

HNC Managing Sports Turf. Improving an area

Over a recent spring and summer several fairy rings appeared on one of the greens at Scraftoft Golf Club. While at the moment the problem fairy rings are small there is potential for them and the problems associated with fairy rings to increase.

The maintenance procedures outlined below are carried out on the greens at Scraftoft Golf Club.

CUTTING: The greens are cut to between 3.5mm and 7mm with a ride on type mower but when ground conditions are too wet or when grass growth is minimal the greens are cut with a Certees mower. Turfgrass clippings are removed after every mowing. Verti-cutting is carried out every three to four weeks in the growing season depending on the weather and levels of play and stress on the greens.

AERATION: Typically, in any given year, an aeration programme on the greens would consist of six winter slitting, an autumn and spring half-inch hollow core followed by core removal and heavy a top dress. A deep aeration like Vertidrain or earthquake is carried out in late autumn, depending on ground conditions. No quad tining is carried out as lack of equipment and budgetary constraints inhibit this practice. All aeration procedures are carried out by contractors (apart from slitting) because at present the golf club does not own any equipment suitable for the job.

SURFACTANTS: Wetting agents are applied in granular forms just after hollow coring and before top dressing. One or two liquid applications are applied throughout the summer months and in dry spells hand watering is also carried out.

FUNGICIDES: Typically fungicide applications are carried out in spring and in autumn, usually between two and four applications a year. The applications are both curative and preventative. Products used include, carbendazim, fenarimol and chlorothalonil. These are usually for the cure or prevention of *Microdochium nivale* (fusarium patch disease) and occasionally anthracnose.

TOP DRESSING: Heavy dressings after Spring and Autumn hollow coring is carried out to encourage soil exchange. Light dressings applied four to six times throughout the growing season to prevent layering between the thatch and dressing. With just over one and a half hectares 9000kgs are applied per annum.

Throughout the year the greens are firm, free draining and have reasonable pace, smoothness and consistency, which are playable for the majority of the year.

They are free from weeds, worms and disease, and are composed of approximately 90% *Poa annua* other grass species make up the remaining 10%. The thatch levels on the majority of the greens are between 20 and 40 millimetres.

The growth rates are even and consistent throughout the main playing season, with 100% grass coverage being the norm. However recently on the 10th green some fairy rings have appeared.

"Fairy rings appear as circles or arcs of dark green grass, often with thin or dead grass just inside or outside the rings. Fairy rings can be caused by one or more of about sixty species of soil inhibiting fungi that feed on

decaying organic matter, sometimes mushrooms appear in the rings, especially following rainfall or intensive irrigation.

"As the fungal mass grows the soil can become hydrophobic, resulting in desecration of the Turfgrass. There is no easy or inexpensive way to control this disease. The most effective measure involves stripping the sod, fumigating the soil and replanting with clean sod." (Turgeon. 1999).

"Disease is an interaction between the plant and a pathogen that disrupts the normal growth and appearance of the plant.

- Turfgrass disease development requires three components; Susceptible Turfgrass host (always present).
- Virulent pathogen (always present).
- Conducive environment in which the host and pathogen interact (changes frequently).

Any stress (environmental or of human origin) placed on the turf will weaken it and make it more susceptible to disease development.

Concentrate on managing the environment of each individual area on the Golf Course to manage the potential problems. Most fungi are totally harmless, using only dead organic matter for growth.

These fungi are extremely important in turfgrass as decay organisms that help reduce thatch, and as competitive organisms that help provide natural biological controls. Excess thatch increases the population of fungi that potentially cause disease if the proper environmental conditions develop.

Therefore excess thatch may also create a stressful environment, especially when the thatch layer becomes hydrophobic. Roots may live in the thatch and never move into the soil layer." (Schumann, G.L. et al, 1998).

During the growing season the fairy rings have only a minor effect on the playing conditions. With the potential for the rings to increase in size and their effect on the aesthetic appearance of the green warrants an investigation into a process on how to eradicate them.

As Schumann mentions above, "excess thatch may also create a stressful environment, especially when the thatch layer becomes hydrophobic". It seems that excessive thatch levels and disease go hand in hand.

Historical means of fairy ring eradication have been disruptive, expensive and even dangerous; also many of the treatments were ineffective. Following an extensive literature search new methods of fairy ring management using chemical (fungicides) control have shown to be very effective in the control of fairy rings.

Following an extensive literature search the only current and effective treatments for fairy rings was found on the Internet.

I read of two recent research studies undertaken in the States, which have successfully used azoxystrobin to treat established fairy rings. At present azoxystrobin only has a UK licence for the treatment of *Microdochium nivale* (fusarium patch).

