

Effective time management

Turf diseases and their control is all about timing, writes Dr Terry Mabbett

It never ceases to amaze why professional sports turf is so prone to disease. Why a sward of prostrate plants with shallow fibrous root systems and green foliage mown and manicured to just millimetres in length is such a worthwhile target for so many fungal diseases appears at first sight to be a mystery.

The answer is deeply embedded

in professional turf's role and function as a sport playing surface, a sequence of events taking place and conditions experienced throughout the calendar year. Unlike swards of green plants grown in agriculture, fine turf grass plants are trampled on and acutely injured on a very regular basis by the blades of the mowing machine.

Like all green plants, turf grasses are least able to fight off fungal

pathogens and manifestations of disease when an 'open door' (cut ends of grass leaves and shoots) is presented for fungal infection against a background of general debilitation (stress) which means grass plants can't mount an effective fightback.

Replenishment management practice including nourishment with nutrients (fertilization) and water supplementation by irriga-

'A' was for anthracnose always appearing in autumn. Fusarium and fallen leaves often appear together although the roots of this disease would have invariably been put down during the previous summer of high traffic and drought



tion, aimed at the recuperation and regeneration of grass, can unwittingly trigger plant pathogenic fungi into action on the rapidly growing, lush and highly attractive turf grass plants.

These are clearly important reasons for the prevalence of fungal disease in turf but the primary underlying reason for sports turf's

proneness to disease is the ever-ready presence of fungal pathogens on the thatch. Thatch as the name implies is a layer of entwined dead and dying grass stems and leaves strategically placed in between the actively growing green grass plant and the soil surface.

Main components of professional sports turf are perennial grasses (persist from year to year). The few which are not (e.g. *Poa annua* – annual meadow grass) seed, germinate and regenerate so easily and quickly that there is essentially no seasonal gap in the sward as a whole.

Accumulation of dead and dying plant matter in such a long term perennial and persistent sward is unavoidable. What's more, thatch is an essential part of the sports playing surface as a cushion and is therefore encouraged up to a point of optimum depth and density. The fungi which live and feed as saprophytes or very weak parasites on the readily available supply nutrients contained in and released by thatch are also encouraged, albeit unavoidably.

Some of these fungi are highly versatile feeders able to 'step up to the plate' as full-blown aggressive parasites and pathogens, when the environmental conditions (e.g. temperature, humidity and surface wetness) are right and the state of turf-grass growth (e.g. soft and lush nitrogen-fed growth) is ripe for the taking.

Thatch is home to many different fungi but the two most damaging to professional sports turf, and specifically golf greens, are *Microdochium nivale* and *Colletotrichum graminicola*, the causal pathogens of, respectively, Fusarium Patch and Anthracnose.

Once upon a time no other disease could match Fusarium Patch on UK turf in occurrence or damage caused. Anthracnose was a purely autumn problem and essentially confined to *P. annua* as a basal stem rot disease.

Fusarium patch is still 'top dog' disease on UK turf. Meanwhile anthracnose has 'spread its wings' and is now seen in summer as foliar blight on a broader range of turf grass species, in addition to its traditional position as a basal rot of annual meadow grass in autumn.

Underpinning the position and status of both fungal pathogens as the most damaging diseases of UK turf is a permanent presence in thatch and a capacity to 'cash in' on favourable sets of environmental factors, including microclimate conditions inside the turf canopy

and largely created by the thatch component.

Facing up to Fusarium Patch

The status of Fusarium Patch as UK's number one disease of sports turf is unquestioned. Surveys show over 90% of all UK greenkeepers can expect to come face to face with Fusarium Patch in any one calendar year. Over 50 per cent of all professional football pitches record Fusarium at least on an occasional basis and even 20 per cent of local authority sports pitches where disease monitoring is less.

A similar picture unfolds on the disease control canvas with four fifths of all fungicide applications made to UK sports turf primarily targeted at Fusarium, although given the broad spectrum activity built into contemporary commercial product other diseases including Anthracnose, Dollar Spot and Red Thread are clearly controlled at the same time.

A whole raft of factors combine and contribute in sending quiescent populations of thatch dwelling *M. nivale* into turf disease causing mode and invariably with roots in a particular period of summer stress before the disease actually shows in earnest in autumn.

M. nivale is present in thatch year round in saprophytic feeding mode (dead decaying organic matter) or in a weakly parasitic mode. The fungus can spring into intense pathogenic activity over the widest range of temperature is (21 °F [-6 °C] and up to about 86 °F [30 °C]) which means greenkeepers can face Fusarium on turf at any time during the calendar year of a cool temperate climate like the UK.

Last but not least is its ability to infect right across the turf grass species spectrum (*Agrostis*, *Festuca*, *Poa* and *Lolium*) and a liking for fertile soils, especially where autumn fertilizer applications heavy on nitrogen give a burst of soft green growth after the summer drought. Simultaneously occurring cool temperatures, mists, dews and accompanying high humidity of during this autumn period are ideal for infection and disease spread.

