



Royal Copenhagen Golf Club

Sustainable Agronomy Report

Report by Alistair Beggs

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ROYAL COPENHAGEN GOLF CLUB AGRONOMY REVIEW

Club Representatives

Martin Nilsson – Course Manager

R&A

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Overview

- The annual review of the golf course at Royal Copenhagen took place during cool and showery conditions following a summer which has been reasonably clement and predictable.
- The structure of the visit involved a course walk on the afternoon of Thursday 4th July followed by performance data collection (as part of the normal club collection cycle) on Friday 5th July.
- The overall standards of presentation and performance of the course have been substantially lifted since my last visit to site in 2022.
- Aside from the 1st and 18th greens which warrant separate mention, the main greens are in very good order both on and beneath the surface. The sward composition is relatively consistent showing 60-70% fescue, around 20-30% bent and a nominal but low percentage of meadow grass which no longer influences the surfaces. The grasses are stronger and better blended than they were in 2022, with less influence from straggly bent and they offer good speed (9ft 6ins) at a sensible height of cut (4mm). The introduction of verticutting with the Maredo unit has proved very successful. The 12th which is high fescue does show high levels of clover contamination. Beneath the surface, profiles are very good showing a consistent, layer free set of profiles with good rooting and well managed organic matter (visual analysis).
- The 1st and 18th greens (and the putting green) offer a very different grass composition with meadow grass dominating these surfaces. There are some signs that overseeding with creeping bent cultivars is showing some level of success. Fescue content remains low despite 20 years of overseeding. There can be no doubt that the environment is less conducive to fescue because of the low lying and shaded nature of these greens. There is little we can do to change this. We did suggest a trial with rye cultivar overseeding to see if this grass can better compete with the meadow grass in this situation. Profiles remain good and show no material differences in the top 150mm to the main greens on the course. It is less the bases and more the environment that is the influence here.
- Green surrounds are better presented but those with irrigation provision are better, e.g. 12th and those without it e.g. 2nd, show less control of moisture which results in fairy ring. Discussions about irrigation investment must continue if approaches are to become more consistent.
- Tees are fine although we did suggest more effort to improve the presentation of the 1st tee. First impressions do count and this is one of the weakest examples. More attention to wetting agent programmes may help too.
- Fairways are substantially improved over their condition in 2022. They are stronger and fuller as a result of additional feeding and seeding work which means weed contamination levels are lower. The next challenge is to find a quick, effective yet non disruptive way of refining and blending the various grass components. The Terrarake (now on site) may be just the job for this - more aggressive than brushing but less time consuming than verticutting. Profiles show no build up of organic matter which is important so there is no need for aggressive remedial aeration to fix this. The ultimate solution is to do as little remedial work as possible to these extensive areas. Targeted vertidrain work and exploration of clean slitting are options for the autumn.
- Bunkers convey the rustic and natural strengths of the site. Do not change this. A lack of consistency will always be a frustration for golfers (the bases are not formally shaped or lined) but they are hazards and should in my view offer a level of jeopardy and inconsistency.

Photographic Gallery and Comments



Photo 1. The greens are offering good performance standards at this time. Swards are largely full and complete, well blended with bents, which are much less intrusive than during the 2022 visit. Sward composition is fescue dominant and routine greens speeds between 9ft 6ins and 10ft are entirely appropriate for member play. They are firm too, with test results showing clegg values between 105 and 125 gravities. We do not want them firmer than this.



Photo 2. White clover contamination is the main inconsistency and with no access to herbicides the use of targeted iron sulphate applications at 60Kg/Ha continues to work well. Admittedly, the greens don't look their best immediately after treatment, but the effect is tolerable given its transient nature (1 week). The greens with slightly higher fescue content may be more prone to contamination from clover and this is a reason to include bent in current and future overseeding programmes. It offers density at times when fescue can't.



Photo 3. The texture of the predominantly fescue bent turf is excellent. Improved mowing performance and regular use of the Maredo unit have both made a difference here. Feeding a little more gives the swards the strength they need to tolerate this approach.



Photo 5. The 1st and 18th greens remain weaker and show much higher percentages of meadow grass (*Poa annua*) despite aggressive overseeding with fescue and more recently creeping bent. There is some evidence of success with the latter species but meadow grass still dominates. The surfaces are better and fuller than they were in 2022 (pock marked and diseased) but they remain volatile – good at their best between June and September, but weak, thin, shallow rooted and disease prone outside of this period. Upper profiles are good and compare favourably with the other greens on the course so my conclusion is that the environment around the clubhouse (lower lying and more shaded) is contributing to the different sward composition and root structure here. We suggested that aggressive Ultrafine rye overseeding be trialled on a small section of one of these greens. Inset - This photo shows the impact of heat stress from the week prior to the visit – another vulnerability of shallow rooted meadow grass!