Before the hydrophobic conditions associated with fairy rings occur a cultural programme of aeration and thatch reduction is seen as best practice as a preventative measure. Also substituting azoxystrobin fungicide for others

that have previously been used, I'm sure, will have a positive effect not only on the fairy rings but other diseases as well.

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STUDY ONE

In the first study which took place in 1997 using fungicides in the control of Localised dry spots (L.D.S.) or type 3 fairy rings and type 1 and 2 fairy rings it was noted that,

"While wetting agents can manage the systems of L.D.S. (as can cultural practices such as verti cutting, areaification, top dressing and hand watering) a fungicide such as Prostar or Heritage is necessary to kill the fungus that causes dry spot or fairy rings. (Gelernter W. 1998).

In studies previous to this one applications of fungicide have been ineffective in the management of fairy rings because traditional fungicides find it impossible to penetrate hydrophobic soils and so have no effect on the pathogen fungi.

STUDY TWO

Fidanza, M. wrote in 2002 following the World Scientific Congress of Golf at St. Andrews, Scotland a paper called 'Conventional and innovative methods for fairy ring management in turfgrass' was presented. The study took place in the States in five different locations, using conventional and innovative methods of fairy ring management between 1996 and 1999.

"Overall best fairy ring control based on creeping bent grass recovery (i.e., <5% reoccurrence in Type 1 and Type 2 fairy ring symptoms from July 1 through to August 5, 99) was observed in those plots with high-pressure injection (HPI) azoxystrobin.

Turfgrass recovery and regrowth effects were first observed five days (July 6, 1999) after treatments were applied. The visual appearance in plots treated with HPI azoxystrobin was easily observed due to the rapid turfgrass recovery and apparent resumption of growth within the treated areas." (Fidanza, M. 2002).

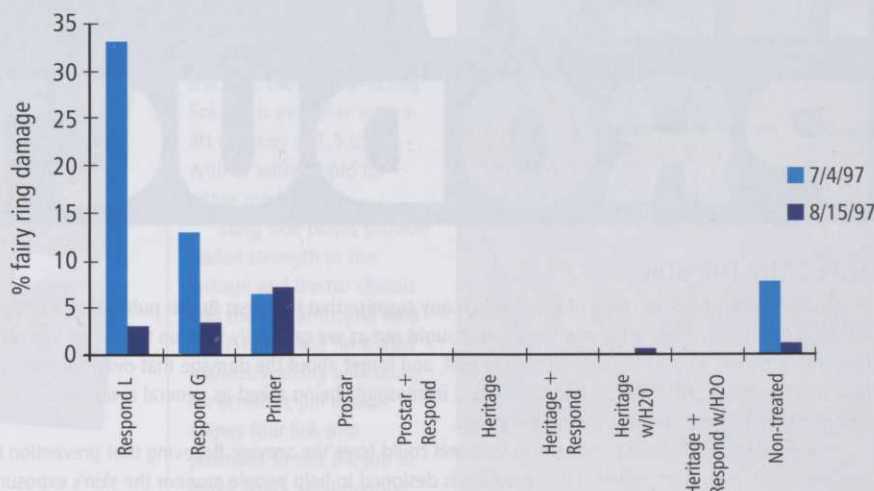
In the two studies the only difference was that one trial was carried out using a high-pressure injector to apply the fungicide and in the other a traditional boom sprayer was used.

It is clearly shown in Table 1 (below) that in the non-treated plot number 10 the amount of percentage localised dry spot and percentage fairy ring damage was high.

However in plot no 6 and 8 where Heritage was applied at 4oz per 1000 sq ft, the reduction in both diseases and the increase in turf quality were dramatic. In table 2 (above) the results are seen to be very marked, also worthy of note is the reduction in turf quality by using respond and primer wetting agents alone. Prostar is a fungicide that is at present not available in the UK.

▼ Table 2

Management of Type B fairy ring symptoms with fungicides and wetting agents



"The most effective way to control diseases is to stop them before plants become infected. Almost all fungicides can act on the surface of the plant to prevent fungal penetration into the leaf surface. In contrast, not all fungicides can stop the progression of disease once fungi have colonised the plant. To do so the fungicide must penetrate the plant surface and control; pathogen activity within the plant", (Agnew M. L. 1999).

The results of the trials are very clear, azoxystrobin is in the new generation of fungicides that penetrate the surface of the grass plant and control pathogens from the inside out. This action of the movement gives the fungicide a chance to work even in hydrophobic soils.

