

# Fusarium

## ...better the devil you know

Henry Bechelet, Technical Sales Manager at Everris, turns detective to investigate Fusarium and how to deal with it

### Know your enemy

If we want to minimise the occurrence of damaging disease attacks, it is essential to know the pathogen and understand what it is trying to do.

The *Microdochium* patch pathogen, *Microdochium nivale*'s single aim in life is to complete its life cycle and reproduce. The problem we have, as turf managers, is that it does this at the expense of the grass plant. The turf, in effect, is the collateral damage.

### Stages of life cycle

#### LAYING IN WAIT

When inactive, *Microdochium nivale* survives in the thatch or soil as microscopic spores or dormant mycelium. The spores can remain viable for up to two years and with-

stand extremely low temperatures (-20°C). They lie in wait for favorable conditions to develop.

#### GERMINATION

The spores begin to germinate in cool wet conditions. This can happen at temperatures between 15°C and -6°C with the ideal range being 0-6°C (combined with periods of leaf wetness for more than ten hours a day).

When the spores germinate they produce long, branching hyphae, tubular structures that search for nutrients to fuel further growth and development.

#### PENETRATION / INFECTION

Specialist hyphae infect the plant by penetrating outer cell walls of leaf sheaths and leaf blades near the soil. Infection can also proceed through the stomata in the leaves and progress rapidly through the plant.

#### MYCELIAL GROWTH

Nutrient absorbing hyphae draw resource from the plant, which is transported from the host to

the fungus to allow it to develop and produce further mycelial networks.

This stage can occur extremely quickly with complete colonisation of the leaf possible in the space of 72 hours. This is when the real damage starts. At this stage, the mycelium growth enables the patches to spread outwards.

#### BLISTERING & SPORE FORMULATION

The fungus finally produces fruiting bodies containing spores that are released to disperse in wind and water, continuing the cycle of disease. The pathogen population will boom exponentially if cool, damp conditions persist.

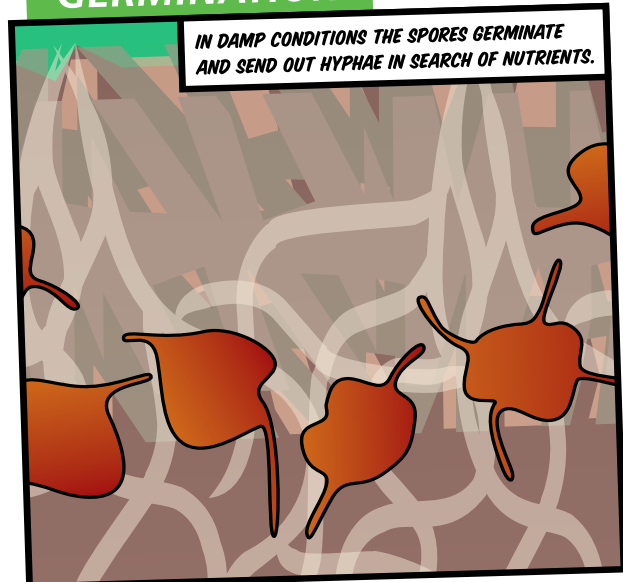
It cannot be emphasised enough that the *Microdochium nivale* pathogen is a merciless parasite. It is solely concerned with its own reproduction, which is achieved by taking resources from its host grass plant. It has no care for the health of the turf and will draw all life from it because the next generation of spores are sent away to find a different host to prey upon.



