by players' feet. Following a thaw, it is often possible to see brown footmarks for several weeks, particularly around hole sites. The greater the weight of play in hard frost, obviously the greater becomes the extent of this damage. Affected areas remain thin for long periods, altering the trueness of the putting surface, and are more susceptible to disease in spring.
- Long-term damage is caused when play takes place after a sudden thaw. In these conditions the top layer of thatch and soil becomes soft, whilst the underlying soil remains frozen. Root damage occurs from the shearing action as players' feet move the soft, unfrozen surface across the frozen sub-surface. This disrupts putting surfaces and creates weak areas that may not recover before the height of the competition season.

TEMPORARY GREENS

The best way to overcome these problems is to follow a management programme for greens that develops excellent drainage and firm, dry surfaces. However, even the best draining greens suffer from surface water retention and frost from time to time and the availability of good quality temporary greens will help protect the main surfaces when they might be adversely affected by continued play. If prepared well in advance of possible need, temporary greens can provide an acceptable alternative to damaging the main surfaces or having to close the golf course altogether. Mow out separate temporary greens of good quality and reasonable size (perhaps 100 m²) well clear of the major putting surfaces. Many clubs do not wish to go to this trouble and put temporary holes on the approach, but damage may still be caused when retrieving balls which go through on to the actual green.

Such temporary surfaces can also be brought into use when major work programmes are being undertaken on the main putting greens, resulting in less disruption and a more rapid accomplishment of the work, in far safer working conditions.

DECIDING WHETHER THE MAIN GREENS ARE FIT FOR PLAY

This is a vital aspect to consider and one that should be noted in the Course Management Policy Document. There must be a clear pecking order of responsibility for closing the main greens. The Course Manager should be the primary arbiter, making a sensible series of inspections through the day. Other club officials should not be allowed to change the decision. The decision-making process should be clear and consistent. Allowing play on overly wet or frozen greens early in the winter sets a dangerous precedent and should be avoided. Every effort should be made to keep green closure to an absolute minimum. Do not automatically close all 18 greens if the first few inspected are unfit. Whenever possible a selection of greens should be kept open, i.e. the naturally drier ones or those less susceptible to frost, provided these are deemed fit for use.

Technical Note

TEE CONSTRUCTION

With the demands of modern golf and the likely future pressure on tee space, we recommend that the following total tee sizes are aimed for:

Par 4 and 5 holes	Par 3 holes
Mens 250m ²	Mens 330m ²
Ladies 100m ²	Ladies 100m ²

Also take into account the need for additional areas for winter teeing grounds and possible “extras”, e.g. separate tees for juniors and seniors who may prefer a shorter course.

The design of teeing grounds has a profound effect on the shape of a golf hole. Careful consideration should be given to the positioning of new tees or the enlargement of existing tees to gain the best out of each hole. The advice of a qualified golf course architect should be sought where a major tee development programme is being considered. STRI can provide this service to clients.

When designing and building new tees or enlarging existing ones, ease

and rapidity of maintenance must be borne in mind, e.g. access for maintenance equipment, including triple mowers. Banks should have a shallow slope for safe mowing. Avoid steep banks that require time-consuming hand mowing. Allow room for moving tee markers from side to side as well as from front to back. Elevate according to the demands of the hole, always keeping to a minimum, and avoid poor sites where grass retention will prove difficult, e.g. under trees where tree

roots, overhanging branches, lack of sunlight and frost can be problematic.

Form the shape of the tee in the subsoil providing a smooth, evenly firmed surface with a slight fall from front to back of between 1 in 70 and 1 in 100 if its situation demands. One large teeing area is less trouble to maintain but constant use by golfers can create serious wear patterns into and away from it, so, in certain circumstances, two tees can reduce tracking considerably.

Where it is necessary to elevate, build up the formation surface using clean subsoil fill, ideally free from heavy clay and large stones. Build up in no more than 225mm layers, firming adequately at each stage to eliminate soft spots. If rubble is used as fill blind it with approved coarse sand to support the topsoil. Avoid fill materials that will decompose over the years, e.g. tree stumps, as these

will lead to sinkage and unevenness at the surface.

