



Plant Disease Update

Pythium spp. (Pythium diseases)

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Pythium diseases are typically one of the most destructive and costly turfgrass problems in intensively managed fine turf situations. Management of the causal agent of these diseases is usually a combination of a number of considerations and actions. This article will endeavour to assist the turf manager with a deeper understanding of this group of organisms and how best to protect turfgrass.



Fungal Facts

- *Pythium* spp. are known to be water born organisms. The spores are highly motile in water (including soil water) and can spread rapidly in favourable conditions.
- Readily infects a wide range of cool and warm season grass species during prolonged wet or humid conditions and can be active in cool conditions as well as warm to hot temperatures, especially when nighttime temperatures are above average.
- The Pythium pseudo fungus produces enzymes that break down the cell wall of the host plant allowing it to penetrate the plant tissue.
- It can enter the host plant through openings such as wounds from physical and mechanical injury such as damage from machinery, plant parasitic nematodes, insects or through open stomata during humid conditions.

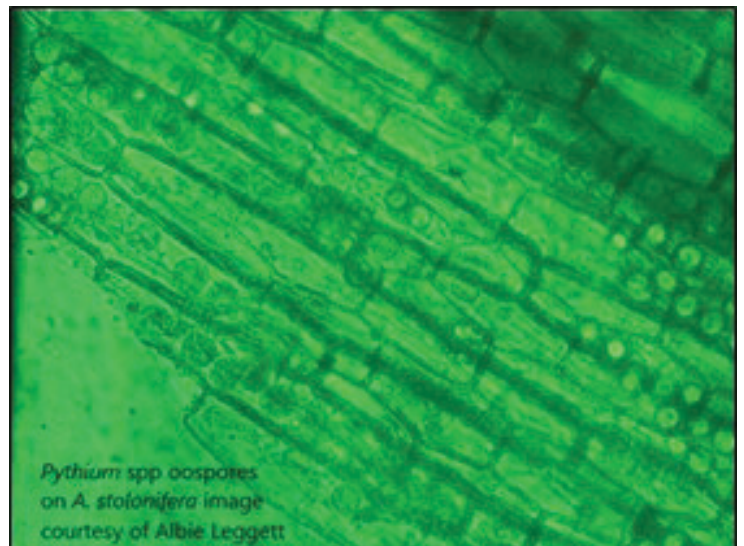
- There are four main diseases caused by *Pythium* spp. in turfgrasses. Damping off of seedlings, Leaf Blight, Crown and root rot, and Root dysfunction.

Damping off

Almost exclusively infects germinating seeds and young seedlings, particularly the Cool season grasses. Onset of this disease can be very rapid due to an increased level of soil moisture during the germination and early establishment phase. The infection begins in the moist seed and young roots and spreads to the base of the crown. The ability of the seedling to absorb water and nutrients will then be completely disrupted resulting in death of the seedlings. This is often a problem when seed is buried too deep in the soil or does not have sufficient seed to soil contact.

Leaf Blight

Pythium leaf blight infects many grass species when conditions are favourable. Daytime temperatures between 25 and 35°Celsius with nighttime temperatures above 20°Celsius with high humidity. It will usually grow up the plant stem from the soil during periods of high humidity or leaf wetness and if undisturbed, can produce a fluffy white mycelium drawing moisture in from the humid air and from the wet surface of the plant. This organism can easily be spread over the entire area where it will infect turf rapidly during favourable conditions.





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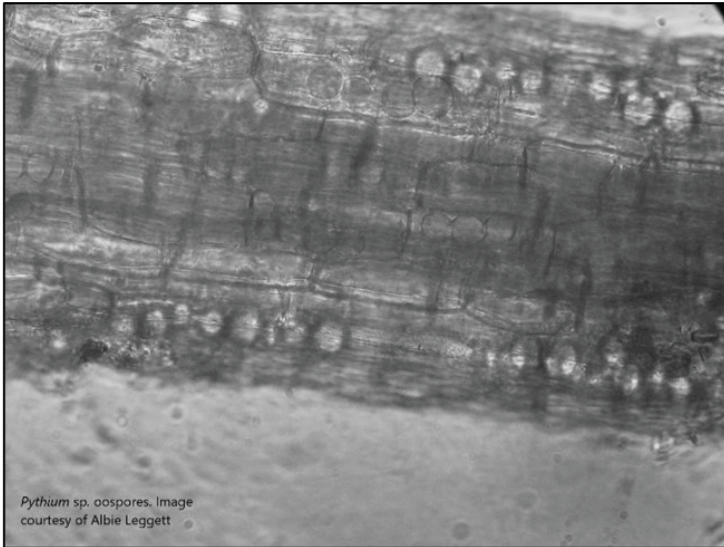
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Root Rot

Pythium root rot affects the roots of many cool and warm season turfgrass species. This Pythium disease can occur in cool or warm conditions with temperatures between 10°Celsius and greater than 30°Celsius in the presence of excessive moisture.

