

Golf courses maintained with minimal to no pesticide input, case studies from Denmark and Italy

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Vorbemerkung

Im Rahmen des Forschungsprojektes (s. Beitrag in RASEN 3/19) zur Frage der Herbizid-freien Unkrautbekämpfung auf Golf-Fairways an der Universität Wageningen, besuchte der Autor, Daniel Hahn, einige Golfanlagen in Dänemark und in Italien, die auf den Einsatz von Herbiziden verzichten. Zur Motivation und Einschätzung der praktischen Möglichkeiten führte er kurze Interviews mit den verantwortlichen Head-Greenkeepers der Anlagen. Über zwei ausgewählte Golfanlagen wird im Folgenden berichtet.

Case study Royal Copenhagen Golf Club, Denmark

Background

Royal Copenhagen Golf Club is the oldest Golf course in Scandinavia (founded 1898) and is located north of Copenhagen. In 1928 the current 18 hole course was inaugurated; 16 of 18 holes are still played in the same order as back then. The golfcourse is situated in a public park and within a 1.000 acre deer park, which is still used by the royal family as hunting ground for deer. The golfcourse was redesigned by Tom Mackenzie and can be described as open Parkland. Copenhagen Golf Club is a members club, with about 1.100 members. The golfcourse is maintained by the superintendent Martin Nilsson and his team of six full-time greenkeepers.

Technical information

Royal Copenhagen Golf Club banned the use of pesticides completely by 2011. The golf course is constructed on government owned land and therefore the use of chemicals was forbidden. On average greens are mowed at 4.2 mm, fairways at 14 mm and tees at 9 mm.

The grass species composition of playing areas can be found in Table 1.



Fig. 1: Royal Copenhagen Golf Club, aerial view of the 15th hole. (Foto. M. Nilsson)

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|------------------------------------|---|
| Grass species composition greens | 60 % <i>Festuca rubra</i> , 30 % <i>Agrostis capillaris</i> , 10 % <i>Poa annua</i> |
| Grass species composition fairways | 90 years old, heterogeneous composition of many species (<i>Festuca</i> spp., <i>Lolium perenne</i> , <i>Poa</i> spp.) |
| Grass species composition tees | 40 % <i>Festuca rubra</i> 40 % <i>Poa pratensis</i> , 20 % <i>Poa annua</i> |

Tab. 1: Overview on the grass species composition on the Royal Copenhagen Golf Club.

The biggest challenge according to the Head-Greenkeeper is to keep the amount of weeds at an acceptable level. Greens are fertilised two to three times a year with granular applications of 60 kg Nitrogen/ha⁻¹/yr⁻¹. The irrigation strategy is to apply water infrequently but 'deep' to reach a soil moisture level of 15-20 % volumetric water content (VMC) after irrigation. During the summer months syringing cycles are used to cool off the plants.

Greens are maintained by frequent cutting, mowing and rolling. Aerification is carried out before September to allow full recovery before colder winter month. Further practices such as brushing or verticutting are not being practiced. Biological products such as seaweed are used as an organic fertiliser source. The Greenkeeping team maintains green speed between 9 and 10 feet throughout the season.

Interview as Q&A with Martin Nilsson, Head-Greenkeeper at RCGC

? Is your golf course open all year round?

! Yes. Greens are prepared for the winter period in August, which involves aerification and the last application of nitrogen. Greens are open all year round but after mid October greens are not cut anymore and only rolled. I believe that fescue dominated putting surfaces can produce good quality throughout the winter, even if they are not growing. The downside of fescue dominated greens is slow recovery after the winter.

? You mentioned that by not using pesticides, you experienced the biggest problems with weed management? Can you explain why and how you deal with weed problems?

! Weeds establish opportunistically, hence whenever there is an opening in the turf swards, weeds can and will invade if seeds are present and the conditions are favourable for germination. We have not used any herbicides for the last 15 years and therefore weeds are present in all playing areas.

