

# TECHNICAL Issues

## A patch of discoloured turf or a patch disease?

Dr Kate Entwistle highlights some the difficulties involved in diagnosing problems

Several times a week I receive telephone calls from both Course Managers and agronomists, describing turf symptoms to me and asking if I can suggest the likely disease that is affecting their sward. Which disease do I think is present and which fungicide should be applied to control it? Although I am more than happy to discuss the symptoms, their development over time and the conditions of the sward in general which may have contributed to the current problem, suggesting the name of a likely disease on that basis is something that I would never recommend that anyone ever does. A complete and accurate diagnosis of a turf problem can only ever be provided once a sample of the turf has been looked at in the laboratory. However, these situations do highlight some extremely important concerns over problem diagnoses that need to be seriously considered.

A complete and accurate description of the problem is an essential first step to its correct identification. However, if you ask several people with experience in the turf industry, to describe the same turf problem, I can guarantee that they will all provide significantly different descriptions. They will use different words to describe what they see and certain characteristics of the turf problem will come across as more important to some than to others. Confusion arises when this information is passed to someone else (like myself) for their opinion on the cause, because the words used to describe the problem will automatically rule out or may even suggest certain potential candidates. As an example, I was recently asked to comment on a 'turf disease' problem that was present across an entire field. The symptoms were described to me as large patches which themselves were not increasing in size, but which had "appeared" and remained at a given size for several weeks. To me, a large patch implies something approaching 0.5 m diameter, fairly regular and circular in outline with the entire sward inside that circular boundary affected in a similar way.

As I found out on visiting the site, what the client meant by a large patch, was completely different. They meant that large parts of the field (patches) were affected but within these parts, the turf was showing signs of localised discoloration, sometimes only individual plants were affected. Of course the 'patch' was not increasing in size because, in actual fact, there was no patch. The area of the field affected remained the same regardless of the number of localised infections present.

All professions have their jargon and turf pathology is unfortunately no exception. In the study of turf disease we use a variety of words to describe the symptoms of the disease as well the fungi that cause them. Many of these words have common everyday meanings which may well seem perfectly reasonable to use, but which may have little to do with the 'pathologists meaning'. The utterance of a single word can send a pathologist running excitedly down a diagnostic path that you may well have not intended them to head!

Sometimes, even seeing symptoms first hand can draw you to an incorrect diagnosis of the problem, if the general symptoms alone are used for the identification. I recently saw an area of *Poa annua* in which the plants

themselves were upright (turgid) and showed no visible signs of foliar rotting but the leaf tissues were fantastic shades of yellow, orange and red. Instantly, you may consider anthracnose basal rot – the above ground symptoms were so obvious. However, on removing a few plants from the area, I failed to find any which showed the blackened crown tissue that is characteristic of this fungal disease. It was only on examination with a microscope that I convinced myself that these symptoms were not related to disease but were actually caused by severe droughting.



It doesn't matter how many times you may have seen a particular problem before, it is always possible to confuse the symptoms with something that could well be totally unrelated. Simply by altering the height of cut, the symptoms of some turf diseases can be dramatically changed and some of the 'characteristics' you generally use to diagnose a problem, may not be present or not quite so obvious.

In my opinion, anyone who believes that they can correctly diagnose all turf problems by merely looking at the above ground symptoms, are not only fooling themselves but perhaps more importantly, run a very real risk of making a diagnostic mistake which the turf manager will ultimately have to deal with. This raises another concern. If a problem is described and/or diagnosed incorrectly, it can only be by chance that the correct course of action is advised. If that advice includes pesticide application, you may be applying a product illegally, you may have wasted your time and money on something that was not needed in the first place or you may even have encouraged a disease by the application of an inappropriate product.

The majority of the 'incorrectly described' and misdiagnosed turf problems come in the form of 'patch disease'. Over the past 12 years I have seen hundreds of turf samples from areas that have been described as having a patch disease problem, only to find out through analysis that no fungus was involved in the problem at all. There are a whole range of turf problems that can express themselves as patches and serious fungal disease problems are definitely in the minority.

How well can you identify the grasses in your sward? It is not as always as easy as you think. You may be fairly certain of your ability but it is very easy to misidentify plant species in close-mown turf and misidentification can send you on a definite wild goose chase when trying to identify any problem. In one

recent case, a turf manager called me up and said that fusarium patch had developed rapidly on three of his greens, almost overnight and he was concerned that the problem was going to spread to the other greens. Before applying a fungicide, he asked if he could send samples of turf to me to confirm the disease and to ensure that there was no other disease problem present. On receipt of the samples, I could see that the sward contained *Poa annua* and that the majority of the sward on each of the samples was uniformly dark brown with little deformity to the leaf tissues. On turf affected with fusarium patch, you are likely to see a deterioration of the sward with the leaf tissues becoming rotten and matted towards the centre of the affected area. Generally speaking, you would see a dark brown border of active disease development surrounding bleached and dying plants. In the early stages of infection, the plants are indeed dark brown and catching the disease at this stage would lessen the chance of scars developing in the sward. But experience told me that this damage didn't look right for disease. Analysis using the microscope confirmed that the dark brown plants in the sward were in fact pearlwort, a weed that grows in discrete patches and that can tolerate close mowing but which had discoloured due to the adverse weather conditions. By looking down on the sward from a height, the *Poa annua* and the pearlwort can be difficult to differentiate but under close examination their differences are quite apparent.

