

Fusarium patch, Microdochium patch or Pink snow mould?

TORO Count on it.

Dr Kate Entwistle looks at a problem which has been afflicting a number of golf courses in recent months

Fusarium patch still remains the most common and widespread fungal disease problem of cool-season amenity turf grasses.

The past few months have seen severe and prolonged outbreaks of this disease developing extensively, even on swards that have received several prior fungicide applications.

WHY SHOULD THIS DISEASE BE SO PERSISTENT?

To try and understand the reasons for the development of fusarium patch, and its apparent disregard for our management efforts aimed at preventing it, we need to look more closely at the fungus that causes the disease.

WHAT IS ITS CORRECT NAME?

The fungus *Microdochium nivale* causes fusarium patch disease. This same fungus used to be called *Fusarium nivale* and it is this 'old' Latin name that gives the disease its generally accepted common name of fusarium patch.

There are many different species of fungi within the genus (or group) *Fusarium* and several of them are able to cause disease on turf grasses.

Fusarium nivale was, however, found to differ sufficiently from all other *Fusarium* species that it was eventually renamed *Microdochium nivale*.

Some people now refer to the disease as *Microdochium* patch but, in general, the old name for the diseases has been retained.

Microdochium nivale is a cold-loving fungus that is able to grow between 1C and 10C. It is possible for the fungus to grow at temperatures above this range but as the temperature increases, its rate of growth will decline.

Some strains of this fungus have been found to grow at temperatures below freezing and it is therefore clearly well adapted at causing damage under cold, wet conditions.

The fungus needs the presence of a water film in which to grow and infection of the turf grass plant takes place only after a prolonged period of leaf wetness.

Cool, wet weather will promote the onset and development of this disease but it has been found that periods of frost interspersed with cold, wet weather, offer the ideal conditions for fusarium patch disease to flourish.

All turf grasses are susceptible to infection but annual meadow grass is known to be the most susceptible of all cool-season grasses.

*Continue
to learn*

Pink snow mould, as the name suggests, is the name given to the symptoms of disease caused by this same fungus, *Microdochium nivale*, as revealed following snow melt.

Over recent months, I have seen many cases of fusarium patch disease in which the fungal mycelium has developed on the surface of the affected turf, generally around the perimeter of the affected patches (Figure 1), encouraging many turf managers to assume that they have pink snow mould developing without snow cover.

The fungal mycelium is extremely pale pink in colour but when it masses together on the surface of the sward, it can appear distinctly pink in colour (Figure 2).

High relative humidity will encourage the growth of the fungus on the surface of the sward but strictly speaking, the disease is still fusarium patch and not pink snow mould.



Photo: Peter Jones Associates Limited

▲ Figure 1: Recently seen symptoms of fusarium patch



▲ Figure 2: Pink mycelium of *Microdochium nivale*

At the end of the day, the common name that we give to the symptoms of disease is far less important than the correct identification of the fungus that causes it.

Microdochium nivale is a fungus that lives predominantly as a saprophyte, living off the decaying organic matter at the base of the sward and in the root zone.

It is not a very specialised fungal pathogen and despite the potential extent and severity of disease outbreaks, the fungus needs to be given the opportunity to infect the turf rather than being able to forcibly enter a healthy plant.

By understanding the conditions that favour infection and disease development, we can adjust our management of the sward such that these conditions are minimised.

The most effective way to manage fusarium patch is to try and limit the onset of the disease. What is imperative is that the disease is spotted in the early stages and not when you see the textbook symptoms appearing on the sward.

If the disease has advanced to this stage, it will be much more difficult to manage and disfiguring scars become more likely.

In the early stages of infection, the plants may become very slightly paler in colour but the first sign you are likely to see are small (2cm diameter) patches of dark brown leaves that will also be noticeably water-soaked (appear wet and somewhat translucent) (Figure 3).

If the disease is not controlled at this stage, the infection can rapidly intensify and the crowns can become infected. Once this has occurred, the turf will take much longer to recover since new plants will need to grow in or establish from seed, to replace those that have been killed.