On greens and approaches we use spot treatments of iron sulphate (60 kg/ha) to weaken the weeds and allow the surrounding turf grasses to outcompete the weeds over time. For plantains we also use garlic products. From my experience, it seems that soil conditions deteriorate if weeds are present. Earthworms start invading and soil casts on the surface create problems for mowers.



Fig. 2: Iron sulphate spot applications, treated areas turn dark in colour. (Foto: D. Hahn)

? In Europe the main turfgrass diseases are dollar spot (*Sclerotinia homoeocarpa*) and snow mold (*Microdochium nivale*). How do you deal with turfgrass diseases if you cannot use any fungicides and how much would you say is playing quality affected throughout the year by diseases?

! Snow mold has been our main concern ever since I took over in 2006. As the greens improved in terms of grass species composition, infiltration rates and management practises, snow mold in the fall and winter is not a big concern anymore.

In previous years, we saw attacks starting in September and carrying on through November and December, but now we see it maybe once a year and it's not very aggressive. Also, the snow

mold we get on red fescue only affects the leaves and is removed after mowing a couple of times. On our poorer greens, namely the 1st and the 18th, we still have bad disease and bad scarring from snow mold in the spring but that's due to a poor location of these greens with lack of light and air movement.

Dollar spot is new to us. Typically, we see it on surfaces that we don't roll frequently namely our pitch and putt course. We also see some incidences of dollar spot on the 12th green which is from 1992 and has a sand-based construction. It's fescue dominated and we never roll it because the green becomes too firm and fast otherwise. If we see signs of disease outbreak, we apply a very low dose of nitrogen to promote grass growth and recovery.

? Do you have any problems with pests such as chafer grubs for example? How do you control them?

! We have issues with chafer grubs and other grubs. Some years are worse than others, but we have never experienced catastrophic attacks. The grubs are naturally mostly in the sandier parts of the golf course, namely bunker edges, approaches and fairways. Problems occur in areas where we don't have good irrigation coverage, i.e. the grass can't recover from the grubs feeding on the grass roots.

However damage from grubs is not a major concern. Most problems arise from birds damaging turf in search for grubs to feed on. We haven't experienced problems from larvae of crane flies since I started here in 2006. What we do struggle with are ants and they occasionally produce soil casts on green surfaces, which disrupt playing quality similar to worm casts. Worm castings used to be an issue particularly on greens. However, we increased topdressing rates over the years, which reduced soil fertility and worm casts have more or less disappeared.

? Do you use any biological products to control weeds, diseases or pests? If you don't use any can you tell us why?

! I use only garlic to scorch the plantains. I think I'm still looking for a reliable product for disease management, at the moment we only use Iron of sulphate during fall and early winter. It's a natural golf course, so I think a certain amount of "damage" from nature should be accepted by golfers.

Evaluation by the author

Playing Royal Copenhagen is a fantastic and almost surreal experience. The golf holes are cut into a parkland side and the views across pastures are magnificent. There is an abundance of wildlife to see when you play the course. The Playing quality is good with firm, fast greens stimping at 9.5 and smooth putting surfaces even though small patches of broadleaved weeds can be seen on the greens. Some greens are invaded by small patches of ryegrass, which affect ball roll and requires manual removal from time to time. Martin and his crew spend a lot of time on spot treating weeds with iron sulphate, which seems to work perfectly fine, however this procedure is very time consuming and therefore expensive.

Most issues at Copenhagen golf course arise by not having fairway irrigation and fairly infertile soil. Therefore, the quality of fairways is moderate. Nevertheless, fairways are firm and ball roll is good, only ball lie is slightly affected sometimes. Martin will install fairway irrigation and fairways will be fertilised, topdressed and overseeded in the coming years. Also, fairways don't have any drainage system, which causes issues during heavy rain events. The subsoil seems to be free draining only the upper soil profile becomes compacted and waterlogged.