Photo 6. Profiles beneath the greens show excellent characteristics. There is no visible build up of organic matter since the last visit (lab testing is underway to confirm this), root growth is strong (apart from the 1st, 18th and putting greens), there is no compaction or layering and top-dressing practices are consistent. You are giving the better grasses the best possible chance to compete and this must continue if the fescues and bents are to thrive.



Photo 7. The tees are perfectly adequate in terms of their presentation and performance. However, we did suggest more attention to wetting agent programmes (improved irrigation coverage is ultimately needed too) and extra efforts to make the 1st tee a better opening experience would be an advantage.



Photo 8. Green approaches lack irrigation control in some cases. The 12th which has irrigation is one of the better examples. Discussions are underway to enhance irrigation coverage to other approaches e.g. 2nd, 11th, 14th 16th, where fluctuations in moisture content are causing fairy ring to disfigure the turf and detract from presentation. Approaches are firm and perform similarly to the greens which is very important. Inset - Clover control is needed and is planned.



Photo 9. The fairways are probably the most improved part of the course. Sward density and composition are both much stronger than in 2022 and consequently, weed contamination levels are lower. This is very important in an environment where herbicides are banned. Current feeding, overseeding and sanding programmes must continue for now and the next challenge is to improve sward blending by finding a way to refine the surfaces. We discussed verticutting last time, but this is not really practical because of the time it takes and the amount of debris it generates. The Terrarake (just arrived on site) might prove to be the perfect solution. Experiment with this for the next few weeks and see if it can be incorporated in a beneficial way. I think it can!



Photo 10. Fairway swards show no detrimental effects from the increased levels of nitrogen applied to them. There is no build up of thatch and sand dilution is working well in the upper profile. We see no need for aggressive aeration or remedial work but targeted vertidrain work to pathways and congestion areas should be considered later in the year. We discussed the potential benefits of slitting and this should become the preferred method of aeration when the time comes to do something. However, for now, I don't see the need for this. Minimising the creation of space is a key objective in this environment.



Photo 11. The semi rough band is cut at 41mm. It needs to act as a buffer to the running ball. If it works in this regard at the current height leave it alone. If not, and balls run through it into the longer rough, consider lifting this to 50mm. Inset – the wider roughs are spectacular and give this course its unique feel and appearance.

Recommendations

Greens

- The 4mm bench height of cut looks tight but this is probably the result of a review of mowing efficiency and quality which looks much better than it did in 2022. Continue to mow at 4mm. Do not go lower.
- The introduction of the Maredo verticutting programme has worked well. Maintain this approach adjusting the frequency and severity of treatment to follow the growth patterns of the offending bent grasses. It is important that fescue density is not compromised by this work.
- Green speeds are fine at 9ft 6ins – 10ft and this with a recent application of fertiliser still evident on the surfaces. Speeds in excess of 10ft are likely to make putting less enjoyable for most golfers given the slopes that exist on some of these greens e.g. 1st.
- Surface smoothness and trueness were assessed as 8's with some 7's on 1st and 18th. I think several of the 8's would have been 9's but for the fertiliser debris.
- Firmness values varied between 105 and 125 gravities on the clegg with moisture levels all comfortably between 18-25%. Again, these are good mid season results – good moisture levels, good moisture consistency (indicating good wetting agent

performance) and excellent firmness in keeping with this traditional site for ground golf. We do not want clegg values higher than 110-115 gravities for member golf.