When determining the finished level, allow for the spreading of a minimum 200mm firmed depth of sandy topsoil or a friable sand/soil mix to the tee top and a minimum firmed 150mm of a similar material on banks. Form a smooth, evenly firmed turf bed by alternate raking and heeling. Spread a pre-turfing fertiliser and gently rake into the surface soil.

Turf the area with the best material available. This can be imported from a commercial grower or lifted from a turf nursery, practice ground or the side of a fairway. Ensure that the new turf consists of an appropriate blend of grasses, ideally the finer fescue and bent ones, though other species such as perennial ryegrass (only the dwarf amenity varieties) and smooth-stalked meadow-grass might be considered to small surfaces

where wear is going to be a real issue. The turf should be free from thatch, silt or clay at its base. Once laid, settle with a light roller using an implement weighing no more than 250kg, making two passes in transverse directions. Top dress with sandy compost at a rate of around 3kg/m² working it well into the joints. Further light top dressing will be required at intervals to perfect the final true surface. If there is sufficient time available then seeding is a feasible alternative to turfing.

Do not bring newly laid areas into play until the turf is well established and a true surface for close mowing has been developed through top dressing.

In executing the works, take recognition of and comply with all statutory Health and Safety Regulations.



Microdochium Patch

Microdochium nivale

STRI

Microdochium patch (formally called fusarium patch) is caused by the pathogen *Microdochium nivale*. Most fine turf areas suffer microdochium patch at some time during the year in the UK and Ireland. The weather conditions that are conducive to the disease are mild, wet days that we associate with autumn.

infection) and acidifying the immediate microclimate at the turf surface. Unfortunately, on occasions it will prove impossible to control microdochium patch by cultural means alone. Over the last few years disease has sometimes been significant and persistent, necessitating the use of fungicides. You need to determine a threshold level that you are willing to accept. Once the disease level increases above this threshold a fungicide application is required. Use the label and the technical expertise of the suppliers to determine which fungicides are suitable for you. Fungicides that can be used to control microdochium patch include chlorothalonil (Daconil Turf from Scotts or Mascot Contact from Rigby Taylor), iprodione (Chipco Green from Bayer), fenarimol (Rimidin from Rigby Taylor) and azoxystrobin (Heritage from Scotts). Please remember when using fungicides to adhere to label recommendations and ensure all COSHH regulations are applied.

Active microdochium patch



Microdochium nivale normally grows saprophytically (feeding on dead material such as senescent leaves in the thatch layer). However, when the weather conditions are conducive to infection, *M. nivale* becomes pathogenic and can infect and kill the grass. *Microdochium nivale* infects the grass through stomata (the structures plants use to breathe) and wounds. *Microdochium nivale* spreads by spores that can be carried on the wind or in water. When the spore lands it will germinate if free water is available and produce a germ tube (a thread of mycelia) that searches for a stomata or wound. The mycelia then colonises the plant. If the colonisation of the plant is severe enough the crown will be killed and the plant will die. In some cases the plant can be colonised but a fungicide application or a frost can knock-back the fungal growth and prevent the crown being killed and the plant will recover. Bentgrass and fescue are susceptible to microdochium

patch, although annual meadow-grass is particularly susceptible. Alkaline conditions and excess fertility (especially in late summer/autumn) can encourage microdochium.

To prevent and control microdochium patch aim to provide a turf surface that is not conducive to infection. Therefore you want to remove any surface water (*M. nivale* needs free water for germination). Switching or brushing to remove morning dew and aeration to encourage the throughput of water can achieve this. Aeration and top dressing encourage the breakdown of any thatch (remember this is where *M. nivale* will be growing saprophytically). However, heavy topdressing can encourage a microclimate (warm and damp) that may encourage the growth of *M. nivale*. Iron sulphate can help by hardening off the grass plant (making it less susceptible to

This information sheet is of a general nature and is intended only to outline the basic information. Such information is not intended to constitute a specification or comprehensive guidance in relation to any project/subject which should only be undertaken after consultation with those holding appropriate qualifications. STRI employs persons so qualified who can provide advice and/or relevant specifications. STRI accepts no responsibility or liability for any claims arising from work carried out pursuant to this leaflet.

For further information, please contact Dr Ruth Mann, Head of Turfgrass Protection at STRI on **+44 (0)1274 565131** or **ruth.mann@stri.co.uk**

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