At the time of my visit I could not see big issues from not using pesticides. It has to be said that the golf course is very open with minor to no shade issues and very good wind circulation keeping leaf wetness periods to a minimum, which helps reducing disease pressure. From a golfers perspective one can probably see that the fairways do not look like on TV but the playing quality is hardly affected. Royal Copenhagen is an exceptional golfing experience and particularly heightened by knowing that the surfaces you walk on are completely pesticide free.

Case study Golf della Montecchia, Italy

Background

Golf della Montecchia (GDM) is located in north east Italy, near Padua. The 27 holes golf course was constructed in 1991 (designed by Tom Macauley), with a unique drainage system to al-



Fig. 3: Golf della Montecchia, aerial view of the 9th hole. (Foto: 1golf.eu, 2019)

low year-round playability. Padua is located in the transition zone, with cold winters and high temperatures in the summer.

Due to heat stress and water limitation in the summer, GDM decided in 2010 to convert tees and fairways (of 9 holes) from cool-season grasses to warm season grasses. The golf course was originally seeded with *Poa pratensis*, *Lolium perenne* and *Festuca rubra* and converted by introducing numerous small plant patches of bermudagrass (*Cynodon dactylon x transvaalensis* cv. Patriot). Golf della Montecchia is a private golf course with 630 members. Maintenance is carried out by seven greenkeepers under the supervision of Brian Og O’Flaherty (Head-Greenkeeper).

Technical information

Golf della Montecchia transitioned to pesticide-free management practices because of legislative limitations. As part of a “Biogolf case study” they decided to apply organic farming principles in 2015, which do not allow the use of pesticides.

Greens are maintained at a cutting height of 2.7 mm during the summer (stimp 9 ft.) and 5 mm during winter (stimp 8 ft.) times. Fairways and tees are both maintained at the same cutting height of 14 mm (summer) and 20 mm (winter). The biggest challenges for the Greenkeeping team are to maintain

aesthetics, playability and economic sustainability of the golf course, while applying organic farming principles.

The grass species composition of playing areas can be found in Table 2.

Furthermore, switching from warm season grasses in the summer to cool season grasses in the winter (through overseeding) requires two different maintenance approaches. In the summer the greenkeeper team tries to apply as little fertiliser input as possible to maintain consistent growth of Bermudagrasses and allow recovery from winter dormancy.

Towards the autumn fertiliser rates are reduced to prepare the turf for dormancy but still enough to allow the cool season mixture to germinate and establish before the winter.

As for irrigation, water is limited and therefore the greenkeeper team is forced to use as little irrigation as pos-

sible. However, drought conditions are preferred in the spring transition to promote die back of cool season grasses, which helps the Bermudagrasses to overtake. At the end of July, Bermudagrass greens are aerified. During the summer, verticutting needs to be performed every two weeks. Additionally, solid tinning is carried out in spring to aid with recovery from Spring dead spot.

According to data published by MINELLI et al. (2015), the conversion to Bermudagrass after 2010 resulted in less mowing (-27 %), fertilisation (-53 %), coring (-50 %), topdressing (-20 %) but a 172 % increase of verticutting. Data was calculated based on engine working times.

Interview as Q&A with Brian Og O’Flaherty, Head-Greenkeeper at Golf della Montecchia

? I believe it’s almost impossible to maintain a golf course without any pesticides, because weather conditions are unpredictable and the outbreak of diseases, the germination of weeds and the emergence of pests might be strongly favoured at some point during the year. Apart from cultural methods do you use any biological products, which can be used under ‘organic farming’ principles?

! We experienced with some organic products but found that none so far provided any control compared to conventional pesticides.

? ‘Organic farming’ is known to be more labour intensive and often results in less yield but produce of higher quality. You stated that you use ‘organic farming principles’ how does that relate to golf? What are your experiences?

