

Fusarium

Microdochium nivale

Fusarium, more correctly now referred to as *Microdochium nivale*, is the pathogen for Fusarium patch, a fungus that attacks turf, particularly fine turf. Fusarium affects cold season grasses in the Northern hemisphere. Three common turf grass species grown in Britain are susceptible to Fusarium: Annual Meadow-grass, *Poa annua*, Perennial Rye-grass, *Lolium perenne* and Creeping Bent, *Agrostis stolonifera*. Although typical of many fungi the disease is particularly active in the autumn. Many golf and bowling greens are composed of a high proportion of Annual Meadow-grass enabling the Fusarium to spread uninterrupted. As the turf goes into the wintertime the surfaces are in a poor putting condition and improvement is likely to be slow. This has historically been one of the main concerns for green keepers.

Turf managers are often forced down a cultural route which inadvertently optimises the composition of Annual Meadow-grass within their greens. This has been brought about by a desire, by golfers, to see lush green surfaces that have been mown below heights that suit species less susceptible to disease, i.e. Common Bent, *Agrostis capillaris* or Red Fescue, *Festuca rubra*. This increases the ball speed but provides an ideal substrate for Annual Meadow-grass which often forms a large part of a seed bank because it is an ephemeral plant that has evolved as an opportunist to fill a broad range of niches. It reacts quickly to nutrients producing lush growth which is susceptible to Fusarium.

Identification

Fusarium starts in the autumn as small orange to red-brown circular spots 1-2 cm in diameter. If left unmanaged the patches increase in size and in the worst case situations the entire surface of a green can be affected. When the fungus is particularly active, the patches have a brown ring at the outer edge. The centre of the patches may become pale brown/yellow. White/pink mycelium may be observed on the outer edge of the patch matting the infected leaves together, this is often used as an indication of high activity. In the spring, fungal activity first starts at the edge of the Fusarium scars. If cool, wet weather conditions persist in the spring, new patches may occur. Because spores and fungal mycelia are spread by water, machinery and foot traffic, Fusarium can appear in streaks or even linear patterns as the fungus is carried by surface drainage, footprints or wheels.

Fusarium is naturally present in soil and thatch as spores and mycelium even during the summer although it is not active at temperatures exceeding 20°C or when there is insufficient moisture. Like most fungi it requires suitable conditions before it starts to germinate or spread and damage other grass plants. Mycelium spread into adjacent plants or spores are carried on the wind or in moisture. These conditions are generally met in the autumn although if summer temperatures become cool and sufficient moisture is available this can trigger Fusarium at any time.

Cultural Methods Of Control

Filling the niche that could potentially be occupied by Annual Meadow-grass is the most effective means of reducing Fusarium. Overseeding with species such as Bents or Fescue is commonly undertaken in the spring and autumn to break up the dominance of Annual Meadow-grass. Implementing fertiliser and aeration programmes that favour species such as Bents and Fescues is necessary in order to ensure they are favoured over Annual Meadow-grass.

Fusarium initially attacks the exterior cells of the grass plant; older plants growth contains more lignin and is less vulnerable to Fusarium, whereas young growth is more susceptible. This has implications for timing of fertiliser applications to minimise flushes of growth when the disease pressure is high. When approaching autumn it is advisable to use slow release forms of fertiliser. Use iron prudently to harden plant cells off and make them less susceptible to disease. Though care must be taken when applying iron in the form of iron sulphate, as swards that are dominated by Annual Meadow-grass tend to have received an abundance of fertilisers that contain a high proportion of ammonium sulphate. High levels of sulphur can lead to 'black layer'. Black layer is a deposit of metal sulphides caused by the activity of anaerobic bacteria. The anaerobic bacteria produce hydrogen sulphide which is highly toxic to turf.

Because Fusarium can survive within the thatch layer, it is good cultural practice to minimise this layer through aeration. Monitor thatch levels and aerate to achieve desired levels of oxygen within the sward. Air flow over the turf can also help reduce the incidence of disease. Drainage will help facilitate the flow of moisture away from the surface. Regular top-dressing can help dilute existing thatch levels however heavy applications of top dressing are to be avoided as this can engender stress which can lead to an outbreak of Fusarium.

Biological Methods Of Control

Biological fungicides have been shown to suppress diseases that can occur in turf such as Fusarium. Research has shown that biological controls can be effective in suppressing certain turfgrass diseases when used on a preventive basis, but they have not been shown to effectively control turf diseases on a curative basis or when conditions are conducive to severe disease development.

Chemical Methods Of Control

Professional Fungicides

A large array of fungicides has historically been used although this armoury has been reduced in recent years as products have been taken off the marketplace. There has also been an increase in disease resistance due to the over reliance upon specific groups of fungicides. Therefore it is useful to adopt a strategic approach when utilising fungicides to derive the best use for what is a relatively expensive resource.

Consider utilising good cultural practice to minimise reliance upon herbicides, the code of practice states that you should 'ask yourself whether you need to use a pesticide or whether there is another method of control or combination of methods you could use.' Appropriate use of the correct fungicide at the most effective time will minimise the potential damage done by Fusarium. Fungicides target Fusarium at different stages and use different modes of action.

Preventative

Preventative fungicides are particularly effective at inhibiting Fusarium before it becomes firmly entrenched. Where a history of disease exists and the potential for disease is high preventative fungicides can be used to prevent Fusarium becoming a problem. This can reduce the overall use of fungicides by tackling the disease when relatively low populations exist. These operate within the plant using various different modes of action.

Curative

A curative fungicide is a fungicide that whose specific mode of action makes it particularly effective at arresting the progress of the disease quickly. Fungicides applied when the first symptoms of disease are evident have been shown to be more effective in disease control than allowing the disease to become established. Treating effectively with an appropriate fungicide will reduce the potential for future outbreaks and limit the need for further applications. Curative fungicides would include:

Preventative And Curative: Some fungicides provide a blend of active ingredients and therefore can be viewed as both a preventative and a curative.

Domestic Fungicides: Lawn Disease Control is a fungicide that can be used for the control of fungal disease within a domestic setting. The active ingredient within Lawn Disease Control is Trifloxystrobin a systemic fungicide. It can be used for the control of Red Thread and Fusarium. As a systemic fungicide it provides protection to the plant in advance of an infestation and be applied to help prevent the disease or as soon as symptoms appear.