- Sward blemishes are few and far between at present. There was some low-level evidence of dollar spot on some of the greens with tree influences e.g. 9th, 10th, 11th, 13th etc., but this was minor. This is a disease which may show increased aggression as the climate warms so do everything possible to remove dew and moisture films early in the morning when soil and air temperatures are high.
- Heat stress on meadow grass was evident on sections of the 1st and 18th. Greater attention to hand hosing prone areas during periods of high heat (> 25 degrees) is needed because shallow rooting meadow grass on south facing slopes can decline very quickly.
- Clover remains the main weed of concern on greens, but the iron sulphate burning programme continues to work well. The frequency of treatment will need to vary with sward health and density. Keeping swards strong and maintaining a good blend of bent with the fescue is the best way to keep clover levels low.
- Revolution programmes continue to work well on greens. Maintain the current approach and aim to keep greens between 15-25% VMC. Any hydrophobic areas that develop should get Aqueduct Flex in conjunction with procure work as necessary. Make sure wetters are always well watered in.
- A slight increase in nitrogen inputs since 2022 has in my opinion benefitted the greens. Maintain this approach working to find a “sweet spot” between 50 and 70 Kg/Ha N per annum. Each year will be different. Wet years may need a little more N. We like the solid approach but liquids have their place to maintain consistency and sources of N should consist of both inorganic and organic elements. A strong start and a strong conclusion to the year are important across all of the greens.
- Sand dressing inputs must keep pace with nitrogen inputs to ensure that organic matter levels beneath the greens do not build. Aim for 100 – 150 tonnes of dressing per annum going higher if higher levels of N are used.
- Monitor soils levels of phosphate and potassium and correct deficiencies as required. Phosphate is unlikely to be necessary anywhere on this site. Some potassium supplementations may be required but never more than 1:1 ratio with nitrogen.
- Watch for anthracnose on 1st, 18th and putting green. Additional liquid N inputs may be necessary through the late summer if this fungus attacks meadow grass in these areas.
- Aeration needs to be purely routine rather than remedial. Profiles present in an exemplary way. Shallow surface work is needed monthly supported with narrow gauge procure work to 100mm three or four times per year. Additionally, use the vertidrain in the late summer to go a little deeper (200mm) aiming for prompt recovery in every case.
- If organic matter levels increase a little following lab testing, use the ninja tines again ensuring prompt recovery.
- Seed introduction remains as the preferred tool for influencing sward composition. It should be a continual action. Continue with the creeping bent introduction to 1st, 18th and putting green but be aggressive. One or two passes is not enough. They might need 5 or 6! June to October is the period you need to be active. On the remaining greens, stick with both brown top bents (DLF cultivars such as Arrowtown and Cleek are favoured) and slender creeping red and chewings fescues. Aeration always provides an opportunity for introduction but the Air seeder and the drill can be used as well. They all have a role to play. Presently, with swards being strong I would err on the side of seeding no more than twice per year. If they weaken, increase the frequency of work. Increase bent attention on thinner greens such as the 12th.
- Consider trialling some ultrafine rye overseeding on a small part of the putting green. Barolympic would be the cultivar of choice due to its lighter green colour. Multi pass drilling is the best way to do this.

Other Points of Discussion

- Consider doing more work to the 1st tee to improve its presentation. This may include additional feeding, some verticutting and refinement work, additional overseeding (fescue and Ultrafine rye), and additional wetting agent work.
- Review irrigation coverage on tees. I understand it is poor. Drought stress will always compromise presentation and performance of overseeding, wetter and fertilisers.
- The approaches perform well, but focus on improving irrigation coverage, to better control fairy ring. Fairy ring is a product of wet dry cycles and inadequate moisture management. Until better coverage can be offered sward declines during dry spells and after them, is inevitable.
- Clover needs to be controlled on approaches and surrounds. This is planned for the next few weeks. It is important to keep on top of this with the iron programme which continues to work well.
- The fairways are much improved on their condition in 2022. The key ingredients that have delivered this change must be maintained, namely, spring (and possibly early autumn) feeding with slow-release products, clipping return (to supplement the above), applying sand at a rate of at least 1000 tonnes per annum, and overseeding (three times a year with Ultrafine rye, brown top bent and hard fescue cultivars) must all continue at current rates. Over the top of this introduce a raking programme to aid weed control and grass blending. Experiment with frequency and severity of passes but always work on prompt turf recovery to minimise space. As soon as too much space is introduced, weed and rogue grass infestations will take place. Keeping swards closed and aiding recovery through feeding is key to success. Use a budget penetrant wetter e.g. Aquasmart, Dispatch etc., prior to rain in the summer months to optimise sward presentation and consistency of look.
- Review the height of cut of semi roughs so that they act as a buffer to the running ball. The course has an imposing look to it at present which is fabulous but if golfer misses are marginal it is important that balls are held in areas where they can be found. If required increase mowing heights from 40mm to 50mm.

Soil Laboratory Testing Results

- Please complete soil testing in the coming weeks and advise of any changes from 2022 figures. Both organic matter and soil chemistry testing should be completed.

Chairman of Green – Questions Answered

- The sward composition of the main greens is estimated by eye to be 60-70% fescue, 20-30% bent and up to 10% meadow grass. Clover is a variable contaminant and there are low levels of coarse grass contamination.
- The sward composition of the 1st and 18th greens is estimated to be 80% meadow grass and 20% bent with little or no fescue present. We suggest Ultrafine rye overseeding to see if this grass can compete with meadow grass in this environment. Fescue can't and bent is struggling although further creeping bent overseeding is recommended.
- Unless vast amounts of money are spent on draining, shaping and lining bunker bases, they will always offer a lack of uniformity/consistency. Even when significant monies are spent there will still be a level of inconsistency especially given the variables here, most notably, the deer. Accepting that bunkers are hazards and that they should offer a level of penalty, is part of the game. That said, the team should do what they can to rake and

redistribute sand so that there is a minimum depth of 40- 50mm sand in the main hitting areas of green side bunkers. Golfers also need to play their part. I often say that bunkers are only as good as the last golfer to rake them!

