

Soil-Borne Turfgrass Diseases

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Introduction

Soil-borne turfgrass diseases affect all warm-season grasses and cause major losses of turf quality. They are caused primarily by fungi and there are few examples of true disease resistance in turfgrass. All turf applications are affected, from home lawns to golf greens, although the incidence and severity of disease is usually higher in highly managed applications. Examples include golfing and bowling greens where the turf is cut low and frequently. Both incidence and disease severity are influenced by plant health, site factors like shading and sometimes directly by mowing height. At times environmental factors like shading, water logging or heat stress can cause severe turf injury and stress and are misdiagnosed as diseases.

Commonly used warm-season turfgrass species are *Axonopus compressus* and *A. fissifolius* (broad and narrow leaf carpetgrass respectively), *Cynodon dactylon* and *C. dactylon* x *C. transvaalensis* (green and hybrid green couches respectively), *Dactyloctenium australe* (sweet smothergrass), *Digitaria didactyla* (blue couch), *Paspalum vaginatum* (seashore paspalum), *Pennisetum clandestinum* (kikuyu), *Stenotaphrum secundatum* (St. Augustinegrass) and *Zoysia* spp. (Zoysiagrass).

Major Root and Crown Diseases

Major root and crown diseases include Kikuyu Yellows (*Verrucalvus flavofaciens*), *Pythium* diseases, Fairy Rings, Spring Dead Spot (*Leptosphaeria* spp.), *Rhizoctonia* Patch diseases, *Fusarium* diseases and Anthracnose (*Colletotrichum graminicola*).

Spring Dead Spot and Anthracnose are not strictly soil borne diseases, their spores survive in plant material and, anthracnose particularly, can also be a foliar disease and disseminated aerially. They do however cause severe root, stolon and crown rots and large patch deaths. They have been included in this summary for that reason. The causal agents of Kikuyu Yellows, *Pythium*, *Fusarium* and *Rhizoctonia* diseases can survive in the soil itself and are considered soil-borne diseases.

Kikuyu Yellows

Kikuyu yellows is caused by the oomycete *Verrucalvus flavofaciens* and is the primary disease of turf and pasture types of kikuyu. The causal agent infects the root system and causes severe root rot and root and plant death. As an oomycete the pathogen thrives in the presence of high soil moisture. Disease symptoms are consistent and are expressed as a yellowing which becomes circular as the affected area expands. The centre of the circle dies and as kikuyu does not regrow in the centre, the patch is colonised by other grasses and broadleaf weed species. This can create an uneven, non-uniform surface. The disease usually appears in spring, progressing through summer and autumn. It is often more noticeable in dry weather. While there are no chemical controls for the disease, it can be masked to a degree by nitrogen fertiliser application.



Kikuyu yellows, a patch disease of *Pennisetum clandestinum* (kikuyu) caused by a fungus *Verrucalvus flavofaciens*.

Pythium Diseases

Pythium is another oomycete, or water mould, and is favoured by high soil moisture. A number of *Pythium* species cause turf diseases.

Damping Off

This is usually a seedling disease, but can be seen on adult turf. Affected seedlings are water soaked, stunted, become wilted and withered and die. The disease is promoted by warm, humid conditions in conjunction with wet soil.

Root and Crown Rot

The roots and crowns are affected. Root and crown rot can be a problem where excessive moisture is kept in the soil profile due to inadequate drainage.

***Pythium* Blight**

This is a leaf infection that creates water-soaked looking patches—leaves in the patch may 'stick' together and white mycelium (fungal strands) may be seen in the morning or in periods of high humidity. The infection and destruction process can be very fast (such as overnight).

Fairy Rings

Fairy Rings are caused by numerous fungal species; a common few are *Lycoperdon* spp., *Marasmius* spp. and *Tricholoma* spp. Symptoms take three forms: no symptoms on turf but the presence of mushrooms, greening of the turf and turf death. All symptoms are in rings that enlarge from year to year. Rings can coalesce and form larger rings, scalloped rings or arcs.

Leptosphaeria Spring Dead Spot

There are two species of *Leptosphaeria* that cause spring dead spot, but in Australia *Leptosphaeria narmari* is the predominant species. Green couch, St Augustinegrass,

Broad Leaf Carpetgrass and Kikuyu are known to be affected. The roots and rhizomes become discoloured and rotten and sunken. On the grass sward, circular patches may be noted in autumn and through winter and spring, or only in spring as turf moves out of winter dormancy. The incidence of the disease may be elevated by high nitrogen application.

Rhizoctonia Patch Diseases

The diseases most commonly known as “brown patch” and “large patch” are caused by a range of fungi in the *Rhizoctonia* group including *R. solani*. The diseases have been documented in most warm-season grass genera and are prevalent in warm, humid conditions in spring through to autumn. Incidence may also be elevated by high nitrogen applications. Patches of turf usually become light green in colour, then yellow, before degenerating into a brown discoloured area. Individual plants may have a dark purplish border and rot at the base of the leaf sheaths and/or stems.

Fusarium Diseases

Winter Fusarium is caused by the fungus *Microdochium nivale*. It was identified for many years as a *Fusarium* species, hence the usage of the name *Fusarium*. It is primarily a cool season and winter disease, and a pathogen of cool season turf, however it has been recorded on warm-season grasses. It is often characterised by an orange/brown colour in the patch and patch borders.

Anthracnose

Included in this summary because of its ability to cause severe crown rot, anthracnose, caused by *Colletotrichum graminicola*, is prevalent in cool, wet conditions and is primarily a disease of cool season grasses. Whilst it can cause severe damage to turf, it is considered a weak pathogen, found where the grass is under pressure from another (usually environmental) factor.

Control

Cultural control for most of these diseases is all about ensuring soil moisture is adequate but not high or excessive. In some soils drainage needs to be improved, while for others, where good drainage is inherent, good irrigation management practices are need to be employed.

Many diseases are also facilitated by high rates of applied nitrogen, often because nitrogen facilitates fast growth rates, producing plentiful amounts of young, easily infected tissue. Where it is possible, fertilise more frequently with less fertiliser to promote steady growth rates.

There is a range of chemicals registered for the control of diseases in turf, some being registered for use against several diseases. Local chemical re-sellers can provide up-to-date information on current chemical registrations and chemical recommendations.