Slow growing turf over deep thatch later in late autumn/winter provides the ideal substrate for *M. nivale* especially under cool wet conditions (32 to 46 °F [0 – 8°C]) and when turf grass is covered with snow, when Fusarium symptoms often display a characteristic pink coloured tinge.

Conditions that promote the spread of *M. nivale* include dew, drizzle, mist, fog, frost occurring



on previously dry and compacted summer stressed turf suddenly refreshed by autumn rains and flushed with fertiliser. Grass growth resumed in earnest but so did the anthracnose fungus having lain 'dormant' in the thatch during the dry summer months. That has changed, with a new and additional form of anthracnose disease (caused by the same fungal pathogen) now first appearing during the summer months as a foliar blight on a much wider range of turf grasses.

Anthracnose is now firmly established as the second most important disease of UK turf after Fusarium Patch. Contemporary Anthracnose is much heavier, presents problems over longer periods and on a much wider range of turf grasses. The measures needed to avoid, manage and control Anthracnose, including use of fungicide sprays, have been reassessed accordingly.

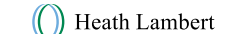
The foliar blight form of Anthracnose was widespread in North America long before it took off in the UK. Infection occurs, symptoms show and disease spreads during spells of high humidity with temperatures over 22°C, especially on turf struggling to grow over a dry root zone. Summer irrigation or watering to alleviate drought stress may aggravate the Anthracnose problem. Water unable to percolate through the dry compacted soil lays on the surface to soak the thatch and generate high humidity, the very conditions which set scene for anthracnose.

night after night with alternating daytime thawing and also snow cover. Poor drainage favours Fusarium Patch as does long uncut grass leaves becoming matted down to create a humid microclimate within the turf grass canopy.

When Fusarium patch strikes in autumn the greenkeeper may look back and see how the 'seeds' of disease were set in summer but that is of little consolation or use until the next time round. More than any other turf pathogen *M. nivale* and Fusarium Patch disease requires an integrated turf management programme that covers and caters for the entire calendar year.

'A' was for anthracnose and always in autumn

'A' was for anthracnose always appearing in autumn as a dark-coloured basal (crown) rot of *Poa annua* (annual meadow grass)



This article comes to you courtesy of the BIGGA L&D Fund.

TOP: The foliar blight form of anthracnose which can appear as early as July (Photograph courtesy Syngenta)

BELOW: Early development of Fusarium Patch from thatch (Photograph courtesy Syngenta)

BOTTOM RIGHT: Timing is the key to preventing infection with Fusarium Patch disease. Close up on symptoms of a well-established Fusarium infection shown here. (Photograph courtesy Vitax)

Affected patches of turf are yellow at first, then bronze with affected grass assuming a dull and darkened appearance. Annual meadow grass and creeping bent grass (*Agrostis stolonifera*) are the prime targets but smooth stalked meadow grass (*Poa pratensis*) and creeping red fescue (*Festuca rubra*) are also affected. This foliar blight stage creates inoculum (spores) for more infection as basal rot in the autumn.

Thatch residing diseases nipped in the bud

Dozens of different turf fungicides have come and gone including classic contact-protectant fungicides, which must be on the leaf before infection takes place, and systemically acting curative chemicals that can enter the grass plant to eradicate established infections.

These pathogens continue to place sports turf under considerable disease pressure but commercial fungicides are under equally considerable pressure from the regulation authorities and related to all aspects of use and environmental loading. These are versatile, fast-moving diseases with greenkeepers invariably waking up to find an unexpected existing infection. Established infections take a lot longer to control with more sprays and larger amounts of fungicide.

Insurance sprays of purely contact-protectant fungicides are all very well but turfgrass is frequently mown. Every time the grass is mown protectant fungicide on the clippings is lost leaving new unprotected growth with severed ends as prime points of entry and infection by pathogenic fungi.

In a completely new departure from traditional thought and practice in fungicide activity and application, Syngenta have introduced a new product called Medallion TL based on the fungicide fludioxonil. Fludioxonil not only targets spores of *M. nivale* and *C. graminicola* on green grass leaves but also in the thatch and soil. These disease problems are therefore nipped in the bud with spores destroyed before they have time to germinate and infect the living grass leaves.





A Fusarium Patch trial which shows a heavily diseased control plot which has not been treated with fungicide. This is surrounded by a large treated kept 'clean' by targeting the thatch with fungicide to prevent leaf infection
(Photograph courtesy Syngenta)

Tackle Anthracnose more effectively

Syngenta and Everris have published a Turf Science in Action guide: An integrated approach to Anthracnose control.

The booklet explains why we need a new approach to Anthracnose control, information on the key products to use to protect against infection and advice on when to apply treatment. It's also packed with details about combining fast-acting nutrition and fungicide applications plus results of STRI research into Anthracnose.

A copy of the guide can be downloaded from the GreenCast website, or email caroline.scott@syngenta.com to receive a copy.



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