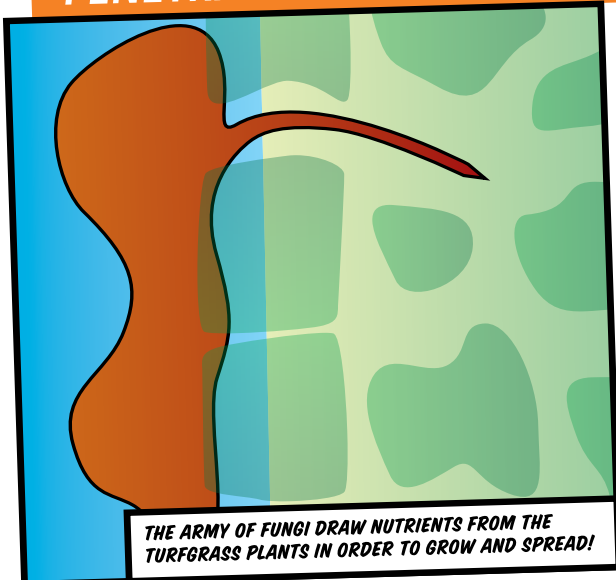
## LAYING IN WAIT



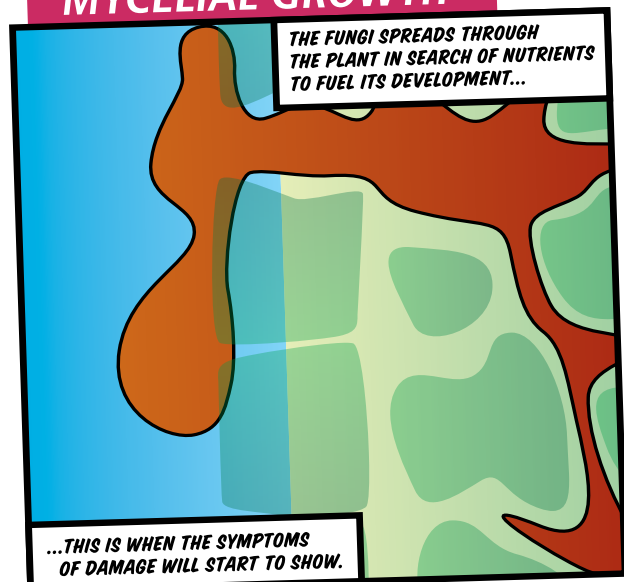
## GERMINATION



## PENETRATION / INFECTION



## MYCELIAL GROWTH



## BLISTERING & SPORE FORMULATION



### Test your knowledge

1. What are the conditions that favour the germination of the Microdochium Patch spores?
2. How does the pathogen fuel its growth and development?
3. What are the main symptoms of Microdochium Patch disease?
4. Why is it best practice to rotate active ingredients or use products with multiple active ingredients?
5. When in the pathogen lifecycle is it best to apply the active ingredient fludioxonil?

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### BIGGA CPD credits

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You will need to go to [http://www.surveymonkey.com/s/BIGGA\\_CPD\\_Fusarium\\_Quiz](http://www.surveymonkey.com/s/BIGGA_CPD_Fusarium_Quiz), complete the quiz and leave some feedback for your CPD credit.

## The symptoms

Initial symptoms begin to show as small brown patches emerging in localised areas. The symptoms are a result of the pathogen causing leaf death due to extensive infection and nutrient withdrawal. Mycelium may also be visible at the edges of the patches as the fungi spreads. As the patches enlarge, the centre becomes water-soaked and paler as a result of the deteriorating leaf structure collapsing and beginning to degrade. These symptoms begin to show quite late in the life cycle of the disease, so early treatment and a preventative approach is essential to limit the potential for extensive damage.

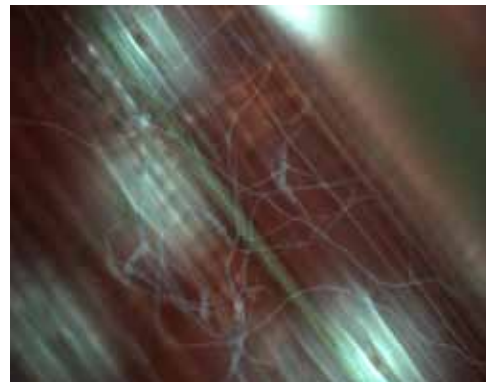
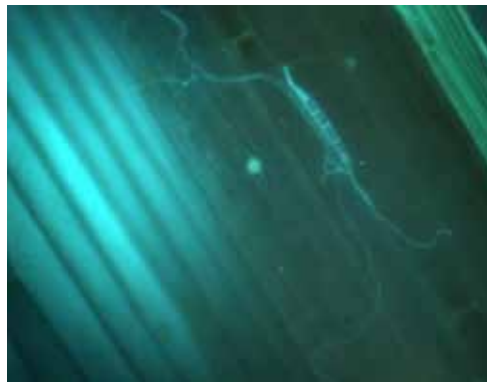
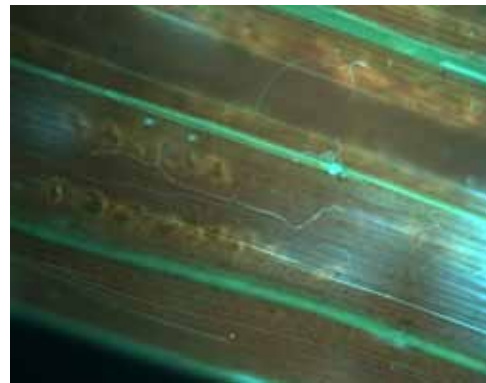
## Your disease prevention strategy