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| Grass species composition greens | Hybrid bermudagrass – <i>Cynodon dactylon x transvaalensis</i> cv. Miniverde Winter overseeding with <i>Poa trivialis</i> |
| Grass species composition fairways | Hybrid bermudagrass – <i>Cynodon dactylon x transvaalensis</i> cv. Patriot Winter overseeding with <i>Lolium perenne</i> |
| Grass species composition tees | Hybrid bermudagrass – <i>Cynodon dactylon x transvaalensis</i> cv. Patriot Winter overseeding with <i>Lolium perenne</i> |

Tab. 2: Overview on the grass species composition on the Golf della Montecchia.

! We have a small greenkeeping team (seven full time staff) and also a relatively modest budget so this lack of resources means that we need to prioritise our maintenance programs to the player needs throughout the year and this may mean that we do not always get to do the maintenance we would like to do on the Green course.

However, the positive aspect of this is the results we have obtained so far have been positive and we feel that we still have the possibility to improve our maintenance practices further and therefore continue to improve the playability of the course for our players.

Evaluation by the author

I visited Golf della Montecchia, during a course visit as part of the ETS field days in 2018. GDM is located north of Italy and to my knowledge the most northern golf course in Europe to try and establish warm season grasses. A combination of organic management practices and trying to maintain warm season grasses in that area makes it difficult to make a judgment about the efficiency of the approach at Golf della Montecchia. However during my course visit, Bermudagrass dominance in fairways was very low and greens appeared patchy with some pockets of Bermudagrass and other cool season grasses mixed with each other.

Also greens were close to aeration and were therefore soft and high in thatch. I believe Golf della Montecchia is still in an experimental stage and the Head-Greenkeeper is short staffed. I hope they will keep the project going and the success of their approach can be reevaluated in some years.

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Vorankündigung 130. Rasenseminar der DRG in Dortmund

Am 11. und 12. Mai 2020 findet in Dortmund das 130. Rasenseminar der DRG statt. Die zweitägige Veranstaltung steht unter dem Generalthema:

„Regelwerke im Rasen – Anlage, Pflege, Fertigrasen“.

Das Seminar spricht vor allem Interessierte aus den Bereichen Planung, Bau und Pflege von Rasensportanlagen sowie natürlich den Garten- und Landschaftsbauer an.

Der Exkursionstag am 11.05. ist geprägt durch die Besichtigung repräsentativer Fußballarenen, einer kommunalen Sportanlage sowie eines Produktionsbetriebs für Fertigrasen.

Die Beispiele aus der Praxis werden am darauffolgenden Seminartag durch Vorträge zu den im Sportplatz- und Galabau geltenden Regelwerken ergänzt.



Foto: K.G. Müller-Beck

Vorgesehen sind:

- „Das Wasser fließt nicht bergauf – warum die DIN 18035-3 Entwässerung überarbeitet wird“

Referent: Dipl.-Ing. Udo Orfgen; Ingenieurbüro für Sportstätten- und Freiraumplanung, Obmann DIN 18035-3, Frankenthal

- „Ohne Pflege ist alles nichts“

Referent: Dipl.-Ing. Markus Illgas; Planungsbüro Ulenberg & Illgas, Straelen

- „Drei Jahre Technische Lieferbedingungen für Fertigrasen: Wie sieht die Praxis aus?“

Referentin: Dr. Gabriela Schnotz; Juliwa-Hesa, Heidelberg

- „Rasen-Normen im Galabau: Vorgaben kennen – Mängel vermeiden“

Referent: Dipl.-Ing. Heinz Schomakers; Fachgebiet Normen und Regelwerke beim BGL, Bad Honnef

Zu Beginn des Seminartags am Dienstag findet die jährliche Mitgliederversammlung mit den Vorstandswahlen statt. Eine zahlreiche Teilnahme ist wünschenswert.

Die Einladung sowie die Möglichkeit zur Online-Anmeldung werden rechtzeitig im Frühjahr 2020 auf der DRG-Homepage bekanntgegeben. Die DRG-Mitglieder werden direkt angeschrieben.