By far, the most common 'patch disease' problem that I see comes from greens that have a problem with surface or rootzone drainage. Large patches of the sward, up to 0.5 m across, can discolour very quickly if the roots are trying to grow through a waterlogged rootzone. Even pure sand rootzones can have problems with water movement and symptoms of waterlogging can be seen equally on these as on soil-based greens. Patches tend to develop on the surface of these affected areas for one of two reasons. If the sward is of variable composition, any patches of *Poa annua* will show signs of stress more readily than the other grasses present in the sward. Alternatively, the green may have localised low areas or areas of compaction which tend to hold water longer than others and it is these that may be showing the symptoms. Either way, analysis of the rootzone will show a characteristic symptoms on the roots and in the most extreme of cases, a sulphurous or sickly smell that indicates that the rootzone conditions are anaerobic. Further analysis of the plant material can confirm whether or not and fungal disease is developing on the turf in these adverse growing conditions although generally, if any fungus is present, it will be colonising the stressed turf as a saprophyte rather than as a parasite.

Other misidentified patch disease problems include the frequently observed patches of bleached or banded leaf tissues that occur during late spring/early summer. Again, it is often patches of *Poa annua* that show up most clearly as being affected by this bleaching of the leaf tissues. Extensive analysis of plants in samples received with these bleached tissues has failed to show any associated fungal pathogen, either on the leaf tissues themselves or colonising the root and crown tissues. In all cases of this problem that I have seen, samples of affected turf will green-up on their own if they are placed inside a laboratory for a few days. On the course, the plants will eventually green-up and generally the bleached symptoms only last for a week or so. Many possible causes have been proposed for these symptoms, including virus damage (which has never been substantiated), but it is most likely that this is a physiological effect caused by the difference between day and night temperatures (possibly in association with available nutrients) on the chlorophyll production within the leaf itself.

So, if a patch of discoloured turf appears on the sward, how do you tell if it is fungal disease? Firstly, identify the grasses in the affected and adjacent unaffected areas. If, for example, you have patches of *Poa annua* in an otherwise bentgrass sward, could the prevailing environmental conditions have caused a specific change in the leaf colour of the *Poa annua* and made it more apparent? Patches of *Poa annua* (or Pearlwort) in a sward may well change colour rapidly with changes in temperature, moisture and nutrient availability. If you have a uniform sward and discoloured patches appear in it, there is, generally speaking, more of a chance that the symptoms have been caused by fungal disease – but not always! Check that the rootzone freely draining. Any small, localised areas that tend to hold water can cause dramatic changes to the sward over a relatively short period of time. The best way to



**Selected grass clones were killed by flood stress when an early spring heat wave warmed a water-logged soil**

check this is by smell. Take a hole-cutter core sample out of the affected area, open it up and smell it. If it makes you throw your head back violently (and you suddenly don't fancy your lunch), maybe there is a slight drainage problem. Grass roots need to breathe and if the rootzone is holding too much water they can't and the plants will show you that they can't. Bleached leaf tissues can be caused by fungal disease, for example red thread and fusarium patch (established infection) but it is probably fair to say that if the affected leaf looks healthy apart from it being white, there is a good chance that the problem has a physiological rather than fungal cause. Fungi will cause bleaching of the tissues once they have removed the nutrients from them and they will often leave the leaf tissue dry and desiccated or water-soaked and rotting. Alternating heat and cold will affect the ability of the plant to produce chlorophyll (the green pigment in leaves) and so, if

'banding' or uniform 'bleaching' occurs, check the recent weather conditions for a likely cause. If the leaf tissue is discoloured on the upper surface but the lower surface remains green, the problem is almost certainly physiological. With all so-called physiological problems, it is possible to have related fungal disease. One of the most obvious is development of fusarium patch disease on a sward that is suffering stress due to a waterlogged rootzone. Patch disease can therefore develop over local physiological problems. It is always worth getting a sample checked if you are in any doubt at all. Everyone, no matter what their experience or background, can be fooled in to making a wrong diagnosis if they go by the foliar symptoms alone.

Some patches that develop on the greens, tees and fairways will be caused by fungi. Many fungal diseases will occur, for example, in one place on a green and spread across the entire surface, or the initial outbreaks will remain fairly unchanged but increase in number over time. Presently in the UK, we are unlikely to see some of the severely disfiguring and rapidly-damaging turf diseases that are a constant worry for turf managers in warmer climates, but it is possible for some of these to show up here as our climate changes. Since new fungal diseases are continuously being identified in the areas of horticulture and agriculture, it is naive to assume that the range of disease problems we encounter in turf will always remain constant. New fungal diseases will develop and the actual cause for some problems that we are presently aware of, will be formally identified. Insects and other invertebrates can also cause patch damage to turf, with some causing a discrete, distinct and very regular yellowing of the turf that you would swear was caused by a fungus. If a patch develops on the sward, don't automatically assume a fungal cause, consider the potential options before you decide on any course of action and if you want to know for sure, get a sample analysed – you may be surprised what we find.