Prevention is always better than cure, so it is important to create conditions that will limit the development of the disease. An integrated turf management approach uses all the tools in our armoury to achieve this. Maintaining turf health and reducing the risk of disease attack begins with sound cultural practices, such as:

- Creating a freely draining turf system with soil profile management, thatch reduction and drainage systems
- Keeping the turf leaf as dry as possible by brushing and switching, dew dispersants, managing irrigation inputs, reducing shade and improving airflow
- Maintaining turf health without creating unduly lush growth, especially in autumn
- Maintaining an appropriate soil pH (generally in the region of 5.5–6.5)
- Monitoring and a keen awareness of the weather conditions that are favorable to the development of disease
- Making use of disease prediction resources such as the green-cast.co.uk website
- Working towards the establishment of grass types with improved disease tolerance
- Using fungicides properly and at an early stage

## Fungicide use and spraying

Even with the best cultural practices in place, disease outbreaks can occur if the environment is favourable enough for long enough. Fungicide use should be considered as part of an integrated turf management plan rather than a fire-fighting approach. Using fungicide to control the inoculum, halt the development of the pathogen and protect the plant is good practice,



especially if there is a significant risk of damage.

You will know that there are a number of fungicides available and that they can have different active ingredients. In general terms, active ingredients are designed to either target the fungi with direct contact (to interrupt its development) or be situated within the plant itself to repel infection by the pathogen from within. Different active ingredients work in different ways, so it is important to select products that are appropriate for each situation. It is best practice to alternate treatments with different modes of action or use products with multiple active ingredients to prevent fungicide resistance occurring in the fungal population.

## Which active?

By way of example, fludioxonil belongs to the phenylpyrrole chemistry group. It is targeted for direct contact with the pathogen and has multi-site activity inhibiting the germination of spores, the creation of hyphae and mycelial growth. It acts in the soil, in the thatch and on the leaf and is best applied preventatively or as an early curative treatment.

Propiconazole is a member of the DMI-fungicides group, and has rapid systemic uptake through the leaf and crown of the plant. It acts on the pathogen from inside the plant, to stop disease development after penetration by interfering

ABOVE: Fusarium under the microscope

with sterol biosynthesis in fungal cell membranes. It is best applied preventatively and is shown to be particularly effective in cooler conditions.

Azoxystrobin is a strobilurin of the QOI group. It is systemic; entering the plant through the roots, crown and leaf, and prevents fungal growth by affecting its cells. This can be applied at any stage but is best applied preventatively.

Some fungicides contain a mix of active ingredients to achieve better control by targeting the pathogen at different growth stages, or in the thatch and soil as well as inside the plant.

## Conclusion

Microdochium patch can be an especially damaging disease if given free rein to grow and reproduce. It is important that we work hard to minimise the risk of attack with good management practice. Fungicide treatment is often necessary, and an appreciation of the disease life cycle and fungicides' mode of action will help achieve the best results.

However, the pathogen will never be completely eradicated, so we must remain vigilant and properly prepared. Our essential weapon against Microdochium patch is undoubtedly our knowledge and understanding, which we can use to create an advantage at least. Sometimes, it's better to know the devil.

## about the author



### Henry Bechelet

Henry has been working in the turf and amenity sector for over 20 years. After training to become an agricultural agronomist he joined STRI as a trainee agronomist in 1992. After a couple of years learning the ropes at STRI he went out on the road as Northern Technical Sales Representative for a fertiliser supplier for seven years. Henry rejoined STRI in 2000 as an agronomist and spent the next 12 years looking after his clients as well as building a reputation for thought provoking articles and as an entertaining speaker.