

John Hughes offers Course Managers and Greenkeepers a reminder of Take-all, which is particularly relevant to staff involved in newly constructed courses or with newer greens

Winner takes all?

The use of bentgrass within new greens has been common for years. Various percentages of bents have been sown in conjunction with fescue and over recent years, some new greens have been sown with pure bent. New varieties have also become available, offering greater shoot density and greater tolerance of close mowing.

The main concern of using bentgrasses, is over their susceptibility to Take-all Patch - a disease that attacks velvet bent, creeping bent and colonial bent varieties. If unchecked the disease will spread, carried physically from one green to another by foot or machinery.

This overview sets out what to look for to spot the disease and tips on preventative and curative measures, should you be unlucky enough to be struck by this disease.



A survivor

“Take-all patch (*Gaeumannomyces graminis*) - or *Ophiobolus* patch as it used to be known - can survive as a saphrophyte in thatch and also survives as dormant mycelium in the plant. It is most serious in newly established turf and does its worst damage generally in new greens. The disease attacks velvet bent, creeping bent and colonial bent. Over many years, traditionally greens have been sown with fescue bent combinations. The fescues are resistant to the disease, the bent component however remains susceptible even in this situation.

Creeping bent does offer many advantages over fescue bent combinations, particularly in its ability to provide dense uniform swards in a relatively short period. However, it is recognised that the maintenance of creeping bent is more specialised, requiring careful management, and that creeping bentgrass, *Agrostis stolonifera* (var *palustris*) is the most susceptible to the disease.

Creeping bent is predominantly used in new greens as a monoculture and should Take-all occur, it will spread quite rapidly. Sadly, the choice of variety of bent has little bearing

on the resistance to the disease, in fact, very dense varieties may exhibit even greater scarring.

Furthermore, the pros of pure bent have to be weighed-up alongside the cons of the high degrees of maintenance associated with some varieties. For instance, some bent varieties are actually very difficult to maintain as they build up such a dense coverage. This in turn leads to difficulty in managing fertiliser applications and to increased aeration programmes - which combine to mean extra funding from the outset of a construction project. These factors should be taken into consideration, as they will have an effect on the future budgetary requirements of the course.

Symptoms to watch for

Take-all first appears as circular patches of slightly depressed grass with a straw to bronze colouration in appearance. These areas will begin as just a few inches in diameter and gradually increase, stretching to often several feet in diameter, with patches joining together to form large, irregular areas.

Often as the disease spreads, the middle of the patches ‘fill in’ with resistant species, with areas of surviving



fescue becoming apparent in fescue bent greens. The roots of the affected grasses will actually become rotted.

Plants which play host to Take-all patch extend to some 40 species of grass, although not all of these hosts exhibit the symptoms associated with the disease.

Life cycle

Initial Take-all infection occurs when the mycelium penetrates the root crown or culm of the turfgrass. The pathogen then spreads by outward movement from plant to plant, spreading over roots, rhizomes and other tissues. In fact, infected material can be carried on machinery or by foot, potentially spreading the disease across all aspects of the course.

Over-wintering or survival in adverse conditions is accomplished by saprophytic infection of the debris of previous seasons plant material. The mycelium can also remain inactive within infected plants until conditions are ripe for a new phase of activity.

The most aggressive phase of the Take-all life cycle is typically seen in cool, wet weather conditions when the plant is actively growing.

Strategies to avoid Take-all

Take-all Patch can therefore survive as a saprophyte in thatch and as dormant mycelium in the plant. As already highlighted, it is more common in newly established turf commonly used on newly constructed areas of courses, normally peaking in three to five years, then declining due to antagonistic microorganisms.

High pH is a significant factor in the development of Take-all so, not only should the pH values of the root-zone and irrigation water be investigated to avoid high pH levels, but you should also look to use acidifying fertilisers. However, it is very important to monitor the greens for any indication of black layer over time.

Aeration plays a vital role in encouraging microbial activity, which is essential to the overall health of the green, as well as encouraging a natural system within the root zone for the recycling and utilisation of elements such as carbon, nitrogen and sulphur.

Gould (1973) observed Take-all patch was far more prevalent on greens which had been subjected to fumigation where soil organisms had been killed. As the turf matured,

Take-all patch occurred with much less frequency. This again points to the need for a good antagonistic microbial population - regular aeration and grooming of the sward are vital for healthy development.

The inclusion of a percentage of fescue in initial sowing mixtures has shown to be of value. Even if the fescue does not persist, it does provide an initial barrier within what would otherwise be a monoculture. Overseeding with fescue - ideally a slender creeping red fescue - will at least fill-in the scars caused by Take-all.

If Take-all does occur, there are cultural practices available to rectify the situation over time - consult your seed supplier or agronomist for guidance and information. If conditions are conducive to the disease, then any bent in the greens will be attacked. Remember: the disease can be carried physically by machinery or on foot from one green to another, so be diligent in preventing this immediately, should you identify Take-all on your greens. There are chemical treatments available for Take-all, but these are not currently licensed for use in the UK - this situation will change however, as fungicides become available to combat the disease.

Conclusions

Good cultural practices will always be necessary in any situation where Take-all occurs. Avoidance is by far the best strategy, so focus on monitoring pH levels, good aeration of the soil and grooming of the sward. Build quality and monitoring of materials is essential. A high quality course maintenance programme is the best policy - quick fixes often have a habit of causing problems at a later stage.

One note of consolation is that as the build-up of antagonistic microorganisms occurs, so the disease will fade. Even in sand greens bacteria and fungi have an uncanny habit of colonising and forming relatively stable populations.

The relationship between microorganisms and the balance that they create is complex and takes time to reach stability. The interaction between Take-all patch and its soil antagonists is an example of complexity leading to stability (Smith et al, 1989). Time is therefore a great healer, and being antagonistic is often not such a bad idea after all."

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