- We discussed the vertical raking/verticutting of fairways again following discussions in 2022. There is no doubt they could tolerate this approach now but the challenge is finding equipment that would allow the team to do the work quickly and efficiently and to clean up afterwards. Debris generation from this work is significant. An alternative approach would be to introduce raking programmes using a tool like the Weidenmann Terrarake to scratch and refine without creating too much of a mess. The team are about to start experimenting with this. I do feel this could be a valuable addition to the fairway maintenance programme which will allow effective improvements to be made.

Interesting Links

Golf Course 2030

GC2030 is The R&A's research programme designed to provide insight, practical solutions and support for golf clubs at a time when challenges such as climate change, pesticide legislation and resource availability are coming to the fore. For more information on GC2030 project outcomes and integrated turf management visit <https://www.randa.org/golf-course-2030-projects-sustainable-agronomy>

The R&A and RSPB Partnership Video

In 2022 The R&A and RSPB put together the following video which was filmed at Hollinwell Golf Club. It highlights the importance and relevance of the game's relationship with nature and we encourage the club to watch this and share the messaging with your membership.

The video can be found here:

https://randagroup.sharepoint.com/:v:/s/SustainabilityTeam/EVGlcF_plPhHIM3yz6ZPJq0BOPTdvXZhRUsc_eSyv8n7oA?e=XRho9H

Cookie Jar Podcast

The following link provides access to a Podcast completed recently by Alistair Beggs. It may provide some useful messaging for golfers and members about challenges facing golf courses at the current time.

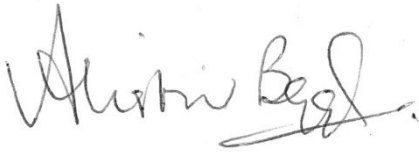
https://chtbl.com/track/BFC859/www.buzzsprout.com/791879/13896248-211-alistair-beggs-on-agronomy.mp3?client_source=small_player&download=true

Pesticide Legislation Update

The following link provides the latest information on pesticide legislation in Europe and The R&A's view on what the future may hold.


<https://www.randa.org/articles/pesticide-use-for-plant-protection-in-golf-what-will-the-future-hold>

Signed



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Course Input and Sustainability Review

Agronomy & Greenkeeping Operations 2024			
	Greens	Tees	Fairways
Surface Area (ha)	1	0.4	8
Nitrogen (kg/ha)	50-70	100-140	60-100
Phosphate P ₂ O ₅ (kg/ha)	0	20	10
Potassium K ₂ O (kg/ha)	20	50	20
Water (m3)	5000	1000	0
Water Source	Own borehole		
Fungicide (apps)	0	0	0
Insecticide (apps)	0	0	0
Herbicide (apps)	0	0	0
Sand Top Dressing (tonnes)	80	40	750-1000
Greenstaff Numbers (18 Holes)	6 fulltime (including CM and mechanic) + summerworkers (2000 hours)		
NB Please do not include spot treatments for fungicide, insecticide and herbicide applications.			

Comments on Annual Chemical, Fertiliser and Water Inputs:

- Nitrogen inputs to greens and fairways are a little higher than they were in 2022 to help control weed invasion. This approach is working well.
- Phosphate inputs are low and should be kept low to keep Poa annua under control. Soil sampling is needed to benchmark soil levels and assess the need for additional inputs. In 2022 levels soil levels were sufficient for healthy growth and this is unlikely to have changed over the last two years.

- Potassium inputs are low too. As an approximate rule of thumb, a 1:1 ratio of N:K is appropriate to help control disease and strengthen autumn growth. Levels were low in 2022 as well.
- Water is used frugally with only 6000m³ being used in 2023. It is pleasing to note that the club is self sufficient of water and not reliant on mains supply.
- In accordance with legislation in Denmark no pesticides are applied to the turf. This creates challenges but the team are finding alternative ways of managing diseases, pest and weeds although there are times when turf quality may be compromised when pressures are high.
- Sand is expensive but strong efforts are being made to dilute and ameliorate upper profiles and create an environment where the finer grasses (fescues in particular) can thrive. Organic matter levels need to be benchmarked again so they can be compared with values from 2022.
- The flexibility of the staffing structure works well in this climate and it is gratifying to hear that the team is producing some very high calibre golfers!