Therefore, it may not be until the spring that swards show significant recovery from severe winter infections.

PREVENTATIVE MEASURES THAT SHOULD BE EMPLOYED

The maintenance that is required to limit disease on individual courses will vary considerably depending on factors such as the specific root zone conditions, local environmental conditions, the sward composition and nutrient input, to name but a few.

Since the fungus grows most actively in cool, wet conditions and is more aggressive on weakened swards, maintenance practices should be aimed at reducing surface moisture and encouraging a strong, less susceptible sward, especially going in to the winter months.

Any moisture on the sward will encourage the growth of this fungus and so removing dew whenever it forms will be of benefit in reducing the onset of infection.

It is possible to move fungal spores across a sward by the practices involved in removing dew but it is not the presence of the fungus that is the limiting factor in disease development but the presence of conditions in which the fungus can grow. Therefore, moving the fungus about will not in itself encourage greater disease development. Keeping the dew on the sward certainly will.

It is also important to check the root zone for any problem with surface drainage. Many of the turf samples that I have received over the past year have shown root zone problems that have resulted in the base of the sward and the thatch remaining wet.

These include thatch build-up and layering of the surface profile or deeper root zone problems that prevent effective movement of water away from the base of the sward. Not only careful maintenance of the root zone but also increased surface air movement will reduce the period of leaf wetness and therefore reduce disease development.

Weakened turf and especially plants that have received excess nitrogen, are much more susceptible to attack by *Microdochium nivale*.

This is due to the fact that their cell walls are much thinner and are much more easily penetrated or damaged and therefore allow more rapid disease progression. Careful monitoring of nutrient input is one of the key factors in promoting a strong and healthy sward that will be less susceptible to infection.

Again, the amount and type of nutrient that needs to be applied will differ from course to course but it is worth keeping in mind that adequate potassium availability has also been shown to help reduce disease severity.

Keeping pH levels constant and at a suitable level for the sward composition, can also reduce the likelihood of this disease. When included in a fertiliser programme, acidifying fertilisers can be used to maintain or adjust the root zone pH.

WHY FUNGICIDES APPARENTLY DON'T WORK

If an approved amenity fungicide is applied as per the label instructions and at the correct time with regard to disease development, the fungicide should provide the extent and duration of protection or control expected.

Over the recent few months, I have received numerous telephone calls asking why fusarium patch disease is still active on the course even after several fungicide applications have been made.

There are many reasons why efficacy may appear to be lower than expected. Timing of the fungicide application is crucial. If a product is applied too far in advance of the environmental conditions that would encourage the disease to become active, as much of the product may have been lost and the relative amount available to control the eventual disease outbreak, is actually much lower than that needed.

In addition, applications of systemic products that may have shown lower than expected results, have invariably been found to have been applied at low water volumes.



If systemic products are to be taken up via the roots, the product needs to get to the roots and so, although reducing the water volume in the tank may mean a reduction in the time required to treat the course, it may also mean efficacy is being compromised.

Tank mixing of products to reduce overall application times can also affect efficacy and should only be considered if label recommendations allow it.

If systemic products are being considered for application, the growth rate of the plant must be borne in mind. If there is little growth in the sward there will be little movement of the product around the plant and therefore efficacy may again be reduced.

Quite often, however, a fungicide application may have appeared to be less effective than anticipated because, after several weeks following the treatment, the disease is still visible.

Fusarium patch scars can take a long time to grow out, especially if they have developed to the stage shown in Figure 1. Since there is little growth of the plants during the winter, recovery will naturally be slow.

If the scars are still apparent but the patches are not getting larger and no further patches are developing, the fungicide has worked as well as any product can under winter conditions.

The fungicide will have stopped the present infection and also offered some protection to the rest of the sward to prevent new outbreaks from developing.

There are no reports in the UK that fungicide resistance has developed to this disease although, in theory, it is possible to find resistant strains of the fungi if fungicides are used inappropriately.

Over use of certain groups of fungicides could lead to short term resistance developing in the fungal population.

By stopping applications of these active ingredients, the fungal population would eventually return to being susceptible and these actives could again be used effectively.

