

GC2030

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Golf Course 2030

Integrated management of turfgrass diseases and insect pests on European golf courses

Project Update 2023



The overall aim of the project is to investigate cultural practices and new technologies for prevention and control of the two most important turfgrass diseases on golf course putting greens and insect pests on golf courses with minimum use of pesticides.

This project is a joint effort by researchers and greenkeepers from the Nordic countries, Germany, Portugal, UK, Finland and Russia, suppliers, Golf to investigate cultural practices, alternative products and new technologies for managing

important diseases: microdochium patch and dollar spot with no or strongly reduced pesticide inputs.

Detailed project updates, reports and whitepapers can be downloaded from www.sterf.org.

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Dollar spot



Microdochium patch

Microdochium patch and dollar spot

To prevent and control these two most important turfgrass diseases on golf courses the project investigates the effects of cultural approaches such as rolling, UV-C radiation, late autumn nutrition and alternative products such as citric acid, iron sulphate against microdochium patch (MP) and dollar spot (DS).

The field studies were conducted in collaboration with the suppliers at NIBIO Landvik (Norway), at STRI in Bingley (UK), on Osnabrücker Golf Club (Germany) and on Copenhagen Golf Club (Denmark).

Cultural approaches and alternative products at NIBIO, Norway and at STRI, UK

The following treatments reduced MP on annual bluegrass/creeping bentgrass golf green compared with control (no fungicides, weekly nutrition of 292 or 313 kg N/ha/yr in 2020 and 2021, respectively): non-frequent (bi-weekly) nutrition, citric acid applied at a rate of 1 kg/ha from August to October, organic slow release nutrition 5-2-4+Fe Suståne (266 or 287 kg N/ha/yr in 2020 and 2021, respectively) and 28% reduced N-nutrition. Rolling in combination with reduced N-nutrition suppressed MP in the first year of trial, but not

in the second. The impact of iron sulphate on MP differed between the years, but there is a tendency that higher rates (8 kg/ha) increased MP more than lower rates (4 kg/ha). Late autumn nutrition (LAN) increased MP in both years.

At STRI Bingley, on colonial bentgrass/poa golf green the following treatments increased MP compared with control (no fungicides, weekly nutrition, 122 kg N/ha/yr): non-frequent (bi-weekly) nutrition and 28% reduced nutrition, but not LAN.



Trial Plots. Landvik, Norway



Rolling at Copenhagen Golf Club, Denmark

It is well known that rolling can reduce dollar spot. It is less known that it can have a preventative effect on microdochium patch, but experiments at Copenhagen Golf Club and research at NIBIO Landvik indicate this.

At Copenhagen GC, the Course Manager Martin Nilsson tested the effect of rolling on a fescue/bentgrass green. At NIBIO Landvik, rolling and the effect of two fertiliser levels were tested on annual bluegrass/creeping bentgrass greens.

At Copenhagen GC timing and frequency of rolling were examined over 3 different rolling treatments; zero, two and four times per week. Course manager Martin Nilsson did monthly registrations of overall turfgrass quality and % of microdochium patch.

Rolling from June did not have a better effect on microdochium

patch than if the treatment started in August. The results showed that rolling reduced microdochium patch by 57%.

Difference between rolling 2 and 4 times per week was not significant. However, Martin Nilsson noticed that the plots rolled 4 times per week looked less dense and more worn than the plots rolled twice per week. It was also observed that plots rolled from August to November looked better than plots rolled from June to November, but there was no statistically significant difference here.

Rolling seems to reduce microdochium patch on annual bluegrass and fescue/bentgrass greens. Rolling four times a week did not give a better effect than rolling twice, and wear from four times rolling gave reduced green quality in late autumn on the green at Copenhagen GC.

Rolling has a positive effect on green quality throughout the summer, but to reduce microdochium patch, it seems that rolling twice a week from August is sufficient for a good control.

It is also worth noting that reduced nitrogen fertilisation in the autumn resulted in less microdochium patch on annual bluegrass greens, as has been shown in previous experiments with autumn fertilisation.



Rolling, Copenhagen Golf Club



UV-radiation at Osnabrücker Golf Club

UV-radiation at Osnabrücker Golf Club, Germany

UV-radiation is a new technology to prevent diseases. It has been documented to have germicidal effects by causing damage to DNA in cell nuclei.

Available data shows a strong effect of UV-C on the mycelial growth of turf diseases. The use of artificial produced UV-radiation to prevent both dollar spot and microdochium patch was investigated at Osnabrücker Golf Club in Germany.

Despite low disease pressure in 2022 as in 2021, the results from

the UV-C radiation trial at Osnabrücker GC showed that the highest dosage of UV radiation (80 mJ/cm^2) compared with control (no treatment) and lower dosages ($10\text{--}40 \text{ mJ/cm}^2$) reduced MP from 1.8% (untreated control) to 0.78% (in the highest UV-C dosage) and DS from 0.87% to 0.16%.

Results suggest that UV-C radiation could provide an alternative physical method to control but not to combat completely dollar spot disease.

Chafer grubs and leatherjackets

As most registered pesticides against these insect pests have been banned in the EU, the need for alternatives to prevent attacks of June beetles and crane flies is growing. The IPM-project conducted a literature review of the management and potential innovation options of monitoring, warning and control of chafer grubs and leatherjackets on golf courses.

At present it is not realistic to get emergency authorisations to use synthetic insecticides to

control chafer grubs and leatherjackets in Scandinavia. The consequence of that is that we must rely on biological and other alternative methods. Biological methods are also more expensive and less effective than the synthetic insecticides.

Good communication with golfers is essential when a golf course is damaged by chafer grubs or/ and leatherjackets, and though the biological methods have been tested in several experiments golfers

must get used to more damage to playing surfaces from insect pests now and in the future.

Overall, a more comprehensive pest management strategy needs to be developed, based on the principles of ecostacking (stacking of ecosystem services for improved biocontrol in this case). Golf Course Managers and Greenkeepers should focus on improving their skills to become experts in using alternative and biological methods for pest management.

	Chafer Grubs	Leatherjackets
The Problem Faced	In the last 10-15 years damage is limited to a few golf courses with sporadic attacks from year to year. Most abundant on sandy soils.	More widespread damages on golf courses (5.1-20.0 %), and it seems as they are increasing. Most abundant on moist areas.
No synthetic insecticides are available, and no prospect of Emergency Authorisations of new insecticides.		
Possible Control & Actions	Greenkeepers have to become experts in using microbiological control. Microbial agents like entomopathogenic nematodes (EPN) and strains of <i>Bacillus thuringiensis</i> . Better monitoring and warning to improve determination on how to use them correctly.	
	Irrigation on greens and surroundings at daytime when beetles are swarming to prevent them laying eggs.	Nest boxes for starlings. Sheeting greens in spring.
	Scare off animals that destroy the turf.	
Urgent Need	Communicate to golfers that they must expect and be willing to accept more damage from insect pests on golf course playing surfaces.	





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