Unlike Pythium leaf blight, it does not produce masses of mycelium but will infect the root and lower crown area. In cool moist conditions, this disease can infect the plant roots whilst producing little if any initial symptoms other than brown and rotten roots and a general thinning of the sward.

As the temperature gets hotter, and the plant requires more water, the brown and rotten roots are unable to supply the upper parts of the turfgrass plant and as such, death of infected plants will occur.



Root Dysfunction

Pythium root dysfunction is the term used to describe the abnormality of the root caused by the invading Pythium organism. This can sometimes present itself as swollen (hypoplastic) root tips and a reduction in fine healthy root hairs. Essentially, this disease distorts healthy growth and function of infected roots.

This disease can easily go undetected as it often infects in cooler conditions, particularly in late autumn and early spring when there is very little demand for water by the plant. It will occur at a temperature range of 10°Celsius and greater than 30°Celsius similarly to the root rotting disease. It is often not until the plant requires more water due to warmer temperatures and active growth that it will exhibit symptoms. However, roots suffering from dysfunction are usually healthy and white looking, unlike the root rotting disease.

Cultural Management - Pythium Diseases

Cultural management practices are a very important part of the managing Pythium diseases. Cultural practices should always be aimed at improving plant health and creating a less favourable environment for the pathogen.

- Minimise water on leaf and crown - Propel wetting agent at 10L/ha monthly to minimise dew formation during times that favour disease. Particularly the leaf blight disease.
- Maintain a good air and water balance in the soil pore spaces and encourage excess water to move down through the capillary tube.
- Consider reducing the use of "holding and multi-functional" wetting agents.
- Be careful to not clog up pore spaces with excessive organic material. Be very selective with the type of product applications being placed in the soil environment.
- Reduce and manage the thatch layer during the growing season.
- Minimise traffic and machinery over infected areas.
- Soil applications of Popul8 to help improve favourable soil microbiology.
- Applications of PK-Fight at 10L/ha as a phosphite.
- Maintain a balanced nutritional approach guided by soil testing (talk to your local Turfcare Australia representative).





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Chemical Management - Pythium Diseases

Preventative chemical management is required in combination with Cultural practices (as above) in order to provide long term management of these turfgrass diseases.




See the table of Fungicides with a label registration for Pythium diseases - *Pythium* spp.

Figure 1: Table of Fungicides with a label registration for Pythium Diseases - *Pythium* spp.

Product Name	Active Ingredient	Label Rate per ha	FRAC Code	Manufacturer
Compass	Fluazinam	1 - 1.5L/ha	29	Adama
Magellan 800WG	Fosetyl Al	9 - 12.5kg/ha	33	Adama
Triumph	Metalaxyl-M	1.7 - 3.5L/ha	4	Adama
Proplant	Propamocarb	4.5 - 6.5L/ha	28	Campbell's Chemicals
Emerald	Fluazinam	1 - 1.5L/ha	29	Campbell's Chemicals
Flowable TMTD	Thiram	16L/ha	M3	Campbell's Chemicals
Banol	Propamocarb	4.5 - 6.5L/ha	28	Envu
Signature Xtra	Fosetyl Al	5.5 - 16.5kg/ha	33	Envu
Rapidol	Mandestrobin	4L/ha	11	Sumitomo
Headway Maxx	Azoxystrobin / Propiconazole	9L/ha	3/11	Syngenta
Heritage Maxx	Azoxystrobin	6L/ha	11	Syngenta
Subdue Maxx	Metalaxyl-M	1.7 - 3.5L/ha	4	Syngenta
Azoxy 250	Azoxystrobin	2.3L/ha	11	Turf Culture
Azoxy 95	Azoxystrobin	6L/ha	11	Turf Culture
Nobility	Fosetyl Al	12.5kg/ha	33	Turf Culture
Impala	Azoxystrobin / Triticonazole	6L/ha	3/11	Turf Culture
Mayfair	Metalaxyl-M	1.7 - 3.5L/ha	4	Turf Culture



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