FACT FILE - AUTUMN 2012

Microdochium Patch

Microdochium Patch and Pink Snow Mould

Microdochium patch is the most common disease of cool-season turfgrasses grown in cool, wet climates. It is caused by the fungus *Microdochium nivale*. The same fungus causes the disease known as Pink Snow Mould and the symptoms of this disease appear after snow melt. Therefore, the two different symptoms developments are caused by the same fungus, but the different common names are used to describe the symptoms that develop following separate weather conditions. Before 1980, the fungus was known as *Fusarium nivale*, however, due partly to the lack of a specific characteristic of the conidia, the fungus was eventually reclassified as *Microdochium nivale*.

Disease Characteristics on Turf

Initial symptoms of Microdochium Patch appear as small, darkened, water-soaked areas of turf that enlarge and coalesce. As the disease progresses, the centre of the affected turf may become pale in colour but whilst active, the leading edge of the patch will remain darker and water-soaked. Under prolonged humidity, fungal mycelium can develop on the leaf tissues but this is not generally apparent. Under snow cover, the fungal mycelium develops on the dying leaves and the production of fungal spore masses gives the edge of the patch a distinct pink colour.
All cool season turfgrasses are susceptible to infection but the diseases are generally more active and severe on close-mown *Poa*-dominated, (particularly Poa annua var. reptans) or *Agrostis* turf and on *Lolium* swards.

Factors Affecting Fungal Development

Microdochium Patch generally develops under cool (0-6˚C), wet conditions and especially during leaf wetness periods of 10 hours per day for several days. It is most commonly seen in the spring and autumn months, but can develop year-round under the right environmental conditions. Fog, drizzle and heavy dew periods are conducive to disease development. Although the disease is common on slow-growing turf, plants that have received high levels of nitrogen may also be susceptible due to their succulent, weak growth. Pink Snow Mould symptoms occur under snow cover over unfrozen ground. Shade, low air movement and poor surface drainage will encourage development of these diseases by reducing plant growth rate and maintaining ideal conditions for fungal infection.

Turf with a high level of thatch can maintain the fungus saprophytically as well as promote the levels of moisture and humidity that are required for disease development. When the spores germinate or the mycelium begins to grow, the plants can become infected. Eventually the fungus in the infected plants will produce more spores and these spores will be moved by wind, water or equipment to spread the fungus (and potentially the disease) across the affected area. If temperatures increase above approximately 20˚C or the turf surface becomes dry, the fungus will become dormant.
Management of Microdochium Patch is focussed on reducing thatch, maintaining low soil pH, increasing surface drainage, increasing air movement, reducing shade and maintaining adequate, balanced, but not excessive nutrition. Fungicides are available to use as part of an integrated programme

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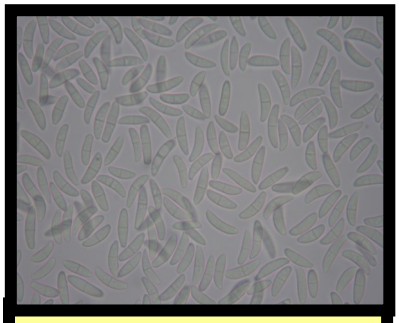
Factors Affecting Fungal Development—Temperature Range

Infection of the plant by *M. nivale* primarily occurs below 15°C with optimum infection between 0 – 6°C. Strains of *M. nivale* are able to grow from -6°C to 28°C, so it is a fallacy that exposure to snow and ice will kill the fungi. In addition, the low temperature activity range of M.nivale makes it extremely difficult to target from a turf bio-inoculation perspective because the applied antagonistic fungi would also need to be active at these low temperatures.



Conidia of M.nivale

Germinating spores of M.nivale

The main source of inoculum is considered to be mycelium in infected rootzones or plant debris (the fungus have good saprophytic ability). Wind-blown spores (conidia and/or ascospores) are considered to be the primary source of fungal dispersal. There has been a large amount of research that shows plant resistance to *M. nivale* attack depends on the ability of the plant genotype to acquire cold-induced resistance.
Cold-hardening strengthens the resistance mechanism that is expressed prior to cold hardening in relatively resistant cultivars/grasses.
Maximal snow mould resistance only develops in cold-hardened plants.

Development on the Plant

Once the fungus has infected the plant, disease development can progress rapidly, depending on the relative susceptibility of the grass type and cultivar. When (cereal) plants are inoculated with the mycelium of *M. nivale*, the fungus grows up from the soil, over the crowns and infects the outer leaf sheath and leaves. The spread of the pathogen proceeds by cell wall penetration followed by the development of hyphae forming nutrient-absorbing structures (haustoria) within the invaded, living epidermal host cells in leaves or endoderm and cortex in crowns.
The pathogen can also penetrate via stomata in leaves.
Following conidial inoculation of wheat, the conidia germinated, produced mycelial networks on the upper leaf surfaces and colonised the leaf within 72h. The host tissues showed degeneration that suggests the fungus produces cell wall degrading enzymes during infection and colonisation of the host.
Whilst the fungus is not causing disease, it survives as spores and mycelium in the thatch or rootzone.

Photograph taken in January 2011 showing fungicide treated green vs. untreated collar after emergence from extended snow cover.

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