The results of the search were very interesting in that all the research carried out is very novel. Until very recently fair ring management had been somewhat hit and miss but, I'm sure that with new technologies in fungicide development the problem may become a thing of the past.

There was very little that I could find in books.

CHANGES TO MAINTENANCE PROCEDURES.

As with all management techniques the aim is to develop, encourage and sustain healthy turfgrass and to reduce hydrophobic soil conditions to prevent the problem before it arises.

A well-aerated soil with appropriate thatch levels using cultural methods is the preventative answer to fairy rings. It is my intention to make changes to the "Maintenance Policy" in 2004 including:

- Encourage the golf club to purchase a tractor-mounted aerator in order to reduce contractor costs and have the ability to carry out micro tinning during the main playing season. Micro tinning will help reduce the amount of thatch without much disruption to play.
- Increase the amount of verti-cutting from once every three to four weeks to once every two weeks.

However; these methods alone will not remove already established fairy rings. Applying azoxystrobin fungicide, instead of those which have been previously applied, may have a positive effect on the current fairy ring problem and may also inhibit any further outbreaks.

Given the research undertaken the only chemical control available in the UK for fairy ring management is azoxystrobin.

Without doubt azoxystrobin (Heritage) helps reduce the effects of fairy rings; it is even quoted on the University of Nebraska Fungicide trade names. (Watkins 1999) as a control.

However in the UK the license is only for the control of Fusarium patch in turf (see annex 3) and any attempt to control any other disease would be contrary to the Control of Substances Hazardous to Health Act 1989.

A change in the timings of fungicide applications to co-inside with hollow coring, reducing the volume of thatch with more verti cutting and increasing the volumes of top dressing will, I am sure, have a beneficial effect in the greens in general and a positive effect on the current fairy ring problem.

▼ Table 1

| Trt. # | Product | Rate/1000 sq ft | Turfgrass Quality Rating | | | | % localised dry spot damage | | % fairy ring damage | | # fairy rings per plot | |
|--------|------------------------|-----------------|--------------------------|---------|--------|---------|-----------------------------|---------|---------------------|---------|------------------------|---------|
| | | | 5/2/97 | 5/30/97 | 7/4/97 | 8/15/97 | 7/4/97 | 8/15/97 | 7/4/97 | 8/15/97 | 7/4/97 | 8/15/97 |
| 1 | Respond L* | 3 oz | 7.7 ab | 6.7 ab | 6.3 c | 6.3 bc | 3.7 ab | 3.3 ab | 33.3 a | 3.0 a | 11.3 a | 5.3 ab |
| 2 | Respond G* | 5 lb | 7.8 a | 6.8 ab | 7.0 b | 6.2 bc | 1.0 b | 3.3 ab | 13.3 ab | 3.7 a | 4.7 b | 6.7 a |
| 3 | Primer 604 | 6 oz | 7.2 b | 6.9 ab | 7.2 ab | 6.9 bc | 0.0 b | 0.0 b | 6.7 b | 7.3 a | 2.7 b | 3.7 ab |
| 4 | ProStar 50 WP | 6 oz | 5.3 c | 6.0 c | 5.5 d | 6.0 c | 18.3 a | 7.5 a | 0.0 c | 0.0 b | 0.0 c | 0.0 b |
| 5 | ProStar 50WP + Respond | 6 oz + 3 oz | 7.5 ab | 7.2 a | 7.2 ab | 7.2 b | 0.0 b | 3.3 ab | 0.0 c | 0.0 b | 0.0 c | 0.0 b |
| 6 | Heritage | 0.4 oz | 7.2 b | 7.0 ab | 7.6 a | 7.3 ab | 0.0 b | 1.7 b | 0.0 c | 0.0 b | 0.0 c | 0.0 b |
| 7 | Heritage + Respond | 0.4 oz + 3 oz | 7.8 a | 6.8 ab | 7.6 a | 7.3 ab | 0.0 b | 1.7 b | 0.0 c | 0.0 b | 0.0 c | 0.0 b |
| 8 | Heritage* | 0.4 oz | 7.0 b | 7.2 a | 7.5 ab | 6.9 bc | 0.0 b | 0.0 b | 0.0 c | 1.0 b | 0.0 c | 1.0 b |
| 9 | Heritage + Respond* | 0.4 oz + 3 oz | 7.7 ab | 7.2 a | 7.4 ab | 7.5 a | 0.0 b | 3.3 ab | 0.0 c | 0.0 b | 0.0 c | 0.0 b |
| 10 | Non-treated | | 7.3 ab | 6.5 bc | 6.3 c | 6.1 c | 11.0 a | 6.7 ab | 8.3 b | 1.7 a | 5.0 b | 1.7 b |