Other fungicide groups could, however, lead to a lasting resistance not only to the specific product applied, but also to all fungicides with active ingredients in the same chemical group.

Should this occur, these fungicides could never be used effectively in that location again. Fungicides must be used carefully and wisely and as stated on the label, if resistance is to be avoided and efficacy is to be maximised.

ENCOURAGE A HEALTHY ROOT ZONE

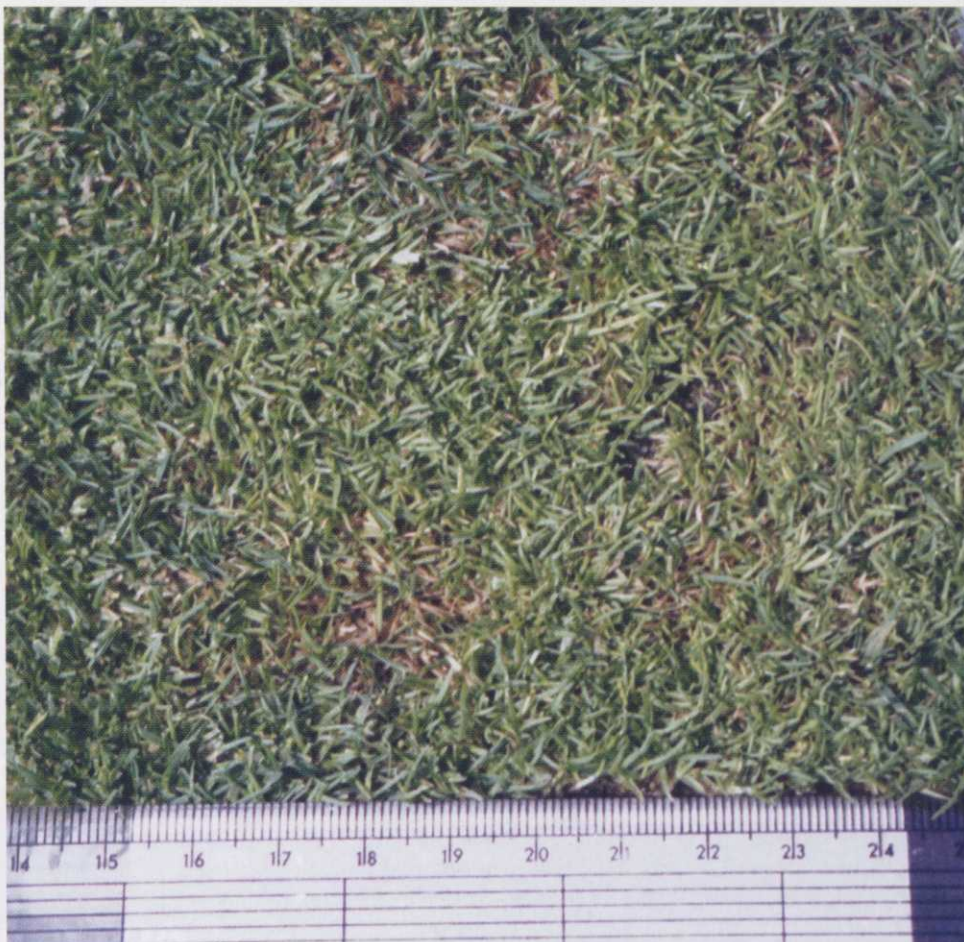
Microdochium nivale is, as I mentioned earlier, primarily a saprophytic fungus. It lives in the root zone and in plant debris until the conditions allow it to cause disease.

If we can encourage and increase the microbial diversity in the root zone and thatch, the relative amount of organic matter on which this fungus can grow as a saprophyte, will be reduced.

Natural competition between this fungus and other micro-organisms can play a huge role in controlling the severity and incidence of fusarium patch.

To achieve this requires careful day to day management and hopefully the rewards for hard work on aeration, balanced nutrient input, scarification, improvement of surface drainage and so on will be seen through the winter with much reduced levels of fusarium patch disease.

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◀ Figure 3: Early symptoms of fusarium patch disease